



Kansas State University, Department of Geology  
Alumni Advisory Council



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*A History of the Department of Geology*



Advisory Board photo 1983



Advisory Board photo 1986



Advisory Board Photo 1995



Alumni Advisory Council 2005



Alumni Advisory Council 2013



Alumni Advisory Council 2014

Alumni Advisory Council 2016



Alumni Advisory Council 2017

**HISTORY OF THE DEPARTMENT OF GEOLOGY AT KANSAS  
STATE UNIVERSITY, 1866-1988**

*by*

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*WITH ADDITIONS BY JIM UNDERWOOD, JOE GRAF, AND JACK OVIATT  
TO BRING THE HISTORY UP TO 1996*

*WITH ADDITIONS BY PAMELA KEMPTON AND ANGELINA BUTLER TO  
BRING THE HISTORY UP TO 2018 (WITH MANY GAPS PRIOR TO 2013)*

## **PREFACE\***

*The encouragement to prepare an overview of the history of the Kansas State University Department of Geology was provided by Jim Underwood in 1983; the history recorded here builds on a description of the early years of the department prepared by Professor Arthur B. Sperry about 1953. I extended the history to 1984, and it is this history, modified and extended to 1988 by Page Twiss, Jim Underwood, and especially by Joe Graf, that is herewith presented.*

*The history and record of an academic geology department includes many things: courses taught by faculty and taken by students, field trips, student and faculty research activities, theses written and defended, student and faculty research papers presented at meetings and published in geologic journals, changes in departmental facilities, and the countless experiences and memories of all involved. In this brief overview, I have provided an historical framework within which many of the activities and people in which and with whom you were involved can be placed. Many who have been a part of the history recounted herein and who have the opportunity to read this summary will have modifications or additions to suggest; please pass them along to the department.*

*Reviewing and then summarizing the history of the KSU Department of Geology has been a rewarding experience, because the history of the department is the history of its people - students, faculty, and staff. In having the great pleasure of being involved in many of the events and with many of you during my almost 60 years at the university and in the department, recalling those events and those involved in them has been a very gratifying and enjoyable experience.*

*And what an exciting 60 years it has been for the science and profession of geology, highlighted by undreamed of insights and revelations about our Earth. The KSU Department of Geology can take great pride in having contributed to those achievements.*

\*Original preface by Joseph R. Chelikowsky, Professor Emeritus of Geology, Kansas State University, Manhattan, Kansas, January 20, 1997

*The text in Chapters I to VI are the original history as written by Chelikowsky, supplemented by photos and drawings discovered by Angelina Butler in 2018. These additions are marked as [2018 addition].*

## **CHAPTER I - BEGINNING AND EARLY HISTORY (1866 - 1921)**



**Professor Mudge excavating a skull.**

Water Colors by Arthur Lakes showing excavation of Dinosaur remains from the Morrison Formation at Morrison, Colorado, 1878.

*[2018 addition]*

The first courses in Geology were taught by Benjamin F. Mudge, professor of natural science and higher mathematics from 1866 to 1874. Before joining the faculty of Kansas State Agricultural and Mechanical College, Mudge was the first State Geologist of Kansas, and he made the first comprehensive geological report and map of the state. He left Kansas State in 1874 to become field geologist for O.C. Marsh of Yale University.

After a lapse of four years during which Geology was not taught, George H. Failyer was employed to teach Mineralogy, Geology, Physics and Chemistry. He was professor of

Chemistry and Mineralogy from 1885 to 1897. During Failyer's tenure, the Board of Regents appointed Dr. William A. Kellerman as head of a newly created Department of Botany and Zoology, which also included Geology and Physiology. This action effectively committed the future of Geology to a destiny among the Biological Sciences for more than 60 years.

In 1881, Zoology and Geology were transferred to the newly established Department of Physiology and Veterinary Science, where they remained until 1894. In that year, Professor Edwin A. Popenoe (employed from 1879 through 1907) became head of a newly formed Department of Zoology and Entomology to which Geology was assigned; in 1907 Dr. Thomas J. Headlee succeeded Professor Popenoe. Although Dr. Headlee did not teach Geology, two members of his staff did: Theophilus H. Sheffer from 1907 to 1910 and Dr. Robert K. Nabours from 1910 to 1912. At this time, Geology was required in the curriculums in Civil Engineering and in Agriculture, although by 1921, Geology had been dropped from the curriculum in Agriculture.

In 1912, Entomology and Zoology became separate Departments, with Professor George A. Dean as Head of Entomology and Dr. Robert K. Nabours as Head of Zoology. From 1912 to 1921 Dr. Nabours taught a class in Geology once or twice each school year. Porter J. Newman of the Department of Chemistry also taught Geology courses from 1917 to 1920.

## **CHAPTER II - FORMATIVE YEARS (1921-1953)**

From World War I until 1932, a number of KSU graduates took Geology courses and, although their degrees may have been in other fields, practiced Geology as a profession. In 1921 Dr. Nabours hired Arthur B. Sperry to teach Zoology and Geology. Sperry had been a student of Biology at Kansas State from 1914 to 1917. After serving in the army during the latter part of the war, he entered the University of Chicago where he received his B.S. degree in Geology in 1920. He was well qualified to teach both Zoology and Geology. Because of the rapid increase in Geology enrollment and Dr. Nabours' desire to devote more time to Zoology and its administration, Sperry was given complete responsibility for Geology and its future at Kansas State. In effect, he was Head of Geology, although he did not bear that title officially until 1946. Although Geology continued to be the responsibility of the Zoology Department, the Geology courses in the University catalog were listed under an independent heading.

In 1921 Francis D. Farrell, Dean of Agriculture, and Professor Ray I. Throckmorton, Professor of Agronomy and Soils, agreed that Geology should be required of students taking Soils; the result was a marked increase in Geology enrollment. The basis for a Master's Degree program in Geology was laid when graduate credit for Research in Geology was approved in 1927.

## Geology Field Camp

During the same year, a course in Field Geology was added to the curriculum. Professor Sperry was already involved in a Summer Field-Camp program as Director of the University of Colorado camp in the Rocky Mountains, having been hired by the University of Colorado in 1923. Kansas State students were allowed to participate. After Professor Sperry resigned from the program in 1932, the arrangement for Kansas State continued.



*[2018 addition]* Photo on the left was taken at field camp during the summer of 1958 at the Colorado School of Mines Field Camp at Wild Horse Park near Colorado Springs.

Original caption: “Gerald Whipple of Jetmore, KS, standing, and Lynn Myers of Beaver Lake, NE, kneeling”

## Degree Programs

In 1930, the KSU administration approved the creation of Geology programs leading to both B.S. and M.S. degrees and the addition of a new full-time instructor. Frank E. Byrne was hired by Professor Sperry in 1930; like Sperry, his B.S. degree was from the University of Chicago. But unlike Sperry, Byrne's principle area of interest was Paleontology. In 1937, Joe Chelikowsky (Ph.D. Cornell) joined the staff; his specialty was structural and regional geology.

The following courses constituted the core upon which all subsequent programs were based: Engineering Geology, General Geology, Physiographic Geology, Historical Geology, Economic Geology, Crystallography and Mineralogy, Field Geology, Structural Geology, Invertebrate Paleontology, Field Methods, Optical Mineralogy, Principles of Geography, Vertebrate Paleontology, Geologic Problems, and Research in Geology. Engineering Geology continued as an offering for the civil engineers, and in some instances served to attract engineers into the Geology program. Principles of Geography was offered for the first time within the framework of Geology and promptly became a popular course.

## First B.S. and M.S. Degrees

In 1932, Seward E. Horner became the first student to be graduated from Kansas State with a B.S. degree in Geology; he was employed by the State Highway Commission of Kansas.

