The cover design was created by Marquita Peterson in celebration of NMSU's Centennial Year. She was commissioned by the Centennial Committee to illustrate the six Trist buildings which remain on campus.

Marquita is a native New Mexican who has studied art in Texas, Oregon, and Idaho. Her works are in private and corporate collections throughout the country. She teaches art in Las Cruces, New Mexico, where she makes her home.
BUILDING THE FUTURE

A History of Engineering at NMSU

1888 - 1988

by

Linda Blazer
To Dr. Ford
who has been "building the future" of the College of Engineering since 1959.
CONTENTS

Acknowledgments ........................................... vii
Foreword .................................................. ix

PART I. A HISTORY OF ENGINEERING AT NMSU: 1888–1988
by Linda Blazer

Engineering Through The Years ....................... 1

1. The Early Years, 1888–1913
   Laying the Foundation .................................. 3
   New Mexico’s Land-Grant Institution ................. 3
   Courses of Study ........................................ 4
   Buildings ................................................ 7
   Equipment .............................................. 9
   Faculty and Students ................................... 9

2. The Goddard Years, 1914–1929
   Important Beginnings ................................. 13
   War Years ............................................... 14
   Reaching Out ......................................... 16
   A Chapter Closes ...................................... 18

3. The Leadership Of Milton And Jett, 1930 – 1946
   A New Focus on Image .................................. 21
   Accreditation and Beyond ............................. 23
   Military Effort on Campus ............................ 24

4. The Thomas Years, 1947–1961
   Setting the Stage .................................... 27
   The Development of Curricula and Programs .......... 27
   Research and Extension ............................... 28
   Staffing ............................................... 28
   Student Enrollment ................................... 29
   Buildings and Equipment ............................. 30
   Honorary Fraternities and Professional Societies .... 31

   Curricula and Programs ............................... 33
   Faculty and Administration .......................... 34
   Enrollment ............................................ 35
   Facilities ............................................. 36
   Women in Engineering ................................ 36
   On The Lighter Side .................................. 37
6. Beginning A Second Century Of Excellence
   The First 100 Years in Perspective .................................. 41
   Looking Toward the Future ............................................ 43
   Engineering Deans, 1914–Present ................................... 45

Departments of The College of Engineering .................. 47

7. Agricultural Engineering ................................................ 49

8. Chemical Engineering .................................................... 53

9. Civil, Agricultural, And Geological Engineering ............ 57

10. Electrical And Computer Engineering ......................... 61

11. Engineering Technology ............................................... 67

12. Industrial Engineering .................................................. 71

13. Mechanical Engineering ............................................... 75

Support Units ............................................................... 79

14. Cooperative Education .................................................. 81

15. Engineering Research Center ......................................... 85

Notes ......................................................................... 89

PART II. ALUMNI HONORS AND FACULTY HISTORY
Compiled by Barbara Powell

Centennial Year 100 Outstanding Alumni ............................ 93
   edited version of Charlotte Beene's New Mexico State University
   College of Engineering Outstanding Alumni.

Engineering Administrators: 1914 – Present ....................... 107

Engineering Faculty: 1891 – Present ................................. 108

Bromilow Awards ............................................................. 119
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Linda Blazer
Barbara Powell
ENGINEERING CENTENNIAL HISTORY COMMITTEE

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Foreword

This book *Building the Future* is about the significant events that shaped the New Mexico State University College of Engineering. Most importantly it is about the people (students, professors, administrators, politicians, and community) that provided the basis on which the future is being built.

H. G. Wells was the originator of the science fiction theme of time travel. The idea of changing the future by moving back in time to alter, initiate, or prevent some event, then returning to the present to reap the benefits of that alteration, has significant appeal. A recent cinema popularization of this idea was given the title “Back to the Future.” Of course the present to which one would return could be changed and therefore the incentive for going back to the past would not have existed. The absence of incentive to go back to the past would mean then that one would not go back, etc.

This circular thought leaves us with two alternatives: 1) there is an infinite set of present times or 2) you can’t change the present. If we accept the latter alternative, we can further conclude that we can’t alter the present by returning to the past, but we can build on the past to influence the future by what we do in the present.

The book is not about going back to shape the future or courses of action that will build a better future, nor is it written to point out that what we should have done in the past to make the present better. Rather it is a book about the strengths of the people that built NMSU, who each in their own way had a vision for a better future focused by their efforts at the present and based on the traditions and strengths of the past.

To those today and to those who follow, use the history of the NMSU College of Engineering as a basis for *Building the Future*. Just as one cannot adequately drive an automobile without a rear-view mirror, one cannot effectively build the future without glimpses of the past.

J. Derald Morgan
Dean
College of Engineering
Engineering
Through the Years
Preparation

Introduction to the Case
The Early Years
1888–1913

Laying the Foundation

In 1888, the citizens of Las Cruces, New Mexico, saw their vision of an educational facility begin to take form. Las Cruces College was incorporated in the spring of that year, and opened its doors to forty students on September 17.

Educational progress in the Mesilla Valley prior to this time had been slow indeed. When Hiram Hadley arrived in 1887, only two schools served the communities of Las Cruces and Mesilla: The Academy of the Visitation and a small public school that enrolled about eighteen children. “Strangely,” Simon Kropp points out, “agitation for improved educational facilities immediately prior to Hadley’s arrival centered around the acquisition of an agricultural college, although the Mesilla Valley was lacking in an adequate public school system.”

In a letter to the editor of the local Rio Grande Republican, October 23, 1886, J. B. Bowman stated, “Almost every state and territory in the union, except New Mexico, is making liberal provisions for the higher education of their young men, and [providing] schools in which they can receive practical instruction in the sciences pertaining to agriculture, mechanic arts, mining, engineering, etc., etc.” Bowman was joined in his efforts by the editor and publisher of the newspaper, Charles Metcalfe, and others.

Into this controversy surrounding substandard educational services walked Hiram Hadley, already recognized as a prominent educator. Hadley moved from Indiana to New Mexico to be near his son, Walter, who was in poor health. The citizens of Las Cruces, who had been promoting better educational services, found in Hiram Hadley the leadership they had been seeking. These persons included John R. McFie, Samuel B. Newcomb, George R. Bowman, James R. Waddill, William L. Rynerson, Numa Reymond, Jacob Schaublin, and W. J. Joblin. It was through the efforts of these concerned citizens that the Las Cruces College came into being. Hiram Hadley, of course, was appointed president.

New Mexico’s Land–Grant Institution

To understand the next stage of development, it is necessary to look at the Morrill Act of 1862. Responding to the concerns of some educators that the classically-oriented liberal arts colleges were not serving the practical needs of the American people, Congressman Justin S. Morrill of Vermont introduced legislation calling for the establishment of agricultural colleges. Passed and signed into law on July 1, 1862, this bill was called a “land–grant” measure because it donated to each state, for the endowment of an agricultural college, 30,000 acres of land for each member of Congress. As explained in the 1890 catalog,

Section 4 provides for the safe investment of the proceeds from sales of lands to constitute a perpetual fund, which shall remain forever undiminished for the "endowment, support, and maintenance of at least one college, where the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and mechanic arts, in such manner as the Legislatures of the States may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life."

4
The full import of this legislation was made clear to the people of the Mesilla Valley when, by an act of the Territorial Legislature of New Mexico, approved on February 28, 1889, the provisions of the Morrill Act were accepted for the Territory. The Rodey Act established the Agricultural College and Experiment Station in or near Las Cruces. It further described the institution which was to be created:

*It shall be non-sectarian in character and devoted to practical instruction in agriculture, mechanic arts, natural sciences connected therewith, as well as a thorough course of instruction in all branches of learning bearing upon agriculture and other industrial pursuits.*

The course of instruction was to be a broad one which included civil engineering and mechanics. Although the creation of a land-grant college had been one of the main objectives underlying the formation of Las Cruces College, it was not immediately clear how Las Cruces College, as it existed, could serve as the land-grant institution proscribed by the Morrill Act. Las Cruces College was striving to meet the educational needs of young children as well as older students. Therefore, the school was divided into four departments: primary, intermediate, academic, and college. To facilitate the transition, it was agreed that the present college would prepare its students to meet the entrance requirements of the projected agricultural college.

Thus, when the Board of Regents of the new institution was appointed by Governor L. Bradford Prince in September of 1889, and Hiram Hadley was named president, the way was cleared for the transformation of Las Cruces College into the New Mexico Agricultural College. The story of engineering, as it has been taught at New Mexico's land-grant institution, begins at this point.

**Courses of Study**

On December 14, 1889, the Board of Regents formulated the first statement of educational policy. It called for "a Department of Mathematics, embracing Land Surveying and Leveling," and also, "a Department of Chemistry and Physics." As Burton P. Fleming points out in his history written as dean in 1933, "It is apparent therefore that the fundamental subjects of an engineering curricula [sic], namely, mathematics, physics, chemistry, and surveying were provided in this institution at its inception."

The college opened on January 21, 1890, with thirty-five students enrolled. A statement in the 1890 catalog explained, "As a leading purpose of the College is to train pupils in branches related to Agriculture
and Mechanic Arts, it will be necessary to have at least two courses of study – one in Agriculture and one in Mechanic Arts. As it is impossible to equip the College this year with shops, tools, etc., the latter course is not outlined. It is confidently expected that in the near future these will be added.”

However, mention was made of the fact that “the College is provided with a first-class transit, level, etc., and students in Surveying, Levelling [sic], and Trigonometry will have practical training in the use of these instruments.” Surveying instruments had been purchased for $265.00 from W. and L.E. Gurley in June 1890.9 Fleming points out that a whole year of drawing was required of freshmen and sophomores; a course in surveying and leveling was a requirement for juniors; and chemistry, physics, geology, and mineralogy were all required subjects. Therefore, engineering fundamentals were being taught, even though not as a separate course of study.10

The first important step taken towards an engineering program was the hiring of August J. Wiechardt, M.M.E., as professor of mechanical engineering. Wiechardt, a fully qualified engineer from Cornell University, was appointed by the Board of Regents February 13, 1891, and became one of ten faculty members, including the president.

Another significant occurrence of the 1890–91 academic year was the changing of the institution’s name from “New Mexico Agricultural College” to “New Mexico College of Agriculture and Mechanic Arts.” The change is particularly noteworthy because, according to Kropp, the new name “seemed to signify the coequal status of agriculture and engineering among the primary functions of the college.”11

The catalog published in the spring of 1891 stated, “Provisions are made for opening the following courses: Agriculture, Scientific, Civil Engineering, Mechanical Engineering, Classical Preparatory and Commercial.” The course in civil engineering was outlined for autumn, winter, and spring terms for all four classes. The mechanical engineering course had not been so arranged, but it was stated that “the leading subjects taught in this course are: drawing, shop practice, mechanical laboratory, and theoretical engineering.”

![Professor August J. Wiechardt, first engineering professor at New Mexico College of Agriculture and Mechanic Arts – 1892. (RGHC)](image)

There were five students in mechanical engineering during the 1891–92 academic year. This number grew to six students in M.E. in 1892–93, and three students in the civil engineering course. It is interesting to note that in 1892 the Board of Regents decided that forging and foundry work were to be included in the curriculum, and instructed the president and the professor of mechanical engineering “to purchase tents in which to set up the necessary shop equipment.”12

The college continued to re-work the curriculum, causing the following student comment in the September 1893 issue of the New Mexico Collegian:
At the beginning of the Sophomore year, students choose agriculture or engineering. ... In the Junior year, the engineering course divides itself into mechanical engineering and civil engineering. We were struck by the entire absence of practical study in electricity, in the mechanical engineering course, but we feel confident that the omission is inevitable, and therefore not a mere oversight. It is to be hoped that it will be supplied as soon as possible. Otherwise, the courses in both these departments are in every way thoroughly good, and in all respects as advanced as those in most other colleges. We understand that a student who has graduated in either of them will have no difficulty in at once securing a position at a salary of forty or fifty dollars a month and that the promotion in such work is very rapid.  

By the spring of 1894, the college was preparing to graduate its first class, and was enjoying the distinction of "becoming the Territory's first degree-granting institution." Two years later, the first engineering graduate received his diploma. The May–June 1896 issue of the New Mexico Collegian stated that, of the four graduates, Albert Henry Peterson "completes the course in Mechanical Engineering; and all take the degree of Bachelor of Science." *

The curriculum for the following academic year would consist of four courses of study, leading to three degrees. The four courses were: 1) agriculture; 2) scientific; 3) civil engineering; and 4) mechanical engineering. The first two culminated in a Bachelor of Science (B.S.) degree; the third and fourth led to a Bachelor of Civil Engineering (B.C.E.), and a Bachelor of Mechanical Engineering (B.M.E.).

February 16 and 22, 1895, the college was visited by inspection committees appointed by the Thirty-first Legislative Assembly. The report of one committee included the following statements regarding the engineering department: "All of the college courses, as now arranged, provide for three terms work in the shops, divided equally between carpentry, wood-turning, and blacksmithing. . . . Those students who take the mechanical course are given an additional year's work in pattern making, foundry and machine shop work."  

There were two significant changes in the curriculum for 1895–96. First, because of a small enrollment, the degrees offered were reduced from three to one, the Bachelor of Science degree. Secondly, "the course in civil engineering was modified in such a way as to emphasize training for those who expected to design and operate irrigation works, and this course was called irrigation rather than civil engineering." The term "irrigation engineering" was used for two years; in 1897–98, the course was again referred to as "civil engineering." In this year, too, a new degree was offered, the Master of Science (M.S.). Charles Lewis Post, who graduated in 1900 after taking the mechanical engineering course, received a Master of Science degree in 1901, becoming the first engineering graduate to do so. Another engineer of the class of 1900, Archie Bruce Sage, received his M.S. in 1910.

Civil engineering was made a separate department for the academic year 1900–01; the classes were taught by W. M. Reed, professor of civil and irrigation engineering. After that, however, civil engineering instruction disappeared from the catalog for six years; not until the 1907–08 school year was it offered again.

The year 1907–08 was an important one for engineering. Not only did civil engineering return to the curriculum to stay, but a full course in electrical engineering was introduced and has continued since that time. Of the college's six courses of study, three were engineering – mechanical, civil, and electrical; the other three were agriculture, household economics, and a general course. Also of interest was the fact that, for the first time, the degree Mechanical Engineer (M.E.) could be substituted for the Master of Science (M.S.) degree.

"A Two Years' Course in Practical Mechanics" was introduced for the 1902–03 school year and was offered through spring 1909; in the last year the name was changed to "Two-Year Mechanical and Electrical Certificate Course." This name was more in keeping with the new name of the department, "Department of Mechanical and Electrical Engineering." Also sporting an expanded name, civil engineering became the

*NOTE: Burton P. Fleming lists Lenuel C. McGrath, a member of the Pioneer Class, as the first engineering graduate, apparently because he was shown to be in the civil engineering course in 1893. However, no mention of engineering is made in McGrath's commencement sketch in the New Mexico Collegian, and subsequent notices refer to him as a public school principal and later a merchant.
“Department of Civil and Irrigation Engineering.” Although mechanical and electrical engineering were separate curricula, civil and irrigation engineering were combined.

The catalog announcements for 1909–10 listed the usual college courses, and also presented “Secondary Courses” – four-year industrial courses in four subjects, one of which was mechanics. These were courses of high school grade. According to the catalog, “The boy who completes the Industrial Course in Mechanics should be a competent shop foreman, power-house superintendent, foreman on construction work, machinist or electrical worker, or after some experience should be prepared for building and contracting.” The course was continued under the name “Industrial Course in Mechanics” until June 1917. The catalog for the 1917–18 school year listed “Practical Mechanics” as one of the five courses then called “College Preparatory,” and several years later, “Pre-College Courses.”

A one-year industrial course was announced in 1913 “to meet the needs of young men who wish short practical courses but may not be able to meet the ordinary entrance requirements.” These students took classes in arithmetic and English in the mornings, and in the afternoons took one of the following: carpentry; brick-laying and concrete work; or blacksmithing, foundry work, steamfitting, and plumbing. The next year’s additions included power plant and electrical work. This course was called “One and Two Year Industrial Course” in 1915–16, and the following year was announced as one of the “One Year Trades Courses.” The trades course appeared in the catalogs until 1921.

Buildings

The new college was opened in rented buildings, with plans getting underway very quickly for a main building which would serve the needs for administrative and faculty offices, classrooms, and a library. The proposed structure was thus described in the Catalogue for 1890: “The new building will be an elegant two-story and basement brick, with stone trimmings, and situated in a most beautiful and healthful spot.” An impressive ceremony, attended by some 3,000 spectators, was held to lay the cornerstone on September 9, 1890. Construction progressed satisfactorily, and McFie Hall, named for the first president of the Board of Regents, John R. McFie, was ready for occupancy about the first week of February 1891. Built at a cost of about $23,000, the building was affectionately known as “Old Main,” and served the needs of the young college well for some twenty years. It was destroyed by fire in 1910.

In an article entitled, “Early History of the Agricultural College,” Hiram Hadley described the area of “Old Main” which was used for engineering purposes:

In the N.E. basement room and in a small room then the S.E. basement room, was located the department of Mechanical Engineering. In the former of these two rooms were four work benches, tool closets, a steam engine, a large grind-stone, wood-turning lathes, shafts, pulleys, belting, lumber, and during a large part of each day, a number of boys and young men diligently at work, sawing, hammering, planing, turning, etc. It was a busy, noisy spot. The small S.E. room was the office for the professor in charge, and it accommodated the classes in drawing. The whole building reminded one of a bee-hive, and as we look back to those days, we wonder how we endured the cramped and inconvenient quarters.19

The Board of Regents made an effort to alleviate these crowded conditions when, late in 1893, it appropriated $250 for a temporary wooden structure to house the forge shop.20 The following description of the new building is found in the report of the Legislative Inspection Committee which visited the college February 22, 1895:

The building is a temporary frame structure, erected entirely by student labor and is 60 x 30 in size. Half of the building is fitted up with benches, lathes, etc., for work in wood, and as now arranged there are six benches and five lathes, and eleven students can be instructed in this department at the same time. . . . In the other half of the building a blacksmith shop is being fitted up and the forges, six in number, are arranged in a semi-circle around the building and the draft furnished and the smoke withdrawn by blower. . . . During the summer another temporary building will be erected for a foundry and machine shop, also a drawing and recitation room.21
The committee report goes on to say:

*The temporary buildings [sic] erected, and the other to be erected, are not what would be expected for the industrial college of this territory. They can only be made serviceable for a brief term of years, and will then have to be replaced by more permanent and extensive buildings. They are the best that could be built with the limited funds at the disposal of the college.*

Work on the “more permanent” building called for by the Legislative Inspection Committee began that summer. The Engineering Building, also referred to in school publications as the “Mechanical Building,” was located south of McFie Hall, and was constructed of adobe bricks. It was “the second important building on campus, and remained for years as the headquarters of instruction in engineering.” It continued to be used until 1960.

![Old Engineering Building – completed in 1896. (Hobson-Huntsinger University Archives)](image)

An article in the *New Mexico Collegian*, October 1895, entitled “Our New Shops,” detailed the plans for the new building:

*As laid out, the plans call for a front portion 55 ft. x 40 ft. and an ell or wing 40 ft. x 80 ft. extending back from the west end of the front portion. The present shop building will form another wing 30 ft. x 60 ft. extending back from the east end of the front building. Between the two wings there will be a room 24 ft. x 24 ft. for an engine room.*

The students noted with interest the progress of the construction, and in March 1896, expressed their pride in this addition to the campus:

*Meadwhile, the new shop building approaches completion. It is already evident that it will be a magnificent structure for the purpose desired. It bears an outward appearance of solidity and permanence that is a strong contrast to the temporary-looking wooden shop building, and that harmonizes well with the thorough character of the work that will be pursued within its walls. The building is a very valuable addition to our permanent equipment, and a worthy home for the best equipped shop in the Territory.*

Fleming says that with the construction and occupation of this building, a new era in the history of engineering education began. The engineering program now had adequate space for “recitation rooms” and various shops, and so began to expand its curriculum and strengthen existing courses. Enrollment increased as well, so that by 1912 it was again necessary to plan new quarters. The building which resulted was the stately structure now known as Goddard Hall, and long recognized as the home of engineering at this institution.
A headline in the September 13, 1912, issue of the Round-Up reads, “Plans for New Engineering Building /To Be One of Most Costly and Beautiful Buildings on Campus.” Designed by Trost and Trost, the college architects, the new building was estimated to cost $30,000. According to the article in the student newspaper, “It will consist of the main unit and two machinery and woodwork annexes joined onto the main unit. . . . The main unit will be three stories in height and the annexes one story.”

An update in the Round-Up, December 13, 1912, reported that the contract had been awarded and construction would probably begin in February. The new structure was to be erected almost in front of the old engineering building, which was now being described as “useful but ugly.” The contract called for completion by July 1, 1913; the building was expected to be ready for occupancy by that fall. It was constructed of red brick, and was indeed of such beautiful design that, seventy years later, it was still described as “majestic.”

**Equipment**

The efforts of the young college to provide suitable equipment for the engineering department were met with approval by the students. An article published in the New Mexico Collegian in 1897 listed the features of the new wood shop: its machines included “three styles of lathes, a patent scroll saw, planer, double circular saw, and trimmer. . . . The machine room is entirely new and. . . offers practical exercises in iron and steel turning and finishing, screw cutting, surfacing and fitting of castings, drilling and boring, grinding and buffing, key seating, taper work, etc., etc.” Mention was also made of “the new 40 H.P. steam plant.”

The mechanical engineering department had made great advances by 1903. “During this time [the last ten years] the floor space has increased from one thousand square feet to more than seven thousand square feet and this latter space is now found inadequate to properly accommodate the large number of students taking this work. The equipment has probably increased in a larger ratio that [sic] the floor space.” Additions to the equipment included “a full size No. 4 Tappit Motion Steam Tank Pump” and two double forges.

**Faculty and Students**

The story of any institution is ultimately that of the people who have helped to build it. This is certainly true of New Mexico State University. From its earliest days as the Agricultural College to the present time,
its character has been molded and strengthened by the dedication, hard work, and enthusiasm of not only its administrators and teachers, but its students as well. The founders of the young school took very seriously the charge of the Morrill Act, "to promote the liberal and practical education of the industrial classes." They struggled with such problems as limited resources, political interference and attempts to discredit the institution, and strove continually to improve the quality of the education they were offering to the southern part of the Territory.

From the beginning, an effort was made to recruit highly qualified instructors. Reference was made earlier to the 1891 appointment of August J. Wiechardt, M.M.E. from Cornell, as professor of mechanical engineering. Civil engineering was taught in the early years by Clarence T. Hagerty, associate professor of mathematics from Notre Dame University.

Wiechardt's replacement in 1894 by Horace Ropes, B.S., a relative of U.S. Senator and Secretary of the Interior Albert B. Fall, is cited by Kropp as an example of the political maneuvering which was affecting the college. Ropes taught both mechanical and civil engineering. After that, the two courses were combined under one instructor until 1900. When Ropes resigned in 1896, he was replaced by Frank W. Brady, M.E., who held the position for six years. In February 1895, the Legislative Inspection Committee included the following statement in its report: "... the teachers, from the assistants up to the president, are earnest and energetic, and the enthusiasm inspired, and the attendance secured, prove their efficiency."

By 1902, Charles Mills had worked his way up from instructor in the college shops to professor of mechanical engineering. He headed that department until poor health caused him to resign in 1905. The position was then taken over by Charles E. Paul, S.B. (present day B.S.).

Burton P. Fleming was hired as professor of irrigation engineering in 1907, and from that time on, irrigation (or civil) engineering had a place in the curriculum. In 1907, also, electrical engineering made its appearance. Archie Bruce Sage, who had graduated from the college in 1906 and had been working in the mechanical engineering department since 1899, was named associate professor in mechanical engineering and instructor in electrical engineering. In the following year, 1908, the name of the department was changed to the Department of Mechanical and Electrical Engineering, and Archie B. Sage became the head, serving until 1914.

The viewpoint of students has been recorded since February, 1893, when the New Mexico Collegian first appeared. This monthly publication was the predecessor of the Round-Up (student newspaper) and the Swastika (yearbook), both of which began in 1907. Perusal of the early issues shows that the work of students in mechanical and civil engineering classes was noted with interest:

The case in the hall containing specimens of some of the work done by the mechanical students speaks highly for that department of our College. From Prof. Wiechardt we understand that no less than five native woods are there represented, thusillo, mesquite, cedar, and native mahogany and pine. Visitors to the College will do well to note the workmanship of some of the vases, Indian clubs, and other lathe works. (February 1893)

The parallel bars just turned out by the mechanical students are a fine production. Keep up the good work and we shall soon have a gymnasium. (March 1893)

The Civil Engineering class are hard at work on their railroad to Bishop's Cap, with Prof. Hagerty as chief engineer. (October 1893)

The Mechanical Department is getting its exhibit ready for the Territorial fair to be held at Albuquerque next September. (June 1895)

The following article is found in the April 1, 1912, issue of the Round-Up:

On Friday last Professor A. B. Sage took the Senior Engineers - Messrs. Leslie Herrmann, John Haggart and K. Olaf Windsor - to El Paso in his Reo car. The party left the college a little after seven o'clock and made the trip in the short time of two and one-half hours, the return trip took more time, however, on account of darkness. The object of the trip was to visit some of the larger manufacturing
establishments of the Pass City.

As the monthly Collegian had evolved into a full-fledged student newspaper, so the young college was growing and expanding, offering its students ever-increasing opportunities as it reached the quarter-century mark.
The Goddard Years
1914–1929

Important Beginnings

The year 1914 was very important to the history of engineering at New Mexico State University. A School of Engineering was created and placed under the leadership of Dean Arthur F. Barnes. That year, too, brought the arrival of another newcomer who was to have a tremendous impact on the institution – Ralph Willis Goddard.

Goddard had earned a Bachelor of Science degree in electrical engineering from Worcester Polytechnic Institute in 1911. In 1913, he was filling a position as instructor of electrical engineering at the University of Nebraska when he received a telegram inviting him to come to New Mexico College of Agriculture and Mechanic Arts as head of the electrical engineering division. He moved his small family to Mesilla Park, New Mexico, and immediately set about meeting the challenges of guiding the college’s youngest department; an electrical engineering curriculum had been established in 1907.

The tumblings of the Mexican Revolution were causing increasing concern to the citizens of southern New Mexico in 1915–1916. Ironically, the military activity provided the impetus for Ralph Goddard to further investigate and develop an area of lifelong interest – wireless communication. Ann M. Velia has related that “he was approached for help in setting up a military communications system between the border patrols, and proved himself capable of the task.”

As Goddard considered this use of telegraphy, an idea began to grow: “If radio communication could be quickly set up among temporary border patrols, wouldn’t a similar system be a boon to New Mexico’s isolated residents?” He was to continue to develop this concept.

Although the troubles on the Mexican border were disquieting – especially so since one of the casualties of Pancho Villa’s raid on Columbus, New Mexico, on March 9, 1916, was alumnus Charles D. Miller, a former territorial engineer – the feeling on campus was generally one of good will, hard work, and mutual support. Since money was not abundant, faculty members frequently made small loans to students or invited them home for dinner. According to Ann M. Velia, author of KOB: Goddard’s Magic Mast, “the students, ... unburdened with big-city sophistication, were honest and earnest, proud to be enrolled. ... The college was a communal family, the pace leisurely enough that people had time to look out for each other.”

The Catalog for 1914–1915, Announcements for 1915–1916 shows that the number of college courses had been increased to seven, with the addition of irrigation engineering. This statement appeared for the first time: “There are three grand divisions of the work and functions of the College. These are: Instructional Service; Experiment Station; Extension Service.” A listing of the Experiment Station staff includes the name of Frederick Louis Bixby, irrigation engineer, formerly professor of civil and irrigation engineering. Bixby is also listed as one of the “Specialists” on the Extension Service staff.

The four areas of engineering taught the previous year now constituted four departments, as explained in this introductory paragraph:

Engineering has been defined as the utilization of nature in the service and for the benefit of mankind, as illustrated in the construction and use of machinery, the erection and maintenance of structures, and the discovery, decomposition, and recomposition of the component parts of material things. The field thus described is so vast that it is impractical in this age of specialization for one to cover the whole, and for the needs of the southwest, four year courses are given by the several departments in Civil, Electrical, Irrigation and Mechanical Engineering, leading to the degree of Bachelor of Science in the course taken.
The Catalog for 1915–1916 presented the college’s course offerings in one of three schools: Agriculture, Engineering, and General Science.

War Years

An “Engineers’ Special Issue” of the Round-Up, dated March 27, 1917, included sixteen articles on the state of engineering at New Mexico College of Agriculture and Mechanic Arts. Most of the articles are signed by either professors or students and bear titles such as, “Good Work Is Being Done by Alumni of Engineering,” “The Field for Electrical Engineers in the West” (by Goddard), “Engineering Courses Are Better Than Ever Before” (by Dean Barnes), and “The Southwest Has No Better E. [sic] Laboratory.” Clearly, the students and faculty were proud of their school.

One article described the Engineers’ Club, which had been formed “almost at the same time” as the college’s founding and had been “entirely overhauled and reorganized” in 1914. “The object of the Engineering Club is to forward the interest of each and every student of engineering in every way possible.” The benefits of membership “can be obtained in no other way during the entire college career.” Another article predicted a bright future for the newly organized Southwestern Society of Engineers, “an organization among all the practicing and teaching engineers of the states of New Mexico, Arizona and West Texas, which has in it the possibilities for large influence in the industrial, social and political development of the Southwest.”

Yet another article addressed the need for more engineers in the event of war. It was pointed out that “at present the United States has eight thousand men and officers in the engineering division. In case of war there would be a necessity for 22,000 more at once.” Less than two weeks after this issue of the Round-Up came out, the United States was at war. Enrollment dropped as students left to fight for their country; “the carefree innocent spirit at the college came to an end.”

The college, particularly through the Engineering School, was to make significant contributions to the war effort. Ann M. Velia describes one of the first in her book, KOB:

The United States Signal Corps, through the Federal Board for Vocational Education, selected New Mexico College of Agricultural [sic] and Mechanic Arts as a site for training some of the 15,000 buzer operators needed in Army communications. Ralph [Goddard] was relieved of his teaching duties and placed as civilian head of the training school.

Several barracks were erected to house the radio equipment, and troops were established in a “tent city” when the school opened December 3, 1917.
In the spring of the next year, President Austin D. Crile received notification that "several hundred soldiers" would be sent to the campus in order to take courses in engineering, blacksmithing, and other mechanical skills... In early July [1918], the campus was inundated by some 220 soldiers, who were to be trained and replaced at approximately sixty-day intervals.\textsuperscript{13}

The college's plan by which students could be trained as soldiers was called the Students' Army Training Corps; it was fully described in the Catalog for 1918–1919:

_The New Mexico College of Agriculture and Mechanic Arts_ was one of the many educational institutions of the country that turned over practically all of their resources to the Government for the training of soldiers during the latter part of the war. Both Station A and Station B [sic] of the Students' Army Training Corps were established here. Section A being known more strictly as the college section, and Section B as the vocational section.

**Section A**

Section A... was organized with the opening of the school year, September 30, 1918. Instruction in this section was given by the regular college faculty and included classroom and laboratory work, distributed in courses as follows:

<table>
<thead>
<tr>
<th>Course</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering</td>
<td>50</td>
</tr>
<tr>
<td>Agriculture</td>
<td>26</td>
</tr>
<tr>
<td>Sanitary Corps</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>79</td>
</tr>
</tbody>
</table>

**Section B**

Section B... was organized some three months earlier than Section A. Work in this section was under the supervision of the School of Engineering. In the emergency of training soldiers during the summer of 1918, the Engineering School was the first and only school in the State of New Mexico to be asked to train soldiers in vocational subjects. This work began July 1, 1918 and continued until the signing of the armistice. Following is the number of men trained in the various trades at this institution:

<table>
<thead>
<tr>
<th>Trade</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carpentry</td>
<td>65</td>
</tr>
<tr>
<td>Concrete construction</td>
<td>68</td>
</tr>
<tr>
<td>Radio</td>
<td>22</td>
</tr>
<tr>
<td>Horseshoeing</td>
<td>40</td>
</tr>
<tr>
<td>Truck driving</td>
<td>88</td>
</tr>
<tr>
<td>Auto engine repairing</td>
<td>52</td>
</tr>
<tr>
<td>Machinists</td>
<td>18</td>
</tr>
<tr>
<td>Oxy-welding</td>
<td>2</td>
</tr>
<tr>
<td>Starting and lighting</td>
<td>38</td>
</tr>
<tr>
<td>Ignition</td>
<td>35</td>
</tr>
<tr>
<td>Total</td>
<td>428</td>
</tr>
</tbody>
</table>

The following members of our regular faculty were entirely engaged in teaching war courses in positions as indicated:

- Austin D. Crile, President
- A. F. Barnes, Dean of Engineering and Supervisor of War Training
- R. W. Goddard, Instructor in Radio Operation
- A. H. Hoffman, Instructor in Engine and Chassis Repair
- M. S. Bowen, Instructor in Machine Shop
- J. W. Tourtan, Instructor in Concrete Construction

Training for war was not the college's sole activity, however. In 1918, an eighth course, vocational teachers, was added to the college curriculum, and agricultural engineering became the fifth department in the School of Engineering.
Reaching Out

The Engineering School was expanded further in 1919 as physics joined the departments of agricultural, civil, electrical, irrigation, and mechanical engineering. Kropp notes that “the engineering school attracted as many students as the agricultural school, an unexpected outcome perhaps of the late war...” Also, this year, the Engineers’ Club voted to affiliate with the American Association of Engineers as a State College Chapter of the organization.