From 1942 to 1944, he was on loan to the U.S. Public Roads Administration as Chief Geologist in the construction of the Alaskan Highway from Dawson Creek to Fairbanks. In 1944 he was promoted to Chief Geologist of the State Highway Commission of Kansas and soon became recognized as a pioneer of highway geology. Many Kansas State graduates subsequently were hired by Horner, and his Department of Highway Geology became a model for other states to follow.

In 1938 Charles P. Walters received the first Master's Degree in Geology from Kansas State. After serving time with the military in the Pacific Theater and Hawaii during World War II, he was employed as a geologist by the Continental Oil Company in the Los Angeles area of California. He became a member of the Kansas State Geology staff in 1948.

### **ASTP - AAF Programs**

When the Army Specialized Training Program (ASTP) and the Army Air Force (AAF) were organized as on-campus programs early in 1943, Professor Sperry was appointed head of the Geography Program and was requested by the administration to organize a staff qualified to teach Geography to both of the military groups. By June of 1943, 400 ASTP trainees had enrolled; this number swelled to 650 by September. During the following semester the AAF joined the program with more than 1900 additional trainees. When the program came to a close, the Department was left with an expertly trained staff, supplied with excellent teaching aids. Another dividend was the great number of trainees that returned to the campus for additional course work in Geography and Geology, some as declared majors. The ASTP and AAF programs were especially significant because they provided the impetus for development of an outstanding Geography program at KSU that ultimately resulted in the creation of a separate Department of Geography in 1966.

### **State Highway Research Laboratory**

The Highway Research Laboratory within the KSU Geology Department probably evolved from early support of Seward Horner and from the many clay-mineral studies by KSU Geology students funded by the State Highway Commission. The laboratory was initiated formally in 1944 when the Engineering Experiment Station agreed to support a program entitled Mineralogy and Petrology of Concrete Aggregates. In addition to the study of the petrology of concrete aggregates, Professor Sperry and Hal Harned, half-time Department of Geology, half-time Highway Commission, worked on several projects involving water absorption of clay minerals. Harned left in 1947 to become Chief Geologist for the California Highway Commission.

Starting in 1950, John D. McNeal (B.S. - 1940) and Carl Crumpton (B.S. - 1949, M.S. - 1950) shared responsibility for several projects dealing largely with clay mineralogy. On August 12, 1954 McNeal left the Research Laboratory to succeed Horner as Chief Geologist of the Highway Commission upon Horner's death. Crumpton remained in the Laboratory as principal investigator. In 1964, the laboratory was moved to Topeka; Crumpton continued

as Head of Research. McNeal became Engineer of Research in 1958 and after successive promotions over the next few years became Director of Planning and Development in 1976.

### **Man's Physical World**

In 1945 the College of Arts and Sciences, with the support of the faculty, approved a complete curriculum revision of the basic university requirements for a degree. The action was the result of considerable debate relative to the merits of education in depth versus education in breadth. The latter alternative won final approval. The result was the development of four comprehensive courses: Man's Physical World, Man and the Biological World, Social Studies, and Humanities. Sperry was appointed Head of Man's Physical World.

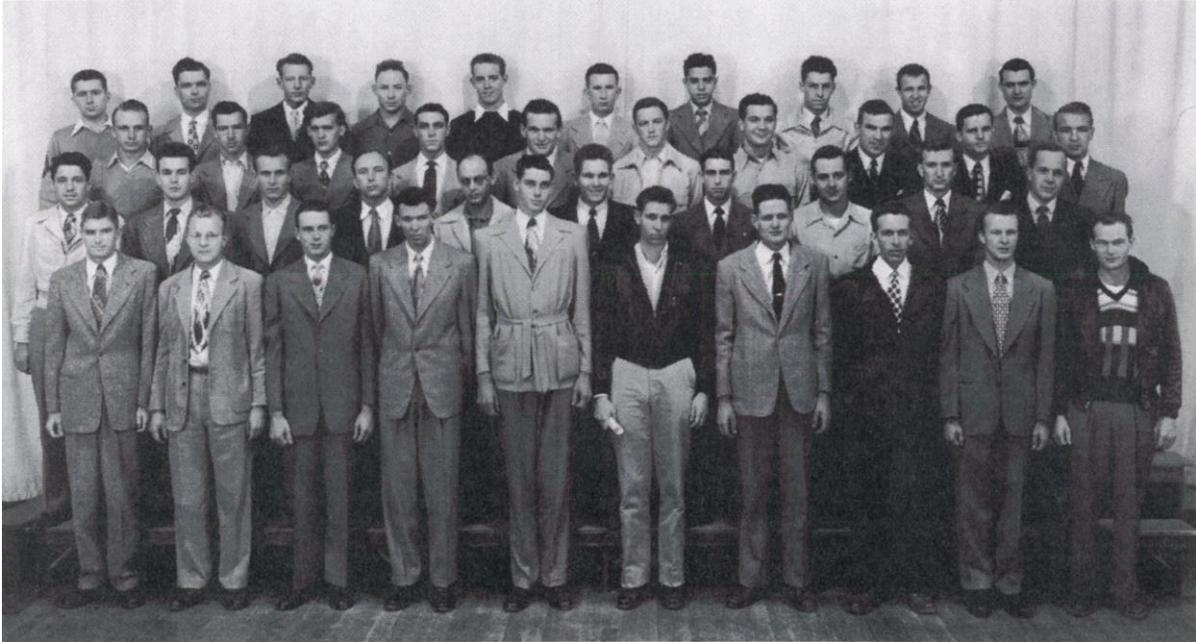
### **Founding of the Geology Department**

On October 3, 1946 President Milton S. Eisenhower announced the creation of a Department of Geology and Geography with Professor A.B. Sperry as its head. The separation of Geology from Zoology was largely an administrative decision made when Dr. Nabours stepped down after 34 years as Department head. Concurrent with Eisenhower's announcement, four new Geology staff members were added, including Louis Riseman in Geology. Later, Henry Beck (1947), Charles P. (Phil) Walters (1948), and Claude Shenkel (1949) joined the Geology staff, bringing the total to 7. These three, together with Joe Chelikowsky and Lou Riseman, had profound influence on the Department and its graduates into the 1980's.

### **Cramped Quarters**

In 1946, the Department of Geology and Geography was housed in the basement of Fairchild Hall. The amount of space was woefully inadequate both with respect to classrooms and offices. In 1947, following the announcement on October 3, 1946 of the acquisition of four new staff members, office space for several staff members was provided in the Office Barracks near Willard Hall. These facilities were abandoned in 1952 when two classrooms and two offices in Fairchild Hall were assigned to Geology (after the History Department was moved into its new quarters in Eisenhower Hall), as were two offices in the basement and two on the second floor of Anderson Hall. Some lecture sections in Geology were taught in the Engineering Lecture Hall and in Kedzie Hall.

The rapid growth in staff prompted by the Man's Physical World program actually lagged considerably behind the growth of Geology student enrollment for several years. In 1946, with 70 newly declared majors, 34 B.S. degrees and 5 M.S. degrees were conferred; by 1950, with more than 250 declared majors, 70 B.S. degrees and 4 M.S. degrees were conferred. At that time only the universities of Texas and Oklahoma had more undergraduate majors than Kansas State.



[2018 addition] This photo was found on the cover of the 2001 Geology Newsletter showing about half of the K-State Geology class of 1949-1950. Let us know anyone you recognize!

### **Williston Geology Club and Alpha Nu Chapter of Sigma Gamma Epsilon**

The Williston Geology Club, the first Geology student organization at KSU, was named for Samuel Wendell Williston, an early graduate of Kansas State University where he was a student of Benjamin F. Mudge. Membership in the club is not limited to Geology majors but includes anyone with an interest in the Earth. The Alpha Nu Chapter of Sigma Gamma Epsilon, the Earth Science honorary society, was established in 1947. Major activities of both student groups have included service projects for the Department, sponsorship of special lecturers, sponsorship of field trips, and sponsorship of Departmental social activities.

### **Survey of Geologic Construction Materials in Kansas**

The U.S. Geological Survey Engineering Branch under Ernest Dobrovolny, in cooperation with the State Highway Commission under Horner, appointed Frank Byrne, from June, 1946 through August, 1959, to make a survey of geologic construction materials available in Kansas. The project the most exhaustive of its kind for the State of Kansas. Twenty-one counties were mapped, the completed publications appeared as circulars and bulletins of the U.S. Geological Survey, and eleven papers outside the scope of construction materials were published.

### **Course and Curriculum Changes (1947-1952)**

By 1947 three curriculums were available: *Applied Geology* - for professional careers in

Geology; *Physical Science with a major in Geology* - for advanced academic careers; and *Geophysics* - for petroleum Geology careers combining Geology and physics. The following 12 new courses were adopted to bring the total course offerings to 30: Geology of Subsurface Water, Sedimentary Petrology, Petrology, Minerography, Micropaleontology, Binocular Examination of Well Cuttings, Index Fossils, Electric Well Logs, Conservation of Mineral and Water Resources, Geologic Reports and Illustrations, and Regional Structural Geology.

### **CHAPTER III - GROWING PAINS (1953-1968)**

In 1953 Professor Sperry retired for health reasons, and Dr. Byrne resigned. After Professor Sperry retired, the Sperry Scholarship Fund was established in his honor. J.R. Chelikowsky was appointed as Acting Head of the Department and in two years became the second Head of the Department. In the late 1940s and the 1950s, Geology evolved from a discipline that was concerned primarily with a visual description of rocks, minerals, and fossils to one that became highly quantified. Geologists were no longer merely concerned with the macroscopic aspects of rocks, minerals and fossils; now the very heart of a mineral in terms of trace elements, isotopes, and ionic response to various induced stimuli played a major role in extracting clues to past environments. This transition resulted mainly from technological advances in sophisticated measuring and analytical techniques that bloomed as spin-offs, in part, from the development of the space program that began after World War II. Later, development of extremely sophisticated instrumentation was made possible through computerized systems based on solid-state circuitry. Wet-chemical analyses gave way to a variety of spectrochemical measurements, X-ray diffraction and fluorescence analyses, mass spectrometry, electron microscopy, neutron activation analysis, and others. In addition, the geosciences were about to receive a major stimulation from world-wide projects of the International Geophysical Year, 1957-1958. Clearly geologists needed more intensive education in mathematics, physics, and chemistry.

In his 1953 report to President James A. McCain, Chelikowsky committed himself and the Department to the development of new programs in Geology, Geophysics, and Geochemistry with emphasis on basic, rather than applied, research at the graduate level. He expressed the hope that these programs ultimately would lead to the granting of the Ph.D. degree by the Geology Department. But before setting the stage for the pursuit of these goals, it was a matter of prime urgency to find new quarters for the Department, which had outgrown its original facilities in the basement of Fairchild hall.

#### **Thompson Hall**

In the fall of 1953, the Department of Geology and Geography applied to the Campus Development Committee to acquire Thompson Hall, a graceful limestone building completed in the Italian Renaissance style in 1922. At that time, Home Economics was housed there; Justin Hall, the new home for Home Economics, was in the planning stage,

and the Student Union, in which Thompson Cafeteria was to be relocated, was nearing completion. The Campus Development Committee responded favorably, and approval for the remodeling of Thompson Hall for Geology and Geography was given in 1954.

Remodeling began in 1955, with a grant of \$40,000; another \$26,000 was provided in 1956. The basement was redesigned primarily for research and sample preparation, faculty offices, and a meeting room for students. The first floor provided space for the Departmental Office, a large 100-seat lecture room, a dual purpose 40-seat recitation and laboratory class room, an X-ray laboratory, and six offices for Geology staff and graduate students. Laboratory class rooms for mineralogy and optical mineralogy, a dark room, and a Geology office were located at the east end of the second floor; the rest of the floor was for Geography.

### **Staff Changes**

In 1953, Page Twiss, whose specialty was sedimentology, and Robert M. Hutchinson (Ph.D. Texas) joined the Geology staff. Twiss left in 1955 to pursue a Ph.D. degree at the University of Texas, and upon its receipt in 1959 returned to KSU. Hutchinson left in 1956 to accept a position on the faculty at the Colorado School of Mines. William K. Clark, whose specialty was paleontology, replaced Hutchinson. Paul S. Wingard (Ph.D., Illinois), optical mineralogy and petrology, joined the staff in 1957. Douglas G. Brookins (Ph.D. M.I.T.), whose specialty was isotope geochemistry, was added to the Geology faculty in 1963, followed by Sambhudas Chaudhuri (Ph.D. Ohio State), also a specialist in isotope geochemistry, in 1966. The last addition to the staff during this period occurred when Paul Wingard left for a position at the University of Akron and Richard W. Vian (Ph.D. Michigan) was hired as his replacement in the area of mineralogy and petrology. By 1968, the Geology faculty numbered 10.

### **Cooperative Programs**

In the fall of 1954, a dual-degree option was approved that would lead to a BS degree in Engineering and in Geology at the end of five years; a minimum of 30 hours of geology was required. In 1958, in co-operation with the School of Education, the course Geology for Science Teachers was incorporated in the Secondary Education Curriculum for science teachers. At about the same time the Curriculum in Geology lost its independent status and was changed to the Geology Option in Physical Science.

### **Man's Physical World**

After the retirement of A.B. Sperry in 1953, the heavy burden of teaching multiple sections of Man's Physical World fell on a relatively young and eager Geology staff. This load stifled the opportunity for growth and development of their research programs and hindered the achievement of the Department's goal of developing a strong graduate program. Thus, the responsibility for Man's Physical World was shifted to the Department of Physics, whose

graduate program already was established.

### Geology Field Camp (Beulah, Colorado)

The establishment of the Kansas State Geology Field Camp at Beulah, Colorado, about 25 miles southwest of Pueblo in the Wet Mountains, resulted from a casual visit to the area in the spring of 1954. The trip into Colorado was sponsored by Sigma Gamma Epsilon as part of a series of annual Spring Break field trips taken by students and staff. Henry Beck, who was completing his Ph.D. degree at the University of Kansas, was familiar with the area, which was near the University of Kansas Field Camp at Canyon City.



Photo and information provided by Page Twiss

Left to right, standing: Keith Umbehr, Tom Bridge, Harold Stewart, Page Twiss, and Charles Seiler  
Front row: Victor Crotinger and Lewis Higginbottom

He had expressed interest in developing a summer field camp for Kansas State in the region, and the camp, under the directorship of Beck, became an instant success.



### Earth Science Summer Institute 1967

**Back Row:** Louanne Lautz, Marion Stole, Celopatra Lark, Sister Catherine Poirier, Mattie Caesar, Sister Clair Tillette, Sister John Agnes Collins, Phil Kemmerly, Eldon Ritche, Eldon Gillispie, Fred Garten, George Lessane. **3<sup>rd</sup> Row:** Guy Schilling, Bob Young, J.R. Chelikowsky, Karl Stacey, Fred Noffke, Willis Crenshaw, Manson Tillman, Ronnie Barkley, Raymond Gilman, Roderick Wood, Darrel Zimmerman. **2<sup>nd</sup> Row:** Paul Chenoweth, Edgar Anderson, Richard Smith, Claude Shenkel, James Swift, Richard Rodebeck, James Matson, Douglas Hedberg, Rodney Petersen, Donald Dunn, James Davis. **Front Row:** Tyree Williams, Earl Scoggins, Donald Hennigh, Norman Staats, Carter Farmer, Jack Lind, Frank Darling, Charles Walters, Frederick Caesar, Merle Hosler, William Warner.

## **Earth Science Summer Institutes**

In 1959, the Geology-Geography staff submitted a proposal to the newly organized Summer Institute Program of the NSF to aid High School Teachers of Science. A grant was received to support a total of fourteen consecutive institutes. More than 600 teachers from nearly every state in the Union participated in the program. Each session consisted of lecture and laboratory activities on campus and a 5-day field trip to Colorado for a total of 8 hours of credit.