In 1920, Goddard became dean of the School of Engineering when Arthur F. Barnes resigned from that position. That year, too, Harry L. Kent became president of the college. Both men were to contribute greatly to the progress of the institution.

Hugh M. Milton has written, “The decade of the Goddard administration was characterized as one of consolidation and formalization of the engineering program. The objective was to strengthen the curricula, secure a fully competent faculty and provide the best equipment with the available monies.” Milton credits Goddard with beginning a program of development which would later lead to the School’s accreditation.

The college curriculum and the number of engineering departments continued to fluctuate for the next few years. When school started in the fall of 1920, irrigation and civil engineering had again been combined into one department. Two years later, chemical engineering became the sixth department in the School of Engineering.

With the armistice came the lifting of the ban on amateur radio activities, and Professor Goddard continued to pursue his interests in this area. The Radio Club was organized in Goddard’s home Oct. 11, 1919, comprised of the interested students who had been invited to listen to the receiving set he had constructed in his basement.

The club then salvaged a receiving set from the Army training school, as well as a wooden building which had been used in the same program. The building, which became known as the “Radio Shack,” was moved to the rear of the Engineering Building (now Goddard Hall) so that that building’s sixty-foot tower could be used for aerial support. Two sixty-foot masts were erected, one from the tower of the Engineering Building, so that it reached a height of 120 feet, and one set in the ground near the Radio Shack. “In November,” writes Ann Velia, “after only a month in service, wind destroyed the taller mast, dropping it in three pieces through the roof of the Engineering Building.”

Goddard and his Radio Club members were quick to recover from such setbacks. With a new 133-foot antenna and experimental radio license number 5XD issued June 3, 1920, for a 50-watt continuous-wave transmitter, the campus Radio Club began public broadcasting. Time signals received from the Naval Radio Station in San Diego and weather reports from the United States Weather Bureau in Denver were given in telegraphic code at 12:00 noon and at 10:00 p.m.
After receiving the commercial license 5XD, the Radio Club began to make great strides. September 1920 saw the college’s affiliation with the American Radio Relay League. The resulting increased activities led to the expansion of the Radio Shack in October. In November, the presidential election returns were received and telephoned to a group of students and townspeople assembled at the college.22

In August 1921, Professor Goddard and student Earl Kieman used their portable radio equipment to coordinate rescue efforts after a flood destroyed much of the towns of Hatch and Santa Teresa, New Mexico.23 Service of this kind exemplified the benefit to New Mexico citizens that Ralph Goddard envisioned as part of the wonderful potential of radio.

“Five hundred new voice stations went on the air in 1922,” Ann Velia writes, “all on the same wavelength. Among them was the New Mexico College of Agricultural and Mechanics [sic] Arts station, assigned the call letters KOB on April 5, 1922. From then on regularly scheduled programs went out from the one kilowatt transmitter.”24

Initially, the programs were informational. The station’s first big user and greatest supporter was the college’s Agricultural Extension Service, whose administrators quickly saw the advantages of this means of disseminating information. Later programming included public health information, travelogues and highway condition reports.25

On October 14, 1922, KOB broadcast a play-by-play description of the football game between the Aggies and the Albuquerque Indians. In Kropp’s words, “This broadcast, hailed as an event that had occurred for the ‘first time in the history of the Southwest,’ became all the more glamorous by virtue of a 56–0 victory.”26
Victrola music was added to the station’s offerings in September 1922, with schedules being printed in local newspapers. On December 10, a 500-watt continuous-wave transmitter was put into service. The greatly increased broadcasting range was proven by receipt of a card from the Samoan Islands, stating that KOB’s broadcast had been heard there, a distance of almost 5,000 miles. By the spring of 1924, KOB was presenting headline news at noon, Aggie alumni news bulletins and live programming which included concerts, lectures, and sports events. The station’s daytime range was figured to be one thousand miles. Cards and letters were received from various parts of the country. A J. Coats, an alumnus of 1920, wrote from Fort Collins, Colorado:

Several radio fans here are very much impressed with the Aggie broadcasting station, and when anyone asks me where I am from, I tell him State College, New Mexico, and he immediately connects it up with the radio broadcasting station. You may tell Dean Goddard for me that he is getting some real good advertising for the institution out of his station.

In addition to reaching New Mexico’s citizens over the air waves, Goddard had traveled all around the state, giving lectures and demonstrations aimed primarily at attracting new students. Of the 1924 commencement ceremonies, Kropp says, “Significantly, the engineering graduates outnumbered the agricultural graduates seven to three.”

By 1924, President Harry L. Kent had eliminated the secondary school courses from the curriculum, so that the program was now fully college level. And there was another reason, not so readily apparent, that 1924 would prove to be a very important date to the School of Engineering and the college: in this year Hugh M. Milton II joined the faculty of New Mexico College of Agriculture and Mechanic Arts as head of the mechanical engineering department.

**A Chapter Closes**

In 1925, the engineers’ honor fraternity, Mu Phi Pi, was organized; this became Sigma Tau and later Tau Beta Pi. Mathematics was added to the School of Engineering, making seven departments, and then dropped again the next year. Agricultural engineering was offered until 1932 and physics was taught solely by engineering professor Daniel S. Robbins from 1923 until 1934, when George Gardiner came.

As the engineering profession continued to develop, so did engineering education at the southern New Mexico college. Simon Kropp says that, for the fall semester 1927, “the school of engineering registered some 100 students, triple the number in the school of agriculture.” Dean Goddard had noted in a talk on the history of the Engineering School, that the engineering enrollment had increased 400% from 1914 to 1927.

The School of Engineering offered two unusual courses during this period. One was an aviation course, taught by Professor Milton. Offered from 1927 to 1935, it is thus described in the college catalogs:

**M.E. 120 Aeronautics.** Airplane engines, fuselage construction and design, meteorology and theory of flight. This course is designed to give those students in mechanical engineering who prefer to go into aviation, the fundamentals of ground school instruction. It is substituted in lieu of M.E. 122 [Industrial Management].

Another interesting addition to the curriculum was a course in international telegraph code, which Dean Goddard offered over KOB in 1925 to anyone with a “set to practice the lessons on.” The correspondence concerning this course is among the engineering records preserved in the University Archives. The young chemical engineering department was establishing itself during this period. The arrival in 1926 of Luke Berry Shires brought to the college a man who was to be “the heart and soul” of the chemical engineering program on this campus until his retirement in 1964. The first B.S. degrees in chemical engineering were awarded in 1926 to Arthur Judson Stewart, Jr., and to Charles Edward Shipe. A 1929 graduate, Bruce H. Sage, went on to earn a place of international renown in the field of chemical engineering thermodynamics; he was awarded an honorary doctorate by the college in 1953.
Another important name added to the list of faculty in 1926 was that of Daniel Boone Jett. A professor in the civil engineering department, Jett instituted a cooperative education program in 1929 whereby students could attend class for six months of the year and work for an industrial firm the other six months. As explained in the Catalog for 1929–1930, "the school is seeking cooperation from power companies, telephone companies, state highway departments, railroad companies, oil companies, mining companies, smelters, refiners, and any other corporations or individuals who might employ engineering students." Kropp, in his history of the institution, mentions the cooperative plan with the state highway department. Courses in mining engineering were offered under the co-op plan, in conjunction with the New Mexico School of Mines at Socorro. The cooperative education program, which at one time had about forty students enrolled, was offered until 1936.

Throughout the late 1920's, Dean Goddard continued to develop KOB. On May 11, 1927, the station received permission to operate at 5,000 watts, and by 1929, the power allotment had been increased to 10,000 watts. A new transmitter house was built around the old Radio Shack in 1927. The wooden building was later removed piece by piece through the door of the brick construction. KOB achieved another broadcasting "first" when it brought the 1928 World Series to the Southwest. "More than five hundred headsets were distributed to ex-servicemen at Ft. Bayard, New Mexico's Veteran's Hospital, in time for the game."

Despite the excitement generated by the station, KOB's presence on the campus was viewed with dissatisfaction by some members of the college community. Ann Velia explains that "although Goddard financed the station's construction and operation to a large degree with his personal funds, and although his powers of persuasion amassed many financial and equipment assets, it was true the station placed some burden on the college. Operating utilities were paid by the college; so were student salaries paid to station employees." It was finally decided in 1928 that KOB should be separated from the college. "While Ralph Goddard would suffer most from the loss of the station, he was the best-informed person to determine and promote KOB's material and intrinsic worth; and best-qualified to assess a prospective buyer's ability to maintain KOB's prominence in broadcasting. Thus, to him fell the burden of disposing of KOB."

A tentative offer from a group in El Paso was received late in the year 1929. Goddard planned to review it during a holiday vacation but had resolved that, until the station was sold, he would make sure that the broadcasts were memorable. He went to the studio December 31 to prepare for a special New Year's Eve program.

In order to enter the generator room from the broadcast studio or the operating room, it was necessary to go outside the building and around to a door which was kept locked at all times. Goddard had designed this plan because of his knowledge of the danger inherent in the arrangement of the powerful motor-generators. He had also devised a tool—a pencil taped to a yardstick—to help with the adjustment of operating parts which were slightly out of easy reach. It was kept in the operating room.

It had been raining most of the afternoon on December 31, 1929. Suddenly, an accident in the generator room attracted the attention of those nearby. Dean Goddard had apparently attempted to make some adjustments on the high-voltage generators. His shoes must have been wet, as was the yardstick—tool he used. The current, driven by 12,000 volts, traveled through the stick to his arm, electrocuting him. Although two doctors and a resuscitation team from El Paso worked valiantly for five hours to revive him, it was to no avail; at 9:45 p.m., Ralph Goddard was declared dead.

KOB went off the air when the accident occurred, and did not resume broadcasting until January 2, 1930, when Goddard's memorial service, held in Hadley Hall, was broadcast to the nation. The following are excerpts from President Kent's address:

To KOB Audience:

It is with extreme regret and grief that I have to announce to you tonight the death of the creator or builder and the director of KOB, Dean R. W. Goddard... As professor of electrical engineering and Dean of the School of Engineering in the New Mexico College of A. and M.A., he was loved and
admired by faculty and students alike. No dean was ever remembered more frequently by former students and associates. No engineering instructor was more admired or respected by practicing engineers. . . . He had built a strong engineering school both in physical equipment and reputation of graduates while in charge as Dean.59

Goddard had built KOB into "the most powerful college station in the world, and the thirteenth most powerful of any type."50 But more important than the radio station were his contributions to the college and to the School of Engineering. Milton writes, "It is understandable that the Engineering School had quite a task in launching upon a professional engineering course. In this program Goddard was at the helm, and to him must be given great credit for the future prestige of the Engineering College of New Mexico State University."51
The Leadership of Milton and Jett
1930–1946

A New Focus on Image

According to Hugh M. Milton, “it took the first three decades of the twentieth century to place engineering education in a competitive position with engineering colleges.”¹ Thus, by 1930, the stage was set for the great strides in professional growth which would be taken by the young Engineering School. Professor Daniel Stucker Robbins was appointed acting dean of the School of Engineering after Goddard’s death and served the remainder of the 1929–30 academic year. During the summer of 1930, James T. Rood, from the University of Wisconsin, was appointed dean. Milton explains that the decision of the Board of Regents was based in part on Wisconsin’s reputation as an outstanding engineering institution, and the belief that the representative of such a school would aid in the competition with the University of New Mexico. As engineering at New Mexico A & M “began to move in the direction of professional engineering,” UNM felt that its standing was being threatened and attempted to persuade the state legislature to limit this program to practical mechanics.² It was hoped that Rood’s presence would add prestige.

However, Dr. Rood found it hard to adjust to life at the New Mexico school, with its comparatively low salaries and limited availability of equipment. “At the end of the first semester of 1930–31 the administrative details of the Engineering School were turned over to Professor Milton,”³ although Rood remained as dean until June 1932.

The leadership of the Engineering School was then assumed by Burton P. Fleming, who had been professor of irrigation engineering at the college from 1907 to 1909. Fleming had recently resigned as head of the Elephant Butte Irrigation District. Milton says that “Dean Fleming contributed greatly to the stature of the Engineering Department by reason of his recognition as an engineer, his personal qualities, and his familiarity with the locality. His gentlemanly approach and friendly attitude, together with progressive leadership, did much to pull frayed and discouraging factions into a favorable light.”⁴

In 1931, Kropp reports, Professor Hugh Milton had been made a colonel in the Army Reserve and was ordered to attend a command school in Washington, D.C., in the spring.⁵ He resumed his teaching duties in the mechanical engineering department upon his return. Although Milton was frequently in the public eye, one occasion that year afforded some unusual publicity. The November 4, 1931, issue of the Round Up ran the following story under the headline, “Engineers’ [sic] Arrested On Three Charges”:

Professor Milton and “Shorty” Irwin had a very good opportunity to display their diplomatic abilities when the Engineers’ hay ride was stopped on Main Street of Las Cruces and arrested for speeding (can you imagine speeding in a horse drawn wagon?), littering the streets and disturbing the peace. . . . [The charge of “disturbing the peace” was the result of singing “Aggies,” while “littering the street” referred to throwing hay from the wagon.]

The procession had gone about three blocks when it was stopped by local cops. It took Professor Milton and “Shorty” Irwin some five minutes to iron out the trouble. Everyone was much quieter as they proceeded toward the Country Club [for a dance].

After the dance was over, the procession wended its way back toward the college by a more devious route, carefully avoiding the main part of town.
The women of the dormitory experienced the thrill of a lifetime – that is, staying out until after one a.m. without being called on the carpet.

The engineers, and some of the women, would like to nominate Professor Milton for the position of "Best Chaperone on the Campus."

Engineers’ Club – 1929-30 school year. (Hobson-Huntsinger University Archives)

Melvin A. Thomas joined the faculty as an electrical engineering professor in 1931; the following year, John W. Jourdan returned to the civil engineering department after a ten-year absence. President Kent suggested, in 1932, that the college call itself “New Mexico State College,” although he knew the name could not be officially changed by the administration. In 1932, also, Professor Milton was directed by the Board of Regents to improve the condition of the existing buildings on campus and to supervise new construction.

To accomplish this, he was to take advantage of the support of such federal agencies as the Civil Works Administration (CWA), the Public Works Administration, and the National Youth Administration (NYA) – agencies "designed to provide jobs through construction that would benefit the people as a whole." He was to start with $76,000 in government bonds which President Kent had been holding for the college for some ten years.

Milton began by having the buildings plastered; new construction included a feed and fertilizer building, an addition to the Engineering Annex, the beginning of the Student Union, and two units of the girls’ dormitory quadrangle. The latter were built at a cost of $550.00 per unit, “including the furniture which was made in the shops of the Engineering School by N.Y.A. students.”

Other campus CWA projects described by Kropp included such public improvements as ditches and sidewalks. In 1933, “Dean Fleming and Professor Jett were appointed the C.W.A.’s regional director and state representative, respectively. Reportedly, Jett’s projects employed several hundred ‘engineers.’”

Professor Daniel B. Jett became head of the civil engineering department in 1933; the following year, Professor Milton was made acting dean, and became the dean in 1935.

In 1933, Burton P. Fleming wrote, “About 1925, by cooperative agreement between the Engineering School and the State Highway Department, the materials testing laboratory of the Highway Department took over the space and facilities of the Engineering School and all testing work of the Highway Commission is now being done practically at the back door of the institution. . . .”

The decision was made to name the engineering building “Goddard Hall,” for Ralph W. Goddard, and the dedication ceremonies were held March 17, 1934. John G. Barry, President of the El Paso Chapter of
the American Association of Engineers, spoke these words: “To what and how would he have wished this splendid building dedicated? I believe from my knowledge of Dean Goddard we understand his wishes when we dedicate it to ‘good engineering,’ which includes sincere teaching and responsible citizenship.”

One of the products of Goddard’s tenure at the college was radio station KOB. In 1931, Dean Rood disclosed that negotiations to transfer radio station KOB to Albuquerque had been underway for some time. The Albuquerque Journal assumed the management of the station in 1932 and issued the following statement:

The Journal states that radio station KOB is owned entirely by the New Mexico State College. The arrangements entered into for its removal to Albuquerque affect in no way the ownership of the station.

Any betterments that the Journal may add will also become the property of the college.

A note in the Catalog for 1935–1936 reads, “The college uses its allotted time over KOB to broadcast educational material of various kinds.” However, complications proved to be too great, and in 1936 the station with its license was sold to the Albuquerque Broadcasting Company.

The catalog published in the spring of 1936 included the death notice of another program, the cooperative courses in engineering which had been initiated by Professor Jett in 1929. It was explained that all of the companies who have been working with the school have been compelled under their economy programs to reduce their working forces, and all of our students, having no dependents, were cut off. Hence at the present time the school is compelled to ask the co-operative students to find work wherever possible during their working periods, until conditions improve to such a degree that the original plan may be resumed.

Related to the co-op program was the summer school: “Since the inauguration of the co-operative plan, courses have been offered in the Engineering School during the entire summer.” It was noted that “the Engineering Summer School will not be held during the summer of 1936, but it is expected to be continued again in 1937 and subsequent years.”

**Accreditation and Beyond**

Hugh Milton has called the accreditation of the Engineering School “the most pressing problem” he had to face upon becoming dean. “Goddard had started a program of development in 1924 and Fleming pushed it along. The confusion in administration from 1930 to 1934 detracted from a progressive program and Milton’s big job was to pull the ends together; clearly state the objectives of the departments, and prove that the curricula was directed toward the objectives.”

Inspection and accreditation of engineering curricula was begun in 1937 by the Engineers Council for Professional Development (ECPD). M. A. Thomas explains that “the chief reason for this activity was to permit state boards of registration for professional engineers to recognize acceptable educational credentials of applicants of registration.”

Milton credits a number of faculty for their assistance in preparing for the submission of engineering programs for accreditation: D. B. Jett, head of civil engineering; M. A. Thomas, head of electrical engineering; M. T. Lewellen, head of mechanical engineering; L. B. Shires, in charge of chemical engineering; Harold A. Brown, who joined the electrical engineering faculty in January 1937; George S. Gleason, who taught architectural engineering (called “architecture” after one year), 1937–1940; and Frank Amador, Jack F. Clark, John Butler, and Stuart H. Sims.

It was the intention of the Engineering School to submit the programs of civil, mechanical, and electrical engineering for accreditation; chemical engineering was not included, because it lacked adequate laboratory facilities. When the ECPD inspection committee visited the campus during the 1937–38 school year, it commended the staff on the clarity of the objectives and the design of the curricula. In November 1938, the School of Engineering was accredited in civil, electrical, and mechanical engineering, “thus assuring acceptance of its graduates in other states and recognition of its credits by other schools.”
One aspect of the curriculum which elicited favorable comment from the accrediting committee was the broad scope which reflected an emphasis on the professionalism of engineering rather than practical aspects alone. Engineering students were required to take such courses as specification writing and economics, in addition to extra work in mathematics as needed. Courses in industrial management and engineering law were also available.\textsuperscript{21}

On September 19, 1938, Hugh Milton was elevated to the presidency of the college, and Daniel B. Jett was named dean of the School of Engineering. Jett had become the most popular teacher on campus, so that Milton wrote, "Not only was he the senior professor... but there would have been a faculty and student revolt if he had not been promoted."\textsuperscript{22}

According to an article that appeared in the *New Mexico Professional Engineer* in January 1960, it was soon after Jett became dean that he acquired the nickname, "Dad" Jett.

\begin{quote}
[Those] of us who worked with him or for him know how he earned the name. Any good, wholesome activity had his complete support; Dad could be counted on to chaperone dances, picnics and house-parties to any hour, as long as everyone present was having a good time. He would dance until one o'clock, have a late snack, and be on hand the next morning, bright-eyed, enthusiastic and well prepared to teach an eight o'clock class. He was chosen most popular faculty member for seven different years.\textsuperscript{23}
\end{quote}

**Military Effort on Campus**

Historian Simon Kropp writes that "the fall semester of 1939 began almost simultaneously with the blitzkrieg on Poland, in essence the opening shots of the second World War."\textsuperscript{24} The college community heard frequent speeches and debates on the topic of war and peace. One of the more practical responses was the inauguration of a pilot training program, held under the auspices of the Civil Aeronautics Authority and directed by Dean Jett.\textsuperscript{25} This program was expanded into the National Defense Training Program in 1940.

According to engineering records in the University Archives, the proposals to conduct training for national defense through schools and colleges had been set forth by the United States Commissioner of Education, and had been passed into law by the 76th Congress. The State of New Mexico presented a plan whereby the State Board of Education also became known as the Board for Vocational Education and, as such, governed the National Defense Training Program, though it was federally funded.
The program was designed to train non-students in skills needed for the defense effort. The term "trainees" was used to distinguish participants from students of New Mexico College of Agriculture and Mechanic Arts, but some college students were also trainees. Classes were held in Alamogordo, Carlsbad, Deming, and Roswell, as well as State College.26

Organized in August 1940, with J. F. Clark as coordinator, the training school included several programs: intensive courses in aircraft and other mechanics were taught in cooperation with the Work Projects Administration (WPA) and the NYA; the Smith–Hughes course was a two-year program with more general courses; civilian pilot training provided ground school and thirty-five to fifty hours of beginning flight training; and girls' first aid filled a "definite need in the national defense program."27 John M. Haberl took over as coordinator in 1941. The program was dismantled in 1945 with the end of the war.

Another military effort was the Army Specialized Training Program (ASTP), established in mid-1942. In contrast to the national defense program to train non-students, the ASTP "brought several hundred of the finest young men of the army here for an accelerated training which was definitely college level engineering.... The entire unit was suddenly called into combat duty in the spring of 1944 and unfortunately most of the men did not get to use their college training in army jobs. Many of these later returned to the college to complete their degrees."28

The ASTP's members, roughly 500 in number, had contributed significantly to the college's enrollments, which declined sharply during the war years. Only about 280 students registered for the fall semester of 1945, forty of whom were engineers.29 Hugh Milton had been called to active duty in September of 1941; he returned in 1945 when the war was over.

In April 1945, an event occurred which was to have great significance for the college: the War Department authorized the formation of White Sands Proving Ground, later called White Sands Missile Range. Several members of the College's faculty had made scientific contributions to the war effort, so that Kropp says,

"Thus by tradition, personnel, and location the College was readily suited to cooperate with the newly established missile center at White Sands Proving Ground. Test firings of German rockets, with the 'voluntary' assistance of German scientists, were conducted during the early months of 1946. During the summer Professor [George] Gardiner and a staff of some twenty-five faculty members and student
assistants were brought into the guided missile field. Laboratory work... was conducted on campus... Funds for the research and operational work were largely provided by contracts with the government... At the same time "private" organizations... were making scholarships in applied physics available to promising students. Thus, the pattern of advanced training in mathematics and the physical sciences was created. The "military-industrial complex" had reached into the campus.30

Associate Dean C. Quentin Ford was a student at New Mexico A&M at that time, and he recalls groups on campus watching the contrails in the skies over the Organ Mountains, as the missile firings continually resulted in new altitude records. "We were literally observing history happening," he says.31

Another development which followed closely behind the establishment of the White Sands Proving Ground, and was related to it, was the creation of the Physical Science Laboratory (PSL), "the brain child of Professor Gardiner."32 Dr. Ford explains that George Gardiner, head of the physics department, had gotten contracts with White Sands and the Defense Agency to do data reduction. Gardiner obtained space in the basement of Kent Hall and hired students (some of whom were Ford's classmates), at the rate of 50c - 75c per hour, to read the data on filmstrips and, using hand-operated calculators, to determine trajectories, distance, etc. "This literally became PSL—off the backs of George Gardiner, a couple of faculty, and a few students."33 Gardiner worked closely with M. A. Thomas, head of the electrical engineering department, on the data reduction and many other projects. Harold Brown was one of ten or twelve faculty who divided their time between an engineering department and PSL, as was Dr. C. Donald Crosno, who came in the spring of 1947.34

The year 1947 was one of many changes. President Hugh M. Milton announced his resignation in order to accept a similar position at the New Mexico Military Institute at Roswell; the student union building was named in his honor that year. Dean Jett was one of two college administrators who were forced to step down at age sixty, based on a policy approved by the Board of Regents ten years earlier. He returned to teaching, and continued as the head of the civil engineering department, while Melvin A. Thomas became the dean of the School of Engineering.
Setting the Stage

Nineteen forty-seven marked the beginning of a new era in the history of the College of Engineering as well as for the entire institution. The enrollment of veterans was reaching its peak, staff who had been away during the war had returned, and a general reorganizing of the institution was in progress. A new president was being sought, as General Milton had given his resignation, and new deans were to be appointed for each of the three academic schools.

The search for a suitable man to replace Dean Jett was especially difficult, as the demand for such men far exceeded the supply. M. A. Thomas was asked to take the position as acting dean; after further administrative discussion, it was decided to give Thomas the full responsibility of the dean's office, with the understanding that he was also to remain as head of the electrical engineering department. This change became effective September 1, 1947.

Three principal factors were at work after the war to change the status of the School of Engineering in the college community. First, large numbers of veteran students had received some technical training in the service, and many were motivated to choose engineering as their course of study in college. Two additional forces were the establishment and growth of White Sands Proving Ground (later White Sands Missile Range) and the Physical Science Laboratory, both established in 1946. These developments were very timely indeed, given the ever-increasing demand for engineering graduates during this period of time.

The Development of Curricula and Programs

The School of Engineering in 1947 offered curricula leading to the B.S. degree in chemical, civil, electrical, and mechanical engineering. Chemical engineering was offered by the combined department of chemistry and chemical engineering. Professor L. B. Shires was nominally in charge although Dr. A. D. Boston was head of the department. The other three curricula were offered by separate departments. Professor D. B. Jett continued as head of civil engineering as he had since 1933, and Professor A. M. Lukens was head of mechanical engineering.

A professional curriculum in agricultural engineering was organized and offered in the fall of 1948. This was jointly administered by the dean of engineering and the dean of agriculture.

Chemical engineering became a separate department on July 1, 1949. Professor Shires continued to turn out a small group of very well qualified graduates through the years. Accreditation of the curriculum was not attempted during Thomas's administration due to a shortage of staff and the lack of sufficient laboratory equipment. However, accreditation (by the American Institute of Chemical Engineers) was accomplished in 1967 when the new space in Jett Hall became available and a staff of four, all with Ph.D's, had been at work for several years.

Gradual changes occurred in each curriculum. The American Society for Engineering Education made several significant studies and proposals for curriculum development. The pressure to conform to
requirements of the accrediting agency, the Engineers Council for Professional Development (ECPD), caused considerable change. Many discussions and debates resulted between staff members as they struggled to work out the necessary compromises between their desires, the available courses in the institution, and ECPD’s recommendations.

Although accreditation inspection activity was discontinued during the war years, 1941–46, the School of Engineering was re–inspected in the spring of 1950 for civil, electrical, and mechanical engineering. Regular inspections were made at five–year intervals, in 1955 and in 1960. An intermediate inspection was made of civil engineering in 1953. This department was deficient in staff and in laboratory facilities at the 1950 inspection, and it was given a provisional rating. A new department head, Professor Frank Bromilow, as well as new staff members and laboratory additions brought the 1955 rating to full accreditation, and this was maintained by all three main departments through the 1960 inspection.

The inspection and accreditation program of ECPD was a very useful and important factor in the development of the School. The preparation of the detailed reports before a committee’s visit forced a review and self evaluation of the programs, while the comments of the committee members did a great deal to encourage the staff.

Graduate course offerings were begun in 1952 by electrical engineering which was authorized to offer the Master of Science in Electrical Engineering. Courses were offered in the evening and most of the students were employees of White Sands Proving Ground. In 1955, civil engineering and mechanical engineering began similar master’s degree programs. These programs rapidly changed to largely daytime schedules, with several graduate assistants in each department. A graduate school was established in 1956 with Dr. Earl Walden as the first dean.

A Doctor of Science plan was approved in 1958 as a combined offering of mathematics, physics, and engineering. However, this was replaced in 1961 by the Doctor of Science in Engineering which was initiated in civil engineering, electrical engineering, and mechanical engineering. Thus, by the end of Thomas’s administration the graduate program was firmly in place. About this time research and publications became important for faculty success and advancement.

Research and Extension

Some research studies in engineering were started as early as 1930, when the dean of engineering also was listed as director of the Engineering Experiment Station. Not until 1957, however, was any organized plan for the Experiment Station placed into operation. In that year, Professor Frank Bromilow was appointed associate director and a token allotment of state funds was made. Several sponsored projects, chiefly in civil engineering, were in progress during that year.

The growth of engineering research was slow at first, but by 1960 all departments were participating and the prospect for a rapid expansion seemed excellent. Two activities which may be classed as engineering extensions were the New Mexico State Highway Conference which was brought to this campus by Professor Frank Bromilow in 1955 and which has continued its annual meetings here, and the Water and Sewage Treatment Short Course which has been held every spring since 1956. Professor John Clark was the one responsible for this very successful activity.

Staffing

Securing adequate staff continued to be a problem throughout the Thomas Administration. Only one teacher in 1947, Dr. C. Donald Crosno, held a Ph.D. degree. At first, new teachers with master’s degrees were gladly accepted, and it was only during the second half of the 1950–60 decade that the college became successful in attracting more faculty with doctorates.
Although there was a considerable turn over in staff, usually one or more each year, there were, fortunately, few changes in department heads. Professor Frank Bromilow became head of civil engineering in 1951, and Professor Harold Brown, head of electrical engineering in 1956. Professors Hanson, Shires, and Lukens continued as heads of agriculture, chemical, and mechanical engineering respectively. After about 1956, Professor Jesse P. Morgan served as assistant to the dean and also supervised the co-op program.

The number of engineering faculty in 1960–61 was thirty-six. Eight of these held a Ph.D. and nearly all of the others held a master’s degree. This contrasts with the year 1947–48 when there were only fifteen on the engineering teaching staff, and only one of these had doctoral-level training.

![James W. Field, voted “Most Popular Faculty Member” – 1957. (HHUA)](HHUA)

![John Clark (1953–1979) in a civil engineering lab. (HHUA)](HHUA)

**Student Enrollment**

The peak of veteran enrollment occurred in the fall of 1947 when more than 500 students registered in engineering. Within two years, the high number of engineering graduates across the country was causing alarm; predictions in national magazines of job shortages for engineers caused enrollments to drop to one-half, nation-wide. At New Mexico A&M, only 249 engineers enrolled in 1951.

The Korean War caused a sudden dramatic demand for engineering graduates, and from 1951 on there was no shortage of jobs. By 1960, more than one hundred industrial companies and governmental agencies were sending representatives to the campus to recruit engineering graduates.

The co-op program and the renewed demand for engineering graduates caused a rapid increase in enrollment from 631 in the fall of 1953 to 1100 in the fall of 1956, after which there was a leveling-off period. At the end of the decade, about 1200 undergraduate students were enrolled in engineering.

The number of degrees granted also illustrates the growth of engineering. Prior to 1947, a total of 528 degrees had been granted. During the fourteen years from 1947 to August 1961, 1,171 bachelor’s degrees and 62 master’s degrees were granted. New Mexico State University*2 was no longer classified as one of the smaller engineering colleges.

*NOTE: The name of the school had been changed by the Board of Regents to “New Mexico State University of Agriculture, Engineering and Science” on December 17, 1958. After approval of the voters in November 1960 and deletion of the last five words, the institution became New Mexico State University.
Buildings and Equipment

The engineering activities in 1947 were centered mainly in what was called the engineering quadrangle. This group of buildings included Goddard Hall, with its annex completed in 1947 as a WPA project, the wood frame civil engineering building, the original adobe engineering building which was continued in use as a welding shop, the KOB transmitter building, and the mechanical engineering laboratory and heating plant. Chemical engineering was allowed to claim a few rooms and laboratories in the Science Hall.

The air mechanics building became available to mechanical engineering in 1948 and provided the first good addition to space for the development of new laboratories. This building had been built just before the war and had served for training a large number of people as aircraft engine mechanics. The two-year training programs, contrary to expectations, did not prove popular after the war and were discontinued. Thus the space and some useful equipment were assigned to mechanical engineering.

Agricultural engineering had constructed its own buildings in 1948. These were not of first-class quality and their location at the entrance of the campus was deplored by some university officials. The buildings served their purpose, however, until they were removed to permit construction of the large agricultural building in the early 1960s. New space for agricultural engineering was included in this building program.

Although plans for a new engineering building were started as early as 1952, it was not until the spring of 1957 that Jett Hall was completed and dedicated. The dean’s office and the departments of civil engineering and mechanical engineering moved into the new building, leaving electrical engineering in Goddard Hall.

Air-conditioning of buildings on the campus commenced with the new Hadley Hall and the library building in 1953. A 1958 addition to Goddard Hall and considerable remodeling therefore gave electrical engineering good air-conditioned quarters. The cooling system was a source of frustration in 1960, when it broke down two days before the inspection visit of the ECPD committee in May, and did not work again for six weeks.
Chemical engineering took over all of the Science Hall in 1957, and thus for the first time had room for expansion. By 1960, plans for a large addition to Jett Hall were formulated; however, it was not until five years later that a contract was signed for construction.