The institute programs led to the subsequent development at Kansas State undergraduate program leading to a BS degree in Earth Science for High School teachers and an arrangement with the School of Education to count the eight hours of graduate credit earned in the Institute toward a graduate degree. Perhaps the most important impact was on the State Board of Education, which came under pressure to upgrade the requirements for Earth-Science teaching in high schools.

## **Distinguished Visiting Professor**

The first visiting professorship in the history of Kansas State was granted to Dr. Charles M. Nevin, Professor Emeritus and former Chairman of the Department of Geology at Cornell University. Nevin was a renowned structural geologist and author of one of the most widely used textbooks on Structural Geology; he also was a consultant in Engineering Geology. At Kansas State during the 1960-1961 academic year, he taught Structural Geology and held weekly colloquiums on a variety of subjects dealing mostly with sedimentary and tectonic structures.

## **Visiting Foreign Exchange Professor**

The first foreign exchange professorship at Kansas State was secured principally through the efforts of university President James A. McCain. Dr. Hans D. Pflug, Docent Professor of Geology at Justus Liebig University, Giesen, Germany, arrived at Kansas State in February of 1962 for a one-year stay. He was an internationally known palynologist and conducted weekly seminars. He cooperated with the State Highway Department on a research project involving physical behavior of gypsum and also did some research on Precambrian fossils of the Belt Series of Montana.

## **Establishment of Geochronology Laboratory**

By 1962, for the first time in more than a decade, the Department had adequate research and teaching space in the same building. In accord with its goal to expand in the area of geochemistry, the Department had particular interest in establishing a research program in the isotopic age dating of rocks. The director of the Geochemistry program at NSF promised that if Kansas State would hire a promising young Ph.D. in Geochemistry, NSF would give every consideration possible to a proposal to equip a Geochronology Laboratory at KSU.

Therefore, Douglas G. Brookins (Ph.D. M.I.T.) was hired at the rank of Assistant Professor in the fall of 1963. A KSU - NSF matching proposal prepared by Brookins gained approval the following year (1964). During the next two years \$44,000 were expended to equip the laboratory with a 6-inch mass spectrometer for Rubidium-Strontium age dating. The laboratory occupied the east portion of the basement in Thompson Hall. In 1966, the laboratory began operation and Sambhudas Chaudhuri (Ph.D. Ohio State), an isotope geochemist with a strong background in clay minerals and sedimentary rocks, was added to the staff.

### **Seismic Observatory**

As part of the U.S. Air Force Vela Uniform Program to develop the capability to distinguish between natural and seismic events and underground nuclear-test explosions, Father William Stauder, S.J., of St. Louis University received a grant in 1960 to establish a network of four seismic stations located in Rolla, Missouri; Debuque, Iowa; Bloomington, Indiana; and Manhattan, Kansas. A site was chosen about half a mile north of the Ag campus; the station went into operation for the first time on September 4, 1961. The station was equipped with three Sprengnether long-period seismographs (E-W, N-S, and vertical) and three Benioff short-period seismographs. The contract was terminated in 1965, and in 1966 the station became the property of Kansas State.

Around 1974, the three Benioff short-period seismographs were returned to St. Louis University in exchange for visual mechanical recorders for the three Sprengnehter long-period seismographs. At the same time, the long-period machines were moved out of the seismic lab and placed in the basement of the newly constructed McCain Auditorium immediately north of Thompson Hall. An underground line was run from McCain to Thompson, where the active recorders were an informative display for students, faculty, and visitors to Thompson Hall.

### **Agricultural Experiment Station Project**

In 1964, the Agricultural Experiment Station under Floyd Smith made arrangements with Henry Beck and the Geology Department to initiate a Water Resources Research program for Kansas. Dr. Beck was budgeted half-time on a twelve-month basis to the Agricultural Experiment Station. This appointment provided support for research by Dr. Beck and his graduate students and continued until his retirement in 1985.

### **Geology and Geography Become Separate Departments**

In 1966, the university administration recognized that the Geography and Geology programs had achieved sufficient strength to stand on their own. Therefore, a separate Department of Geography was formed with Dr. William Siddall as Head. Joe Chelikowsky remained Head of Geology, and both departments remained together in Thompson Hall for 16 years.

## **Ph.D. Program in Geochemistry**

The success of a Department is directly related to the contributions of its members, and its progress over time is testimony to the work of each individual. There is no question that by 1966, the Department had reached the stage where a Ph.D. program was appropriate, and an application was made to the Board of Regents for a Ph.D. program in Geochemistry. In 1967, the Board approved the request. Dr. Brookins had support money in his NSF grant for two graduate research assistants. One of them, Robert Methot, working on the geochronology of pegmatites in Connecticut, completed all the requirements for his degree in 1973.

Unfortunately, his degree proved to be the only Ph.D. granted in Geochemistry at Kansas State. In 1973, following an intensive study to identify ways to reduce costs and cut back on graduate programs with fewer than two Ph.D. graduates per year, the Board of Regents cancelled the program. Thus more than fifty years of hard-won attainment were eliminated in a few seconds by the stroke of a pen.

## **CHAPTER IV - SETTING THE HOUSE IN ORDER (1968-1977)**

By the end of 1968 the total number of BS degrees granted in Geology was about 650, and the total number of MS degrees granted was around 120. Of the 120 Masters Degrees granted, at least 20 of the recipients received the Ph.D. degree at other universities. After serving 15 years as Head of the Department, J.R. Chelikowsky relinquished the responsibility to Page C. Twiss on July 1, 1968.

Thus far, the physical growth of the Department occupied most of the high priorities. Although students were not slighted, the establishment of a sound, well-staffed Department with proper research facilities drew most of the attention. Twiss prepared a student guide and a system of advisement, particularly at the graduate level, that served as a model that was copied by other Departments.

### **Staff Changes**

In order to strengthen the paleobiology program (see below), Ronald R. West (Ph.D. Oklahoma) was added to the faculty in 1969. In 1971, Richard Vian left KSU for a position at Miami University (Ohio); his replacement was Robert L. Cullers (Ph.D., Wisconsin), an expert in igneous petrology and trace element geochemistry. In 1972, Doug Brookins left to accept a position at the University of New Mexico; his replacement was Donald O. Whittemore (Ph.D., Penn. State), and whose specialty was water chemistry. Also in 1972, William Clark resigned from the faculty to pursue an independent consulting business. His position was converted into GTA positions, bringing the faculty to a total of 10.

## **Emergence of the Paleobiology Program**

During the 1960's, biology, in addition to chemistry and physics, was being rapidly incorporated into geologic studies. Paleontologists were no longer content to study only the classification and morphology of fossils but began to utilize studies of live organisms, recent environments, and biochemical and geochemical data to understand better the fossil record in its entirety. Paleoenvironments were being reconstructed by analogy to modern animals and environments, and paleoecology became a very important part of sedimentary Geology and paleontology. In the late 1960s the Department made a commitment to paleobiology similar to the one it made in the early 1960s to geochemistry. Ron West was hired to join the staff in 1969, and in later years, this commitment was continued with the addition of George Clark in 1977 and Richard Busch in 1984. In order to establish a more formal relationship between biology and Geology, Dr. Theodore M. Barkley, Dr. Spencer Tomb, and Dr. Chris Smith of the Division of Biology became Ancillary Professors of Geology, and Ron West became an Ancillary Professor of Biology.

## **Distinguished Visiting Professor**

In the spring of 1970, Dr. B.V. Boucek, an internationally known paleontologist and an authority on Siluro-Devonian paleontology and stratigraphy arrived on the campus. At the time he was president of the International Paleontological Union and Professor of Geology at Charles University in Prague, Czechoslovakia. He conducted seminars on invertebrate paleontology, and informal class meetings with students in paleobiology.

## **Course and Curriculum Changes (1968 - 1972)**

By the late 1960's, space vehicles began sending back messages of their findings from outer space; a new frame of reference was available to help provide a broader planetary context for geologic observations. Geology programs nation-wide began to reflect the new era by the development of new courses and curriculums. Kansas State was no exception; Planetology, Oceanography, Geology of Planets, and Environmental Geology were added to existing curriculums. Several older courses were either dropped or revised. In some instances only the name was changed to fit more recent terminology. Eleven courses were dropped and 19 were added. One of the more innovative courses was Topics in Geology, a seminar course which provided for discussions of current topics for undergraduates. The term paleontology was dropped from course descriptions. All of the petrology courses were raised to the graduate level, as was Advanced Paleobiology. Other graduate courses included Advanced Hydrogeology, Planetology, and Structural Mineralogy. Thus, by 1972, there were 13 courses available for graduate credit, compared with 5 in 1968.

The dual degree option in Civil Engineering and Geology (1954) was reprogrammed in 1971 to include the Geology Summer Field Camp; other Geology courses included: Physical Geology (4), Historical Geology (4). To obtain the dual degree, all of the regular requirements for the Civil Engineering Degree had to be fulfilled.

## **Departmental Library**

Another student aid materialized when Sperry's extensive collection of books formed the basis of a Departmental library shortly after Sperry's death, October 23, 1972. To this collection has been added books and journals donated by faculty, students, alumni and friends of the Department.

## **Hallway Museum**

In 1970 the natural history museum on the main floor of Fairchild Hall was abolished; because much of the museum material was geological, the Geology Department was granted authority to move most of the display cabinets to Thompson Hall. They were refinished and wired with display lights activated by automatic timers. A wide range of geological exhibits are displayed in the hallway museum.

## **Enrollment Trends and Operational Costs**

By the end of the period, 1968-1977, about 700 BS degrees and 150 MS degrees had been granted. The all-time peak in the number of Geology majors was in 1948; and the low point was in 1965. Departmental operating costs, excluding salaries, had increased more than ten-fold since 1953. However, the average operational cost over a 30-year period was considerably lower than that of other physical-science Departments.

## **CHAPTER V - OIL BOOM YEARS (1977 to 1985)**

In 1977, Page Twiss stepped down as Department head and James R. Underwood, Jr. succeeded him. The period 1977 to 1985 encompassed the peak in what will probably go down as the greatest oil boom in history. For the Geology Department it was a time highlighted by significant increase in enrollment, by active alumni interaction with the Department, by dramatic increase in endowed funds, by the acquisition of all of Thompson Hall, by significant strengthening of undergraduate and graduate programs, and by upgrading of space and equipment.

The period also was one of Departmental self-study and evaluation. In December 1981, the Department and the Department head were evaluated by the Dean and Associate Dean of the College of Arts and Sciences as part of the quadrennial review program of the College. During the spring, 1982, the Department, the college, and the university engaged in a comprehensive self-study for the 10-year evaluation by the North-Central Association of Colleges and Universities. That study was followed in the first half of 1983 by a comprehensive program review by the board of Regents.

## **Staff Changes**

In 1977, Joe Chelikowsky retired. He was replaced by James R. Underwood, Jr. (Ph.D.)

Texas), an expert in structural and regional Geology and planetary Geology, who joined the faculty as Department Head. Don Whittemore left the Department in 1978 to accept a position with the Kansas Geological Survey. He was replaced by George R. Clark, II (Ph.D., Cal. Tech), who had been on the staff in 1977 as a sabbatical replacement. Clark's specialty was geobiology, but with an emphasis on structure and chemistry of living shells and fossils. Lou Riseman retired in 1980 and was replaced by Joseph L. Graf, Jr. (Ph.D. Yale), whose interests were in the areas of economic Geology, mineral exploration, and geochemistry. Claude Shenkel retired in 1984. Richard M. Busch (Ph.D., Pittsburgh) joined the faculty in the stratigraphy position.

### Ancillary Professors

Leroy Page, Department of History, and Basil Curnutte, Department of Physics, were appointed ancillary members of the Department. In addition John Doveton of the Kansas Geological Survey was appointed an adjunct member of the Department.

### Geology Advisory Council

In 1977, J.R. Chelikowsky, Professor Emeritus, who had either taught or known all of the Departmental alumni, was asked to select the names of 20 graduates of the Department of Geology who would be asked to serve on the proposed KSU Geology Advisory Council. All accepted the invitation; they were appointed by the president of KSU and held their first meeting March 31 - April 1, 1978. Rules of Procedure were adopted, Departmental programs and facilities were reviewed, and council members interacted with faculty and students. Members serve three-year terms and may serve an additional three years if they wish. Membership is unofficially structured to include women, to include a broad range of age and experience, and to include representatives of state and federal agencies and academic institutions. It is not necessary that one be a KSU graduate or a geologist to serve on the council.

<b>KSU Geology Advisory Council Founding Members [2018 addition]</b> (those attending the first meeting on March 31 – April 1 are highlighted in bold font)	
Gerald E. Abbey '38	<b>Robert D. Cowdery '49</b>
<b>Donald D. Anderson '50</b>	<b>Gordon G. Lill '40</b>
<b>Denzil W. Bergman '43</b>	<b>Melville R. Mudge '47</b>
<b>Norman W. Biegler '50</b>	<b>Howard G. O'Connor '47</b>
Clarence E. Brehm '32	<b>Gene A. Ratcliff '56</b>
Thomas E. Bridge '50	<b>Richard E. Roby '49</b>
Virgil A. Burgat '39	<b>Fredrick W. Stump '52</b>
Vincent Bruce Coombs '46	Carol Lynn Urish '73
<b>William A. Crawford '57</b>	Roxie L. Voran '75
<b>Carl F. Crumpton '49</b>	<b>Frank W. Wilson '51</b>
<i>A second meeting was held November 10 – 11, 1978. New members selected for the council were: John Brewer, Walter Frederickson, Mike Konig, Sam G. Manos, Mikeal K. Maune, Harold Price, John E. Scherer, Barry Snyder, Donald W. Steeples, Paul M. Strunk.</i>	

Also traditional is the formal adoption of resolutions requesting the support of the university administration in meeting specific Departmental needs. Critical administrative decisions favorable to the Department almost surely have resulted, in part, because the college and university administration were aware that the Geology Department is supported enthusiastically and substantially by prominent individuals in the State of Kansas and elsewhere.

### **Scholarships and Other Student-support Funds**

Student support funds underwent a period of tremendous growth in the late 1970's and early 1980's, sparked in large part by the Geology Advisory Council. Undergraduate scholarship funds were established to honor Joe Chelikowsky and Claude Shenkel; the David C. Underwood and Kendall Scholarships were established to aid both undergraduates and graduates; and the John L. Garlough and Ada Swineford Scholarship Funds were established to provide additional assistance to outstanding Graduate Teaching Assistants. A Memorial Scholarship Fund to support student travel to professional meetings was established in honor of Kenneth Shewell, BS 1972. The Frank Byrne Scholarship Fund was established to assist students to participate in field camp. *[2018 Addition. The scholarship was established by Mr. Max Krey and Mr. V. Richard Hoover in honor of the late Frank E. Byrne, KSU professor of geology from 1930-1946. The first award was made in spring 1982.]* Other funds that are of benefit to students include the Williston Geology Club Computer Fund, which is used to provide computing equipment and software for student use, and the Geology Library Fund. *[2018 Addition: The Reitz and Reitz-Spade Isotope Geochemistry Fund was established in 1986 to support the department's isotope geochemistry lab, and the Elden E. II and Sylvia H. Leasure Student Field Geology Fund was established the following year. The latter has been particularly valuable for supporting enhanced field experiences for students for over 30 years.]*

*[2018 Addition: In 1980, the Kansas Geological Society Hammer Award was given out for the first time. The Hammer Award recognizes the student with the highest average in Petrology.]*

### **Program Modifications**

Program modifications, in part responding to suggestions and concerns expressed by the KSU Geology Advisory Council, were implemented to strengthen the bachelor degrees in Geology and in Geophysics. Geology majors were required to take Engineering Physics rather than General Physics, a basic course in Computer Science, Sedimentary Processes and Systems, Optical Mineralogy, Exploration Geophysics, Geological Data Analysis, and Geologic Presentation (a course designed to give students experience with oral presentations of geologic data).