At the end of Thomas’s term as dean, much progress had been made in securing space and in the improvement of laboratory facilities. In addition to purchased equipment, a number of industrial corporations had assisted in making donations of equipment or by offering equipment at very substantial discounts in price. Among the dozen or more companies who gave valuable assistance were the General Electric Company and the Westinghouse Electric Corporation.

Surplus military equipment was secured to great advantage in some cases and less so in other cases. One example of the latter was a carload of unspecified electronic surplus material which the Physical Science Laboratory and electrical engineering were to share. After paying freight charges from Utah, it was discovered that the shipment consisted of odd parts for a tubular radio mast or antenna but that the parts therein could not be assembled into even one complete antenna!

The Sanitary Engineering Research Building was completed in 1959. This was the first (and only) building assigned completely to engineering research. It was built with a grant from the U. S. Department of Health with matching state funds, and was to be used for health-related research for at least ten years. (The building is still in use in 1989.) Professor John Clark was the director of this program.

The University Research Center, organized in 1959, had its own building soon after that time. Electrical engineering was the first engineering department to participate actively in this development with the appointment of Dr. Kaiser Kunz as research professor of electrical engineering in 1960.

**Honorary Fraternities and Professional Societies**

A local honorary fraternity in engineering, Mu Phi Pi, had been established in 1925. The requirements for admission were made similar to those of the national fraternity Sigma Tau, and in 1949 the members were finally successful in petitioning Sigma Tau to establish a chapter here. The Alpha Gamma Chapter of Sigma Tau was installed on May 22, 1949, and the first initiation group included forty students, two alumni, and three professors. The first president was William Harvey. The sponsor was D. B. “Dad” Jett, who had sponsored Mu Phi Pi most of the years since its origin.

Activities of Sigma Tau varied through the years depending on the ambition and ability of the officers, but were generally satisfactory and helpful to the college. Professor L. B. Shires became sponsor in 1956 upon the retirement of former Dean Jett, and continued as sponsor until his own retirement in 1964. Later, Sigma Tau became Tau Beta Pi.

Mechanical engineering students were successful in petitioning Pi Tau Sigma, and the Tau Delta Chapter of that national honorary fraternity was installed on April 13, 1950. Thirty-one students were initiated as charter members, with Bob Fox as president and Professor Glen Panteleer as sponsor. Students in electrical engineering followed suit several years later with the installation of the Gamma Chi Chapter of Eta Kappa Nu on May 9, 1959. Professor Harold A. Brown was the first sponsor. Both of these groups have been quite active in their respective departments.

Student branches of national professional societies have been an important source of activity in all the engineering departments. In some cases, considerable financial aid is supplied by the national organization supporting student paper contests and district meetings as annual affairs. Many faculty members have served as sponsors of the groups, the names of which indicate the departments involved: The American Chemical Society (ACS), the American Society of Agricultural Engineers (ASAE), the American Society of Civil Engineers (ASCE), the American Institute of Electrical Engineers (AIEE), later to become the Institute of Electrical & Electronic Engineers (IEEE), and the American Society of Mechanical Engineers (ASME).

A student Engineers’ Council was formed soon after 1950 to coordinate the activities of the several student organizations. It was made up of two representatives from each student branch and each honorary
fraternity. The chief duties of the council were to plan and carry out the engineering “mixer” in the fall and Engineers’ Day, including the Engineers’ Ball, in the spring.

Engineering students were active in many campus organizations and it should be noted that university student body presidents were frequently from the Engineering College. The quality of students studying engineering had much to do with this record, but the attitude of the teaching staff was also important. Definite efforts were made to emphasize the responsibility of the engineer to take his place in the community as well as taking part in professional activities.

In August of 1961, Dean Thomas turned over to Professor Frank Bromilow the leadership of the College of Engineering. Another milestone had been reached on a journey which had offered its travelers ever-increasing opportunities for growth. For Dean Bromilow, and others who would follow him, the road ahead promised more challenges and more rewards in the quest for excellence.
5 Coming of Age
1962–1987

Curricula and Programs

The greatest contribution Dean Frank Bromilow made to the engineering program at NMSU was to build a strong graduate program. M. A. Thomas had laid a good foundation; the departments of civil, electrical, and mechanical engineering offered both a master’s degree and a Ph.D. by 1961. Bromilow realized that a strong professional faculty was a prerequisite for a solid graduate program and, although he did not have a doctorate himself, he began to hire people who did.¹

Dr. Narendra Gunaji in civil engineering, Dr. D. Bruce Wilson in chemical engineering and Dr. Frank Carden in electrical and computer engineering are all among the professors who were hired for the express purpose of developing and strengthening the program of graduate studies in their respective departments. Dr. C. Quentin Ford in mechanical engineering (recruited by Dean Thomas in 1959), was also given this charge. The first doctoral degree in engineering was awarded to Richard K. Fergin, a student of mechanical engineering, in June 1964.

Another important development which occurred early in Bromilow’s administration was the establishment in 1963 of the Technical Institute, later to be called the Department of Engineering Technology. Professor Louis Kleine, associate professor of mechanical engineering, was appointed first department head of engineering technology and was charged with developing the programs in electronic, civil, and mechanical technology. "Always a pragmatist and devoted to engineering application, Dean Bromilow recognized the need to provide to New Mexico residents a means to enter the technological age even though they might not want or be able to attain an engineering education."²

Engineering technology initially offered only two–year associate degrees in the civil, mechanical, and electrical options. The first class of sixteen graduates received their degrees in 1965. In 1971, the program was expanded to offer a Bachelor of Science degree, and became the only four–year program in engineering technology in New Mexico.³ It was accredited four years later, the associate degree programs having been accredited in 1968.⁴

The early 1960s saw some important changes in the chemical engineering department as Dr. Edward Thode became head in 1963, and a Master of Science program was approved in 1966. Also significant was the department’s first participation in the co–op program in 1964. Accreditation by the American Institute of Chemical Engineers was awarded following the inspection visit during the 1966–67 academic year.⁵

The first Bachelor of Science degree in industrial engineering was awarded in 1967 from the mechanical engineering department. Two years later, a separate department was formed, as Dr. Ford explains:

Dean Bromilow also recognized that New Mexico could not support separate programs in Nuclear and Industrial Engineering at each of the universities and he negotiated an agreement whereby UNM would provide Nuclear Engineering and NMSU would provide Industrial Engineering. Thus, in 1969, Dr. C.Q. Ford, Head of Mechanical Engineering, took what was an option in Mechanical Engineering and structured it into a new Department of Industrial Engineering. This was to be the last department formed up to the present time [1986].⁶
A master’s program was established in industrial engineering in 1975.

There were several name changes during the period which reflected the evolving nature of the organizations. Electrical Engineering became Electrical and Computer Engineering in 1973 and the Engineering Experiment Station became the Engineering Research Center in 1982. Even the name of the accrediting agency was changed in 1980, as the Engineers Council for Professional Development (ECPD) became known as the Accrediting Board for Engineering and Technology (ABET).

Agricultural engineering, which had received its first five-year accreditation in 1965, lost its status as a separate department in 1986 when its affiliation with the College of Agriculture ceased. The program was moved into the civil engineering department. Another program housed in that department was geological engineering, which had first offered a bachelor’s degree in 1972–73. Thus, with the move in 1986, the name of the department was expanded to Civil, Agricultural, and Geological Engineering.

Two programs born in the 1950s grew to have great significance for the College of Engineering: cooperative education and the Engineering Experiment Station (Engineering Research Center). Both have offered students educational opportunities which would not otherwise have been available. Co-op participants gain first-hand professional experience, often at locations around the world; and research activity benefits graduate and undergraduate students, both directly, through participation, and indirectly, through improved and current teaching.

The Interdisciplinary Doctoral (I. Doc.) program was instituted by the dean of the graduate school, W. H. Matchett, to serve students whose interests and career goals are not met adequately by degree programs in the traditional disciplines, but which can be met by judicious combinations of existing disciplines. Chemical engineering students Stan Holbrook and Bruce A. Barna were among the first to take advantage of this opportunity; Barna received the first I. Doc. degree in 1984.\(^7\)

**Faculty and Administration**

The transition in 1961 from the Thomas administration to that of Frank Bromilow was no doubt made smoother by the presence of Jesse P. Morgan, a civil engineer who had been at the university since 1948. Morgan served as assistant dean for one year under Thomas, and was assistant to Dean Bromilow until 1968–69. Of particular interest to New Mexico residents is the fact that Jesse Morgan was responsible for building the tunnel between Alamogordo and Cloudcroft.\(^8\)

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An early computer in the Engineering College – 1963. (Hobson–Huntsinger University Archives)  
Honeycomb solar collector – 1976 (HHUA)
The faculty in 1963–64 was already beginning to show the results of the efforts of Deans Thomas and Bromilow toward professionalism. Of forty-nine faculty members, thirteen had earned doctorates, and twenty-two were registered professional engineers.9

Roger M. Zimmerman took over Morgan’s post in 1968 and served as assistant dean for about six years. When Frank Bromilow died unexpectedly in 1974, Zimmerman became acting dean while a search was conducted to fill the position.

John Hernandez, who had come to NMSU in 1965, had taken a sabbatical leave in 1973 to go to Turkey and work with environmental engineers there. When he returned two years later, he was made dean of the College of Engineering. C. Quentin Ford was named associate dean. Hernandez points out that since Milton became president in 1938, there had been only three deans: Jett, Thomas, and Bromilow; therefore, these years represented a “relatively long and very stable” period of growth.10

Hernandez had stated at the beginning of his term that he would hold the position for five years,11 so in 1980 a search committee again began seeking a new dean. In the catalog published in June 1980, Dr. Ford is listed as the interim dean, while George W. Lucky (from electrical engineering) is shown to be the interim associate dean.

Ford guided the college from July 1, 1980, until July 1, 1981; at that time Joseph Genin, a mechanical engineer, was hired to fill the deanship, and Dr. Ford resumed his duties as associate dean. In January 1981, John Hernandez went to Washington, D. C., to become the Deputy Administrator of the U. S. Environmental Protection Agency. When he returned two and a half years later, he found full-time teaching to be almost like a new experience. Hernandez credits Dean Genin with offering suggestions which proved to be quite helpful in improving his teaching style.12

John Patton, head of chemical engineering when Genin became dean, has also commented on Genin’s ability to give sound advice: “Encouragement and enlightened counsel offered by Joe Genin...altered the Department’s rebuilding philosophy.”13

Genin returned to teaching July 1, 1985, and in the fall, J. Derald Morgan came to NMSU from the University of Missouri–Rolla to assume the deanship of the college. Called “flexible, gutsy, aggressive, a leader and idea man,” Dean Morgan is proving himself very capable of guiding the College of Engineering into its “second century of excellence.”

Enrollment

Increases and decreases in engineering enrollments have been cyclical in nature, and have followed national trends and concerns. Dr. Ford notes with interest the fluctuations he has observed in the last forty years.14 Right after the war, he explains, engineering enrollments went up quite high as veterans had seen the need for technology during the war. The year 1950 saw the greatest number of engineering degrees granted until about 1980. Enrollments then declined until the Sputnik period, about 1958–59. Interest in engineering and science became greater again and the enrollment cycled back up until about 1966–67.

When interest waned in the early 1970s, the result was the period of lowest enrollment in the College since the mid–1950s. In 1973, the enrollment “bottomed out” at just over 1,000 students in engineering; tenured faculty were asked to leave.15 Then, once again, enrollment started back up and peaked about 1981–82, with some 2,600 students in engineering – 2 1/2 times the 1973 figure.

Although enrollment is presently on a downswing, decreasing at the rate of about 4 percent a year, Dr. Ford does not find this worrisome. Engineering continues to attract good students, and though the numbers may continue to decrease for a few years, he knows the reverse will soon be true. It’s just a matter of riding the wave: “We work like mad and handle the high points, and then we relax and recoup in the low points.”16

Some of the credit for the high enrollment figures of the early 1980s must be given to Dr. John Hernandez, who, as dean, set out on a “vigorously recruiting effort” which proved to be quite successful.17 Hernandez particularly sought minority students - Hispanics, Blacks, Native Americans, and women. He found money in industry and government for tuition scholarships and, with a National Science Foundation
grant, helped establish the Southwest Center for Science and Engineering, aimed at high school minority students.\(^{18}\)

In 1963–64, there were 4,250 students enrolled at NMSU. Of this number, 1,271, or approximately 30 percent, were engineering students.\(^{19}\) At the beginning of the spring 1988 semester, the university enrollment was 13,265, and the number of engineers totalled 2,303 undergraduates and 147 graduate students.\(^{20}\)

**Facilities**

An addition to Jett Hall was completed in 1966, and the chemical engineering department moved into that portion which had been designed for it. Thomas–Brown Hall became the home of the electrical engineering department in 1972, and both engineering technology and industrial engineering moved into Goddard Hall. In 1980, the Engineering Complex was completed. It is a modern-looking building which, besides housing the Solar Energy Institute, is primarily used as laboratory space for all the engineering departments except electrical and computer engineering and chemical engineering. In 1982, the College of Agriculture’s dairy laboratory was remodeled and renamed the Engineering Technology Annex.

Facilities for agricultural engineering changed several times during this period. The Quonset huts gave way to the new Agriculture Building in 1964; space here was supplemented by the construction of an agricultural engineering laboratory building two years later. When Knox Hall was built in 1981, the department moved its offices to it from the Agriculture Building. Since 1986, agricultural engineering has been a part of the civil engineering department, and continues to use some of the facilities of the College of Agriculture. A new building, Engineering Complex II, has just been completed to serve the department of civil, agricultural, and geological engineering.

**Women in Engineering**

The distinction of being the first woman engineering graduate of the New Mexico College of Agriculture and Mechanic Arts belongs to Elizabeth Elser McCallum, who earned a degree in civil engineering in 1934. The 1942 *Swastika* included this comment: “Engineers, the boys (and two girls this
Engineering Complex I, built in 1980. (Photo by Information Services)

year, as well)... spend most of their time in chemistry, electrical engineering or steam labs, when they’re not surveying the campus or the mesa.”

Engineering as a career choice for women has developed significantly in the last ten to fifteen years. As Dr. George Abemathy explains, “The engineering profession is a thinking profession rather than a physical profession; women could have done it all along. Culturally, we didn’t know that, didn’t encourage them to do that.” He adds, though, that women probably have better job opportunities than men, because companies are trying to correct the long-standing imbalance.

John Hernandez points out that one of the problems women have that men don’t is the lack of role models; therefore, it is hard for them to see themselves in engineering jobs. Women do well in the profession, so he feels that situation will be improved in time.

Presently, the department with the highest number of female students, about 150, is electrical and computer engineering, the largest department. In terms of percentages however, industrial engineering is the leader, with women making up 30–45 percent of that department’s total enrollment. The agricultural engineering program has had some outstanding female graduates, including Katy Byrd-Humphries, first woman president of the New Mexico Society of Professional Engineers.

**On The Lighter Side**

One of the qualities essential to greatness – whether of a man or of an institution – is humor, and there are, of course, many incidents and occasions which the faculty and students of NMSU can remember with pleasure, light-hearted moments which add color to the fabric of the college experience.

One such incident has been recounted by engineering technology’s department head emeritus Louis Kleine. It concerns Evern Wall, who was a student in Professor Kleine’s thermodynamics class in 1957. Wall received two degrees from New Mexico State University, a B.S. in electrical engineering in 1957 and an honorary doctorate in 1984. He began working with El Paso Electric Company while a student in 1953, and progressed to become president of the company. He is presently Chairman of the Board and Chief Executive Officer, and was named NMSU College of Engineering Distinguished Alumnus in 1976.

But on the Saturday morning when Professor Kleine was giving his two-hour thermodynamics final exam, Evern Wall wasn’t feeling too well. He had been to a party the night before and he didn’t really feel...
up to taking a final exam. Without any mention of this fact, he took a seat in the back row and spread his test papers out in front of him.

As the period drew to a close, another student, who had done very well all semester, handed in his paper and started to leave. Professor Kleine (who says he never did particularly like to grade papers) whispered to the student, “How would you like for me to flip a coin for your grade – 80 or 90?” The student said, “No, I think I did better than a 90; I want you to grade it.” Professor Kleine laughed and agreed.

Evern Wall heard this exchange, even though he was sitting in the back, so when he turned in his exam, folded and with his name on the outside, he asked, “How about me, Prof? I heard you.”

“What did you hear?” Kleine asked.

“I heard you offer to flip him a coin. Won’t you flip me a coin?”

Kleine says that Evern was “squeaking by” in that course, which was a mechanical engineering course required of all engineering majors. It wasn’t from lack of ability; Evern was “stretched out” that last semester and was putting more of his effort into electrical engineering courses which were his major. But, Kleine emphasizes, “he was a very likeable fellow.”

So Professor Kleine said, “Okay, I’ll flip you – 70 or 0!”

Evern said, “Flip it.”

Kleine said, “You’re going to call it?” and Evern said yes.

So the professor flipped a coin, and Evern called it correctly. “Okay,” Professor Kleine said, “you’ve got at least a 70. I’ll grade it to see if you got a better grade than that, but you’ve got at least a 70.”

When Professor Kleine was grading the papers later, he found that Evern Wall had handed in four blank sheets of paper; the only writing was his name on the outside! As Professor Kleine says, “Evern could not lose on that flip!”

It’s not the usual way of grading, but the story has provided lots of laughs over the years.

Grades were the subject, too, of an incident recalled by Mack Haley (B.S., 1966). According to Haley, it was hard to get an A from Professor James Field, who taught mechanical engineering shop courses. Even though Mack thought his work was above average, he had received a C at the end of the first semester class. During the second semester, students were assigned the task of making a screw jack. Mack got an A on this project, and since he had a 93 average in class, he asked Field if he deserved a B. Professor Field considered for a moment and then declared magnanimously, “Yes, you do deserve a B!”

Another story about Professor Jimmy Field concerns his demonstration of a turret lathe. The machine could perform several functions in a sequence, but the operations had to be changed manually. One student
apparently could not see the need for this particular bit of education and asked the professor if there weren't machines which could perform the process automatically. "Hell, yes," Field replied, "but a punk like you couldn't turn one of those machines on!"²⁸

Of course, faculty members can tell funny stories about students, too. George Alexander, head of the engineering technology department, remembers the time a student called to say that he wouldn't be able to come to class because the results of his examination for strep throat were "negative." And on a grander scale, if not more humorous, Dr. Alexander recalled he loaned a "starving student" $300 to pay for groceries and rent, only to learn that the student and his girlfriend used the money to enjoy Spring Break in Mazatlan.²⁹

Engineering technology professors were, in fact, able to recall several amusing incidents. Professor Louis Kleine, being an avid pipe smoker for many years, discovered on more than one occasion that his tobacco contained chopped rubber bands. "Another time he received a bill from Playboy magazine for two gift subscriptions. Possibly a student had thought that Professor Kleine wanted the president of the university and the registrar to receive additional reading material."³⁰

Professor Herrol Skidmore contributed this humorous fact: "Students in engineering technology have developed an award for the professor who piles it on the deepest. The plaque has a large cow chip on it that has been sprayed with gold paint. This is an annual award."³¹

Paul Finch, professor of industrial engineering, tells of coming to NMSU after a career in industry to teach computer simulation, a subject in which he is well qualified. During a random sampling of student opinion in the College of Engineering, one student commented, "Finch doesn't know anything about simulation and certainly shouldn't be teaching a course in it." Six years later, Finch received the Bromilow Award for excellence in teaching.³² Perhaps it is true that "he who laughs last, laughs best"!
Beginning a Second Century of Excellence, 1988–

The First 100 Years in Perspective

As engineering education at New Mexico State University enters its second century, it seems an appropriate time to reflect upon the College’s progress in the past, assess its merits in the present and examine its goals for the future.

For George Abernathy, the institution’s changing from New Mexico College of Agriculture and Mechanic Arts to New Mexico State University was a move “into this century.” He says, “When I came in 1957, we were a small, predominantly agricultural school. . . . We built a university that was consistent for the people of New Mexico to send their sons and daughters to school and get a good, solid foundation at an excellent institution. . . . I think we’ve gone from a cow–college to a full–fledged university. We may not be the best in the world, but we’re very good for the amount of dollars we cost the state.”

In an effort to determine the forces which have shaped the College of Engineering, professors who have been at NMSU ten years or more were asked to respond to questions regarding significant changes and developments, persons of influence, and areas of strength.
According to a number of responses, the source of greatest change has been the impact of computers. Frank Carden says, "Computers have changed our way of life – our way of teaching, our way of solving problems, our way of communicating." Quentin Ford agrees; what computers have done, in his opinion, is to provide "greater opportunities to do types of problems, get solutions that we were not able to before." The computer has opened up vistas that before were only dreamed about.

Other responses reflect similar views. To Satish Kalam, the "explosion of computer resources" is one of the most significant developments in recent years. Raymond Willem points to the "use of the computer to solve an increasing number of engineering problems; also the development in capacity to do computation." "Increases in computer power and reduction in size, energy requirements and cost of computers" were factors mentioned by Javin Taylor. Paul Finch explained that greater computing power included "equipment, software, network [capabilities] on campus and off."

The computer has taken the place of the slide rule. This would have seemed highly unlikely to engineers of earlier days. Consider, for example, this statement from the 1942 Swastika: "An engineer can easily be identified by his slide rule. A soldier without a gun is not in as horrible a predicament as an engineer without his 'slip stick,' and critics in the other schools accuse the technicians of carrying their brains in their hip pockets."

In addition to computerization, the most readily apparent changes have resulted from growth: higher enrollments, more and better facilities, a broader curriculum in some areas, and increased funding for research and equipment. Frank Carden has pointed out that the establishment of graduate programs has allowed NMSU to compete with other nationally recognized universities on the east and west coasts.

Greatly increased research capabilities have also added to the status and prestige of the Engineering College. Narendra Gunai believes that its accomplishments may be recognized by the uses and ramifications of the research work done here, and by the fact that government or private industry then "sees fit to elevate our graduates to high levels of responsibility."

The Cooperative Education Program has given NMSU graduates the experience that employers are seeking, so when Maurice Hamilton was asked about the most important development, he named the co-op program. "In terms of engineering education, that's it."

Specific program developments of significance include the Bachelor of Science in Engineering Technology, the Master of Science in Manufacturing Engineering from the industrial engineering department, as well as that department's televised instruction. Ray Willem points out that "a very solid beginning has been made" in optics, and J. Eldon Steelman mentions the increased enrollment of women students.

Not all the changes have been positive; one respondent referred to the greatly diminished interest and activity in solar research, and another commented on the loss of camaraderie which comes with increased size.

When engineering professors were asked to name those persons who had had the greatest influence on them, the list that resulted looks like a "Who's Who in Engineering at NMSU." "Dad" Jett, Hugh Milton, and M. A. Thomas were mentioned, as were Deans J. Derald Morgan and C. Quentin Ford, Professors Frank Carden, Jim Field, Gerald Flachs, Arch Lukens, John Clark, Bill Fleming, Louis Kleine, and George Lucky. William Kersting, Javin Taylor, and Gerald Flachs were praised by a colleague who said, "I think those guys are as good as you get." Some who have been specially recognized for their teaching skills are Westhafer Award recipients Bill Kersting of EE and Leonard Traina of CE; Bromilow Award recipients Jesse Lunsford, Bill McCarthy, and Leonard Traina of CE, Paul Finch of IE, Eldon Steelman of EE, and Bruce Wilson of Ch E; and Donald B. Roush Award recipient Mary Ann Maher of IE.

The inclusion of former Vice-President William B. O'Donnell, mathematics professor Earl Walden, Jim Hageman and Dale Alexander from the chemistry department, and Joe Denk from the Computer Center illustrates the fact that engineering is a part of the total university community.
Looking Toward the Future

Any plans for future progress and direction must be built upon the present strengths of an organization. It is precisely this fact that engenders optimism when contemplating the prospects for the College of Engineering.

Associate Dean Ford has very eloquently described the solid foundation on which tomorrow’s programs and activities will be based. As he puts it, the College has maintained a high level of technological development and current, strong curricula. It has been active in new areas of research, and has been very successful in recruiting outstanding faculty, particularly some young, very dynamic people. “We have maintained an academic ethic; . . . the school has always been known as a friendly, professional type of school, and I think we have maintained that image well—that’s something I’m very proud of.” He mentions the fact that this engineering program was one of the first to be accredited, and has maintained a good, solid position. Ford states also that the College has stayed “in the forefront of science and technology.”

But although each of these factors contributes to the success of the whole, the College of Engineering is, first of all, the people—administrators, faculty, and students—who have given, and continue to give support in countless ways. The real strengths of the College, as evidenced by these statements by engineering professors, are: “faculty members that enjoy teaching and administration that values it,” “availability of faculty to interact with students,” “strong emphasis on undergraduate teaching,” “bona fide concern for the student,” “quality teaching,” “outstanding atmosphere and attitude of faculty and students,” “dedicated faculty,” “fundamental undergraduate curriculum,” and “outstanding students.”

The size of the school is also a positive factor: “smaller program size allows faculty to pay individual attention to the students”; “technically competent, small, personal”; “size has not become overwhelming; classes still manageable.”

Thus, the College has a solid foundation on which to build its future. Associate Dean Ford anticipates no radical changes, but rather “a continual strengthening and enhancement of what we do have.” That statement could refer to the doctoral programs in chemical engineering and industrial engineering effected in 1988 and ’89 respectively, or to the construction of Engineering Complex II, a building which will be used primarily by civil engineering.

Herrol (Jim) Skidmore notes that “rapidly expanding technology has caused a continuous relearning process to become necessary.” To Dean Morgan, it is the momentum of this process which will influence the College in the future. He envisions that, by the year 2000, companies will be very dynamic. As companies change, he says,

this will affect the way in which people will have to address their lifetime of work . . . . What you’re doing, how you’re doing it may turn over three, four, five times in a lifetime of forty or fifty years of working . . . and therefore, the ability to have access to continued education and refreshment of your talents and capabilities is going to become more and more important. . . . The College of Engineering at New Mexico State University should be a part of that force, a part of providing the people of New Mexico—anywhere in New Mexico—the opportunity to be a dynamic part of the changes of the work force and to maintain their competence.

The College has already begun to address this need by establishing off-campus graduate programs at Kirtland Air Force Base, Clovis, and Carlsbad.

When Quentin Ford was asked recently what makes a good engineer, he named these qualities: someone who is curious, who has a certain amount of entrepreneurship, and who is not afraid to take chances; someone who has an understanding, or rather, a lack of fear of science and mathematics, and an interest in the economic standards of living. Engineers have to be people-oriented. “We can take the theories of science, the laws of mathematics and apply these to real everyday life.”

John Hernandez would add some more requirements for the engineers of the future. “I think we need to insure, as time goes on, that we instill in these students the need to prepare themselves to be managers, to be administrators of engineering activities.” Engineering graduates must be articulate, able to think logically and express themselves well.
The following statements are found in a brochure published by the College of Engineering: “Engineering is the conversion of ideas into reality. . . . Engineers are the people who imagine, research, design, and create. . . . For centuries, through the science of engineering, major contributions have been made toward a better quality of life and toward the accomplishments of today’s high-tech world.”

As engineering at New Mexico State University moves into its second century of helping students change ideas into reality, it does so supported by the dreams and hard work of all who have gone before, and guided by the vision of today’s leaders. The future for the College of Engineering looks very bright indeed.
DEANS OF ENGINEERING
1914 – Present

Arthur F. Barnes
1914–1920*

Ralph W. Goddard
1920–1929*

James T. Rood
1930–1932*

Burton P. Fleming
1932–1934*

Hugh M. Milton
1935–1938*

Daniel B. Jett
1938–1947*

Melvin A. Thomas
1947–1961*

Frank Bromilow
1961–1974*

John Hernandez
1975–1980

C. Quentin Ford

Joseph Genin
1981–1985

J. Derald Morgan
1985 – Present

* Photos courtesy of Hobson–Huntsinger University Archives.
Departments of the College of Engineering
Agricultural Engineering

Although all the engineering departments share the same basic philosophy, there is in the history and development of each department something which differentiates it from the others. Agricultural engineering is distinguished by the fact that it was jointly administered by the College of Engineering and the College of Agriculture until it was discontinued as a separate department in 1986. Although the funds for research came through the Agricultural Experiment Station, the academic responsibility has always resided in the College of Engineering for accreditation purposes.

M. A. Thomas points out that “the departments of Agricultural Engineering and of Physics were part of the School of Engineering for many years.”¹ (Agricultural engineering was established by 1919, C. Q. Ford explains, with an option available in irrigation engineering.)² Thomas continues, “Degrees were not offered in these fields, however, and they operated only as service departments. The work in Agricultural Engineering was discontinued in the late 1920s [early 1930s] and the department of Physics was transferred to the School of Arts and Sciences.”³

In 1948, agricultural engineering was once again established as a department, and Charles Bouns was named head. The three faculty members originally assigned to the department were Bouns, Alvin Stewart, and Zariel Tyson. When, after several years, these three men left the school for different reasons, Eldon Hanson became department head. Hanson was a United States Department of Agriculture employee stationed at the college. He administered the department from 1951 until his retirement in 1979, and during this period made “monumental” contributions in the research of water consumption.⁴

Exhibit at Dona Ana County Fair, October 6–9, 1926. (Hobson-Huntsinger University Archives)
Agricultural engineering has a dual nature, as represented by its name. According to George Abernathy, who took over as department head in 1980, an agricultural engineer has to have the understanding of both a civil engineer and an agronomist. For that reason, it shouldn’t be surprising that the “Father” of agricultural engineering at NM A&M was an agronomist, Albert S. Curry. Acting director and associate director of the Agricultural Experiment Station from 1945 to 1963, Curry was, more than anyone else, responsible for starting the agricultural engineering program. He had done a great deal of research on water utilization by plants, and his files and equipment became the nucleus of the new department.

Ag engineering courses, dealing with subjects such as farm machinery and irrigation and drainage, were taught to students from both the schools of Agriculture and Engineering. However, the courses were different for the two groups. Engineering students received more math and science in preparation for designing an irrigation and drainage system, for example.

The perspective of agricultural engineering also differs somewhat from that of civil engineering. Both disciplines deal with structures and environments, and the many aspects of treatment, control, and use of water. Irrigation and drainage is an especially important subject to both groups, and Dr. Abernathy explains the difference in approach between ag engineering and civil engineering:

The civils would take more of a large-scale view of irrigation, the design of something like Elephant Butte Irrigation District—the dam, and all the big ditches... Ag engineers take the water after it comes onto the farm, so we’d be designing conveyance ditches, but they would generally be smaller conveyance ditches than civils would design. We’re more interested in the soil/water/plant relationships... and matching crops to the water supply. Civil does publish some papers in that area, but generally ag engineering is stronger on farm irrigation where civil is stronger in the large-scale irrigation developments. Actually, it should be a partnership between the two of them to work out a system that goes all the way from the water source to the farm.

The reason for agricultural engineering’s distinctive nature was also the cause of its demise as a separate department in 1986. The program had always been supported by the College of Agriculture through the Agricultural Experiment Station. Agriculture has (state) appropriated research funds, whereas the College of Engineering relies on contract agencies for research money. When, in 1986, there was perceived to be a large cut in the appropriations for the Experiment Station, the College of Agriculture administrators decided that, instead of reducing everyone’s funds, they would simply terminate one program—agricultural engineering. So, in July 1986, affiliation with the College of Agriculture ceased and the program was moved to the civil engineering department, which is now called “Civil, Agricultural, and Geological Engineering [CAGE].”

Although the department did not develop a graduate program because of the small number of undergraduates, it was well known as a supplier of graduate students. Dr. Abernathy says he “almost had a waiting slot at Texas A&M” anytime a worthy student wanted to work on a master’s degree. He also worked with graduate students in the civil and mechanical engineering departments, and from the College of Agriculture. Now, one of the advantages of housing the program in the civil engineering department is that ag engineering students can earn a master’s degree (in civil engineering); Abernathy sees this as a big improvement.

The enrollment of the agricultural engineering department fluctuated over the years, once or twice reaching a high of around fifty students, but generally averaging about twenty-five. The job market is always an important factor. Therefore, the number of foreign students has been consistently high, reflecting the importance of agriculture internationally, with prospects of employment more favorable than those represented by the domestic job market.

Although the number of students in ag engineering has been small, there have been some really good students. Calvin Parmell, for example, was an outstanding graduate; he is now on the faculty of Texas A&M. Katy Byrd-Humphreys, one of the first women to graduate in agricultural engineering, now holds an office in the New Mexico Society of Professional Engineers. She supervises construction on retention dams near Clovis and, according to Abernathy, “she has to deal with the toughest old contractors you’ve ever
seen. She said that when she was pregnant, she looked very much like the people she was working with!”
Ag engineering really has not had very many women students in comparison with the other engineering
departments. At this time (1988), there are three women in the program.

Accrediting of the dualy administered department began in the mid-1960s and has always been done
through the College of Engineering. ABET, the engineering accrediting agency, accredits programs rather
than departments, so there was no discontinuity when agricultural engineering moved to the civil
engineering department. Indeed, the program’s position is stronger now, as ABET recommends that
students be able to take classes from five professors, and the late department’s faculty had been reduced to
three.

Although ag engineering students have participated in the co-op program, this work-study format has
not held the role of prominence which it holds for other branches of engineering education, primarily
because of the lack of large employers. The most active cooperative arrangement has been with the USDA
Cotton Ginning Research Laboratory at Mesilla Park, which takes one or two co-op students a semester.
One student went to the John Deere Company, and a large number of ag engineering students co-op at PSL
(Physical Science Laboratory), although they’re not getting agricultural engineering experience. During
the summer months, ag engineering students can work with the Soil Conservation Service and the Bureau of
Land Management.

During the mid-1970s, some of the best job opportunities for engineers were with the oil well service
companies. Although this work was not related to agriculture, companies such as Halliburton and
Schlumberger really enjoyed working with agricultural engineers because, as Abernathy puts it, “generally
our engineers were from either small communities or farms and the fellows were just used to working hard,
and long hours, and didn’t mind being outside and getting dirty... and they are good equipment operators.”
Abernathy’s observations, in fact, are similar to the opinions expressed by others regarding the desirability
of employing NMSU co-op students and graduates. Because of their background, they do tend to be
hardworking, independent, and self-motivated.

Agricultural engineering has made some significant contributions, many of which are not widely
known. For example, Eldon Hanson and Boyce Williams did pioneering work in drip irrigation in the
1960s, probably earlier than the Israelis, who were the first to exploit it commercially. Ag engineers were
able to show cotton farmers that cotton could be picked without the use of a defoliant, thus saving quite a bit
of money, and early research demonstrated that farmers probably were (and are) doing more plowing than is
really necessary, although this work has not been utilized as well as it could have been.
Early facilities for the agricultural engineering program consisted of two Quonset huts, located right at the entrance to the campus where the Ag Building now stands; these had to be moved in 1964 to make room for the new building. For a year or two, ag engineering had to "jump from place to place." The completion of the Ag Building was a boon in two ways: 1) it provided new quarters for the young department; and 2) it had not cost as much to build as had been anticipated. With the "left-over" funds, an ag engineering laboratory building in which classes would be held for the next fifteen years was constructed behind the Ag Building. When Knox Hall was built in 1981, the ag engineering offices and some small labs were moved there from the Ag Building. This combination—Knox Hall and the Ag Engineering Building—constituted the best facilities the department had had.

George Abernathy is one of a number of professors who can describe New Mexico A&M from a student's point of view. He came to the school in 1948, the year ag engineering was started, and immediately recognized the field as one which was ideal for him. A story he tells with some enjoyment concerns those early days. Behind the two Quonset huts (which he helped to build), was a hydraulics lab. Abernathy was out one Saturday afternoon, plowing around with an old grader, and cut a main water line. Since his father was a plumber, he knew what to do. He went to town, bought a Dressler coupling, and fixed the water line. He says, "Eldon Hanson always remembered that this student was able to do that by himself— to get the water connected without calling him. I think that's why he called me for the job in 1957!"
Chemical Engineering

In 1924, when the Board of Regents decided to institute a curriculum in chemical engineering, that field was the youngest of the major branches of engineering. The American Institute of Chemical Engineers had been formed in 1908, and assumed the role of accreditation of chemical engineering curricula in 1926. The rationale presented by Dean Goddard for establishing the curriculum at NMCA & MA was no doubt based on the need for qualified engineers by the agricultural chemical industry, the mining industry, and by oil and gas production and refining.

The first assistant professor of chemical engineering arrived on campus in 1926. Luke Berry Shires, who had just completed his M.S.Ch.E. degree at Penn State, was the first chemical engineering faculty member to be found in the vast area of the desert Southwest, literally the only one between Austin, Texas, and Pasadena, California. "Prof Shires," as he was known to his colleagues, was an individual very much concerned about the well-being of others, students and faculty alike, and was widely admired by undergraduates and alumni. "Demanding, but compassionate," was the common description of his relations with students. Despite the meager resources with which he had to work, his students received a first-class education which provided a strong foundation for their professional careers.

Upon arrival, Professor Shires was assigned space in the Science Hall, which was to remain the home of the chemical engineering program until 1966. Although combined with chemistry, the chemical engineering curriculum was administered by the School of Engineering from the beginning. The early curriculum followed the industrial chemistry model; however, the 1930s saw changes in the curriculum brought about by an emphasis in the leading universities upon the unit operations and unit processes concepts, thus giving greater importance to engineering than to industrial chemistry. The institution followed suit with a bona fide unit operations laboratory course.

The war years brought a halt to instruction, but the postwar period was characterized by an expanding student population and changing curricular demands. In 1949, a new chemical engineering department was formed, with Professor Luke B. Shires as the first department head. For over a decade there were only two faculty members in the department. With the arrival of Dr. Dinwiddie C. Reams in 1956, to fill the second faculty position, research was added as a vital component of the chemical engineering curriculum.

Funds for modernizing the laboratory equipment were very scarce in all the engineering departments. This deficit, plus the small size of the faculty and the deteriorating physical plant, rendered accreditation impossible, thus making it difficult to retain qualified faculty.

In 1961, Professor Shires asked to retire the next year. Although the university administration seriously considered abandoning the curriculum, it was decided instead to allocate sufficient funds for upgrading it to accreditable status.

Professor Shires recruited his own replacement in the person of Dr. Edward F. Thode. The two men met in 1948 and had maintained correspondence over the years. One condition of Dr. Thode's move to NMSU was that Shires remain for one year as professor after Thode became head, in order to assist with the transition.
Dr. Thode (Sc.D., MIT) assumed his new position in September 1963 and renewal of the department began in earnest. The faculty was expanded rapidly, as four professors with doctorates, one of whom was Donald Bruce Wilson, were hired in the next four years. It was essential that the physical facilities be improved, since the department could delay no longer in installing modernized equipment and in making room for a growing student body. The Science Hall had to be renovated. Realignment of the interior space was not easily accomplished in the old building. Once Professor Thode asked Dean Bromilow if a door which was nailed and blocked shut could be unblocked to permit easier flow of student traffic to a laboratory. Dean Bromilow gazed reflectively at a long diagonal crack in the brick wall and responded, "You had better not. That door is holding the wall up!"

An objective of Dr. Thode's which held high priority was establishing co-op opportunities for chemical engineering majors. The first co-op program established for these students was a "first" in another way: Los Alamos National Laboratory had never employed undergraduate co-op students before its arrangement with the university in 1964–65. Within five years, over twenty NMSU chemical engineering students were working at various industrial and government facilities.

A requisite for a stable undergraduate program is the presence of a graduate program. A Master of Science degree in chemical engineering was approved in the late fall of 1965, and the M.S. program began in 1966.

Beginning in 1964, the department submitted a series of proposals to the National Science Foundation for undergraduate equipment grants. These proposals were successful. Also in 1964, Dr. Thode worked with Dean Bromilow in designing the portion of the Jett Hall addition to be allocated to chemical engineering. The department moved into facilities which were modern and spacious, although not yet fully equipped, in September 1966. At this point the requisites for accreditation – competent faculty, good facilities, and a strong curriculum – had been met. Accreditation was awarded in the 1966–67 academic year.

In 1970, engineering enrollments began a four-year "down cycle" which resulted in an administrative decision in 1974 to reduce the chemical engineering faculty from five to four. Rather than participate in a decision to terminate one of his tenured colleagues, Dr. Thode resigned as department head and transferred to the department of management, in the College of Business Administration and Economics.

The years following Dr. Thode's departure were not easy ones for chemical engineering. The curriculum suffered, and accreditation problems soon followed. Because of the internal strife and resulting resignations, the department's accreditation was reduced from six to two years.
Dean John Hernandez, who had replaced Dean Bromilow, initiated a search for a new head and, during the interim, appointed Associate Dean C. Q. Ford as acting head. After many months, the search committee recommended that Professor John T. Patton (Ph.D. 1959, Oklahoma State) be hired as the permanent head. Arriving in Las Cruces in June of 1977, Dr. Patton immediately faced the problem of rebuilding the faculty and curriculum to accredited stature.

In rapid succession, three recent Ph.D. graduates were hired to bolster the faculty resources. They were ably assisted by two retirees, Herb Minter and Ed Groth, both of whom had distinguished industrial careers. Through their mature counsel and dedicated effort, these two men contributed significantly to the department.

The careers of the three young faculty members failed to mature as fast as each had hoped. One by one, they left the department so that by 1980 the department was again faced with a rebuilding chore. Following the wise counsel of Joe Genin, who had become dean in 1980, the department decided to recruit more mature, established professors. In the next eighteen months, four outstanding professionals had joined the chemical engineering faculty: Dr. K. H. McCorkle, Dr. Allen Rakow, Dr. Richard Long, and Dr. Rudi Roubicek.

Dr. Roubicek, a distinguished, world-recognized authority in biochemical engineering, provided much valuable research leadership. With almost no university assistance he established the Biotechnology Center of Excellence, later renamed the Center for Biochemical Engineering Research. His capacity for coping with adversity was demonstrated by his establishing a bioengineering laboratory on the roof of Jett Hall when conventional space was unavailable! It is hoped that royalty income from his invention of the Roubicek cone fermenter can make a major contribution to biochemical engineering research at NMSU in the years ahead.

The outstanding quality of chemical engineering students and graduates became evident as they assumed positions of leadership and received College and university honors. Even in lean years, the chemical engineering enrollment was of the highest caliber. In 1980, as the number of quality students increased, the department continued to strengthen.

Undergraduate enrollment grew at a rate of approximately 10 percent per year from 1977 through 1981, when it peaked at an all-time high of 230 students. Graduate enrollment grew from three in 1977 to twenty-four in 1981. This growth could not be sustained indefinitely, of course. As both internal pressures and outside forces were brought to bear, the enrollment declined. This was not without some benefit, however. As teaching loads were lightened and research activity maximized, the overall program achieved a better research–teaching balance.

The surging vitality in research and graduate education generated numerous requests for doctoral level training. Accommodating these requests would have been impossible without the support and assistance of Dr. W. H. Matchett, dean of the Graduate School. Dean Matchett established the Ph.D. program in interdisciplinary studies to satisfy students’ needs in areas not included in established Ph.D.–granting departments. Dr. Bruce A. Barna received the first degree in 1984 and soon gained national recognition for excellence in teaching design at Michigan Technological University.

The demand for and productivity of the I. Doc. (Interdisciplinary Doctoral) program generated administrative support for a bona fide Ph.D. in chemical engineering. In 1985, under the leadership of J. Derald Morgan, the new dean of engineering, a petition was initiated to gain approval for this degree. Although the proposal met with significant opposition, the major hurdles have now been cleared and final approval was received in NMSU’s Centennial Year, 1988.

Two additions to the faculty in the mid-1980s contributed to the quality of the program. Joe Creed, an NMSU graduate of 1959, was initially hired on a part-time basis to teach the undergraduate laboratories; his duties were increased in 1985 to include the teaching of the undergraduate design class. [In 1988, Joe Creed became assistant dean, with a primary responsibility of program development]. Dr. Ricardo Bogaert was hired upon the completion of his Ph.D. in June 1986, to replace Dr. Ken McCorkle in teaching material science.
Research funding increased as the established faculty matured. This allowed the department to employ two additional faculty on research funding: Dr. Francisco del Valle, from the University of Chihuahua, and Dr. Stan Holbrook, who received his Ph.D. in the Interdisciplinary Doctoral program at NMSU in 1987.

As of 1988, the department stands at an all-time high with respect to faculty quality and strength of programs. The faculty, which totals ten, includes four faculty members with tenure and three individual research programs that are receiving national and worldwide attention. Undergraduate and graduate enrollment bottomed out in 1986, but both are now growing at an acceptable rate of approximately 10 percent per year. The future is filled with promise, and the unanimous expectation is that the stature and recognition of the department will grow measurably in the years to follow.

There were two faculty changes during the university’s centennial year. Donald B. Wilson retired in January 1988, and in May Dr. Ron K. Bhada was hired as head of the department. The number of faculty remains ten, and the outlook for the future continues to be bright.
Civil, Agricultural, and Geological Engineering

Civil engineering shares with mechanical engineering the distinction of being the oldest engineering disciplines at New Mexico State University. The first statement of educational policy, formulated by the Board of Regents in 1889, called for "a Department of Mathematics embracing Land Surveying and Leveling." The first catalog, published five months after the college opened January 21, 1890, promised that students would have practical training in the use of transits, levels and other instruments; the textbook to be used by the surveying class was by Wentworth and Gillespie.

Civil engineering was one of the six courses offered by the college the next year. The full curriculum was outlined for all four classes. Clarence T. Hagerty, professor of mathematics, taught the first CE classes; when Horace Ropes came in 1894, he was listed as professor of civil and mechanical engineering. Although the Catalogue for 1893–1894, Announcements for 1894–1895 states that the degree Bachelor of Civil Engineering (B.C.E.) would be conferred upon those students completing that course, the title of the degree was changed the next year to Bachelor of Science (B.S.) and thus continued.

In 1895, "civil engineering" became "irrigation engineering" in order to reflect the emphasis on "training for those who expected to design and operate irrigation works..." After two years, the name was changed back to "civil engineering." Classes were taught by Frank W. Brady (M.E.) until 1900.

The Catalogue for 1899–1900, Announcements for 1900–1901, lists W. M. Reed, C.E., as professor of civil and irrigation engineering but states, "this has just been made a separate department, and the professor was not appointed in time to prepare a detailed statement of work of his department for the catalog". However, civil engineering was not mentioned at all in the next catalog, or indeed, until 1907.

From 1908 until 1914, civil and irrigation engineering instruction were combined in one department by that name. The following rationale was given:

"The widespread development of irrigated areas throughout the arid West, both by means of gravity flow and by pumped water, has extended the duties of the Civil Engineer to include a knowledge both of irrigation methods and of pumping machinery. The province of the Civil Engineer as an Irrigation Engineer, becomes, therefore, the furthering of the development, conservation and economical use of limited water supplies both for irrigation and domestic purposes."

In 1914, when the School of Engineering was created, it included four departments: civil, electrical, irrigation, and mechanical engineering. Civil and irrigation engineering existed as separate departments until 1920. They were again combined under the title, "civil and irrigation engineering" for six years, dropping "irrigation" from the name in the fall of 1926.

Faculty for this period included Burton P. Fleming, professor of irrigation engineering from 1907 to 1909, and Frederick Louis Bixby, who was hired to replace Fleming. Bixby, however, did not join the faculty of the newly formed Engineering School, although he stayed with the college as irrigation engineer.

George P. Stocker was the first department head of civil engineering under the new organization, and remained for two years. He was followed by Frank A. Hitchcock, who also stayed two years, and Daniel S. Robbins, who stepped aside after one year as head.
A head of irrigation engineering was not designated during the School's first year, but in 1915, Raymond Matthew is shown to be in charge. John William Jourdan took over the next year and continued as head until 1922 (including two years as head of the combined department). Ernest C. White became the next head of civil engineering, to be replaced by Harvey Oden Garst in 1924. Garst offered stability to the department for the first time, remaining in charge for nine years.

Daniel Boone Jett joined the faculty in 1926, and in 1933, was made head of the department of civil engineering. He retained this responsibility during the years he was dean of the Engineering School, 1938–1947, and afterwards until 1951. “Dad” Jett’s activities, which are presented in more detail elsewhere in this history, included the organization and management of the first co-op program, 1929–1936; supervision of Civil Works Administration projects, and appointment as the State CWA representative in 1933; direction of the Civil Aeronautics Authority’s pilot training program on campus, 1939; and general supervision of the National Defense Trade School held during the war years, 1940–1945. He is also remembered by many for the correspondence he maintained with Aggies in the military service.

Jett made substantial contributions to the engineering profession as well. According to C. Quentin Ford, "Dad" Jett almost single-handedly set up and administered the process for registration of professional engineers. When New Mexico enacted legislation calling for the registration of professional engineers and land surveyors in 1934, Jett became a member of the State board, and served as its chairman for sixteen years.5

Frank Bromilow joined the civil engineering department as its head in 1951. Jett continued as a full-time professor for five more years. When he had begun teaching in 1926, “the department had graduated a total of 22 engineers; at the time of his retirement in July, 1956, the department, under Professor Frank Bromilow, graduated its 232nd Civil Engineer.” D. B. Jett died January 10, 1960.

Professor Bromilow was instrumental in bringing the New Mexico State Highway Conference to the campus in 1955; it has been held annually since that time. The proceedings of the 1955–1974 Conferences were issued as Experiment Station Bulletins, Bromilow having been named Associate Director of the Experiment Station by Dean Thomas.

Another important addition to the civil engineering faculty in the early 1950s was John W. Clark, who came in 1953. John Hernandez has called Clark "one of the most imaginative and creative men I've ever known — a real inventor." His book is still used in civil engineering courses today.

Clark quickly established himself as an expert in the field of water usage and supply. Kropp notes that in 1956, "Professor John W. Clark at a water conference advised the leaders of Las Cruces to reclaim sewage
effluents if they expected their community to industrialize." In fact, Clark's Water and Sewage Treatment Short Course became an annual event.

Another of Clark's contributions was the recruitment of fellow civil engineer John W. Hernandez in 1965. Hernandez organized the New Mexico Environmental Institute in 1970. This organization was housed at NMSU, but drew on all six of the New Mexico’s four-year institutions.

When M. A. Thomas turned the deanship over to Frank Bromilow in 1961, John Clark served as head of civil engineering for one year. From 1962 to 1966, Russell C. Brinker held the position. Dr. Samuel P. Maggard took over in 1966 and remained in charge until 1978; he directed the Engineering Research Center from January to December of 1988, when he returned to the classroom.

Dr. Narendra Gunaji joined the faculty in 1960, when college administrators were striving to develop a strong graduate program and supporting research activity. Civil engineering had begun a master's degree program in 1955, and a general Doctor of Science degree plan had been replaced in 1961 by a Doctor of Science in Engineering. Gunaji was given the responsibility of developing a civil engineering doctoral program, and strengthening the master's program in water resources, hydraulics, and hydrology. He began by examining national curricula and selecting the necessary courses.

Active, well-funded research was seen to be essential to support the caliber of graduate work envisioned for this institution. Dr. Gunaji was put in charge of the Engineering Experiment Station in 1964 and served as its Director until 1982. At that time, he returned to classroom teaching for four years, retiring in 1986. He is presently a member of the United States International Boundary and Water Commission.

Conrad G. Keyes, Jr., became head in 1978. He had first served the department as a graduate student in 1960, and had joined the faculty in 1966. Keyes held the position until 1987. Kenneth White, who had directed the Engineering Research Center for three years, became head of civil engineering in January 1988.

Stacey Anich, civil engineering lab – early 1989. (Photo by Information Services)
The 1972–73 catalog shows the first appearance of the department’s offering of a B.S. degree in geological engineering. In 1986, the College of Agriculture withdrew its support from the dually administered agricultural engineering department. That program also found a home in the civil engineering department, whose name was changed to reflect the expansion: Department of Civil, Agricultural, and Geological Engineering.

During the 1940s and 1950s, civil engineering classes were taught in a wood frame building known as “Building 10” and located where Thomas–Brown Hall now stands. The department moved into Jett Hall when that building was completed in 1957, and still holds most classes there. Some laboratories – for materials testing, soils, and hydraulics – are housed in the Engineering Complex, built in 1980.

The main changes in civil engineering education in the last twenty years, as indeed in all areas of engineering, are due to the influence of computers. Dr. Gunaji points out that the course he taught in 1962 was an entirely different course in 1982, even though the title was the same. The fundamentals haven’t changed, but the applications are entirely different.
10 Electrical and Computer Engineering

The electrical and computer engineering department is the largest of the engineering departments; it is so big, in fact, that it is sometimes jokingly referred to as "the fifth largest university in the state."\textsuperscript{1} As was the case with many electrical engineering departments, the program at this institution grew out of the mechanical engineering discipline.

Instruction in electrical engineering was desired by the students of New Mexico College of Agriculture and Mechanic Arts as early as 1893. An article in the New Mexico Collegian of September 1893 contains this observation of the curriculum:

\begin{quote}
We were struck by the entire absence of practical study in electricity, in the mechanical engineering course, but we feel confident that the omission is inevitable, and therefore not a mere oversight. It is to be hoped that it will be supplied as soon as possible.\textsuperscript{2}
\end{quote}

In 1897 and for the next ten years, one course in electrical engineering was offered as part of the mechanical engineering program. According to Burton P. Fleming, "instruction in electrical engineering appears to have followed closely the early developments in this branch of engineering. By 1900 we find the engineering building was completely wired with electric lights and instructional work already was underway in dynamo and motor testing."

Electrical engineering first appeared in the catalog in 1907; that year, it was listed as one of the six college courses and it was shown to be a subdivision of the general department of engineering, along with mechanical and civil engineering. It was thus described in the catalog:

\begin{quote}
This course is arranged to supply the demand for men who have a practical knowledge of electricity, as well as a thorough knowledge of the principles and laws governing forces with which they have to deal. For the first two years the course is identical with the Mechanical Engineering course, but branches out separately during the third year. This is for the reason that the two courses must through necessity run nearly parallel, as a well equipped electrical engineer must also be a mechanical engineer, and must have some training in the principles of steam and hydraulics.
\end{quote}

The following year, and until the School of Engineering was created in 1914, there were two engineering departments: the Department of Mechanical and Electrical Engineering and the Department of Civil and Irrigation Engineering. A two-year mechanical and electrical certificate course was offered in 1908–1909; although it did not appear again in the catalogs, it must have been given one more year, as Pedro Larquier earned a certificate in 1910.

Early EE graduates included Earle Cracraft Hornbrook, who is shown in the 1908 Swastika to have completed the mechanical–electrical course, and Stuart Knight Baker and Gordon Wilson Goebel, who completed the electrical engineering course in 1910.

Until 1914, electrical engineering courses were taught by mechanical engineers, with the exception of Ross William Elliott, E.E., who is shown only in the catalog for 1910–1911. The creation of the Engineering School coincided with the establishment of electrical engineering as a separate department under the leadership of Professor Ralph W. Goddard. Even though he became dean in 1920, Goddard continued as department head until his death in 1929.
The activities of the electrical engineering department during Goddard’s administration have been documented by Ann M. Velia in the book, KOB: Goddard’s Magic Mast, and described elsewhere in this history. Thanks in part to Goddard’s personal recruiting efforts and the attraction of KOB, enrollments grew.

Velia has noted that, “in February of 1915 the electrical engineering department gained a new laboratory.” By 1923, the following equipment was available to electrical engineering students:

The electrical laboratories contain a varied collection of modern machinery. . . . These machines are served by a system of conductors installed in conduit, whereby any machine may be connected electrically to any other through a large plug switch board. Provision is also made so that different motors and generators may be mechanically connected either by means of belts or flexible couplings. The laboratories are also equipped with suitable instruments for measuring electrical power, potentials and currents, as well as with apparatus to facilitate the carrying on of all the common tests of electrical machinery, both stationary and dynamic.

Special mention might be made of the high voltage insulation testing equipment, the electric meter testing plant, the artificial transmission line, the telephone plant, the radio plant, the arc welding plant, the farm lighting plant, the steam turbine generator plant, and the three element oscillograph to photograph electrical phenomena.

When Goddard died, William Evan Carroon, Jr., was given what Milton calls “the impossible task” of managing radio station KOB. Carroon had been at the college since 1919 and had assisted Goddard since 1921. His departure in 1931 created a vacancy which was filled by Melvin A. Thomas.

James T. Rood became dean of the Engineering School and head of the electrical engineering department in 1930. He and Thomas were the only two faculty in the department so, when he left two years later, Professor Thomas was assigned the full teaching load. Later, assistance was given by John H. Butler, Carl M. Wolfe and Frank Amador. Harold A. Brown came in January 1937, and C. Donald Crosno in the spring of 1947.

Thomas was named dean in September 1947, and continued to head the department until 1956, at which time Harold Brown took over. Brown served as head until 1968 and retired in 1970.

In 1952, the department was authorized to offer the Master of Science in Electrical Engineering. By 1961, a total of sixty-two master’s degrees had been granted. In that year, a Doctor of Science in Engineering was initiated for civil, mechanical, and electrical engineering. Ray Black became the department’s first graduate teaching assistant in September of 1954 and joined the faculty as the department’s first Instructor the following year. Professor Black will retire in June of 1989 after thirty-five years of service in the field of electronics.
In 1961, M. A. Thomas gave up the deanship to Frank Bromilow and returned to classroom teaching—the activity he says “gave me more satisfaction and joy than anything that I could have done.” After six more years of teaching, which included a trip to India in 1962, Professor Thomas retired in 1967.

Dr. Frank Carden became head of the electrical engineering department in 1968, having come to NMSU two years earlier. He was given a charge by Dean Bromilow to develop a graduate program, supported by outside funds, and to develop the supporting research program. In 1968, Dr. Wiley Thompson, Dr. Lonnie Ludeman, and Dr. Eldon Steelman joined the university and in 1969 Dr. Gerald Flachs was hired. These energetic recent Ph.D. graduates then helped provide the initial thrust and momentum to develop a significant graduate and research program within the department. The results of Carden’s efforts in these areas are readily apparent as the number of graduate students in electrical engineering has increased from about forty-five in 1968 to about 140 today. In 1968, the department had about $25,000 in outside funds available for research; it presently spends about $2.5 million a year in outside funds.

One of the first programs to emerge from this new emphasis on graduate studies was the Electric Utility Management Program (EUMP), the graduate level electric power program established in 1968. The goal of EUMP’s founders was to develop a program that would meet industry’s need for engineering managers who understood the financial and regulatory aspects of the industry. The program, which to date has graduated more than 140 M.S.E.E. students, is unique in that it provides course work in advanced electric power engineering and management. The director of EUMP since its inception has been Professor Bill Kersting, also an alumnus of NMSU.

Carden says the best way to describe the electrical and computer program as it has evolved is “dynamically explosive.” Faculty members realize they must stay right on the frontier of technology in order to produce the graduates wanted by modern industry. Thus they make “a magnum effort” to stay current on new developments and bring them back to the classroom through teaching and research.

In explaining the growth and development of the department in the last fifteen to twenty years, Carden says, “It was our goal to support and complement the technological community in the Southwest, particularly in New Mexico.” University engineering personnel looked at such facilities in New Mexico as White Sands Missile Range, Holloman and Kirtland Air Force Bases, Sandia, and Los Alamos, and decided that “the modern technical activities these federal agencies were involved in were the activities we should support.”

As engineering educators in the 1970s became aware of the trends toward increasingly sophisticated electronics and computerization, they talked to industry leaders about the engineer who would be wanted in the future. “They described that person as someone with an EE [“double E”] degree, but with the capability to utilize microcomputers in the design of electronic modules.” Dr. Flachs took the first steps in developing such a program.

Thus the department became, in 1973, the “Department of Electrical and Computer Engineering,” probably one of the first five EE departments in the United States to reflect this new emphasis. As a school which now produced “computer engineers,” NMSU had taken its place as a pioneer in the field. Qualified faculty were sought: electrical engineers with Ph.D.’s, who specialized in computer engineering. Drs. Javin Taylor and Robert Golden came to the department in 1976 and 1978, respectively, joining Dr. Flachs in expanding the computer program. Another professor hired to enhance the computer department, Dr. Jay Jordan, came in 1984. All three have remained very active in research: Dr. Taylor in computer architecture and parallel processing; Dr. Golden with the Cosmic Ray Laboratory; and Dr. Jay Jordan in computer vision and image processing. As a result of these research efforts, the computer engineering program at NMSU has developed into one which is nationally recognized in both undergraduate and graduate areas.

Another area of the department which is very strong, and which is Dr. Carden and Dr. Ludeman’s specialty, is communications. The highly advanced communication networks of today involve electromagnetics, antennas, and microwaves. The field is both broad and diverse, and includes such varied types of communication as transmitting data from one computer to another or analyzing information received from a tactical missile which has been instrumented to relay temperature, vibration, and other performance factors. Much of the department’s work is done in conjunction with White Sands Missile
Range, which conducts some 5,000 experiments a year.

Because the study of antennas is such a vital part of this area, the department boasts, among its facilities, an anechoic* chamber. The blue styrofoam–like points which cover the walls, ceiling, and floor of this room make it look like something from a science fiction movie.

But then science fiction might be tame stuff compared to the reality of today’s engineering technology. When Americans watched Neil Armstrong step onto the moon’s surface, they did not know that the mathematical model which made that television link possible had been developed at New Mexico State University.

The first large funded research programs in the department were a Systems Countermeasure project initiated by Dr. Thompson and a Real–Time Vision Tracking project initiated by Drs. Flachs and Thompson. Both of these programs were funded by the U. S. Army for about one–half million dollars each and provided the ground work for one of the biggest research areas at NMSU. This research is called electronic vision analysis and combines computers, systems, communication, and image processing. Image processing involves “building intelligence into a missile so that the missile not only recognizes an object of interest, but knows what to do about it.” In electronic vision analysis, the system has to make a decision about the picture received in real–time, as a human would do. Dr. Carden pointed out that the department has million–dollar contracts with a number of government agencies to do research in real–time image processing.

Another large research area is the Cosmic Ray Program, which evolved from Professor Robert Golden’s work as a graduate student with Nobel prize winner Dr. Luis Alvarez. It is a NASA sponsored research program which is currently utilizing a large balloon–borne instrument containing a superconducting magnet and particle detectors, similar to those used for elementary particle studies at Fermi lab, CERN. In 1979, a flight of the balloon–borne magnet resulted in the discovery of antimatter, in the form of antiprotons in the cosmic rays. The source of these particles of antimatter is of great interest to scientists who study theories about the creation and evolution of the universe. This discovery resulted in international recognition of NMSU and its research programs.

Electro–optics is a fairly new area of importance. This emphasis has been the specialty of Professors Stuart Schleusener and Mike Giles. It involves fiber optics and small, low–powered lasers which are studied

*Greek word, meaning "without echo."
as a means of communication. The present electro–optics research complements the computer and digital image processing efforts in electronic vision research.

Electronics rounds out the department’s curriculum. Almost all areas of study have both an undergraduate and a graduate component, so the faculty are involved in teaching both. According to Carden, “Getting students involved in research, getting them to publish, getting them recognized nationally – that’s the name of the game.”

The electrical engineering department was housed in Goddard Hall from its dedication in 1934 until January of 1972. President Corbett and Dean Frank Bromilow sought legislative approval for a new building for the department. Department Head H. A. Brown and Professor George Lucky began planning for the new building in the fall of 1967. The architectural concept of columns on the exterior which resulted in unobstructed interior walls was developed by Brown. The final layout was made by Carden and Bromilow.

As the new head, Dr. Carden was given the responsibility of getting the department into a new facility. Those efforts also met with success and, in 1972, the department moved into Thomas–Brown Hall, named for Melvin A. Thomas and Harold A. Brown.

Electrical engineering has grown considerably since then, from 300 undergraduates in the early 1970s to a present enrollment of about 900. The department is about the same size as New Mexico Institute of Technology at Socorro or the university’s own College of Agriculture. But, Dr. Carden emphasizes, besides being large, the department has a reputation for turning out outstanding engineers. He points out that 120 companies come to campus specifically to interview EE graduates – more than for any other discipline – and “the reason these companies come is they like our product.”

Electrical engineering has been fully accredited since 1937–38. About 30% of its students participate in the co–op program. And its honor society HKN (Eta Kappa Nu) has twice been designated the most outstanding chapter in the nation (of about 250 EE departments). As is the case with others of the engineering departments, there is a good relationship between the faculty and students.

The Carden years in electrical engineering could be characterized as years of stability and growth. The electrical engineering faculty found the department a happy and enjoyable place to work and grow. The net result was minimum faculty turnover and a pleasant, collegial environment.11

Dr. Carden laughs as he tells about the change students undergo during their college years. “When freshmen come in, they’re polite and quiet and kind of bashful – really very nice people. As they become seniors, they walk up and down the hallways like they own the place. They come into my office and put their feet on my desk and say, ‘Well, now, Frank, here’s what I think we ought to do!’”

A bit of an exaggeration, perhaps, but it serves to illustrate the quality Frank Carden finds a most rewarding aspect of his career: the satisfaction of watching students “grow and mature, and gain self confidence, and go out as engineers.”

Dr. Carden returned to teaching and research activities in 1987 and Dr. Javin Taylor became acting department head.
Engineering Technology

Engineering technology was organized in 1963 to meet the need for two-year associate degrees in mechanical, civil, and electrical engineering. Originally called the "Technical Institute," the department's purpose was, and is, to prepare students to fill the role of technologist — the "essential man in the middle" of the engineering team.

As modern technology becomes increasingly more complex, the gap between the "thinker" (the engineer) and the "doer" (the skilled craftsman) becomes greater, as does the need for someone to translate the engineer's ideas into workable form. The announcement of the establishment of the Technical Institute included the following explanation:

*Engineers study scientific discoveries to make effective use of newly-found knowledge. Today he has concentrated training in mathematics and science as well as engineering skills. His objective is to apply scientific knowledge through applied research, design, and development.*

*The technologist plans, builds, tests, operates, and services devices designed and developed by both scientists and engineers. He is an aid to the engineer, one who can get things done, translated from drawings or models to a final form. He is able to take the engineer's or scientist's plans and, often in cooperation with the third member of the team, the craftsman, complete them.*

Because of requests from Sandia National Laboratories and other high-tech organizations for graduates with this kind of training, university administrators (President Roger Corbett, Vice-President William O'Donnell and Dean of Engineering Frank Bromilow) met with engineering department heads (Eldon Hanson of agricultural, Luke Shires of chemical, Russell Brinker of civil, Harold Brown of electrical and Quentin Ford of mechanical). This group decided that the associate degree program should not be administered within the existing departments of civil, electrical, and mechanical engineering, but should be established as an additional, separate department.2

Dean Bromilow, in the spring of 1963, asked mechanical engineering professor Louis Kleine to head the new department. Professor Kleine's charge was to design the curricula for three programs—civil technology, electronic technology and mechanical technology—and to begin instruction in the fall.