The geophysics program was strengthened by the replacement of Atomic Physics with Electric Circuits and Controls; by making Geophysics, a course taught in the Department of

Physics, a requirement; by the addition of a basic course in Computer Science, by the addition of a new course, Exploration Geophysics; and by the addition of Geological Presentation, a course to provide students with experience in the presentation of geologic data.

### **Planetary Geology**

An exciting new dimension in geologic education evolved with the advent of the Space Age. In the 1960s, Phil Walters inaugurated one of the first courses in Planetary Geology in the United States. Later, he added a graduate course, Planetology, and taught one or the other of them about every third semester until his retirement in 1985.

Jim Underwood came to K-State in 1977, having been involved in NASA-supported studies since 1972. Three of his graduate students, with NASA support, have completed theses involving geologic study of areas of Mars, Ganymede, and Venus using images supplied by orbital spacecraft. Since 1985, Underwood has taught the planetary science courses inaugurated by the pioneering efforts of Phil Walters.

### **Civil Engineering Option in Geological Engineering**

At the beginning of the fall term, 1982, the Department of Civil Engineering and the Department of Geology initiated an option in Geological Engineering. This option required 20 credit hours of Geology, including Introductory Geology, Elementary Geology Laboratory, Mineralogy-Petrology, and Structural Geology. The Geological Engineering option in Civil engineering does not replace the long-standing dual degree program in Civil Engineering and Geology, in which 30 hours of Geology are required. Unfortunately, this program was terminated by the faculty of the Department of Civil Engineering in 1988 because of a lack of support on the part of their faculty and a corresponding lack of interest on the part of their students.

### **Regular Short Courses**

From 1980 until 1985, the American/Canadian Stratigraphic Company of Denver provided, without charge to the students of the Department of Geology, the standard 40-hour Am/Strat Short course in the analysis of well samples and the preparation of sample logs. This course, taught the week following spring-term final examination, proved invaluable to the students by giving them some insight into what may be their first task as a well-site geologist upon joining a mining, petroleum-exploration, ground-water, or engineering geology company.

Beginning in 1982, a 40-hour short course entitled *Log Analysis: Remote Sensing in the Subsurface*, was taught the week prior to the spring term by Dr. John Doveton, Senior Scientist with the Kansas Geological Survey and Adjunct Professor of Geology at Kansas State University.

## **Weekly Departmental Seminar Program**

The Department had a long tradition of monthly seminars featuring guest speakers, graduate students, and faculty reporting on their research. In 1978, the Department began a series of weekly seminars. The weekly gathering of faculty and students provided a good mechanism for Departmental communication, and each semester exposes the students to activities and each semester exposes the students to activities of some 15 geologists and to the geologic data that they have presented. Furthermore, the seminar presentations heighten student awareness of the importance of good oral communication skills, and provides insight to the great variety of professional geologic activities.

## **Geology Moves into all of Thompson Hall**

In the early 1980's, both the Geology and the Geography Departments were feeling the need for additional space for their teaching and research activities. In addition, the Department of Geography expressed a desire for a more central location on campus. Therefore, in 1982, with the opening of Bluemont Hall, the Department of Geography was given permission to move into part of Dickens Hall, and Geology was given all of Thompson Hall. However, no state funds were made available for remodeling of space in Thompson Hall.

A major priority was to move the mass spectrometry laboratory to a new location that was larger and cleaner than the original laboratory in the basement. The new laboratory on the second floor, remodeled entirely with Departmental funds, was inaugurated in 1983. Additional space upstairs was made available for a conference room, an ore microscopy and economic geology laboratory, an addition to the library, and 5 faculty offices.

## **Distinguished Service Awards**

The Department of Geology and the College of Arts and Sciences have recognized seven geology graduates with Distinguished Service Awards. These outstanding geologists are:

- Gordon A. Lill - Associate Director of the U.S. National Ocean Survey (retired).
- Melville R. Mudge - Geologist with the U.S. Geological Survey (retired).
- Ernest Dobrovlny - Geologist with the U.S. Geological Survey (retired).
- John M. Parker - Geologist with Imperial Oil, Ltd., Standard Oil and Gas Co, Kirby Petroleum Co., and Northwest Exploration Co., and currently consulting geologist in Denver. President of the American Association of Petroleum Geologists, 1982-1983.
- John D. McNeal - Kansas Department of Transportation (retired).
- Carl M. Crumpton - Research Engineer with the Kansas Department of Transportation.
- William J. Barrett - Barrett Resources Corp., CEO
- Robert D. Cowdery - Petroleum Inc. (retired); President of the American Association of Petroleum Geologists, 1996-1997.
- Frank W. Wilson - Kansas Department of Transportation; Kansas Geological Survey (retired).

## **CHAPTER VI - TRYING TIMES FOR THE GEOLOGIC PROFESSION (1985-1988)**

The early 1980s were a very good time for geologists, and for Geology departments throughout the country. Enrollments were high and departments were expanding both staff and programs. In addition, the majority of students were directly entering professional careers in the oil and gas industry with bachelor's degrees. Geology curriculums were strengthened to include the courses students would need in their careers. KSU was no exception; by 1985, the Geology curriculum had only 3 elective hours and the geophysics curriculum had but 2.

When the power of OPEC to control the price and production of crude oil weakened in the mid-1980's, the price plummeted. Exploration and research by major oil and gas companies slowed dramatically, and many independent companies that had formed during the boom went out of business. Many young geologists lost their jobs and many experienced geologists were encouraged to take early retirement. Geology enrollments also declined markedly; although the "bulge" of students who had entered in the early 1980s continued until 1986 or 1987, the number of new students was so low that most of the majors were juniors or seniors. At KSU, the enrollment dropped from a high of about 180 majors in 1983 to a low of 11 majors in 1988. The challenge facing all Geology departments in the late 1980s was to respond to the changing opportunities for graduates and the changing needs of graduates, and to rebuild the confidence of potential students in Geology as a career choice.

At KSU, this challenge was met by revision of the undergraduate curricula, by increased interaction with science educators and with our colleagues in the College of Education, by increased interaction with our colleagues at the University of Kansas and the Kansas Geological Survey, and by strong emphasis on faculty and graduate student research as a means to enhance the Department's reputation and external support.

### **Staff Changes**

In 1985, both Henry Beck and Phil Walters retired, and Joe Graf became department head as Jim Underwood continued his research in Planetary Geology and teaching of Structural Geology and related courses. At the same time, the Agricultural Experiment Station decided to terminate its support of the one-half position in Geology that had partially supported Beck for 20 years. The Department was allowed only to hire one tenure-track faculty member to replace the two who retired. Charles G. (Jack) Oviatt (Ph.D., Utah) was added to the staff in 1985; his areas of expertise include Geomorphology, Quaternary Geology and Stratigraphy, and Field Geology. In 1987, Jim Underwood began a two-year assignment at NASA headquarters in Washington, D.C.; David A. McConnell (Ph.D., Texas A&M) was hired as his temporary replacement. In January, 1988, Peter R. Rose (Ph.D., Texas) joined the faculty as Visiting Distinguished Professor (see below). In June, 1988, Rich Busch resigned

from the Department to accept a joint museum/science-education position in Delaware. In October, 1988, the Department is beginning recruitment of a stratigrapher to replace Busch, and a joint appointment in Geology and education (see below).

### **Curriculum Revisions**

In response to the very low numbers of majors in the late 1980's and to the changing needs of those majors, the Department modified the undergraduate programs in 1988. Faculty recognized that graduates needed a more individually-planned curriculum, because individual students may desire preparation for any number of career options, including oil and gas, ground water, engineering Geology, environmental Geology, graduate school, or even combinations of Geology with non-scientific fields. It became clear that a more flexible curriculum with many more free electives had to be developed, and that individual advising would have to become much more important. The proposed new curricula removed many of the Geology courses added to the required package during the previous 10 years and some supporting science courses in order to generate 28 elective hours in Geology. The Geophysics curriculum was changed by requiring the same basic Geology courses as the Geology curriculum and eliminating some courses to generate 8 hours of electives. Copies of the new curricula are attached as Appendix II.

### **Interactions with Science Education**

Starting in 1985, the Geology Department increased its interactions with the College of Education and the newly formed KSU Center for Science Education. A major reason for this was to elevate the teaching of Earth Science at the K-12 level in Kansas so that more potential students would be exposed to the excitement of the field and possibly opt to major in geological education. Joe Graf, Jim Underwood, and later Rich Busch participated in a number of activities with teachers and science educators. In 1986, Dr. Larry Enochs of the Department of Curriculum and Instruction, an expert in Earth Science Education, was appointed an ancillary member of the Department. During the 1987-88 academic year, Rich Busch was assigned 0.2 time to the Center for Science Education; one result was an NSF grant to help teachers use field activities in the teaching of Earth Science. In the summer of 1988, the Geology Department proposed to the Colleges of Arts and Sciences and Education that the half-position in Geology be combined with funds from the College of Education to support a joint appointment in Geology and Earth Science Education for an individual who will work on the NSF grant and assist Geology with service teaching.

### **Interactions with the University of Kansas and the Kansas Geological Survey**

In the early 1980s, discussions began between Jim Underwood and Ernest Angino, then Chair of the KU Geology Department, about a possible cooperative Ph.D. program patterned after the one that exists between the KSU and KU departments of Computer Science. Gradual acceptance of the concept evolved both at KSU and KU, and in 1986, Joe Graf and Tony Walton, Chair of Geology at KU, prepared a proposal for participation of KSU Geology

faculty in the doctoral program in Geology at KU. This proposal was accepted by both departments and the College of Liberal Arts and Sciences at KU, and by the KSU and KU Graduate Schools. The KU-KSU cooperative Ph.D. program in Geology became a reality in 1989. Other interactions at KU included the naming of Dr. Hans-Peter Schultze and Dr. Larry Martin, both of the Department of Systematics and Ecology and the Museum of Natural History, as adjunct faculty in the KSU Geology Department.

The Kansas Geological Survey has supported faculty and student research at KSU for a number of years. In 1987-88, this support became more formalized through a departmental proposal system, and Dr. W. Lynn Watney and Dr. Chris Maples of the Survey were named adjunct faculty members in the Department.

### **Visiting Distinguished Professorship**

A Distinguished Professorship development program was begun in late 1981 by Jim Underwood with support from the Advisory Council, the late Clarence Brehm, and a number of others. The goal of the program was to establish a \$300,000 endowment, the interest from which would be added to a budgeted faculty salary to support a visiting position for a geologist or geophysicist who has been successful in the development of the energy resources. By 1987, the Fund had almost reached the goal; however, the university was not able to provide the Department with an additional faculty line for the professorship. Fortunately, in 1987, Jim Underwood received a two-year appointment from NASA, freeing up a portion of his salary, which combined with the half position still in the Department and earnings from the Foundation Fund, provided sufficient support for the Professorship. The decision was made to begin a search for an appropriate individual to start in January, 1988. As a result of the search, Dr. Pete Rose was appointed Visiting Distinguished Professor for the Spring semester of 1988 and the 1988-89 academic year.

A number of short courses also have been supported by the Distinguished Professorship Fund: (1) Petroleum Exploration Geochemistry, Dr. Colin Barker, (2) Seismic Stratigraphy, Dr. Richard Sherif, (3) Carbonate Petrology, Dr. Clyde H. Moore, (4) Tectonics in Petroleum Exploration, Dr. James Lowell, (5) Sequence Stratigraphy, Dr. Robert Weimer, and (6) Geothermal Principles, Dr. Andrea Förster.

### **New Foundation Funds**

Two important new funds were established in 1985 and 1986. Upon his retirement, and in recognition of his long association with Field Camp, the Henry Beck Fund was established (with initial donors being from the first group to attend the Beulah camp) to assist student field activities, including field camp and field trips. In 1986, the Geology Advisory Council, wishing to honor Lou Riseman and Phil Walters, endowed the Walters/Riseman Fund, the purpose of which is to provide general support to the Department's activities. [

## **Activities Honoring Benjamin F. Mudge**

Soon after Geology moved into all of Thompson Hall, Mrs. Laureda Bunker, Melville R. Mudge, and Dr. Melville Thompson, all great grandchildren of Benjamin F. Mudge and KSU graduates, expressed an interest in remodeling and refurnishing the conference room (T 208) and naming it in honor of B. F. Mudge. Following the completion of the project in 1987, the same individuals endowed the Mudge/Thompson Scholarship to provide financial assistance to graduate or undergraduate students in the Department.

## **CONCLUSION**

Similar to the history of other academic disciplines at Kansas State University, the history of Geology has been strongly influenced by KSU's role as a Land Grant Institution. Geology's early incorporation within the agricultural degree program led to its later administrative position within Biology and later within Zoology, an association that continued until the Department of Geology and Geography was established in 1946. In retrospect, had Geology become a separate department in the late 1920's or early mid-1930's, it might have developed and flourished as did the other physical sciences, and acquired a doctoral program sometime prior to the 1940's or soon after World War II.

The Department of Geology has been known for its high-quality teaching, which developed as a result of its early roles as a service department to agriculture and later engineering, and its instrumental role in the development of the Man's Physical World course. Without sacrificing that tradition, the Department began a path toward research excellence, first in the area of geochemistry, and later in the area of paleobiology and stratigraphy. This emphasis continues.

As the Department enters the last years of the 20th century, the long-term increase in consumption of energy, mineral, and water resources and the need for geologic information to solve engineering and environmental problems will insure a bright future for the science and profession of Geology. The challenge to the KSU Department of Geology will be to continue to provide sound, basic geologic education to young men and women so that they can play decisive roles in this exciting and challenging future.

*Professor Chelikowsky's history encompasses the first 122 years of geology at K-State. In the sections below, we try to cover as much as we know about the most recent 30 years, from 1988 to 2018. Our knowledge is incomplete, so if anyone reading this report can supply additional information, please let us know, so we can continue to update the history. Thanks!*

Pamela Kempton, September 2018

## **HISTORY OF THE LAST 30 YEARS...**

### **CHAPTER VII – CONTINUING ON, FROM 1988 TO 2007**

#### **Changes in Faculty (1988-2007)**

With the retirement of Rich Busch in 1988, the department recruited Allen Archer in 1989 to fill the sedimentology / stratigraphy position. Also joining the department that year was William Maury Harris (Earth science education). The following year saw the arrival of Keith Miller as a post-doctoral research associate working with Ron West.

In 1995, Jack Oviatt replaced Joseph Graf as Head of Department and Keith Miller transitioned from his post-doctoral position to a teaching role as a Research Assistant Professor. The following year Mary Hubbard replaced James Underwood as the department's structural geologist. In 1999 Steve Gao joined the Department of Geology as the first geophysicist in department history, and Dr. Kelly Liu joined the Geology faculty two years later as only the second tenure-track geophysicist in the Department of Geology since its founding in 1946.

Jack Oviatt stepped down as Department Head in 2001 and was replaced by Mary Hubbard. Around the same time, a hiring freeze that had prevented the department from filling an open petrologist position was lifted, and the department recruited Kirsten Nicolaysen, who took up the position in 2003. Mike Brady filled the Distinguished Professor of Petroleum Geology chair the same year. Two years later, in 2005, Iris Totten was appointed to an Earth science education position and Dr. Matthew Totten became the department's petroleum geologist.