The Technical Institute opened in September of 1963 with forty-three students. Classes were held in the old Air Mechanics building. Two years later, sixteen graduates received the Associate of Science in Engineering Technology degree, and all were employed in New Mexico. It was also about two years later that the name of the department was changed to the "Department of Engineering Technology."

In 1966, a two-year associate degree program in electro-mechanical technology was introduced, but dropped a few years later. At that time, too, a one-year drafting certificate course was added. It has since been transferred to the Dona Ana Occupational and Educational Branch.

In 1971, student demands, combined with industry's need for a still more knowledgeable graduate, brought about an expansion of the program: a Bachelor of Science degree was offered in engineering technology. This was, and still is, the only four-year program in engineering technology in the state of New Mexico. Although the two-year program was also maintained, studies made of enrollment figures through 1984 show that approximately 97% of the two-year graduates have gone on to complete a bachelor's degree. The three two-year programs and the B.S. degree program have all been accredited for several years.

Engineering technology moved from the Air Mechanics Building to Goddard Hall in 1972; most instruction is held there now. In 1982, the College of Agriculture's dairy lab was remodeled and renamed the Engineering Technology Annex. It is used primarily for offices and mechanical and civil technology labs. The department's enrollment had grown to 500 students in the spring of 1984 and presently has seventeen faculty.

In 1985 George Alexander became department chairman. The civil option, which had been under the direction of the mechanical option coordinator, Bill Fleming, was now completely separate and headed by Jim Herrol Skidmore.
One of the biggest changes in the ET department in recent years has been the increase in computer programming applications in all three options. More computer programming courses are now required and most courses of level 200 and above require some computer programming.

Another significant development in the ET program has been the development of the computer aided drafting (CAD) program. Presently under the direction of Al Romero, the program was developed in the fall of 1984 by Bill Fleming. This course is one of the most popular engineering courses in the College and attracts students from all the engineering disciplines.³

Professor Kleine, who served as department head until his retirement in 1984, believes that the strength of the department has been the concern for students shown by the faculty and staff. He reports that “a majority of the faculty during [my] tenure gave that extra effort to make the programs successful and that local citizens volunteered to teach courses without renumeration.”⁴ Former Deans Hugh Milton and M. A. Thomas contributed their expertise to engineering technology classes. It is Professor Kleine’s sincere belief that “the taxpayers of New Mexico get their money’s worth at this university!”⁵
12 Industrial Engineering

Industrial engineering is a diverse field, not really related to any other area of engineering. Even so, in many institutions, including New Mexico State University, the study of it began as part of mechanical engineering. The industrial engineering department, youngest of the engineering departments at NMSU, was begun in 1969. The curriculum had been started before that, in the mechanical engineering department; the first bachelor's degree in industrial engineering was given in 1967.\(^1\)

William C. Arndt was the first head of the department and served until 1972; he was followed by Philip E. Hicks, who held the position through May 1976. Satish J. Kamat, who is originally from Bombay, India, and had come to NMSU in 1970, served as department head through January 1982. When Kamat stepped down to resume full-time teaching responsibilities, Arun G. Walvekar became head and remained so until December 1987, at which time he took a two years' leave of absence. Dr. Kamat has again assumed the leadership as permanent department head.

The department began its master's program in 1975. Before that time, industrial engineering graduates were pursuing advanced degrees through the mechanical engineering department; the degree earned was the Master of Science in Mechanical Engineering. Now, not only can students earn a master's degree in industrial engineering, but they may soon be able to earn a Ph.D. degree. The department is in the process of getting approval for its doctoral program; if approved, it will begin fall semester 1988.

Industrial engineering as a discipline probably began, at least in the United States, in the 1940s. Dr. Kamat describes the scope of this rather comprehensive field: "It covers all aspects of any industry or any organization that either makes a product or provides a service... Industrial engineers design, implement, and improve systems that put together all the resources. The resources include equipment, people, building, money, materials -- whatever it takes to accomplish the purpose."

There are several major areas of industrial engineering. One is methods engineering, which Kamat characterizes as "time and motion study, to estimate how long it takes to do a job of good quality with the given specifications, equipment, tools, training, etc.," thus determining how to do the job better -- whether by improving quality or output, or decreasing time or cost.

Another area is facilities design -- designing the plant that makes the product or provides the service. Dr. Kamat offers as an example a plant that makes computers; although the equipment may have been made by mechanical or electrical engineers, it is the responsibility of industrial engineers to determine where to place the equipment for most efficient production.

Quality control and production control constitute a third area, as industrial engineers analyze the output to ascertain the means to make better use of resources. The area of operations research involves the use of mathematical models for decision-making, while in applied statistics, problem solving draws upon probability statistics for concerns such as quality control.

Of these different aspects of industrial engineering, two -- methods engineering and facilities design -- are sometimes said to be "traditional," while the others are called "modern." Some institutions have specialized programs, dropping one or the other. At NMSU, since the industrial engineering department is small, the more complete program is taught.
For the first three years of the department’s life, industrial engineering classes were taught on the second floor of Jett Hall. When Thomas–Brown Hall was completed in 1972, the electrical engineering department, previously housed in Goddard Hall, moved into the new building. Goddard Hall was then remodeled, and the industrial engineering department moved into new quarters between the fall 1972 and spring 1973 semesters.

The enrollment of the department has been as high as about 100 undergraduate majors; during the spring 1988 semester there were seventy-four. Women make up 30–45 percent of this number, probably the highest female enrollment in the College.

Industrial engineering was accredited in 1971, the earliest possible date, since a program cannot be accredited until it has graduated students. Members of the accrediting team which visited in 1975 found a lack of progress which resulted in the department being placed on probationary or “show cause” status. The department was to reply to a list of concerns within two years. This was done; all responses were satisfactory and accreditation continued.

Also, as a result of the accreditation board’s 1975 report, the university conducted an internal review in conjunction with the North Central Association’s review (for accreditation of the university). This evaluation also resulted in probationary status for the department: industrial engineering had five years to make the necessary progress or the department would be terminated. Again, the challenge was met; the department requested a second review at the end of only three years, and was subsequently returned to full standing. Kamat gives much credit to Dean John Hernandez for guiding the department through this difficult time.

Much of this constructive activity took place around 1976, a year which Dr. Kamat considers a turning point, not only for the department, but for the university as a whole. He cites such examples as an influx of highly qualified faculty, improved laboratory and computer facilities, and more and better resources in general.

About 20–25 percent of the industrial engineering students participate in the co-op program at some point in their educational careers; there are usually openings for five to ten students any given semester. Employing companies include IBM, at various locations across the country; Texas Instruments; General Motors, Saginaw Gear Division; Ethacon; and, in New Mexico, Intel Digital Equipment (in Albuquerque).
and the NASA site at White Sands. A co-op program with El Paso Electric Company was started about three years ago, and there has been an IE student there every semester and summer since. The co-op experience is a valuable one for students in this department, since they usually work with industrial engineers in the employing companies and therefore, get professional experience. Dr. Kamat explains that students usually go on the co-op program as juniors, although it is open to sophomores. As juniors, the students have taken some industrial engineering courses. Their work experience then makes the next courses they take more meaningful.

A variety of research has been conducted by industrial engineering faculty. The early 1970s saw some work in water resources in cooperation with NMSU’s Water Resource Research Institute. This study included a joint project with the University of New Mexico (UNM). Later, in 1974–75, a research contract with the White Sands Missile Range Office of Missile Electronic Warfare provided the opportunity to examine the vulnerability of certain weapon systems through simulations (computer-based research). This contract lasted six years.

About 1983, two faculty members, Satish Kamat and Michael Burke, became involved in robotics research with the Computing Research Laboratory (CRL). They were looking at the ways robots could be integrated with different sensory devices, such as visual, tactile, and ultrasonic senses. This project was phased out after two or three years when CRL’s orientation moved from robotics to artificial intelligence. However, the department is still doing some work in robotics.

Dr. Kamat points out that it will be necessary for the department to expand its research base in order to support the doctoral program. Opportunities must be provided for graduate students to become involved in research in such areas as variable computing and artificial intelligence with its applications to manufacturing.

One of the most innovative and exciting steps taken by industrial engineering is one that will have implications for university teaching in general: the department has begun a joint program with UNM whereby a student at either institution may earn a master’s degree in manufacturing engineering. Supported by industries in New Mexico that provide fellowships and summer jobs, this program has four core courses. Two are taught by UNM and two by NMSU. They are broadcast live, simultaneously, to the other campus. In addition to the core courses, there are electives at both schools which can either be broadcast or for which the credits can be transferred. The program began officially in the spring of 1988. Industrial engineering, too, has played a major role in off-campus education, with programs at Kirtland Air Force Base, Clovis, and Carlsbad.
When asked to recall any humorous incidents which had occurred during his tenure, Dr. Kamat related a story concerning some shenanigans on one particular Engineers' Day, an event which is held annually in the spring. A group of IE students conspired to kidnap all the faculty (with the knowledge of their wives). About 5:00 on Saturday morning, the professors were blindfolded and taken from their homes to the home of one of the students, for breakfast. Adding to the enjoyment of the occasion was the fact that each faculty member had been given a T-shirt with a funny nickname on the back, which he then had to guess. After they had eaten, they were again blindfolded and taken to the softball field where the department's team was to play in the finals later that day. The students placed one blindfolded professor on each of the four bases — and left!

The prospects for industrial engineering look very bright indeed. This is based on the outlook for engineering in general, both nationally and internationally. As big companies are facing the challenges posed by a highly advanced technology, they are beginning to see that some of the solutions lie not just in bigger and better equipment, but in making better use of the equipment and resources available — in other words, the expertise offered by industrial engineers.

As a department of NMSU, too, the future is exciting, for reasons already described, and also because of the leadership and support of College administration. Dean J. Derald Morgan has had a big impact on the progress of the department described by Kamat as "a broad-based, solid program that puts out qualified graduates." Kamat is enthusiastic; in his words, "We're riding a high and going higher!"
The mechanical engineering department at New Mexico State University has been the most stable of the engineering disciplines and, along with civil engineering, the longest taught. The *Catalogue for 1890–1891; Announcements for 1891–1892* listed mechanical engineering as one of the six college courses to be offered the following year. August J. Wiechardt, M.M.E. from Cornell University, was hired February 13, 1891, as professor of mechanical engineering, "and equipment for his department, including machine shop equipment, an engine, etc., was purchased and installed during the summer of 1891."

Early courses included thermodynamics, strength of materials, analytical mechanics, graphics and kinematics (all listed under “Theoretical Engineering”), and drawing – elementary machine design, high-speed steam engine design, and machine design from specification. Classroom teaching was supported by practical application in the shop and laboratory. Forging and foundry work were added to the curriculum in 1892 and the equipment was housed in tents until more adequate facilities could be obtained.

Simon Kropp, in his book *That All May Learn*, has described the political milieu in which the young college struggled. President Hiram Hadley was replaced in 1894 by Samuel P. McCrea, the choice of the Democratic majority on the Board of Regents. "When Professors Wiechardt and [Frederic F.] Barker resigned, it became obvious that the faculty had been affected by the presidential turnover. . . . About the same time [that Barker accepted another position] Wiechardt’s position in the department of mechanical engineering was filled by Horace Ropes."

Ropes was the son-in-law of the editor of the *Independent Democrat*, who in turn was one of Senator Albert B. Fall’s relatives. As that newspaper verbally battled with the *Rio Grande Republican*, the college was caught in what Kropp calls "a deadly journalistic crossfire." Among the charges hurled back and forth was the indignant claim that "Professor Ropes, the Fall family’s pedagogue, received $2,000 per year for teaching three students . . ." while some "campus ‘specialists’" were paid $1,600 annually.

Ropes resigned early in 1896 and was replaced by Frank W. Brady, M.E. Brady taught both mechanical and civil engineering courses until 1900, when it appeared that civil engineering would become a separate department. Instead, instruction in that area was discontinued until 1907. After one more year, Brady was replaced by Charles Mills, who had started out as shop foreman in 1894.

Mills served until 1905, when Charles E. Paul assumed the leadership of the department for three years. In 1908, Archibald Sage, who had become an assistant in the mechanical engineering department before his graduation in 1900, took charge of the Department of Mechanical and Electrical Engineering (as it was called at that time).

Sage resigned in June 1914. When the School of Engineering was created during the next year, Arthur F. Barnes served as its first dean, and also as head of the once again separate department of mechanical engineering.

Leadership changed rather quickly in the years following the departure of Barnes in 1920. Norman N. Tilley held the position for one year (1920–21), Otto B. Goldman for two years (1921–23), and John A. Herrington for one year (1923–24). When Hugh M. Milton took over in 1924, he brought welcome stability to the department. In an interview sixty–two years later, Milton looked back on that time: "When I got here, they told me, ‘If you stay for a year, you’ll stay forever.’ I found that was true." He also commented that,
at the age of 26, he was younger than some of his students for the first year or two. Milton administered the department until he was made dean of the Engineering School in 1935. At that time, M. T. Lewellen became head and served six years.

Arch M. Lukens, who became head of mechanical engineering in 1941, has been described as “truly a pioneer in the field of solar energy applications and research.” According to C. Quentin Ford, Lukens did very good, fundamental work in this area. “He had sponsored projects from the Navy and the Air Force, the purpose of which was to study effects of solar energy on various kinds of materials.” This work, referred to as an “actinic process,” was comprehensive and continued over several years.

Unfortunately, Professor Lukens never did publish the results of his research. Although he compiled a great deal of material, it was only made available through his students. The present Solar Energy Institute, while having no connection with Lukens, did grow out of the mechanical engineering department and much of the work that Lukens had done.

Another man who was to leave his mark was Merle Creech, who came in 1956. The three white wooden towers located near “A” mountain were designed by Creech for the testing of antennas without interference from metallic substances around them. The towers were built for the Physical Science Laboratory, who “got a lot of mileage out of them,” since it is hard to find areas of such low interference.

Creech was a self-educated person in some respects. He had taught himself German and knew Russian fairly well. He was a good instructor and well-liked. His large personal library was donated to the university when he passed away in the late 1960s.

C. Quentin Ford first came to New Mexico College of Agriculture and Mechanic Arts as a student in 1941. His education at this institution was interrupted by the war. When he returned to campus in August 1946 to continue in engineering, he found a school very different from the one he had left. The people were about four to six years older chronologically, but about twenty years older experience-wise. When he started as a freshman, “there were virtually no married students on campus and no cars; coming back in ’46, half or more of the student body were married and cars were much more prevalent.”

76
Ford was especially close to "Dad" Jett, with whom he corresponded during the war, and Arch Lukens, who also kept in touch with Ford after he graduated. In fact, when Quentin Ford came back to New Mexico A&M in 1959, it was because of his friendship with Lukens and their understanding that Ford would replace Lukens as department head; he did so a year later, in 1960.16

The first faculty member in mechanical engineering with a doctorate, Ford was asked to help "beef up" the master's program which had been established in 1955, and to help get a doctoral program started. The first doctoral candidate in mechanical engineering, Richard K. Fergin, graduated in 1964.17 The department now offers the Master of Science and Doctor of Philosophy degrees; areas of specialization are heat transfer, mechanics, fluid mechanics, and solar energy.18

Ford administered the department for eleven years, turning it over to Marshall M. Sluyter in 1971. Ford returned to classroom teaching for three years and then was named associate dean in 1974, a position he held until the summer of 1988 when he retired. Sluyter continued as head until 1975, at which time Phillip R. Smith assumed the position. In the fall of 1988, Phillip Smith returned to the classroom and passed the department head post on to George Mulholland.

Mechanical engineering programs feature courses in mechanics, thermodynamics, engineering analysis, fluid mechanics, and engineering design. They prepare students for a broad range of employment opportunities, including design, research and development, technical sales and service, project engineering, management, and power system engineering. Projects as diverse as perfecting mechanisms for artificial limbs or providing guidance systems for the space shuttle or developing alternative power supplies from solar, wind, and geothermal energy sources all fall within the realm of the mechanical engineer.19

One program which reflects the department’s desire and ability to stay at the "forefront" of current technology is the modern laser optics laboratory constructed by mechanical engineering professors Larry K. Matthews and George Mulholland. Designed to study the mechanical properties of materials, the laboratory includes "a helium–neon laser, bi–directional reflectometer, various monochrometers, a holographic camera, optical beam steering systems, and a vibration isolation system."20

It is situated in a room in the basement of Jett Hall, the building in which most mechanical engineering courses are taught. "In addition to research applications, the optics laboratory is expected to be a powerful learning tool for undergraduate and graduate engineering students. An engineering optics course has been developed in the department of mechanical engineering (ME 470), making use of the equipment."21

Another program headed by a mechanical engineer for nineteen years, but which has had a great impact on the college as a whole, is the Cooperative Education (co–op) Program. Directed by Maurice Hamilton from 1965 to 1984, the co–op program has been tremendously successful in attracting students, making it possible for them to earn money while attending school, and giving them the professional experience which employers are seeking as well as an opportunity to be trained by those employers.
Support Units of the College of Engineering
Cooperative Education

One of the programs that has substantially served to strengthen the College of Engineering by providing students with experience before they graduate, is the Cooperative Education Program. In 1958, Robert H. Huddleston, former chief of the training branch of the White Sands Missile Range Civilian Personnel Office, wrote about the race between America and the Soviet Union for technical supremacy. He spoke of the general need "to muster our resources to assure adequate numbers of such specialists [scientists and engineers] who are properly trained and effectively utilized," and of the specific need to provide "a scientific and technical staff adequate to execute the responsibilities of the Proving Ground."\(^1\)

He went on to say:

In 1952, the Army at White Sands Proving Ground, recognized that this problem would be continuous and embarked upon a cooperative work-study program with the New Mexico College of Agriculture and Mechanic Arts in nearby Las Cruces. The plan was designed to recruit into Federal Service, undergraduate students in engineering, physics, and mathematics and has now completed its fifth year.\(^2\)

There were several plans of cooperative education in use at the time. After careful consideration, the plan selected for adoption was one in which the year would "be divided into two equal six-month periods with one group of students attending college full time while the other group is working full time. The two groups exchange places twice a year at the start of the semester or summer session."\(^3\) A student entering the program from high school could complete the requirements for a bachelor's degree in a minimum of five years.

David Smallwood (center) on the job at WSMR with Capt. William Nelson (left) and David S. Short. La Crosse missile in background – 1960. (HHUA)
In looking at the results of the program thus far, Huddleston pointed out that, in addition to meeting the primary objective—developing a source of scientists and engineers—cooperative education has produced a number of side benefits: 1) financial assistance induces more students to enter college (and engineering and science); 2) being able to apply theoretical knowledge helps to stimulate interest; and 3) college withdrawals are reduced.

Although the program at White Sands, as developed by Dean M. A. Thomas, Brigadier General George G. Eddy and James Patton, represented the college’s first major venture into cooperative education, the concept of combining academic instruction with practical experience was not new to the school. In 1929, Professor Daniel B. Jett organized a cooperative program, part of which consisted of an arrangement with the El Paso Electric Company to employ four students. Two of them would work for six months while the other two attended classes, then the groups would switch. Three of the students involved in this early effort were Clifford Malone, Harold Smith, and N. C. Peyton. Dr. Kropp notes that, in 1929, “the school of engineering instituted a cooperative plan with the state highway department whereby students could alternate between school and work.”

After White Sands “opened the door” of cooperative education in 1952, other companies and government agencies soon began to see the value of such a program. The New Mexico State Highway Department renewed its participation in 1953. “About 1956,” according to Professor Maurice Hamilton, director of the co–op program from 1965 to 1984, “[students from this program] walked into Edwards Air Force Base, told them what co–ops were and that’s when that one started. The students themselves sold it.”

The association of the Physical Science Laboratory (PSL) with the co–op program developed primarily as a result of its Satellite Ground Exportation Program, begun in 1959 under a contract with the Department of the Navy to operate satellite instrumentation stations. A statewide recruitment of student trainees was undertaken, with the first group beginning in the fall semester, 1960. Maurice Hamilton estimates that in a ten–year period about 1200 students went through that program.

One of the first students recruited for the PSL co–op program was Mack Haley, who describes it as “the greatest thing I ever had a chance to do.” Haley, now area manager for U.S. West Communications in southern New Mexico, had received an application by mail and, with classmates Edmund Archuleta and Mike Coinman, had been accepted into the program before graduation from high school in 1960. After a year of laboratory and classroom training, Haley’s group was sent to Hawaii for nine months, while another group went to Japan. Until his graduation in 1966, Mack’s campus education was interspersed with trips to the Philippines, Wake Island (for ten days), and Midway. He could have gone out one more time before graduating, and regrets now that he didn’t. However, he was employed by PSL after graduation and, for the next six years, traveled to Greenland (twice), Brazil (twice), Argentina, Ecuador, Chile, Easter Island, Afghanistan, and Alaska.

“There’s no way you could buy that kind of experience,” Haley says of his years as a student. It made going to school more of an adventure; there was always something to look forward to, whether it was coming home or going somewhere else.”

Dr. C. Quentin Ford, in 1963, called Cooperative Education “one of the most successful programs established by the College of Engineering.” He went on to say,

Presently, there are working agreements with the White Sands Missile Range, National Aeronautics and Space Administration, New Mexico State Highway Department, Lea County Highway Department, Federal Communications Commission, the Physical Science Laboratory, and several other organizations. . . . The experience gained during work phase is invaluable, and makes the graduates much sought after by industry. Currently there are approximately 400 students enrolled in the co–operative program.9

In 1965, mechanical engineering professor Maurice E. Hamilton was named director of the Cooperative Education Program, a position he held until 1984. At the time Hamilton took over, all the students in the program were engineering and/or math, physics, or chemistry majors. The new director set a

goal: the co-op program was to be for all majors at New Mexico State University. He began to actively recruit students, explaining that, in addition to PSL, a broad spectrum of companies would be participating. Finally, Hamilton told Dean Frank Bromilow that it was important that the program be more centrally located so it could be seen as more than just an engineering co-op program.

Thus, in 1972, the administration of the Cooperative Education Program was moved into the Student Affairs Office and, Hamilton says, “that’s when the program really began to bloom.” At one point, there were thirty-two different majors represented by the students in the program; there were thirty-five students from wildlife science, for example.

Professor Hamilton believes very strongly in the value of cooperative education. He cites a study made in 1980–81 of the students involved in the co-op program which indicated that the percentage of students graduating is much higher than the norm. The percentage of students going to graduate school was also higher. About 80 percent of the graduates were being employed by the companies for whom they had worked as co-op students.

Hamilton has high praise for the students who have gone through the co-op program; he estimates the number at about 6,000, and he knows most of them: “Those kids that have been on that co-op program have been so fantastic!” He has always tried to “understand who they are and where they’re from.” His interest in students and his remarkable memory of their individual careers is evident in his conversation. He is especially proud of the fact that NMSU students are work oriented; they make the kind of employees companies are seeking. Understandably, Professor Hamilton sees the Cooperative Education Program as the development of greatest significance in engineering education at New Mexico State University.
Engineering Research Center

The Engineering Research Center, until 1982 known as the Engineering Experiment Station, was conceived in the beginning years of the institution. An article appearing in the February 1896 issue of the *New Mexico Collegian* begins with mention of the Hatch Act of 1887, which created the Agricultural Experiment Station, and the Morrill bill of 1890, making an annual appropriation to each land grant college. The article continues: “A movement is now well under way to introduce a bill to this session of Congress, authorizing the establishment and endowment of an ‘Engineering Experiment Station’ in connection with each Land Grant College. Among the objects of these stations, the proposed bill states the following: ‘To promote investigation and research respecting the principles and applications of the various branches of the science of engineering and of naval architecture.’”

It was further explained that the “relations of the Stations with the general government are to be established and maintained through the Department of the Navy.”

No further mention of an Engineering Experiment Station is found until 1917, when an article in the *Round-Up* addresses the issue as follows:

> Logically at the time of the passage of the Hatch act congress [sic] should have provided for an engineering experiment station as well as agricultural. No doubt this would have been done had it not been that at that time engineering science was much in advance of agricultural. It was the pressing need of scientific agricultural study rather than any intentional neglect of mechanic arts which made congress [sic] provide for agricultural experimentation only.

The writer goes on to say that many states “have established engineering experiment stations at the A&M colleges without waiting for federal aid. Such experimental work would be of great service to this state....”

About that time, work in irrigation engineering was being conducted through the Agricultural Experiment Station. The *Catalog for 1914–1915* lists Frederick L. Bixby as an irrigation engineer on the Experiment Station staff. He is no longer shown to be part of the Engineering School faculty, although the previous year he held the position of professor of civil and irrigation engineering.

In the catalogs around 1930, the dean of the School of Engineering is also shown to be the director of the Engineering Experiment Station. However, any documentation of activity from that period has yet to be found.

In the late 1950s, the Engineering Experiment Station was reactivated by Dean M. A. Thomas, who saw it as an important factor in staff and graduate student development. His efforts were continued by Professor Frank Bromilow, head of the department of Civil Engineering, who then also assumed the role of part-time associate director of the Experiment Station. Bromilow became dean in 1962, and so acting associate directors were appointed until 1964, at which time the Engineering Experiment Station was placed under the direction of Dr. Narenda Gunaji.

Gunaji had come to NMSU in 1960, one of several young professionals hired to help develop a strong graduate program. Although a master’s degree in mechanical engineering had been granted in 1907, regular graduate work was not continued and the granting of the master’s degree was not authorized again until 1952. In 1958, the degree Doctor of Applied Science could be “obtained as a joint offering of electrical engineering, physics, and mathematics.”
With the approval of the 1959 New Mexico Legislature, six doctoral programs were started at NMSU, three in the College of Arts and Sciences (physics, chemistry, and mathematics) and three in the College of Engineering (civil, mechanical, and electrical engineering). The College of Engineering then used the additional appropriated money to increase library holdings, hire more faculty, and fund some basic research projects; the support of a doctoral program requires the capability of conducting independent research investigations in a suitable environment (well-equipped laboratory).

Dean Thomas and Professor Bromilow had already seen the advantage of having all sponsored activity (requests for research support from outside sources) coordinated through a research organization. Working from this viewpoint, and with a mandate to strengthen the College’s graduate and research programs, Dr. Gunaji proceeded to build the Engineering Experiment Station to a position of prominence.

Proposals were made to outside agencies, and as their acceptance gradually increased, the College was able to match the outside money with state appropriations, thereby creating a “new economy” of research funding. Graduate students were attracted by the availability of research assistantships. By the early 1980’s, these were being funded completely from outside sources. As faculty members succeeded in obtaining support for their ideas, thus attracting students to explore those ideas, the program grew.

According to an information sheet issued in 1976, “the Station strives to encourage, foster, and promote research, and assist individual research projects in the College. It also administers research funds, integrates multidisciplinary research projects, and facilitates the liaison required with non-university institutions and local, State and Federal agencies.” These agencies include the Federal Water Pollution Control Administration (now Environmental Protection Agency), Bureau of Reclamation, Defense Department, National Science Foundation, and Department of the Army. Although the funding sources have primarily been federal agencies, certainly companies such as IBM have also played an important part.

As director of the Engineering Experiment Station, Dr. Gunaji reported directly to the dean of the College. Because he was relieved of such academic responsibilities as evaluation and promotion review, he was able to maintain a closer rapport with, and offer guidance to the faculty.

Dr. Gunaji developed a method of using the funds to the best advantage while providing incentive for the faculty: when money was received from an agency, it went first to the researcher, to be used as needed. Any left-over funds were used to support small research ideas. If an idea appeared to be worth pursuing, the faculty member could apply for a grant for a full-scale project. Gunaji refers to this type of support funding as “seed money.”

In addition to research programs, the Station provided continuing education, both to the contract agencies, and to the faculty of other institutions. Two examples are the courses offered to personnel of the Bureau of Indian Affairs to increase the efficiency of technical manpower, and a Water Resources Institute given by Gunaji for ten years under the auspices of the National Science Foundation.

The function of the Engineering Experiment Station has always been research administration. Therefore, the name was changed in 1982 to more accurately reflect the unit’s purpose. The Engineering Research Center, which is located in an office next to the dean’s office, receives proposals submitted by the faculty, checks accuracy and format, and forwards them to the agencies. It administers the contract when a proposal is accepted, and is responsible for the accounting and for any technical reports which are necessary to satisfy contractual requirements.

Following Narendra Gunaji as director, Keith Carver held the position for two years. Kenneth White filled the post from September 1984 to January 1987, when he became the head of the civil, agricultural, and geological engineering department. In 1987, Sam Maggard took over the directorship of the Engineering Research Center until 1988, when the position was passed on to its present director, Dr. Larry Matthews.

The tremendous growth in engineering research at NMSU can be seen by comparing the total expenditures in 1960 and in 1986. In that twenty-six year period, the funds increased from $51,320 to $1,969,906. The institution ranks within the top 100 universities receiving federal money.

Dr. Gunaji sees this advancement in the area of research as one of the most significant developments in recent years. The university’s position of status and prestige is demonstrated both by the uses and
ramifications of the research work done here, and by the accomplishments of NMSU graduates, who are able to fill highly responsible and influential posts in American society.\textsuperscript{15}

Associate Dean C. Quentin Ford has described four centers of excellence in the Engineering Research Center.

\textit{Major projects, and areas of concentration are: Electronic Vision Laboratory in Electrical and Computer Engineering; Transportation Center, primarily for bridge analysis in Civil Engineering; Bioengineering and Enhanced Flow in Chemical Engineering; Thermal Sciences in Mechanical Engineering. All of these activities support the academic program by giving the faculty the opportunity to remain current, while students are employed and able to see the frontiers of engineering being penetrated.}\textsuperscript{16}
Notes

The Early Years, 1888-1913
2. Ibid., p. 3.
4. The Agricultural College and Experiment Station of New Mexico, Catalogue for 1890, p. 4.
9. Ibid.
22. Ibid.
27. Fleming, p. 8.
31. Fleming, p. 5.
32. Ibid., p. 6.
33. Kropp, p. 45.
35. Kropp, p. 93.
36. Ibid., p. 76.

The Goddard Years, 1914-1929
2. Ibid., p. 41.
3. Ibid.
5. Velia, p. 47.
6. New Mexico College of Agriculture and Mechanic Arts, Catalog for 1914-1915; Announcements for 1915-1916, p. 87.
10. The United States declared war on Germany April 6, 1917.
12. Ibid., p. 48.
14. Ibid., p. 158.
15. New Mexico College of Agriculture and Mechanic Arts, Catalog for 1919-1920; Announcement for 1920-1921, p. 37.
17. Ibid., p. 15.
18. Velia, p. 50.
19. Ibid., p. 51.
20. Ibid., p. 52.
21. Ibid., pp. 56-57.
22. Ibid., pp. 57-58.
23. Ibid., p. 65.
24. Ibid., p. 70.
28. Ibid., pp. 85, 91.
29. Ibid., p. 91.
30. Ibid., p. 71.
32. Ibid., p. 32.
33. Velia, p. 117.
34. New Mexico College of Agriculture and Mechanic Arts, Annual Catalog, 1927-1928; Announcements, 1928-1929, p. 110.
35. Velia, p. 94.
37. New Mexico College of Agriculture and Mechanic Arts, 1925 Swaziloka.
38. Thode and Patton, p. 2.
40. Ibid., p. 203.
42. Velia, pp. 112, 127.
43. Ibid., p. 113.
44. Ibid., p. 125.
45. Ibid., p. 111.
46. Ibid., p. 124.
47. The amount of voltage was reported by the El Paso Evening Post, 1 January 1930; the Rio Grande Farmer, 2 January 1930, and the Round-Up, 15 January 1930.
48. Velia, pp. 128-34.
49. Ibid., pp. 135-38.
50. Ibid., p. 127.
The Leadership of Milton and Jett, 1930–1946

1. Milton, p. 3.
2. Ibid., p. 10.
3. Ibid., p. 11.
4. Ibid.
6. Ibid., p. 216.
8. Ibid.
15. Ibid., p. 162.
19. Ibid.
22. Ibid., p. 19.
24. Kropp, p. 255.
25. Ibid., p. 256.
27. New Mexico College of Agriculture and Mechanic Arts, 1942 Swastika, p. 89.
30. Ibid., p. 299.
33. Ford interview.
34. M. A. Thomas, interviewed by Jim Laukes, Las Cruces, n.d.

The Thomas Years, 1947–1961

1. This section is an edited version of the paper, “College of Engineering, 1947–1961,” by M. A. Thomas.

Coming of Age, 1962–1987

5. Thode and Patton, p. 5.
7. Thode and Patton, p. 10.
11. Ibid.
12. Ibid.
14. Ford interview.
15. Hernandez interview.
16. Ford interview.
17. Hernandez interview.
18. Ibid.
20. Statistics held in the College of Engineering.
22. Hernandez interview.
25. Abernathy interview.
28. Haley interview.

Beginning a Second Century of Excellence, 1988–

1. Abernathy interview.
2. The comments quoted in this section were made in response to questions asked during an interview or by a written questionnaire.
3. Ford interview.
4. Ibid.
6. Kamat interview.
8. Hernandez interview.

Agricultural Engineering

4. Abernathy interview. Information for the rest of the section was taken from this interview.

Chemical Engineering

1. This section is an edited version of the paper, “History of the Department of Chemical Engineering at New Mexico State University,” by Edward F. Thode and John T Patton.

Civil Engineering

1. Fleming, p. 2.
2. Ibid., p. 7.
3. New Mexico College of Agriculture and Mechanic Arts, Catalog for 1913–1914; Announcement for 1914–1915, p. 106.
5. “‘Dad’ Jett,” p. 7.
6. Ibid.
7. Hernandez interview.
9. Hernandez interview.
12. Ibid.
13. Ibid.

**Electrical and Computer Engineering**
1. Carden interview.
5. New Mexico College of Agriculture and Mechanic Arts, Catalog for 1922-1923; Announcements for 1923-24, p. 58.
10. Carden interview. Much of the information for the rest of the section was taken, sometimes verbatim, from this interview.
11. Dr. Javin Taylor.

**Engineering Technology**
1. "Establishment of The Technical Institute" (announcement by the College of Engineering, New Mexico State University, 1963).
2. Kleine, p. 2.
5. Kleine interview.

**Industrial Engineering**
1. The information in this section was taken, often verbatim, from the interview with Dr. Satish Kamat.

**Mechanical Engineering**
1. Fleming, p. 2.
5. Ibid., p. 53.
6. Ibid.
8. Ibid.
10. Ibid.
11. Ibid.
12. Ibid.
13. Ibid.
14. Ibid.
15. Ibid.
16. Ibid.
17. Ibid.
18. "M.E." (recruitment brochure), Department of Mechanical Engineering, New Mexico State University, 1987.
19. Ibid.
21. Ibid., p. 2.

**Cooperative Education**
2. Ibid., p. 2.
3. Ibid.
6. Hamilton interview.
7. Ibid.
8. Haley interview.
11. Ibid.
12. Ibid.
13. Ibid.

**Engineering Research Center**
3. Ibid.
5. Gunaji interview.
6. Thomas, "Brief History," p. 3.
7. Gunaji interview.
8. Ibid.
9. Ibid.
10. Ibid.
11. Ibid.
12. Kamat interview.
13. "Engineering Experiment Station" (information sheet), College of Engineering, New Mexico State University, 1976.
15. Gunaji interview.

91
# ENGINEERING ADMINISTRATORS

## 1914 – Present

### Deans

<table>
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<tr>
<th>Year</th>
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<td>1920–29</td>
<td>Ralph W. Goddard</td>
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<td>James T. Rood</td>
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<td>Burton P. Fleming</td>
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<td>1935–38</td>
<td>Hugh M. Milton</td>
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<td>Daniel B. Jett</td>
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<td>Melvin A. Thomas</td>
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<td>Frank Bromilow</td>
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<td>1975–80</td>
<td>John W. Hernandez</td>
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<td>C. Quentin Ford</td>
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<td>Joseph Genin</td>
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<td>1985–</td>
<td>J. Derald Morgan</td>
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### Associate Deans

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<td>1960–68</td>
<td>Jesse P. Morgan</td>
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<tr>
<td>1968–74</td>
<td>Roger M. Zimmerman</td>
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<td>1975–88</td>
<td>C. Quentin Ford</td>
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<td>1988–</td>
<td>J. Eldon Steelman</td>
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### Assistant Dean

1988– Joe L. Creed

### Engineering Research Center Directors

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<tr>
<td>1964–82</td>
<td>Narendra N. Gunaji</td>
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<td>1982–84</td>
<td>Keith Carver</td>
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<td>1984–87</td>
<td>Kenneth R. White</td>
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<td>1987–88</td>
<td>Samuel P. Maggard</td>
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<td>1988–</td>
<td>Larry K. Matthews</td>
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### Assistant to the Dean

1980– Rose Marie Melon
## ENGINEERING FACULTY
### 1891 – Present

### 1891-1960  New Mexico College Of Agriculture And Mechanic Arts
### 1960– New Mexico State University

### 1891–1914  Department Of Engineering

<table>
<thead>
<tr>
<th>Name</th>
<th>Date</th>
<th>Rank and/or Title</th>
<th>Degree</th>
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</thead>
<tbody>
<tr>
<td>Frederick L. Bixby</td>
<td>1909–1916</td>
<td>Professor civil &amp; irrigation</td>
<td>B.S., Univ. of Calif., 1904</td>
</tr>
<tr>
<td>Frank W. Brady</td>
<td>1895–1900</td>
<td>Professor irrigation &amp; mechanical Professor civil &amp; mechanical</td>
<td>B.M.E., Purdue Univ., 1888; M.E., ibid., 1894</td>
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<tr>
<td>J. R. Burkey</td>
<td>1908–1909</td>
<td>Assistant professor civil 1909</td>
<td>C.E., Ohio State Univ., 1908</td>
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<tr>
<td>Elmer I. Chute</td>
<td>1903–1904</td>
<td>Assistant mechanical</td>
<td>A.B.E.E., Univ. of Tenn, 1904</td>
</tr>
<tr>
<td>DuVal Garland Cravens</td>
<td>1897–1898</td>
<td>Assistant engineering department</td>
<td>B.S.</td>
</tr>
<tr>
<td>Burton P. Fleming</td>
<td>1906–1909</td>
<td>Professor irrigation</td>
<td>M.E., Cornell Univ., 1906</td>
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<tr>
<td>J. Jacob Grieb</td>
<td>1908–1909</td>
<td>Assistant mechanical</td>
<td>B.S.M.E., Clarkson Memorial Shool of Tech., 1908</td>
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<tr>
<td>Clarence T. Hagerty</td>
<td>1893–1894</td>
<td>Professor civil</td>
<td>B.S., Notre Dame Univ., 1890; M.S., ibid., 1895</td>
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<td>1908–1914</td>
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<td>George K. Kahle</td>
<td>1913–1914</td>
<td>Asst. 1913 &amp; asst. prof. irrig. 1914</td>
<td>B.S., Univ. of California</td>
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<tr>
<td>James S. Macgregor</td>
<td>1901–1903</td>
<td>Assistant mechanical</td>
<td>B.S., NMCA &amp; MA, 1902</td>
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<tr>
<td>John George Miller</td>
<td>1905–1908</td>
<td>Assistant mechanical</td>
<td>B.S.M.E., NMCA &amp; MA, 1907</td>
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<tr>
<td>Charles Mills</td>
<td>1900–1905</td>
<td>Assistant professor mechanical 1901 Mechanical department head 1902</td>
<td>No information</td>
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<td>Charles E. Paul</td>
<td>1904–1908</td>
<td>Professor mechanical</td>
<td>S.B., M.I.T., 1900</td>
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<tr>
<td>Roy L. Phelps</td>
<td>1910–1911</td>
<td>Assistant irrigation</td>
<td>No information</td>
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<tr>
<td>W. M. Reed</td>
<td>1899–1900</td>
<td>Professor civil &amp; irrigation</td>
<td>C.E., Univ. of Vermont</td>
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<tr>
<td>Horace Ropes</td>
<td>1894–1896</td>
<td>Professor civil &amp; mechanical</td>
<td>B.S.</td>
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<tr>
<td>Archibald Bruce Sage</td>
<td>1899–1914</td>
<td>Asst. &amp; asst. prof. mech. 1900–07 Prof. mech. &amp; elect. 1907–14 Department head 1908–14</td>
<td>B.S., NMCA &amp; MA, 1900; M.S., ibid., 1911</td>
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<tr>
<td>William F. Schaphorst</td>
<td>1906–1911</td>
<td>Assistant mechanical 1906 Assistant prof. mechanical 1907–11</td>
<td>B.S., S. Dakota Ag. Coll., 1905; M.E., ibid., 1908</td>
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<tr>
<td>Lloyd Blaine Selby</td>
<td>1911–1914</td>
<td>Assistant professor mechanical</td>
<td>B.S.M.E., W. Virginia Univ. 1908; M.E., ibid., 1909</td>
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<tr>
<td>Jay B. Stoneking</td>
<td>1908–1913</td>
<td>Assistant irrigation</td>
<td>M.E., NMCA &amp; MA, 1908</td>
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<tr>
<td>G. E. West</td>
<td>1910–1911</td>
<td>Assistant mechanical</td>
<td>No information</td>
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<tr>
<td>August J. Wiechardt</td>
<td>1891–1894</td>
<td>Professor mechanical</td>
<td>M.M.E., Cornell Univ.</td>
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<tr>
<td>Clarence Clyde Winn</td>
<td>1911–1914</td>
<td>Assistant mechanical &amp; electrical</td>
<td>B.S.M.E., Purdue Univ., 1908</td>
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Faculty

College Of Engineering Established - 1914
1914–Present

1. Department of Agricultural Engineering

1919–33  Department of Agricultural Engineering
1948–86  Department of Agricultural Engineering
1986–    Department of Civil, Agricultural, and Geological Engineering

HEADS

1948–51  Charles T. Bourns
1951–79  Eldon Hanson
1979–86  George H. Abernathy
1986–87  Conrad C. Keyes (CAGE)
1987–    Kenneth R. White (CAGE)

AG. E. FACULTY

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<th>Name</th>
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<tr>
<td>Jose F. Alfar</td>
<td>1967–1972</td>
<td>Associate professor</td>
<td>Ph.D., Utah State Univ., 1967</td>
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<tr>
<td>Charles T. Bourns</td>
<td>1948–1951</td>
<td>Professor, Department head 1948–51</td>
<td>M.S., Texas A&amp;M Univ., 1947</td>
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<td>Kenneth Frost</td>
<td>1945–1948</td>
<td>Associate professor</td>
<td>M.S., Univ. of Calif, 1933</td>
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<tr>
<td>Eldon Hanson</td>
<td>1949–1979</td>
<td>Professor, Department head 1951–79</td>
<td>M.S., Utah State Univ., 1948</td>
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<tr>
<td>Arthur Henry Hoffman</td>
<td>1917–1919</td>
<td>Assistant professor</td>
<td>B.S. Ag. E., Iowa State College 1914; B.S.E.E. ibid., 1915</td>
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<tr>
<td>Craig. E. Kalessen</td>
<td>1981–1982</td>
<td>Assistant professor</td>
<td>M.S., Univ. of Calif.–Davis, 1979</td>
</tr>
<tr>
<td>Fred Richard Powers</td>
<td>1919–1921</td>
<td>Assistant professor</td>
<td>B.S. Ag. E., Univ. of Illinois, 1915</td>
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<tr>
<td>Alvin E. Stewart</td>
<td>1948–1951</td>
<td>Associate professor 1952</td>
<td>M.S., Texas A&amp;M Univ., 1948</td>
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<tr>
<td>Lambert H. Wilkes</td>
<td>1955–1958</td>
<td>Associate professor</td>
<td>M.S., Texas A&amp;M Univ., 1952</td>
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2. Department of Chemical Engineering

1926–49  Department of Chemistry and Chemical Engineering
1949–    Department of Chemical Engineering

109
HEADS

1926–48 Clayton W. Botkin (Chem. & Ch. E.) 1975–77 Kermit L. Holman (acting)
1963–74 Edward F. Thode

CH. E. FACULTY

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<tr>
<td>Harold M. Belkin</td>
<td>1964–1979</td>
<td>Associate professor</td>
<td>Ph.D., Carnegie–Mellon Univ., 1954</td>
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<tr>
<td>Rohinton K. Bhada</td>
<td>1988–</td>
<td>Professor</td>
<td>Ph.D., Univ. of Michigan, 1968</td>
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<tr>
<td>Ricardo Bogaert</td>
<td>1986–</td>
<td>Department head 1988</td>
<td>Ph.D., Univ. of Delaware, 1986</td>
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<tr>
<td>Michael Cho</td>
<td>1988–</td>
<td>Associate professor</td>
<td>Ph.D., Univ. of Houston, 1977</td>
</tr>
<tr>
<td>Joe L. Creed</td>
<td>1983–</td>
<td>Assistant professor</td>
<td>M.S., NMSU, 1986</td>
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<tr>
<td>Fransisco Del Valle</td>
<td>1986–</td>
<td>Associate professor</td>
<td>Ph.D., M.I.T., 1965</td>
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<td>Harry Folster</td>
<td>1968–1980</td>
<td>Professor</td>
<td>Ph.D., Univ. of Maine, 1969</td>
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<td>Fred Sumner Hanson</td>
<td>1948–1951</td>
<td>Associate professor</td>
<td>Ph.D., Lawrence College, 1939</td>
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<tr>
<td>Kermit L. Holman</td>
<td>1965–1977</td>
<td>Professor</td>
<td>Ph.D., Iowa State Univ., 1964</td>
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<tr>
<td>Richard Long</td>
<td>1981–</td>
<td>Professor</td>
<td>Ph.D., Rice Univ. 1973</td>
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<tr>
<td>Kenneth McCorkle</td>
<td>1980–1987</td>
<td>Associate professor</td>
<td>Ph.D., Univ. Tenn.–Knoxville 1966</td>
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<td>Allen Rakow</td>
<td>1981–</td>
<td>Associate professor</td>
<td>D.Sc., Washington Univ., 1974</td>
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<tr>
<td>Dinwiddie C. Reams</td>
<td>1955–1958</td>
<td>Assistant professor</td>
<td>M.E., Yale Univ. 1950</td>
</tr>
<tr>
<td>Rudolf Roubicek</td>
<td>1982–</td>
<td>Professor</td>
<td>D.Sc., Czechoslovakia Tech. Univ., 1949</td>
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<tr>
<td>Henry P. Sheng</td>
<td>1957–1962</td>
<td>Assistant professor</td>
<td>M.S., Purdue Univ. 1958</td>
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<tr>
<td>Luke B. Shires</td>
<td>1926–1965</td>
<td>Professor</td>
<td>M.S., Penn State 1926; Ch.E., Ohio Northern Univ. 1928</td>
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<tr>
<td>Donald Bruce Wilson</td>
<td>1964–88</td>
<td>Professor</td>
<td>Ph.D., Princeton Univ., 1973</td>
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3. Department of Civil, Agricultural, and Geological Engineering

1914–19 Department of Civil Engineering and Department of Irrigation Engineering (separate)
1919–26 Department of Civil and Irrigation Engineering
1926–86 Department of Civil Engineering
1986– Department of Civil, Agricultural, and Geological Engineering
## HEADS

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<tr>
<td>1915–16</td>
<td>Raymond Matthew</td>
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<td>1916–22</td>
<td>John W. Jourdan</td>
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<tr>
<td>1922–24</td>
<td>Ernest C. White</td>
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<td>1924–33</td>
<td>Harvey O. Garst</td>
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<td>1933–56</td>
<td>Daniel B. Jett</td>
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<td>1957–61</td>
<td>Frank Bromilow</td>
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<td>1961–62</td>
<td>John W. Clark</td>
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<td>1962–66</td>
<td>Russell C. Brinker</td>
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<td>1966–78</td>
<td>Samuel P. Maggard</td>
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<td>1978–87</td>
<td>Conrad C. Keyes</td>
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<td>1987–</td>
<td>Kenneth R. White</td>
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## CAGE FACULTY

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<td>A. Kulathu Aiyer</td>
<td>1981–</td>
<td>Associate professor</td>
<td>Ph.D., Univ. of Illinois, 1969</td>
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<tr>
<td>John Babcock Baker</td>
<td>1931–34</td>
<td>Assistant materials engr. Professor 1978</td>
<td>M.S., Univ. of Illinois, 1924</td>
</tr>
<tr>
<td>Edgar L. Barrows</td>
<td>1917–23</td>
<td>Assistant professor</td>
<td>Student, Univ. Mich., 1905–08</td>
</tr>
<tr>
<td>Allie W. Blair</td>
<td>1987–</td>
<td>Assistant professor</td>
<td>Ph.D., Univ. Texas/Austin, 1985</td>
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<td>Charles F. Bird</td>
<td>1941–42</td>
<td>Assistant professor</td>
<td>M.S., Univ. Michigan, 1938</td>
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<td>Charles H. Bonney</td>
<td>1941–48</td>
<td>Professor</td>
<td>B.S., NMCA &amp; MA, 1933</td>
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<tr>
<td>Russell C. Brinker</td>
<td>1961–82</td>
<td>Department head 1962–66 Visiting professor 1972–82</td>
<td>M.S., Univ. of Minnesota, 1933</td>
</tr>
<tr>
<td>Frank Bromilow</td>
<td>1951–74</td>
<td>Department head, 1951–61 Dean of engineering 1961–74</td>
<td>M.S., Univ. of Pittsburgh, 1939</td>
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<tr>
<td>Labry Brown</td>
<td>1948–52</td>
<td>Associate professor</td>
<td>M.S.C.E., Georgia School of Tech., 1932</td>
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<td>John Cabrera</td>
<td>1982–83</td>
<td>Associate professor</td>
<td>Ph.D., Cornell Univ., 1971</td>
</tr>
<tr>
<td>Fernando Cadena–C</td>
<td>1980–</td>
<td>Associate professor 1984</td>
<td>Ph.D., Calif. Inst. of Tech., 1977</td>
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<tr>
<td>Lawrence C. Campbell</td>
<td>1926–34</td>
<td>Materials engineering</td>
<td>B.S.C.E., NMCA &amp; MA, 1919</td>
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<td>Lokesh N. Chaturvedi</td>
<td>1977–83</td>
<td>Associate prof. geological engr. 1979</td>
<td>Ph.D., Cornell, 1969</td>
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<tr>
<td>John William Clark</td>
<td>1953–79</td>
<td>Professor</td>
<td>M.S., Missouri School of Mines, 1953</td>
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<tr>
<td>Bob J. Donham</td>
<td>1958–62</td>
<td>Associate irrigation</td>
<td>M.S., NMSU, 1960</td>
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<td>Elton G. Endebrock</td>
<td>1964–75</td>
<td>Assistant professor 1961</td>
<td>Ph.D., Univ. of Arizona, 1964</td>
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<td>Burton P. Fleming</td>
<td>1932–34</td>
<td>Associate professor 1968</td>
<td>M.E., Cornell Univ., 1906</td>
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<td>Harold Ganow</td>
<td>1985–</td>
<td>Professor</td>
<td>Ph.D., Univ. of Illinois, 1975</td>
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<tr>
<td>Harvey Oden Garst</td>
<td>1923–32</td>
<td>Department head 1932–34</td>
<td>B.S.C.E., Univ. of Missouri, 1909; C.E., ibid., 1922</td>
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<td>R. J. Hammersmith</td>
<td>1959–62</td>
<td>Assistant professor</td>
<td>B.C.E., Univ. of Minnesota, 1950</td>
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<tr>
<td>Frank A. Hitchcock</td>
<td>1916–18</td>
<td>Professor civil</td>
<td>M.S.C.E., Christian Bros. Coll., 1916</td>
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<td>Ti Huang</td>
<td>1959–67</td>
<td>Assistant professor</td>
<td>Ph.D., Univ. of Michigan, 1960</td>
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<td>Ricardo Jacquez</td>
<td>1981–</td>
<td>Associate professor</td>
<td>Ph.D., Virginia Polytechnic Inst., 1976</td>
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<td>Roy T. Jennings</td>
<td>1956–1960</td>
<td>Professor 1958</td>
<td>M.S., Univ. of Tennessee, 1937</td>
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<td>Chester C. Kiesel</td>
<td>1962–1964</td>
<td>Associate professor</td>
<td>M.P.H. Univ. of Pittsburgh, 1959</td>
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<td>Donald A. Linger</td>
<td>1960–1963</td>
<td>Professor 1965</td>
<td>Ph.D., Iowa State Univ., 1960</td>
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<td>Jesse V. Lunsford</td>
<td>1958–1985</td>
<td>Professor 1967</td>
<td>M.S., Univ. of Calif., 1954</td>
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<tr>
<td>Raymond Matthew</td>
<td>1915–1916</td>
<td>Instructor irrigation engr.</td>
<td>B.S.C.E., Univ. of Calif., 1915</td>
</tr>
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<td>Bernard C. McBeath</td>
<td>1959–1962</td>
<td>Associate professor</td>
<td>M.S., Stanford Univ., 1951</td>
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<td>William McCarthy</td>
<td>1980–</td>
<td>Associate professor 1985</td>
<td>Ph.D., NMSU, 1980</td>
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<td>Ronald McPherson</td>
<td>1981–</td>
<td>Associate professor</td>
<td>Ph.D., West Virginia Univ., 1968</td>
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<td>Oliver Payne</td>
<td>1946–1961</td>
<td>Assistant professor 1953</td>
<td>B.S., Valparaiso Univ., 1921</td>
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<td>James Post</td>
<td>1969–1970</td>
<td>Associate professor</td>
<td>Ph.D., Univ. of Arizona, 1966</td>
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<td>Richard N. Pugh</td>
<td>1949–1955</td>
<td>Assistant professor</td>
<td>M.S., Univ. of Rochester, 1949</td>
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<tr>
<td>Fay M. Raymond</td>
<td>1923–1926</td>
<td>Instructor of civil engr.</td>
<td>B.S.C.E., Iowa St. Univ. 1920</td>
</tr>
<tr>
<td>Daniel Stucker Robbins</td>
<td>1918–1930</td>
<td>Instructor general engineering Acting dean of engineering 1930</td>
<td>M.S., Univ. Valparaiso, 1894; Ph.D., ibid., 1907</td>
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<td>Lloyd R. Robinson</td>
<td>1962–1965</td>
<td>Assistant professor</td>
<td>M.S., Univ. of Kansas, 1958</td>
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<td>Zohrab A. Samani</td>
<td>1987–</td>
<td>Assistant professor</td>
<td>Ph.D., Utah State Univ., 1983</td>
</tr>
<tr>
<td>Stuart Hobbs Sims</td>
<td>1935–1941</td>
<td>Associate professor 1938 Acting department head 1938–39</td>
<td>B.S.C.E., Univ. of Michigan, 1903</td>
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<td>Frank W. Stout</td>
<td>1963–1965</td>
<td>Assistant professor</td>
<td>M.S., Univ. of Delaware, 1956</td>
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<td>Leonard A. Traina</td>
<td>1967–</td>
<td>Professor 1978</td>
<td>Ph.D., Univ. of Wisconsin, 1968</td>
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<tr>
<td>Timothy Ward</td>
<td>1980–</td>
<td>Professor 1986</td>
<td>Ph.D., Colorado State Univ., 1976</td>
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<tr>
<td>Ernest Charles White</td>
<td>1921–1924</td>
<td>Professor civil &amp; irrigation</td>
<td>B.S.C.E., Norwich Univ., 1908; C.E., ibid., 1915</td>
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<tr>
<td>Charles Clay Withrow</td>
<td>1946–1949</td>
<td>Assistant professor&lt;br&gt;Professor 1970&lt;br&gt;Associate dean of engr. 1968–74&lt;br&gt;Acting dean of engineering 1974–75</td>
<td>B.S., Rose Polytech, 1925&lt;br&gt;Ph.D., Univ. of Colorado, 1965</td>
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### 4. Department of Electrical and Computer Engineering

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<th>Year</th>
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<tbody>
<tr>
<td>1914–73</td>
<td>Department of Electrical Engineering</td>
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<tr>
<td>1973–</td>
<td>Department of Electrical and Computer Engineering</td>
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**HEADS**

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<th>Rank and/or Title</th>
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<tr>
<td>1914–29</td>
<td>Ralph W. Goddard</td>
<td>1956–68</td>
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<td>Harold A. Brown</td>
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<tr>
<td>1930</td>
<td>William E. Carroon (acting)</td>
<td>1968–87</td>
<td></td>
<td>Frank F. Carden</td>
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<tr>
<td>1932–56</td>
<td>Melvin A. Thomas</td>
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**E. & C.E. FACULTY**

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<tr>
<td>Frank Amador</td>
<td>1935–1946</td>
<td>Assistant professor 1941</td>
<td>M.S., Univ. of Kansas, 1935</td>
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<td>Raymond J. Black, Jr.</td>
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<td>Eric Johnson</td>
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<td>Jay Jordan</td>
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<td>Don M. Merrill</td>
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<td>An–hwa Soong</td>
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<td>Melvin Aubrey Thomas</td>
<td>1931–1967</td>
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### Faculty

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<td>Walter L. Weeks</td>
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### 5. Department of Engineering Technology

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### HEADS

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### E.T. FACULTY

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<td>George D. Alexander</td>
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<td>Ambrose Barry</td>
<td>1982–1987</td>
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<td>Jeffrey S. Beasley</td>
<td>1988–</td>
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<td>David Bollscheiwer</td>
<td>1980–</td>
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<td>M.S., NM Mining &amp; Tech. 1981</td>
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<td>Robert Cameron</td>
<td>1978–</td>
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<td>C. Stuart Ferrell</td>
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<td>Louis Kleine</td>
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<td>Mel A. Peterson Jr.</td>
<td>1986–</td>
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<td>Michael Roseborough</td>
<td>1982–1987</td>
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<td>Herrol (Jim) Skidmore</td>
<td>1978–</td>
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6. Department of Industrial Engineering

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<td>Michael Burke</td>
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<td>James W. Field</td>
<td>1969–1975</td>
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<td>Paul R. Finch</td>
<td>1976–</td>
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<td>M.S., Univ. of Tennessee, 1966</td>
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<td>Mary Ann Maher</td>
<td>1984–</td>
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<td>Ph.D., Univ. of Rochester, 1979</td>
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7. Department of Mechanical Engineering

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<td>Joseph Genin</td>
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<td>Ph.D., Univ. of Minnesota, 1963</td>
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<td>Ronald Pederson</td>
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<td>A. R. Shouman</td>
<td>1971–1975</td>
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<td>Ph.D., Univ. Minnesota, 1933</td>
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<tr>
<td>Phillip R. Smith</td>
<td>1947–48</td>
<td>Assistant professor 1954</td>
<td>Ph.D., Univ. of Minnesota, 1976</td>
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<tr>
<td>John Mark Stephenson</td>
<td>1954–1960</td>
<td>Professor Department head 1920–21</td>
<td>Ph.D., Univ. of Florida, 1969</td>
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<tr>
<td>Norman Nevil Tilley</td>
<td>1920–1921</td>
<td>Assistant professor</td>
<td>Ph.D., Univ. of Iowa, 1956</td>
</tr>
<tr>
<td>Raymond Willem</td>
<td>1976–</td>
<td>Assistant professor</td>
<td>Ph.D. Univ. of Kansas, 1966</td>
</tr>
<tr>
<td>Dennis Zallen</td>
<td>1976–1977</td>
<td>Assistant professor</td>
<td>M.S., Univ. of Texas, 1949</td>
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</tbody>
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118
# ENGINEERING FACULTY

## 1891 – Present

### 1891-1960 New Mexico College Of Agriculture And Mechanic Arts
### 1960– New Mexico State University

## 1891–1914 Department Of Engineering

<table>
<thead>
<tr>
<th>Name</th>
<th>Date</th>
<th>Rank and/or Title</th>
<th>Degree</th>
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<tbody>
<tr>
<td>Frederick L. Bixby</td>
<td>1909–1916</td>
<td>Professor civil &amp; irrigation</td>
<td>B.S., Univ. of Calif., 1904</td>
</tr>
<tr>
<td>Frank W. Brady</td>
<td>1895–1900</td>
<td>Professor irrigation &amp; mechanical Professor civil &amp; mechanical</td>
<td>B.M.E., Purdue Univ., 1888; C.E., Ohio State Univ., 1908</td>
</tr>
<tr>
<td>J. R. Burkey</td>
<td>1908–1909</td>
<td>Assistant professor 1909</td>
<td></td>
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<tr>
<td>Elmer L. Chute</td>
<td>1903–1904</td>
<td>Assistant mechanical</td>
<td>A.B.E.E., Univ. of Tenn, 1904</td>
</tr>
<tr>
<td>DuVal Garland Cravens</td>
<td>1897–1898</td>
<td>Assistant engineering department</td>
<td>B.S.</td>
</tr>
<tr>
<td>Burton P. Fleming</td>
<td>1906–1909</td>
<td>Professor irrigation See also 1932 – civil</td>
<td>B.S.M.E., Cornell Univ., 1906</td>
</tr>
<tr>
<td>J. Jacob Grieb</td>
<td>1908–1909</td>
<td>Assistant mechanical</td>
<td>B.S.M.E., Clarkson Memorial Shool of Tech., 1908</td>
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<tr>
<td>Clarence T. Hagerty</td>
<td>1893–1894</td>
<td>Professor civil</td>
<td>B.S., Notre Dame Univ., 1890; M.S., ibid., 1895</td>
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<td>1908–1914</td>
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<td>George K. Kahle</td>
<td>1913–1914</td>
<td>Asst. 1913 &amp; asst. prof. irrig. 1914</td>
<td>B.S., Univ. of California</td>
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<tr>
<td>James S. Macgregor</td>
<td>1901–1903</td>
<td>Assistant mechanical</td>
<td>B.S., NMCA &amp; MA, 1902</td>
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<tr>
<td>John George Miller</td>
<td>1905–1908</td>
<td>Assistant mechanical</td>
<td>B.S.M.E., NMCA &amp; MA, 1907</td>
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<tr>
<td>Charles Mills</td>
<td>1900–1905</td>
<td>Assistant professor mechanical 1901 Mechanical department head 1902</td>
<td>No information</td>
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<tr>
<td>Charles E. Paul</td>
<td>1904–1908</td>
<td>Professor mechanical</td>
<td>S.B., M.I.T., 1900</td>
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<td>Roy L. Phelps</td>
<td>1910–1911</td>
<td>Assistant irrigation</td>
<td>No information</td>
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<tr>
<td>W. M. Reed</td>
<td>1899–1900</td>
<td>Professor civil &amp; irrigation</td>
<td>C.E., Univ. of Vermont</td>
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<td>Horace Ropes</td>
<td>1894–1896</td>
<td>Professor civil &amp; mechanical</td>
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<td>Archibald Bruce Sage</td>
<td>1899–1914</td>
<td>Asst. &amp; asst. prof. mech. 1900–07 Prof. mech. &amp; elect. 1907–14 Department head 1908–14</td>
<td>B.S., NMCA &amp; MA, 1900; M.S., ibid., 1911</td>
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<td>William F. Schaphorst</td>
<td>1906–1911</td>
<td>Assistant mechanical 1906</td>
<td>B.S., S. Dakota Ag. Coll., 1905; M.E., ibid., 1908</td>
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<td>Lloyd Blaine Selby</td>
<td>1911–1914</td>
<td>Assistant professor mechanical</td>
<td>B.S.M.E., W. Virginia Univ. 1908; M.E., ibid., 1909</td>
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<td>Jay B. Stoneking</td>
<td>1908–1913</td>
<td>Assistant irrigation</td>
<td>M.E., NMCA &amp; MA, 1908</td>
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<td>G. E. West</td>
<td>1910–1911</td>
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<td>August J. Wiechardt</td>
<td>1891–1894</td>
<td>Professor mechanical</td>
<td>M.M.E., Cornell Univ.</td>
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<td>Clarence Clyde Winn</td>
<td>1911–1914</td>
<td>Assistant mechanical &amp; electrical</td>
<td>B.S.M.E., Purdue Univ., 1908</td>
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College Of Engineering Established – 1914
1914–Present

1. Department of Agricultural Engineering

1919–33  Department of Agricultural Engineering
1948–86  Department of Agricultural Engineering
1986–    Department of Civil, Agricultural, and Geological Engineering

HEADS

1948–51  Charles T. Bourns            1986–87  Conrad C. Keyes (CAGE)
1951–79  Eldon Hanson                1987–    Kenneth R. White (CAGE)
1979–86  George H. Abernathy

AG. E. FACULTY

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<tr>
<td>Jose F. Alfaro</td>
<td>1967–1972</td>
<td>Associate professor</td>
<td>Ph.D., Utah State Univ., 1967</td>
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<tr>
<td>Charles T. Bourns</td>
<td>1948–1951</td>
<td>Professor</td>
<td>M.S., Texas A&amp;M Univ., 1947</td>
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<td>Kenneth Frost</td>
<td>1945–1948</td>
<td>Associate professor</td>
<td>M.S., Univ. of Calif, 1933</td>
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<td>Eldon Hanson</td>
<td>1949–1979</td>
<td>Professor</td>
<td>M.S., Utah State Univ., 1948</td>
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<td></td>
<td>Department head 1951–79</td>
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<td>Arthur Henry Hoffman</td>
<td>1917–1919</td>
<td>Assistant professor</td>
<td>B.S. Ag. E., Iowa State College 1914; B.S.E.E. ibid., 1915</td>
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<td>Robert Huelsman</td>
<td>1979–1986</td>
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<td>Ph.D., Utah State Univ., 1979</td>
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<td>Craig. E. Kallsen</td>
<td>1981–1982</td>
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<td>M.S., Univ. of Calif.–Davis, 1979</td>
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<td>Fred Richard Powers</td>
<td>1919–1921</td>
<td>Assistant professor</td>
<td>B.S. Ag. E., Univ. of Illinois, 1915</td>
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<td>Alvin E. Stewart</td>
<td>1948–1951</td>
<td>Associate professor 1952</td>
<td>M.S., Texas A&amp;M Univ., 1948</td>
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<td>1961–1967</td>
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<td>Zariel Gay Tyson</td>
<td>1949–1960</td>
<td>Assistant professor 1953</td>
<td>M. Ag., Univ. of Florida, 1949</td>
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<tr>
<td>Lambert H. Wilkes</td>
<td>1955–1958</td>
<td>Associate professor</td>
<td>M.S., Texas A&amp;M Univ., 1952</td>
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2. Department of Chemical Engineering

1926–49  Department of Chemistry and Chemical Engineering
1949–    Department of Chemical Engineering
HEADS

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<td>1926–48</td>
<td>Clayton W. Botkin (Chem. &amp; Ch. E.)</td>
<td>1975–77</td>
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<td>1963–74</td>
<td>Edward F. Thode</td>
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<td></td>
<td>Kermit L. Holman (acting)</td>
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<td>John T. Patton</td>
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<td>Rohinton K. Bhada</td>
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CH. E. FACULTY

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<tr>
<td>Paul D. Babcock</td>
<td>1977–81</td>
<td>Assistant professor</td>
<td>Ph.D., Lehigh Univ., 1975</td>
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<td>Harold M. Belkin</td>
<td>1964–79</td>
<td>Associate professor</td>
<td>Ph.D., Carnegie-Mellon Univ., 1954</td>
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<tr>
<td>Rohinton K. Bhada</td>
<td>1988–</td>
<td>Professor</td>
<td>Ph.D., Univ. of Michigan, 1968</td>
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<tr>
<td>Ricardo Bogaert</td>
<td>1986–</td>
<td>Department head 1988</td>
<td>Ph.D., Univ. of Delaware, 1986</td>
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<td>Michael Cho</td>
<td>1988–</td>
<td>Associate professor</td>
<td>Ph.D., Univ. of Houston, 1977</td>
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<tr>
<td>Joe L. Creed</td>
<td>1983–</td>
<td>Assistant professor</td>
<td>M.S., NMSU, 1986</td>
</tr>
<tr>
<td>Fransisco Del Valle</td>
<td>1986–</td>
<td>Professor</td>
<td>Ph.D., M.I.T., 1965</td>
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<td>Harry Folster</td>
<td>1968–80</td>
<td>Professor 1979</td>
<td>Ph.D., Univ. of Maine, 1969</td>
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<td>Edward Groth</td>
<td>1976–83</td>
<td>Assistant professor</td>
<td>Sc.D., Yale Univ. 1941</td>
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<td>Fred Sumner Hanson</td>
<td>1948–51</td>
<td>Associate professor</td>
<td>Ph.D., Lawrence College, 1939</td>
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<td>Murty Kuntamukkula</td>
<td>1979–82</td>
<td>Assistant professor</td>
<td>Ph.D., Rice Univ., 1976</td>
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<td>Richard Long</td>
<td>1981–</td>
<td>Assistant professor</td>
<td>Ph.D., Rice Univ. 1973</td>
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<td>Kenneth McCorkle</td>
<td>1980–87</td>
<td>Associate professor</td>
<td>Ph.D., Univ. Tenn.-Knoxville, 1966</td>
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<tr>
<td>John T. Patton</td>
<td>1977–</td>
<td>Professor Department head 1977–88</td>
<td>Ph.D., Oklahoma State Univ., 1959</td>
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<tr>
<td>Allen Rakow</td>
<td>1981–</td>
<td>Associate professor</td>
<td>D.Sc., Washington Univ., 1974</td>
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<td>Dinwiddie C. Reams</td>
<td>1955–58</td>
<td>Assistant professor</td>
<td>M.E., Yale Univ. 1950</td>
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<tr>
<td>Rudolf Roubicek</td>
<td>1982–</td>
<td>Professor</td>
<td>D.Sc., Czechoslovakia Tech. Univ., 1949</td>
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<tr>
<td>Henry P. Sheng</td>
<td>1957–62</td>
<td>Assistant professor</td>
<td>M.S., Purdue Univ, 1958</td>
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<tr>
<td>Luke B. Shires</td>
<td>1926–65</td>
<td>Professor Department head 1949–63</td>
<td>M.S., Penn State 1926; Ch.E., Ohio Northern Univ. 1928</td>
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3. Department Of Civil, Agricultural, and Geological Engineering

1914–19 Department of Civil Engineering and Department of Irrigation Engineering (separate)
1919–26 Department of Civil and Irrigation Engineering
1926–86 Department of Civil Engineering
1986– Department of Civil, Agricultural, and Geological Engineering
### HEADS

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<th>Years</th>
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<tr>
<td>1915–16</td>
<td>Raymond Matthew</td>
<td>1961–62</td>
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<tr>
<td>1922–24</td>
<td>Ernest C. White</td>
<td>1966–78</td>
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<tr>
<td>1924–33</td>
<td>Harvey O. Garst</td>
<td>1978–87</td>
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<tr>
<td>1933–56</td>
<td>Daniel B. Jett</td>
<td>1987–</td>
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<tr>
<td>1957–61</td>
<td>Frank Bromilow</td>
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### CAGE FACULTY

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<th>Rank and/or Title</th>
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<tr>
<td>A. Kulathu Aiyer</td>
<td>1981–</td>
<td>Associate professor</td>
<td>Ph.D., Univ. of Illinois, 1969</td>
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<tr>
<td>John Babcock Baker</td>
<td>1931–1934</td>
<td>Assistant materials engr.</td>
<td>M.S., Univ. of Illinois, 1924</td>
</tr>
<tr>
<td>Edgar L. Barrows</td>
<td>1917–1923</td>
<td>Assistant irrigation</td>
<td>Student, Univ. Mich., 1905–08</td>
</tr>
<tr>
<td>Allie W. Blair</td>
<td>1987–</td>
<td>Assistant professor</td>
<td>Ph.D., Univ. Texas/Austin, 1985</td>
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<tr>
<td>Charles F. Bird</td>
<td>1941–1942</td>
<td>Assistant professor</td>
<td>M.S., Univ. Michigan, 1938</td>
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<tr>
<td>Charles H. Bonney</td>
<td>1941–1948</td>
<td>Assistant professor</td>
<td>B.S., NMCA &amp; MA, 1933</td>
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<td>Russell C. Brinker</td>
<td>1961–1982</td>
<td>Professor</td>
<td>M.S., Univ. of Minnesota, 1933</td>
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<tr>
<td>Labry Brown</td>
<td>1948–1952</td>
<td>Associate professor</td>
<td>M.S.C.E., Georgia School of Tech., 1932</td>
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<td>John Cabrera</td>
<td>1982–1983</td>
<td>Associate professor</td>
<td>Ph.D., Cornell Univ., 1971</td>
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<td>Fernando Cadena–C</td>
<td>1980–</td>
<td>Associate professor 1984</td>
<td>Ph.D., Calif. Inst. of Tech., 1977</td>
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<tr>
<td>Lawrence C. Campbell</td>
<td>1926–1934</td>
<td>Materials engineering</td>
<td>B.S.C.E., NMCA &amp; MA, 1919</td>
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<tr>
<td>Albert Samuel Curry</td>
<td>1923–1935</td>
<td>Associate irrigation</td>
<td>B.S.A., NMCA &amp; MA, 1923</td>
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<tr>
<td>Elton G. Endebrock</td>
<td>1964–1975</td>
<td>Associate professor 1968</td>
<td>Ph.D., Univ. of Arizona, 1964</td>
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<tr>
<td>Burton P. Fleming</td>
<td>1932–1934</td>
<td>Professor</td>
<td>M.E., Cornell Univ., 1906</td>
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<td>Harold Ganow</td>
<td>1985–</td>
<td>Associate professor 1970</td>
<td>Ph.D., Univ. of Illinois, 1975</td>
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<td>Harvey Oden Garst</td>
<td>1923–1932</td>
<td>Professor civil</td>
<td>B.S.C.E., Univ. of Missouri, 1909; C.E., ibid., 1922</td>
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<td>Narendra N. Gunaji</td>
<td>1960–1986</td>
<td>Assistant professor</td>
<td>Ph.D., Univ. of Wisconsin, 1958</td>
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<td>John W. Hernandez</td>
<td>1965–</td>
<td>Professor civil</td>
<td>Ph.D., Harvard–Radcliffe, 1965</td>
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<td>Ti Huang</td>
<td>1959–1967</td>
<td>Assistant professor</td>
<td>Ph.D., Univ. of Michigan, 1960</td>
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<td>Roy T. Jennings</td>
<td>1956–1960</td>
<td>Professor 1958</td>
<td>M.S., Univ. of Tennessee, 1937</td>
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<td>John William Jourdan</td>
<td>1917–1922</td>
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<td>Asst. prof. civil 1933–1935</td>
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<td>Donald A. Linger</td>
<td>1960–1963</td>
<td>Department head 1966–78</td>
<td>M.S., Univ. of Calif., 1954</td>
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<tr>
<td>Jesse V. Lunsford</td>
<td>1958–1985</td>
<td>Associate professor</td>
<td>Ph.D., Purdue, 1963</td>
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<td>Samuel P. Maggard</td>
<td>1963–</td>
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<td>Instructor of civil engr.</td>
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### 4. Department of Electrical and Computer Engineering

1914–73  
Department of Electrical Engineering  
1973–     
Department of Electrical and Computer Engineering

#### HEADS

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#### E. & C.E. FACULTY

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### 5. Department of Engineering Technology

1963–65  The Technical Institute  
1965–    Department of Engineering Technology

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1969-- Department of Industrial Engineering

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**I.E. FACULTY**

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7. Department of Mechanical Engineering

1914-- Department of Mechanical Engineering

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**M.E. FACULTY**

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<td>Rank and/or Title</td>
<td>Degree</td>
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<tr>
<td>----------------------</td>
<td>------------</td>
<td>---------------------------------------------</td>
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</tr>
<tr>
<td>Fred Baumgartner</td>
<td>1942–1945</td>
<td>Assistant professor</td>
<td>M.E., Institute of Tech. Burgdorf, Switzerland</td>
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<tr>
<td>George Boley</td>
<td>1968–1973</td>
<td>Associate professor</td>
<td>M.S., Michigan State Univ., 1960</td>
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<tr>
<td>John Henry Butler</td>
<td>1929–1941</td>
<td>Assistant professor 1936</td>
<td>B.S.M.E., Univ. Kentucky, 1929</td>
</tr>
<tr>
<td>Norman Byers</td>
<td>1968–1973</td>
<td>Professor</td>
<td>Ph.D., Kansas State Univ., 1965</td>
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<tr>
<td>John Cherng</td>
<td>1978–1982</td>
<td>Research professor</td>
<td>Ph.D., Univ. of Tennessee, 1977</td>
</tr>
<tr>
<td>Vincent Choo</td>
<td>1985–</td>
<td>Assistant professor</td>
<td>Ph.D., Univ. of Liverpool, 1982</td>
</tr>
<tr>
<td>Jack Fred Clark</td>
<td>1935–1941</td>
<td>Professor</td>
<td>B.S.M.E., Iowa St. College, 1922</td>
</tr>
<tr>
<td>Richard C. Coddington</td>
<td>1966–1968</td>
<td>Assistant professor</td>
<td>Ph.D., Univ. of Kansas, 1966</td>
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<tr>
<td>Richard Colbaugh</td>
<td>1986–</td>
<td>Professor</td>
<td>Ph.D., Penn. State Univ., 1986</td>
</tr>
<tr>
<td>M. D. Creech</td>
<td>1955–1968</td>
<td>Assistant professor</td>
<td>M.S., Oklahoma Univ., 1930</td>
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<tr>
<td>Donald Fenton</td>
<td>1977–1987</td>
<td>Assistant professor 1956</td>
<td>Ph.D., Univ. of Illinois, 1974</td>
</tr>
<tr>
<td>J. W. Field</td>
<td>1946–1969</td>
<td>(See also industrial engineering.)</td>
<td>B.S., NMCA &amp; MA, 1938</td>
</tr>
<tr>
<td>C. Quentin Ford</td>
<td>1959–1988</td>
<td>Professor</td>
<td>Ph.D., Michigan State Univ., 1959</td>
</tr>
<tr>
<td>H. L. Gephart</td>
<td>1961–1975</td>
<td>Professor</td>
<td>Ph.D., Univ. of Minnesota, 1963</td>
</tr>
<tr>
<td>Joel Gilbert</td>
<td>1982–1984</td>
<td>Associate professor</td>
<td>M.S., Calif. Inst. of Tech., 1946</td>
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<tr>
<td>Otto Berger Goldman</td>
<td>1922–1924</td>
<td>Professor</td>
<td>Ph.D., Univ. of Oklahoma, 1965</td>
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<tr>
<td>M. E. Hamilton</td>
<td>1960–</td>
<td>Department head 1921–23 Associate professor 1966</td>
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<tr>
<td>Harry C. Hardee</td>
<td>1966–1968</td>
<td>Assistant professor</td>
<td>B.S.E.E., Univ. of Calif., 1903</td>
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<td>Edward Hensel</td>
<td>1986–</td>
<td>Professor</td>
<td>Ph.D., Univ. of Texas, 1966</td>
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<tr>
<td>John A. Herrington</td>
<td>1923–1924</td>
<td>Department head 1923–24 Assistant professor 1971</td>
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<td>R. Dean Hill</td>
<td>1982–</td>
<td>Professor</td>
<td>M.S., Colorado Univ., 1950</td>
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<td>Richard Hills</td>
<td>1981–</td>
<td>Associate professor 1985</td>
<td>Ph.D., NMSU, 1986</td>
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<tr>
<td>Richard Ernest James</td>
<td>1949–1953</td>
<td>Assistant professor</td>
<td>Ph.D., NMSU, 1979</td>
</tr>
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<td>John Jozwik</td>
<td>1957–1965</td>
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<td>Ph.D., Univ. of Wisconsin, 1967</td>
</tr>
<tr>
<td>L. Kleine</td>
<td>1954–1963</td>
<td>Assistant professor 1958</td>
<td>Ph.D., Univ. of Toledo, 1975</td>
</tr>
<tr>
<td>Jerry Ku</td>
<td>1985–1988</td>
<td>(See also engineering technology.)</td>
<td>M.E., Univ. of Oklahoma, 1947</td>
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<td>Leo Lafrance</td>
<td>1977–</td>
<td>Assistant professor 1981</td>
<td>M.S., NMSU, 1959</td>
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<td>Ian Leslie</td>
<td>1984–</td>
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<td>M.S., NMCA &amp; MA, 1957</td>
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<td>Ph.D., SUNY-Buffalo, 1984</td>
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</tr>
<tr>
<td>Name</td>
<td>Date</td>
<td>Rank and/or Title</td>
<td>Degree</td>
</tr>
<tr>
<td>--------------------</td>
<td>------------</td>
<td>----------------------------------------------------------------------------------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>Marcy Thomas Lewellen</td>
<td>1928–1944</td>
<td>Professor, 1936 Department head 1935–41</td>
<td>B.S.M.E., Iowa State Univ., 1921 M.E., ibid., 1930</td>
</tr>
<tr>
<td>Arch M. Lukens</td>
<td>1941–1964</td>
<td>Professor Department head 1941–60</td>
<td>M.S., Colorado Univ., 1927; M.E., ibid., 1929</td>
</tr>
<tr>
<td>Raymond P. Lutz</td>
<td>1964–1969</td>
<td>Associate professor 1968 Assistant professor</td>
<td>Ph.D., Iowa State Univ., 1964</td>
</tr>
<tr>
<td>Larryl Matthews</td>
<td>1982–</td>
<td>Associate professor 1957 Associate dean of engr. 1960–67</td>
<td>Ph.D., Purdue Univ., 1982</td>
</tr>
<tr>
<td>Hugh Megone Milton</td>
<td>1924–1947</td>
<td>Professor 1978 Department head 1988–Assistant professor</td>
<td>M.E., Univ. of Kentucky, 1922</td>
</tr>
<tr>
<td>Jesse P. Morgan</td>
<td>1946–1967</td>
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<td>B.S., NMCA &amp; MA, 1929</td>
</tr>
<tr>
<td>Herlauf P. Neilson</td>
<td>1934–1935</td>
<td>Assistant professor</td>
<td>Ph.D., Univ. Minnesota, 1933</td>
</tr>
<tr>
<td>Glenn F. Pantener</td>
<td>1946–1966</td>
<td>Assistant professor</td>
<td>B.S., Purdue Univ., 1935</td>
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<td>Ronald Pederson</td>
<td>1984–</td>
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<td>Ph.D., Univ. of Minnesota, 1976</td>
</tr>
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<td>A. R. Shouman</td>
<td>1960–1987</td>
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<td>Ph.D., Univ. of Iowa, 1956</td>
</tr>
<tr>
<td>Phillip R. Smith</td>
<td>1964–</td>
<td>Professor 1972 Department head 1975–88</td>
<td>Ph.D. Univ. of Kansas, 1966</td>
</tr>
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<td>John Mark Stephenson</td>
<td>1947–48</td>
<td>Assistant professor 1954</td>
<td>M.S., Univ. of Texas, 1949</td>
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<td>Norman Nevil Tilley</td>
<td>1920–1921</td>
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<td>Ph.D., Univ. of Colorado, 1967</td>
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<td>Raymond Willem</td>
<td>1976–</td>
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<td>Ph.D., Purdue Univ., 1973</td>
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<td>Dennis Zallen</td>
<td>1976–1977</td>
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</tr>
</tbody>
</table>
Frank Bromilow came to New Mexico State University in 1951 as professor and head of civil engineering. In 1961, he became dean of the College of Engineering, a position he held until his death in 1974.

Bromilow Awards are conferred annually by the College of Engineering in recognition of Frank Bromilow’s leadership and enhancement of the quality of faculty during his tenure as dean of the College of Engineering.

In 1978 the award for faculty excellence was established to perpetuate the high level of excellence that Dean Bromilow sought to develop in the College. The award is given alternately for excellence in research and excellence in teaching. Recipients are selected by the College of Engineering department heads from nominees submitted by the engineering faculty.

**Bromilow Teaching Awards**

1978  Professor Leonard Traina (CAGE)  1984  Professor William McCarthy (CAGE)
1980  Professor Jesse Lunsford (CAGE)  1986  Professor Donald B. Wilson (CH. E.)
1982  Professor Paul Finch (I.E.)  1988  Professor J. Eldon Steelman (E.E.)

**Bromilow Research Awards**

1979  Professor Phillip Smith (M.E.)  1985  Professor Richard Hills (M.E.)
1981  Professor Milan Cobble (M.E.)  1987  Professor Wiley Thompson (E.E.)
1983  Professors Kenneth White and John Minor (CAGE)

**Bromilow Staff Awards**

1978  Mr. Tony Alvarez  1982  Mr. Raymond Duran
1979  Ms. Lupe Robles  1983  Ms. Rose Marie Melon
1980  Ms. Cleo Gledhill  1984  Ms. Lois Busby
1981  Ms. Charlotte Beene
# INDEX

**A**
- ABERNATHY, George, vii, 37, 41, 50, 51, 52
- ACKERMAN, John T., 93
- ALEXANDER, Dale, 42
- ALEXANDER, George, vii, 39, 68
- ALLRED, Dallas C., 93
- ALVAREZ, Dr. Luis, 64
- ALVAREZ, Tony, 119
- AMADOR, Frank, 23, 62
- ARCHULETA, Edmund, 82
- ARMSTRONG, John F., 93
- ARMSTRONG, Neil, 63
- ARNWINE, William C., 71
- ARVIZU, Dan E., 93

**B**
- BAILEY, Frank J., 93
- BAKER, Stuart K., 61
- BARKER, Frederic F., 75
- BARNES, Arthur F., 13, 16, 45, 75, 107
- BARRY, John G., 22
- BECKEITT, Archie, viii
- BEENE, Charlotte, xii, 119
- BHADA, Ron K., 56
- BICKEL, James E., 93
- BINNING, C. David Jr., 93
- BIXBY, Frederick L., 13, 57
- BLACK, Ray, 62
- BLEVINS, Tim, vii
- BOEBINGER, Robert W., 93
- BOGAERT, Ricardo, 55
- BOSTON, A. D., 27
- BOURNS, Charles, 49

**C**
- CARDEN, Frank, vii, 42, 63, 64, 65
- CAROON, William E. Jr., 62
- CARPENTER, Chris, viii
- CARVER, Keith, 86, 107
- CASTRO, Adela, vii
- CHENEY, Richard P., 94
- CHEW, Woodrow, W., 94
- CLARK, Jack F., 23, 25
- CLARK, John W., 28, 31, 42, 58, 59
- CLARK, Ralph H., 94
- CLEMENT, Charles A., 94
- COBBLE, Milan, 119
- COINMAN, Mike, 82
- COOPER, H. Warren, 94
- CORBETT, Roger, 64, 68
- CREECH, Merle, 76
- CREED, Joe, vii, 55, 107
- CRILE, Austin D., 15, 16
- CROSNO, C. Donald, 26, 62
- CUNICO, John J., 94
- CUNNINGHAM, Harold D., 94
- CURRY, Albert Harold S., 50

**D**
- DANOFF, Sidney, 95
- DAVIES, John S. Jr., 95
- DAVIS, George L., 95
- DAVIS, Robert W., 95
- DEL VALLE, Francisco, 56
- DENK, Joe, 42
- DENNEY, Fred N., 95
- DONHAM, Bob J., 95
- DONNER, William O., 95
- DURAN, Raymond, 119
- DURGIN, David L., 96

**E**
- ECKER, Donald E., 96
- EDDY, George G., 82
- EDMONDSON, Samuel A., 96
- ELLIOTT, Ross W., 61

**F**
- FALL, Albert B., 10, 75
- FERGIN, Richard K., 77
- FIELD, James, 38, 39, 42
- FINCH, Paul, vii, 39, 42, 119
- FLACHS, Gerald, 42, 63, 64
- FLEMING, Bill, 42, 68, 69
- FLEMING, Burton P., 4, 5, 6, 8, 10, 21, 22, 23, 45, 57, 61, 107
INDEX

FORD, C. Quentin, iii, vii, viii 26, 35, 42, 43, 45, 49, 55, 67, 68, 76, 77, 82, 87, 96, 107
FOREMAN, Edgar F., 96
FOREMAN, Harold W., 96
FORT, Tomlinson, 96
FOX, Bob, 31
FRENCH, Josiah, 96
FRENGER, Frank G., 105
FRIELINGHAUSEN, Lisa, vii

G

GANDARA, Arturo, 97
GARDINER, George, 18, 25, 26
GARST, Harvey O., 58
GENIN, Joseph, 35, 45, 55, 107
GILES, Mike, 64
GILMER, Jesse B., 97
GLEASON, George S., 23
GLEDHILL, Cleo, 119
GODDARD, Earl G., 97
GODDARD, Ralph W., 13, 15, 16, 17, 18, 19, 20, 21, 22, 23, 45, 53, 61, 107
GOEBEL, Gordon W., 61
GOLDEN, Robert, 63, 64
GOLDMAN, Otto B., 75
GOMEZ, Louis R., 97
GONZALES, Omega S., 97
GORMAN, Frank W., 97
GROTH, Ed, 55
GUNAJI, Narendra, vii, 42, 59, 60, 85, 86, 107

H

HADLEY, Hiram, 3—4, 75
HAGEMAN, Jim, 42
HAGERTY, Clarence T., 10, 57
HAGGART, John, 10
Haley, Mack, vii, 38, 82
HAMILTON, Henry H., 97
HAMILTON, Maurice E., vii, 42, 78, 82, 83
HANKAMER, Michael, 97
HANKS, Kenneth W., 98
HANSON, Eldon G., 29, 49, 51, 68
HERNANDEZ, John, vii, 35, 43, 45, 55, 58, 59, 72, 107
HERRINGTON, John A., 75
HERRMANN, Leslie, 10
HICKS, Philip E., 71
HILLS, Richard, 119
HIRAM, Hadley, 7
HITCHCOCK, Frank A., 57
HIXON, Emmett E., 98
HIXON, Joe L., 98
HOFFMAN, A. H., 16
HOLBROOK, Stan, 34, 56
HORNBRUCK, Earle C., 61
HOWARD, William J., 98
HUDDLESTON, Robert H., 81, 82
HUNGATE, GaIl, viii

J

JAEGGER, Dwight L., 98
JAMES, Clinton C., 98
JETT, Daniel B., 18, 22, 24, 26, 27, 31, 35, 45, 58, 82, 107
JOBLIN, W. J., 3
JOHNSON, Charles L., 98
JORDAN, Jay B., 63
JOURDAN, John W., 16, 22, 58

K

KAMAT, Satish J., vii, 42, 71, 72, 73, 74
KENT, Harry L., 16, 18, 20, 22
KENT, Harry L. Jr., 98
KERSTING, William, 42, 63, 99
KEYES, Conrad, vii, 59, 99
KIERNAN, Earl, 17
KIRBY, James W., 99
KLEINE, Louis, vii, 37, 38, 39, 42, 67, 68, 69, 99
KLIPPSCH, Paul W., 99
KROPP, Simon, 3—4, 5, 10, 16, 17, 18, 21, 24, 25, 58, 75, 82
KUNZ, Kaiser, 31

L

LA FLEUR, Walter, 99
LARQUIER, Pedro, 61
LEWELLEN, M. T., 23, 76
LINDSAY, Jon, 99
LONG, Richard, 55
LOTH, William D., 100
LUCKY, George W., 35, 42, 64
LUDEMAN, Lonnie, 63
LUKENS, Arch M., 27, 29, 42, 76, 77
LUNSFORD, Jesse, 42, 119
LUNSFORD, Oliver R., 100

M

MAGGARD, Samuel P., 59, 86, 107
MAHER, Mary Ann, 42
MANN, Thomas T., 100
MARTINEZ, M. G., 100
MATCHETT, W. H., 34, 55
MATTHEW, Raymond, 58
MATTHEWS, Larry K., 77, 86, 107
McCALLUM, Elizabeth E., 36
MCCARTHY, William, 42, 119
McCGRATH, Lemuel C., 6
McCORKLE, Ken, 55
McCREA, Samuel P., 75
McFIE, John R., 3—5, 7
McGURN, John M., 105
McKEE, Charles D., 100
MELON, Rose Marie, 107, 119
METCALFE, Charles, 3—4
METHVIN, David H., 100
MILLER, John G., 106
MILLER, Charles D., 13
MILLS, Charles, 10, 75
MILTON, Hugh M., 16, 18, 21, 22, 23, 24, 25, 26, 27, 35, 42, 45, 69, 75, 76, 107
MINOR, John, 119
MINTER, Herb, 55
MORALES, Caesar, 100
MORGAN, J. Derold, vii, ix, 35, 42, 43, 45, 55, 74, 107
MORGAN, Jesse P., 29, 34, 107
MORRILL, Justin S., 3
MULHOLLAND, George, 77

N
NEWCOMB, Samuel B., 3—5
NOFTSKER, Russell, 100

O
O'BERRY, Carl G., 101
O'BRIEN, Walter J., 101
O'DONNELL, William B., 42, 68

ORR, William R., 101
OSBORNE, William P., 101
OWEN, Debra, vii

P
PANLENER, Glen, 31
PARNELL, Calvin, 50
PATTON, James, 82
PATTON, John, vii, 35, 55
PAUL, Charles E., 10, 75
PETERSON, Henry P., 6
PETERSON, Marquita, ii
PETTY, George Kibbe Jr., 101
PEYTON, N. C., 82
POST, Charles L., 6
POWELL, Barbara, vii, viii, xii
PRUITT, John R., 101

R
RAKOW, Allen, 55
RAY, Harry W., 101
REAMS, Dinwiddie C., 53
REED, W. M., 57
REEVES, Dick W., 106
REISCHMAN, Michael M., 101
REYMOND, Numa, 3
ROBBINS, Daniel S., 18, 21, 57
ROBLES, Lupe, 119
ROMERO, Al, 69
ROOD, James T., 21, 23, 45, 62, 107
ROPES, Horace, 10, 57, 75
ROUBICEK, Rudi, 55
ROUSH, Donald B., 42
ROWLAND, Chester A. Jr., 101

S
SADLER, Betty, vii
SAGE, Archie B., 6, 10, 75
SAGE, Bruce H., 18
SCHAUBLIN, Jacob, 3
SCHLEUSENER, Stuart, 64
SELLARS, John R., 102
SERGENT, B. Dwaine, 102
SHIPE, Charles E., 18
SHIRES, Luke B., 18, 23, 27, 29, 31, 53, 68
SHRIVER, William K., 102
SIMS, Stuart H., 23
SKAGGS, Samuel R., 102
SKIDMORE, Herrol (Jim), vii, 39, 43
SLUYTER, Marshall M., 77
SMART, Debbie, vii
SMITH, Samuel H., 103
SMITH, Floyd R., 102
SMITH, Harold, 82
SMITH, Lawrence A., 102
SMITH, Phillip, 77, 119
STEELMAN, J. Eldon, vii, 42, 63, 107, 119
 STEWART, Arthur J. Jr., 18, 49
STOCKER, George P., 57
STOLARZYK, Larry G., 103
STURMAN, William H., 103

T
TAUSWORTHIE, Robert C., 103
TAYLOR, Javin, vii, 42, 63, 65
THODE, Edward F., 53, 54
THOMAS, Melvin A., vii, 22, 23, 26, 27, 32, 34, 35, 42, 45, 49, 59, 62, 64, 69, 82, 85, 86, 107
WALDEN, Earl, 28, 42
WALL, Evern, 37, 38, 104
WALLING, D. Craig, 104
WALLS, J. R., 104
WALSH, Edward A., 104
WALVEKAR, Arun G., 71
WARNER, Fred W., 104
WARRICK, Stuart C. Jr., 104
WELLS, H. G., ix
WHITAKER, William E., 104
WHITE, Ernest C., 58
WHITE, Kenneth R., 59, 86, 107, 119
WIECHARDT, August J., 5, 10, 75
WIESE, Donald H., 104
WILLEM, Raymond, vii, 42
WILLIAMS, Boyce, 51
WILSON, Donald B., 42, 54, 56, 119
WINDSOR, K. Olaf, 10
WINGROVE, Franklin B., 106
WINTON, John D., 105
WIRTH, Rachael, viii
WITTER, Robert E., 105
WOLFE, Carl M., 62
WOLFE, James A., 105
WUNSCH, Donald C., 105

Z
ZIMMERMAN, Roger M., 35, 107
ZSCHIELE, John, 105
INDEX

A
ABERNATHY, George, vii, 37, 41, 50, 51, 52
ACKERMAN, John T., 93
ALEXANDER, Dale, 42
ALEXANDER, George, vii, 39, 68
ALLRED, Dallas C., 93
ALVAREZ, Dr. Luis, 64
ALVAREZ, Tony, 119
AMADOR, Frank, 23, 62
ARCHULETA, Edmund, 82
ARMSTRONG, John F., 93
ARMSTRONG, Neil, 63
ARNWINE, William C., 71
ARVIZU, Dan E., 93

B
BAILEY, Frank J., 93
BAKER, Stuart K., 61
BARKER, Frederic F., 75
BARNÁ, Bruce A., 34, 55
BARNES, Arthur F., 13, 16, 45, 75, 107
BARRY, John G., 22
BECKETT, Archie, viii
BEENE, Charlotte, xii, 119
BHADA, Ron K., 56
BICKEL, James E., 93
BINNING, C. David Jr., 93
BIXBY, Frederick L., 13, 57
BLACK, Ray, 62
BLEVINS, Tim, vii
BOEING, Robert W., 93
BOGAERT, Ricardo, 55
BOSTON, A. D., 27
BOURNS, Charles, 49

BOWEN, M. S., 16
BOWMAN, George R., 3—5
BOWMAN, J.B., 3—4
BOYKIN, Benjamin M., 94
BRADFORD, L., 4
BRADY, Frank W., 10, 57, 75
BRINKER, Russell C., 59, 68
BROMILLOW, Frank, 28, 29, 32, 34, 35, 45, 54, 58, 59, 62, 64, 68, 83, 85, 86, 107
BROWN, Harold A., 23, 26, 29, 31, 62, 64, 68
BUDENHOLZER, Roland A., 94
BURKE, Michael, 72, 73
BUSBY, Lots, 119
BUTLER, John H., 23, 62
BYRD-HUMPHREYS, Katy, 37, 50

C
CARDEN, Frank, vii, 42, 63, 64, 65
CAROON, William E. Jr., 62
CARPENTER, Chris, viii
CARVER, Keith, 86, 107
CASTRO, Adela, vii
CHENEY, Richard P., 94
CHEW, Woodrow, W., 94
CLARK, Jack F., 23, 25
CLARK, John W., 28, 31, 42, 58, 59
CLARK, Ralph H., 94
CLEMENT, Charles A., 94
COBBLE, Milan, 119
COINMAN, Mike, 82
COOPER, H. Warren, 94
CORBETT, Roger, 64, 68

CREECH, Merle, 76
CREED, Joe, vii, 55, 107
CRILE, Austin D., 15, 16
CROSNO, C. Donald, 26, 62
CUNICO, John J., 94
CUNNINGHAM, Harold D., 94
CURRY, Albert Harold D., 94
D
DANOFF, Sidney, 95
DAVIES, John S. Jr., 95
DAVIS, George L., 95
DAVIS, Robert W., 95
DEL VALLE, Francisco, 56
DENK, Joe, 42
DENNEY, Fred N., 95
DONHAM, Bob J., 95
DONNER, William O., 95
DURAN, Raymond, 119
DURGIN, David L., 96
E
ECKER, Donald E., 96
EDDY, George G., 82
EDMONDSON, Samuel A., 96
ELLIOTT, Ross W., 61
F
FALL, Albert B., 10, 75
FERGIN, Richard K., 77
FIELD, James, 38, 39, 42
FINCH, Paul, vii, 39, 42, 119
FLACHS, Gerald, 42, 63, 64
FLEMING, Bill, 42, 68, 69
FLEMING, Burton P., 4, 5, 6, 8, 10, 21, 22, 23, 45, 57, 61, 107
FORD, C. Quentin, iii, vii, viii 26, 35, 42, 43, 45, 49, 55, 67, 68, 76, 77, 82, 87, 96, 107
FOREMAN, Edgar F., 96
FOREMAN, Harold W., 96
FORT, Tomlinson, 96
FOX, Bob, 31
FRENCH, Josiah, 96
FRENGER, Frank G., 105
FRIELINGHAUSEN, Lisa, vii

G
GANDARA, Arturo, 97
GARDINER, George, 18, 25, 26
GARST, Harvey O., 58
GENIN, Joseph, 35, 45, 55, 107
GILES, Mike, 64
GILMER, Jesse B., 97
GLEASON, George S., 23
GLEDHILL, Cleo, 119
GODDARD, Earl G., 97
GODDARD, Ralph W., 13, 15, 16, 17, 18, 19, 20, 21, 22, 23, 45, 53, 61, 107
GOEBEL, Gordon W., 61
GOLDEN, Robert, 63, 64
GOLDMAN, Otto B., 75
GOMEZ, Louis R., 97
GONZALES, Omega S., 97
GORMAN, Frank W., 97
GROTH, Ed, 55
GUNAJI, Narendra, vii, 42, 59, 60, 85, 86, 107

H
HADLEY, Hiram, 3—4, 75
HAGEMAN, Jim, 42

HAGERTY, Clarence T., 10, 57
HAGGART, John, 10
Haley, Mack, vii, 38, 82
HAMILTON, Henry H., 97
HAMILTON, Maurice E., vii, 42, 76, 82, 83
HANKAMER, Michael, 97
HANKS, Kenneth W., 98
HANSON, Eldon G., 29, 49, 51, 68
HERNANDEZ, John, vii, 35, 43, 55, 58, 59, 72, 107
HERRINGTON, John A., 75
HERRMANN, Leslie, 10
HICKS, Philip E., 71
HILLS, Richard, 119
HIRAM, Hadley, 7
HITCHCOCK, Frank A., 57
HIXON, Emmett E., 98
HIXON, Joe L., 98
HOFFMAN, A. H., 16
HOLBROOK, Stan, 34, 56
HORNBRICK, Earle C., 61
HOWARD, William J., 98
HUDDELESTON, Robert H., 81, 82
HUNGATE, Gaill, viii

J
JAEGGER, Dwight L., 98
JANES, Clinton C., 98
JETT, Daniel B., 18, 22, 24, 26, 27, 31, 35, 45, 58, 82, 107
JOBLIN, W. J., 3
JOHNSON, Charles L., 98
JORDAN, Jay B., 63
JOURDAN, John W., 16, 22, 58

K
KAMAT, Satish J., vii, 42, 71, 72, 73, 74
KENT, Harry L., 16, 18, 20, 22
KENT, Harry L. Jr., 98
KERSTING, William, 42, 63, 99
KEYES, Conrad, viii, 59, 99
KIERNAN, Earl, 17
KIRBY, James W., 99
KLEINE, Louis, vii, 37, 38, 39, 42, 67, 68, 69, 99
KLIPSCHE, Paul W., 99
KROPP, Simon, 3—4, 5, 10, 16, 17, 18, 21, 24, 25, 58, 75, 82
KUNZ, Kaiser, 31

L
LA FLEUR, Walter, 99
LARQUIER, Pedro, 61
LEWELLIN, M. T., 23, 76
LINDSAY, Jon, 99
LONG, Richard, 55
LOTH, William D., 100
LUCKY, George W., 35, 42, 64
LUDEMAN, Lonnie, 63
LUKENS, Arch M., 27, 29, 42, 76, 77
LUNSFORD, Jesse, 42, 119
LUNSFORD, Oliver R., 100

M
MAGGARD, Samuel P., 59, 86, 107
MAHER, Mary Ann, 42
MANN, Thomas T., 100
MARTINEZ, M. G., 100
MATCHETT, W. H., 34, 55
MATTHEW, Raymond, 58
Index

THOMAS, Roland E., 103
THOMAS, Roy W., 103
THOMPSON, Wiley, 63, 64, 119
TILLEY, Norman N., 75
TORREZ, Eloy J., 103
TRAINA, Leonard, 42, 119
TSCHANTZ, Bruce A., 103
TYSON, Zariel, 49

V

VELIA, Ann M., 13, 15, 17, 19, 62

W

W. M. Reed, 6
WADDILL, James R., 3—5
WALDEN, Earl, 28, 42
WALL, Evren, 37, 38, 104
WALLING, D. Craig, 104
WALLS, J. R., 104
WALSH, Edward A., 104
WALVEKAR, Arun G., 71
WARNER, Fred W., 104
WARRICK, Stuart C. Jr., 104
WELLS, H. G., ix
WHITAKER, William E., 104
WHITE, Ernest C., 58
WHITE, Kenneth R., 59, 86, 107, 119
WIECHARDT, August J., 5, 10, 75
WIESE, Donald H., 104
WILLEM, Raymond, vii, 42
WILLIAMS, Boyce, 51
WILSON, Donald B., 42, 54, 56, 119
WINDSOR, K. Olaf, 10
WINGROVE, Franklin B., 106
WINTON, John D., 105
WIRTH, Rachael, viii
WITTER, Robert E., 105
WOLFE, Carl M., 62
WOLFE, James A., 105
WUNSCH, Donald C., 105

Z

ZIMMERMAN, Roger M., 35, 107
ZSCHEILE, John, 105
CLASS SECTION

This section lists alumni alphabetically by the class year of the most recent degree earned at NMSU.
GEOGRAPHICAL SECTION

This section lists alumni alphabetically by state and then by city.

ALABAMA

Anniston
TROWSE, Michael John

Athens
MARKER, Lawrence Russell

Auburn
HERRING, Bruce Edgar

Birmingham
ELLINGSON, Rodney L.
KUESTER, Marcel Thaddeus PAYNE, John Robert

Enterprise
NIMROD, Daniel Warren

Florence
CURLY, Ronald L.

Harvest
ASPREY, Robert Russell

Huntsville
BREWSTER, Linda Camp
BREWSTER, Steve Ronald
CARTALDI, Fortunato Frank
CORNING, Harold T.
CONWORTH, Carl H.
COVINGTON, Lorenzo Ross
DAVIS, Beth Ann
EDWARDS, Jared Allen
ELEGAZANTE, Frederick L.
HAMILTON, Thomas Kenneth
LEW, Jon Dee
LOMAN, Jack Wallace
NAREDDA, Michael
NIBLICK, James Edward
PIFFIN, William Charles
POHL, Greg Miller
RAY, Richard Allen
SAGE, Michael F.
SHROCK, Keith Andrew
SMOOTH, Edward Bruce
SOCCO, Howard Arthur
YOUNG, William Thomas

Madison
JOURDAN, Thomas Michael
MIXON, Larry Campen
THIMSEN, Donald Carl

Meridianville
STAGGS, James William

Mobile
CADENA, Ruben Chapparo
MIRES, Gay Elwood

Montgomery
KENT, Richard R.

Sylacauga
HALVERSON, Colton Shelby

ALASKA

Anchorage
DOYER, Robert G.
FAULK, Clyde Oral
FRANKLIN, Nelson M.
GARRARD, James Lewis
HOGGARD, Calvin Lewis
HUFF, Richard Earl
LEGG, Doug Lynn
LENSNIAK, Margaret F. Dixon
MCNAUGHTON, David Alexander
RAINWATER, Douglas Frank
SISSON, Dick Alexander
SMITH, Harold Dean
WELCH, Gerald Edmond

Bethel
BORGINO, Harold A.

Chugiak
MERIK, Ellis Wellington

Delta Junction
FESMIRE, Philip Scott

Eagle River
ABRAMS, Carl Maxwell
BOGGIS, Marion Miller
KHAUSE, Bobbi Ellen
QUINONES, Alicia Maria
SWEENEY, James Patrick
WILSON, Robert Leo

Fairbanks
DALLAS, Dale D.

Homer
MATTHEWS, Samuel Cephas

Kotzebue
JONES, Paul Byron

Springdale
MITCHELL, Dee Tim

ARIZONA

Apache Junction
LUCERO, Mark Anthony

Blue
COLEMAN, Kimbale

Buckeye
JONES, Travis Hayhurst
MARLEY, Norman Leo

Casa Grande
NICHOLSON, Michael Edward

Chandler
ABEYTA, Leon A.
ACKER, Thomas William
ASHCRAFT, Phillip Lynn
BROWNFIELD, Jey Arthur
BUSH, Michael Davis
BUSH, Stanley Allen
CARLSON, John Paul
CASEBOLT, Jerry Keith
COX, John W.
DAVIS, Douglas Lee
DESHAZO, Gary Lee
GERMAIN, Mark Steven
GOMEZ, Armando
GONZALEZ, Richard Joseph
HARENDROCK, Donovan Ray
HUMPHREY, Michael Eugene
JACOBSON, Mark Edward
LUJT, Greg Joseph
MENDEN, George Adrian
MENEFEE, Stephen Clyde
NAVARRIO, Jesu Antonio
RICHARDSON, Donna Hayden
ROUSE, Kelly Margaret
SALINE, Kenny R.
WHITFORD, Steven Karl
WILLIAMS, Glenn Carter

Douglas
CHAMBERS, Charles E.
GLEN, John R.

Eagar
HURLBUT, Bret Wesson

Elgin
DAVISON, Gene E.

Flagstaff
ESCARINO, Patricia Nava
HARDGRAVE, Robert G.
HILL, Gregory Nathan
HUGHY, Glenn A.

THURMAN, Jack Anthony
FORT APACHE
JONES, Frank H.

GILBERT
Gonzalez, Hector S,#
PYROVSKA, Jacob Donald
SELLERS, John William

GLendale
AVILA, Danilo Louis
BOLAND, Gary L.
BRENT, Patrick Robert
COLLINS, Terrance George
EVERY, Michael Wayne
FRANQUERO, Ronald Acop
GENTILE, Philip Dean
GRANT, Miles Ray
GREGORY, Michael Scott
HANNA, William Edward
HOPKINS, Paul Terry
JONES, James Ronald
JONES, Kent Edward
JONES, Robert Eugene
MARTINEZ, Jose Mata
MARTINEZ, Ronald Felix
MCCONNELL, Barbara J.
MONK, Raymond Charles
PERKINS, Gary Russell
RAINES, Martin Lloyd
RANGSTROM, Greg P.
RICHARD, Craig D.
SANDERS, Charles Herbert
SHELDON, David Gordon
STAHLER, Sabrina Laplante

Goodyear
CORTEY, Daniel Dennis

Green Valley
BLACK, Joe Bailey

Hereford
IQUEY, Gary Dean

Keams Canyon
RICHARDS, Charles Brock

Laveen
DAVIES, Leslie L.

Litchfield Park
BOWDEN, Robert Michael
BIELER, Ronald Gene

Maricopa
ANDERSON, Charles Brock

Mc Neal
MAGRUDER, Champ Clark

Mesa
ALTINA, Sidney Louis
BERINGER, Christopher R.
BIRENSH, Robert Louis
CHAVEZ, Francis Ferdinand
COLE, Jerry M.
CORLEY, Walt A.
DEVEREUX, Fritz Moore
DONATI, Robert G.
DUNE, Nancy
EMERSON, Ashley David
HILLIER, Dave R.
HOUSE, Steven Michael
JARAMILLO, Vivian Antonio
JERABEK, James David
JOHNSON, Terence Lynn
JUSTICE, Marcus Shane
LARSON, Roger Jay
LUCERO, Jus
LUND, Barbara
MANN, Frank Victoria
MAXWELL, James Howard
MOYER, Conie Lee
NEAL, Joseph W.
ROBBINS, Jane
ROSS, Charles J.
SHARPE, Craig Linn
TAYLOR, Ron J.
TOTTEN, David
WALSH, Joseph William
WHITEGROVE, Christopher
WIEMER, Jon David
WITT, Don Carl

MORENCI, GALASSINO, John Christine

OVERGAARD
MC CLOSKEY, Steven Dale

Page
HENRIQUES, Bob Ray
NELSON, Alan Harris

Payson
MATLOCK, Norman Eddy

Peoria
BANHODHSAVAYEE, Chousin
CERROLO, C. Eugene
CHARTIER, Everette
COMCOTT, Ed
DILLON, Mike
DORINGER, Jack
FRASER, Robert
GOODWIN, Ray
HARRIS, John
HOLMQUIST, Ted
HOLZINGER, Helen
HOPKINS, Paul
LACEY, Rick
LALAN, Edward
LAMBERT, Robert
LAMBERT, Richard Arlin
LAWSHE, James S.
LOBOP, Michael Anthony
LUJAN, Ruben Acosta
MACK, Ernest Howard
MC ENEREE, Charles Alvin
MONTOYA, Carlos Bianco
MURDOCK, James Ernest
NEWBY, Larry Andrew
OWENS, Dennis Ray
PARKER, Gary Lloyd
PARRAZ, Delani Michelle
PERRIS, Larry Duane
RINEY, Charles Charles
ROBERTS, Robert R.
ROSE, Richard Cleon
ROMERO, Gary Timothy
SALAZAR, Obed M.
SARMADIAN, Jerry Wayne
SHINKE, John Michael
SMITH, Eugene Carl
SOLIS, Jorge C.
SMITH, Richard David
SPRINKLE, Ernest Harold
STANLEY, Paul Arnold
SWARTZ, Oliver H.
TANKERSLEY, Robert Linn
TARLOCK, Robert Thomas
TORNQUIST, David Bruce
TURNER, Julian Judson
WILSON, Mabel
WILSON, Andrew
WRIGHT, G. Ronald
YOUNG, Randy Alan

PORTAL
RICHARDS, James David

Prescott
ALFREDI, Dallin C.
LANFORD, Samuel Ford
MURPHY, George Miles

Scottsdale
CLINTON, Michael C.
COOPER, Jerome D.
DAWSON, Joe E.
EMMETT, Gary Lee
HANSEN, Robert K.
JEFFERS, Patrick David
JENSEN, Robert E.
LEGER, Kevin
LEGER, Richard
MARKING, Alan
MARTINEZ, Eugene Carlos
MARTIN, Frank
MATERSON, Donald Grant
PRUDICT, Jerry Emery
PROUTY, Salem Montgomery
RICKETS, Colin Jackson
RUSSE, Edvart Scezner
RUSSELL, Paul E.
SCHNEIDER, Danny Lee
STULTING, Rex Loyd
STULTING, Roy M.
STULTING, William B.
TATCHELL, Wesley Duane
THOMAS, Roland Everett

Sedona
BRUMMETT, Patrick T.
CONNER, Ira M.

Show Low
JASON, Muhammad Amin
LORANG, William Gregory
MURPHY, John Patrick

Sierra Vista
BRAMEL, Edwin Francis
CARRERAS, Leonardo C.
DOUGLAS, Johnny Earl
JACOBS, Pat
LOOS, Robert Wayne
MICHAEL, George Perry
STONE, John Eaton

Springfield
ZETTEL, Peter Anthony

Sun City
EVANS, Raymond George

Sun City West
HERRING, Charles David

Tec Nos Pos
MARQUEZ, Robert Orozco

Tempe
BALL, Kenneth Leslie
BARNARD, Robert Leon
CHAVEZ, Mary Anne
CARTER, Elizabeth
DAVIS, Gary Lynn
FEISTE, Elise
FISIUT, Brian B.
GOODARD, Matthew Stewart
HINES, John
IVES, Jonathan Andrew
LASBROOK, John Dominique
LOGAN, Brian Lamore
LOPEZ, David Eugene
OLIVAS, Tomas
PARKS, Stuart John
PETERSON, Harold James
POWER, Robert Charles
SALVADOR, Markham Jordan
SHILLITO, Carol Scott
SKAGGS, Bruce Wood
STEELE, Bradley E.
STEVES, Patrick
WATSON, John Josephine
WEAR, William Ross
WILDSTEIN, Kevin Lynn

Tonapah
BENNETT, Benny G.
NEW MEXICO STATE - COLLEGE OF ENGINEERING

Bulldog
BUI, Jean Claude
RAMOS, Henry

Buñol
BURN, David M.
CRAIG, William H.
MC ADAMS, Donald Edward

Calabassas
BELL, R. Richard

Calexico
VIGIL, Ramon Pablo

Calidad
BOGGY, Marc Allen

Camarillo
BRUNET, William Link
EBY, Thomas Leeland
HOWARD, Joseph Richard
KUSANO, Harold M
LITTELL, Robert Earl
ROTH, Roger Ray
STROUD, John Edwin
TOGAMI, Richard Keiiku
TRIPPLETT, Elijah Vaughan
TURNER, Leroy Wibber

Canyon Country
CEDERBERG, Mark B.
CRAWFORD, Mark T.
CRAUSHER, Joseph
CROSS, Robert

Carlsbad
HOPF, Anthony J.

Carlsbad
HOFMANN, John Morgan

Carmichael
HELM, Michael L.
LOGAN, Phillip W.
MILLER, Richard J.
REYNOLDS, Elizabeth Easterling

Carson
HENDERSON, Joel Edward

Cedar Hill
PHILLIPS, Roy Timothy

Cerrillos
AFSS, Abdullah

Chatsworth
MATTINGLY, James Kirk
RAVAL, Pramod Marshall

Chico
ENGEL, Eugene T.

Chinle
RICHARDS, John D.

Chinle
QVAH, MohammedAbul SIROLO, Roberto Edwardo

Chula Vista
EMERSON, Lawrence L.
GAMBARELLA, Stephen William
PADILLA-WUSON, Fe
TUTTON, Fred Diles
WUNTCH, John Joseph

Citrus Heights
SHAW, Lunny Dunn

Claremont
BROWN, Edward L.
SPIEKNIK, Randal R.

Cloverdale
DOMINGUEZ, Ismael Carrasco

Concord
ALLEN, Robert Lee
BARRETT, David E.
GERHARD, Peter Thorp
SAXMUND, Lorna Ray
WICKS, Robert J.

Corona
ALBA, Gustavo
CARRASCO, Ernesto C.
WICKRUMAGASEN, Gerald Wayne
WILSON, Dale Ray
YARRAGO, Freddy Dekhoma

Coronado
GREENSLATE, Robert M.
RAMON, Roman Lorenzo

Costa Mesa
WARRICK, Stuart Clair
WILLIAMS, Charles Leroy

Cupertino
BRADFORD, Jeffery Joseph
HEIDERREICH, Gary L.

Cypress
GALLAGHER, Andrew Chris
HICKS, Aaron David
TRUJILLO, Avetino Angel

Dana Point
SCHLEIDER, Michael Alan

Danville
LAMB, Michael David
STRAHBERG, Edwin William

Davis
HONEYFIELD, Harold Rex

Del Mar
DIETZ, Joseph F.

Diamond Bar
MC DOWELL, Edward Roulard

Dixon
HANSON, Elaine Richard

Downey
HAMPSON, Kenneth Alan
RAMIREZ, Arturo

Dublin
OGAZ, Gilbert Adrian

Edwards
PERRY, Todd Alan

El Cajon
MC FARLAND, Richard Alan

El Centro
DOYLE, Vickie Linn

El Cerrito
DAVIS, Robert W.

Elk Grove
MARRUJO, Daniel Pedrazza

El Dorado
TAUCHERT, Leonard Conrad

Encinitas
HULL, Dwayne E.
TURNAGE, Douglas Lee

Escondido
BAJA, Paul David
BAUM, Karl Bradley
ELZONDO, Paul Mark
HANNON, Carl Argus
HUNTSINGER, James P.
RAGLAND, David Clifford
SAUGAN, Jodi Donna
WIDENER, Ronald Dean

Eureka
HUGHES, Steven Rolland
LEMONS, Michael A.
WELTY, Paul William

Fresno
TSENG, Leo Cheng

<table>
<thead>
<tr>
<th>Florida</th>
<th>New Mexico State - College of Engineering</th>
</tr>
</thead>
<tbody>
<tr>
<td>Palm Beach Gardens</td>
<td>PALM BEACH GARDENS</td>
</tr>
<tr>
<td>Palm Harbor</td>
<td>STUBBS, Charles William</td>
</tr>
<tr>
<td>Panama City</td>
<td>HOKANSON, Lawrence Dale</td>
</tr>
<tr>
<td>Panama City Beach</td>
<td>COLEY, Bruce Ryan</td>
</tr>
<tr>
<td>Pensacola</td>
<td>BERGREN, Jan Charles</td>
</tr>
<tr>
<td>Punta Gorda</td>
<td>CRUZ, Richard Robert</td>
</tr>
<tr>
<td>Safety Harbor</td>
<td>HOPKINS, Ronald Jacob</td>
</tr>
<tr>
<td>Satellite Beach</td>
<td>WINFIELD, Robert Arthur</td>
</tr>
<tr>
<td>Seminole</td>
<td>ESCH, Gary L.</td>
</tr>
<tr>
<td>Shelburne</td>
<td>FROST, Richard Wayne</td>
</tr>
<tr>
<td>St. Petersburg</td>
<td>HENDERSON, David L.</td>
</tr>
<tr>
<td>Tallahassee</td>
<td>STEVENS, Everett Lee</td>
</tr>
<tr>
<td>Tampa</td>
<td>HOLMES, Harry A.</td>
</tr>
<tr>
<td>Temple</td>
<td>MURPHY, Robert Jeramiah</td>
</tr>
<tr>
<td>Titusville</td>
<td>JUAREZ, Antonio</td>
</tr>
<tr>
<td>West Melbourne</td>
<td>REYES, Ramon Ernesto</td>
</tr>
<tr>
<td>West Palm Beach</td>
<td>SWEATT, Richard Van</td>
</tr>
<tr>
<td>Winter Garden</td>
<td>FIEDLER, Harold P.</td>
</tr>
<tr>
<td>Alachua</td>
<td>JUAREZ, Antonio</td>
</tr>
<tr>
<td>Atlantic</td>
<td>REYES, Ramon Ernesto</td>
</tr>
<tr>
<td>August</td>
<td>CANDY, William Robert</td>
</tr>
<tr>
<td>Decatur</td>
<td>SORENSON, Marc Lee</td>
</tr>
<tr>
<td>Douglasville</td>
<td>WHITE, Richard Allen</td>
</tr>
<tr>
<td>Dun</td>
<td>WOOD, Kim Brian</td>
</tr>
<tr>
<td>Evans</td>
<td>BURGER, Charles W.</td>
</tr>
<tr>
<td>Gainesville</td>
<td>MYER, Clayton Rex</td>
</tr>
<tr>
<td>Gladesville</td>
<td>MARRUJO, Robert Pedraza</td>
</tr>
<tr>
<td>Glendale</td>
<td>BLAKE, Scott Fletcher</td>
</tr>
<tr>
<td>Kennesaw</td>
<td>DE LUCIA, Jon Gregory</td>
</tr>
<tr>
<td>Lawrenceville</td>
<td>CLARK, Byran Brian</td>
</tr>
<tr>
<td>Leesburg</td>
<td>DORN, Ronald Eugene</td>
</tr>
<tr>
<td>Liburn</td>
<td>ZAMAN, Qamar U.</td>
</tr>
<tr>
<td>Marietta</td>
<td>SCHEER, Cecilia Ruby Mc Clung</td>
</tr>
<tr>
<td>Martinez</td>
<td>ORE, John Wesley</td>
</tr>
<tr>
<td>Montezuma</td>
<td>KOELTZOW, Lorrie R.</td>
</tr>
<tr>
<td>Norfolk</td>
<td>STRICKLAND, Robert Harvey</td>
</tr>
<tr>
<td>Quitman</td>
<td>DINKINS, Sandra Kay</td>
</tr>
<tr>
<td>Roswell</td>
<td>EVANS, John Charles</td>
</tr>
<tr>
<td>Warner Robins</td>
<td>LOCKWOOD, James Douglas POTTER, Dennis Jack</td>
</tr>
<tr>
<td>Titusville</td>
<td>JUAREZ, Antonio</td>
</tr>
<tr>
<td>West</td>
<td>REYES, Ramon Ernesto</td>
</tr>
<tr>
<td>Winter Garden</td>
<td>FIEDLER, Harold P.</td>
</tr>
<tr>
<td>Alachua</td>
<td>JUAREZ, Antonio</td>
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<tr>
<td>Atlantic</td>
<td>REYES, Ramon Ernesto</td>
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<td>CANDY, William Robert</td>
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<td>Decatur</td>
<td>SORENSON, Marc Lee</td>
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<td>Douglasville</td>
<td>WHITE, Richard Allen</td>
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<td>Dun</td>
<td>WOOD, Kim Brian</td>
</tr>
<tr>
<td>Evans</td>
<td>BURGER, Charles W.</td>
</tr>
<tr>
<td>Gainesville</td>
<td>MYER, Clayton Rex</td>
</tr>
<tr>
<td>Gladesville</td>
<td>MARRUJO, Robert Pedraza</td>
</tr>
<tr>
<td>Idaho Falls</td>
<td>BURR, Robert H.</td>
</tr>
<tr>
<td>Lawrenceville</td>
<td>SAWYER, Gabriel William</td>
</tr>
<tr>
<td>Leesburg</td>
<td>CLARK, Byran Brian</td>
</tr>
<tr>
<td>Liburn</td>
<td>ZAMAN, Qamar U.</td>
</tr>
<tr>
<td>Marietta</td>
<td>SCHEER, Cecilia Ruby Mc Clung</td>
</tr>
<tr>
<td>Martinez</td>
<td>ORE, John Wesley</td>
</tr>
<tr>
<td>Montezuma</td>
<td>KOELTZOW, Lorrie R.</td>
</tr>
<tr>
<td>Norfolk</td>
<td>STRICKLAND, Robert Harvey</td>
</tr>
<tr>
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<td>DINKINS, Sandra Kay</td>
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<tr>
<td>Roswell</td>
<td>EVANS, John Charles</td>
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<tr>
<td>Warner Robins</td>
<td>LOCKWOOD, James Douglas POTTER, Dennis Jack</td>
</tr>
<tr>
<td>Titusville</td>
<td>JUAREZ, Antonio</td>
</tr>
<tr>
<td>West</td>
<td>REYES, Ramon Ernesto</td>
</tr>
<tr>
<td>Winter Garden</td>
<td>FIEDLER, Harold P.</td>
</tr>
<tr>
<td>Alachua</td>
<td>JUAREZ, Antonio</td>
</tr>
<tr>
<td>Atlantic</td>
<td>REYES, Ramon Ernesto</td>
</tr>
<tr>
<td>August</td>
<td>CANDY, William Robert</td>
</tr>
<tr>
<td>Decatur</td>
<td>SORENSON, Marc Lee</td>
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<tr>
<td>Dun</td>
<td>WOOD, Kim Brian</td>
</tr>
<tr>
<td>Evans</td>
<td>BURGER, Charles W.</td>
</tr>
<tr>
<td>Gainesville</td>
<td>MYER, Clayton Rex</td>
</tr>
<tr>
<td>Gladesville</td>
<td>MARRUJO, Robert Pedraza</td>
</tr>
<tr>
<td>Idaho Falls</td>
<td>BURR, Robert H.</td>
</tr>
<tr>
<td>Lawrenceville</td>
<td>SAWYER, Gabriel William</td>
</tr>
<tr>
<td>Leesburg</td>
<td>CLARK, Byran Brian</td>
</tr>
<tr>
<td>Liburn</td>
<td>ZAMAN, Qamar U.</td>
</tr>
<tr>
<td>Marietta</td>
<td>SCHEER, Cecilia Ruby Mc Clung</td>
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Mangilao
APODACA, Carmela Beatrice

Tamuning
SELL, Roy

NO. MARIANA ISLANDS

Saipan
GOOD, Nathaniel Stanley

PUERTO RICO

Gurabo
MONSERRATE, Jorge Luis

Mayaguez
DIAZ, Josue
FORESTIER-MERCAD, Libia E

Vega Baja
BALCAZAR, Patrick Joseph

INTERNATIONAL

Argentine
ALVAREZ, Fred
ESFAHANI, Ahmad M
GORDON, Nancy Davis

Australie
HINTZ, Thomas B.

Bolivia
GAKELBOTSE, Baruluganyi
Reflux
OLIPHANT, Clement
ORMACHEA, Victor Gabriel
TORRES, German

Canada
GRAY, Roland Ferrell
LOW, John G.
MITSINGAS, Michael Joannou
RENDEIRO, Joao Carlos
SALLAJ, Abdul Latif

Egypt
EL-SHERIF, Samir Fathy
FERGUSSON, Jim Bob
HAYIS, John Daniel
JOHNSON, Lorraine Landers
MCSHERRY, Michael J.
RYAN, Hugh William
TAG, Assem Abdel-Rahim

England
BOIZICH, Mark Patrick

Greece
ANGELIS, Stavros Sp.
BOTRAN, Jaime
PRENTECE, Stuart Adol

Hong Kong
CHAN, Mai

India
ADHYARU, Tanun B.
BHADA, Mandil P.
BJARNARSON, Sigurdur
DHONRA, Rakesh Kumar
FISCHER, Eduard
GUPTA, Lachman Das
KANWAR, Satpal R.
MORGAN, Walter Douglas
NARAYAN, Ramesh Vinod
PHELPS, Arthur
PRUSKY, Irvin Jack
SHAH, Girish Charulal
SHAH, Meghalal Sardarnal

Jordan
ABU-AFIF, Mohammed M
INANUWA, Junishiro
TSUKAMOTO, Kenichi

Kuwait
ABDEL-RAZAG, Ahmad Yousef
ABDULLAH, Adad Mohamad
ARSO, Peter S.
CHEIKH, Paul Kipkuri
JERAGH, Abdullahjume D. Abas
KHANALI, Patrick Kurag
KURKJI, Maimun
MUNEEN, Richard F.
THOMAS, Thomas
WATHOBDI, Kiong

Lesotho
LETSEI, Mohapi Francis

Malaysia
ABD KARIM, Mohamad Noor
ABDULLAH, Aliza
ABDULLAH, Muhammad Zaki
ABDULLAH, Sabri
ABU BAKAR, Zaini
ALI, Mustafa Kamal
AFFRICA-ACOSTA, Cesar
CADES-CEPEDA, Fernando
CHAVEZ, Alfredo Eduardo
CHAVEZ, Amancio Javier
CHAVEZ, Gilberto Mario
CRUZ-ACOSTA, Kenneth Alexander
DIAZ, Eduardo Gerardo
FLORES, Jesus
FRAGOSO, Balb Chavez
GARCIA-MORENO, Felipe
GARCIA-RIOVIRA, Rafael
GONZALEZ-VILLARR, Carlos Enrique
GUTIERREZ, Guillermo
H. OTINAM, Nazifullah Bot
KHAN, Khurshid Sali
LAHAR, Hafiz
LOW, Mei Fong
MACIAS, Ruben Angel
MACIAS, Victor Manuel
MD, SHARIY, Rohani B.
MOHD NAYAN, Azmi
MORALES, Cesar
OTINAM, Daudilain Tarjin
PAVARA, Jessi Alfonso
POTOSKY, Dennis Evan
PUASA, Muhammad Rizal Bin
BORREDO-SOZA, Cortes
SHARIY, Fozah
TERAN, Francicio
YUNUS, Samuel
YUSOF, Zulkiifli Bin
ZAINAL, Zamudin Bin
ZUHRI, A. Rahman

Mexico
DIAZ, Conrado

Nigeria
ABDULLAH, Garba Abubakar
MALIK, Saadu
MASHI, Garba Ibrahim
OKOH, Anthony
SANI, Adamu Ahaji
SOKOLO, Robert Edward
SUMAIYON, Buseh Laiwala
USMAN, Garba

Pakistan
MANSOUR, Shahin Ahmed
TINTORER, Jorge Alejandro

Pacific islands
LESNIAK, Charles

Scotland
HULL, Theodore Loy
JAMA, Hussein H.
SEYED-SULEIMAN, Abdul Matin

Saudi Arabia
AL-HAFPOODH, Jaffer
AL-KHALIL, Yousfi A.
AL-KHALIFAH, Kamal Abdullah
AL-NAFIR, Sameer Mohammed
BISHOP, Denis Allen
BRUTON, Gregory Allen
FARRIS, Dan Ray
MAAOG, John Abbott
QURAYDIS, Saleh Ibrahim
REBBAN, Saad Ali
SALARS, Daniel Nila
STRICKLER, Gary William
UMARI, Sulayman Mohammed

Sri Lanka
VARATHAN, Siraguru

Taiwan
CHAO, Yu-Hsin
INDRAMVARRA, Ketti
SUDUOOKAIT, Panmut
WU, Chuan-Wei
WU, Tse-Hau

The Netherlands
ROBINSON, Rick Allen

Venezuela
DAVILA, Alba Basartino
MILIAN, Vincente
REYES, Pedro Orlando
SKAGGS, Samuel Russell

West Germany
MEYHOFF, Edgar Gustave

West Indies
GARDNER, Earl Dexter

Yemen Arab Rep.
AKLAN, Amin Mohammed

Zimbabwe
GOTORA, Paul
MASANJANISE, Gladys
MUSARURWA, Bernard