In 2006, Kirsten Nicolaysen, Steve Gao and Kelly Lieu left the department to move to other positions and Bob Cullers officially retired. Mary Hubbard stepped down as Department Head in 2007 to become Dean of the College of Science at Utah State University, and George Clark was appointed as interim Department Head.

#### **Increasing (and Decreasing) Enrollments and Regents Review, 1990s**

Numbers of geology students peaked in the early 1980's with about 180 majors, but by the end of the decade enrollment was down to just 11 students (in 1989). During the early

1990s undergraduate majors increased to around 40, although introductory geology classes were filled to capacity, serving over 1700 students per year. To encourage enrollment, George Clark revised the introductory labs and large lecture sections to make them more relevant to students from other disciplines. Plans were made to introduce an undergraduate program in natural resources and environmental science.

The university at the time was struggling with strong enrollments and weak budgets, and the entire Regents system was undergoing a massive review of all programs. One of the goals of the review was to streamline the system by focusing investment on “priority” programs and reducing, combining or eliminating others. The strong enrollments in introductory Geology courses were viewed positively by the review and the Geology Department was able to remain an independent department.

### **Crumbling Classroom Initiative Used to Update Classrooms**

In the late 90’s, the state provided funding to remodel classrooms and improve Thompson Hall. Department classrooms, including 201 (Computer lab/classroom) and 216 (Petrology lab/classroom, along with university classrooms 101 and 213, were repainted and installed with computers, projectors and technology equipment that allowed instructors to improve content of their courses. Faculty could provide PowerPoint presentations and show video clips during lectures to emphasize course content. An elevator was also added to the building.

### **Dedication of the Wilma and Henry Bayer Memorial Geology Plaza**

The Dedication of the Wilma and Henry Bayer Memorial Geology Plaza occurred on July 5, 1997. The plaza was constructed on the south side of Thompson Hall in memory of Alumni Wilma and Henry Bayer, who graduated in 1916. The construction of the plaza was done by Bayer Stone Company. Children of Wilma and Henry Bayer include Winifred Bayer Miller, Warren Bayer, Burke Bayer President of Bayer Construction Company, Margaret Bayer Grimm (deceased), Diane Bayer Erbe, and Max Bayer President Bayer Stone Company.

### **New Foundation Accounts**

Over 25 new Foundation accounts were established by generous donors in the 1990s and early 2000s, most of them providing valuable scholarships for undergraduate and graduate students. Paul Nelson (B.S. ’50; M.S. ’52) established the Danheim Nelson Equipment Fund and the Danheim Nelson Scholarship Fund to provide financial aid to undergraduates and graduate students interested in field mapping and/or laboratory investigation of linear pattern geology. In 1997, the Page C. Twiss Graduate Fellowship was endowed to assist a graduate student in geology. The John L. and Marilyn A. Johnson Hern Geology Scholarship was established by the Hern Family Partnership from Houston, Texas, to provide financial assistance to a Geology major, with preference given to students who have graduated from high schools in Reno County, Kansas. The Neil A. Wendling Memorial Scholarship was

endowed by Nancy Wendling of Houston, Texas, to provide financial assistance to a Geology major who has demonstrated growth and development in the Geology profession. The William J. Barrett Fund for Excellence in Geology was established to assist students with an interest in petroleum geology. The Gale R. and Linda M. Yarrow Graduate Student Fellowship was endowed to provide support for married students with dependents. Other scholarship funds include: the Anita C. Lehner Geology Scholarship, the Ronald D. Schulz Memorial Scholarship, the Ivy Fuller Olds Geology Scholarship, The Arthur B. Sperry Memorial Scholarship Fund, the Topeka Gem & Mineral Society, Inc. Scholarship, the Robert J. Dietterich Memorial Scholarship in Geology, and the Petroleum Geology Scholarship. Excellence funds established to provide financial assistance to the Geology Department more generally include: the H.E. Mathy Geology Endowment, the Richard and Carolyn Roby Unrestricted Geology Departmental Support Fund, the Geology Department Fund, the David Tim Havley Department of Geology Discretionary Fund, the Calvin D. and Armistice L. Albert Fund for Excellence in Geology, the Harold A. Brown Discretionary Fund in Geology and the Geology Advisory Council account. With state contributions to the funding of higher education declining year on year (see below), these discretionary funds have been critical to the financial well-being of the department in recent years.

Cognizant of the significant declines in student enrollment, and the decline in the energy sector over the second half of the 1980s more generally, the advisory council established the Geology Distinguished Professorship in 1990 to strengthen the petroleum geology group within the department.

### **Coombs Award for Effective Teaching in Geology**

Bruce Coombs (B.S. '46; M.S. '48") created the Bruce and Connie Coombs Award for Effective Teaching in Geology. Bruce's contributions to the Foundation provided \$5,000 each year for the award, which was presented to a geology faculty member and used to enhance teaching in the department. The first award was in 1999 to Monica Clement (1999), Mary S. Hubbard (2000), George Clark (2001), Sambhudas Chaudhuri (2002), Kristen P. Nicolaysen (2003), Allen Archer (2004), Sambhudas Chaudhuri (2005), Matthew W. Totten (2006-2007).

### **GEOFIT Workshop**

In summer 2002 teachers from nine eastern Kansas schools participated in the first GEOFIT Workshop, hosted by the geology department. Dr. Jack Oviatt, Dr. Steve Gao, Dr. Kelly Liu, and Monica Clement collaborated to provide the middle school and high school science teachers with geology and geophysics field experiences. GEOFIT (Geoscience Field Investigations for Teachers) was sponsored by the Kansas Collaborative for Excellence in Teacher Preparation (KCETP) and was a mutual project involving our department, the College of Education and the Center for Science Education. Some of the geological equipment used by the participants was purchased through a NSF "Equipment for Undergraduate Field Geophysics Courses" grant. The goal was to provide teachers with

geoscience field and lab experiences that could then be transferred into appropriate activities for middle and high school science students.

### **Geology Department Invites Students Displaced by Hurricane Katrina**

The Totten family relocated from New Orleans to Manhattan in August 2005 just weeks before Hurricane Katrina hit New Orleans. Dr. Iris Totten filled the earth science education position and Dr. Matthew Totten filled a petroleum geology position. In late August Hurricane Katrina hit New Orleans putting a stop to classes that semester. The Totten's and Marry Hubbard extended a sincere welcome to students displaced by the hurricane. Six graduate students and two undergraduate students accepted the offer, joining the Geology Department. Over the next two years all eight students graduated from the department.

### **Recognizing Our Alumni**

William J. (Bill) Barrett (B.S. '56; M.S. '58) received the Distinguished Service Award from the College of Arts and Sciences at KSU in 1992. Bill is a member of the Geology Advisory Council and has been a member of the KSU President's Club. Bill is well known for two major discoveries, the Hilite Oil field and the Madden Gas Field, both in Wyoming. He ultimately created Barrett Energy Company, which merged with Plains Petroleum to create the sixth largest natural gas operator/producer in the giant Hugoton Gas Field in southwest Kansas. Barrett Resources Corporation was later sold to Williams Companies for \$2.8 billion. Bill remained active in the industry until 2007, when he retired (for the third and final time) at age 78. He has been a generous supporter of the Geology department at K-State through the William J. Barrett Fund for Excellence in Geology. His philanthropy was recognized in 2012 when the AAPG presented him with the L. Austin Weeks Medal.

## **CHAPTER VIII – WEATHERING AN ECONOMIC DOWNTURN**

### **Faculty Changes 2007-2013**

In 2007, Matthew Brueseke joined the department to fill the vacant petrology position created by the departure of Kristan Nicolaysen. Dr. Brueseke now teaches Mineralogy, Economic Geology and frequently leads our Regional Geology Field Trip. The latter usually occurs over the summer and is intended to introduce students to geology not available in Kansas. The most recent trips have been to Big Bend, TX, and Yellowstone, WY. Matt's research is field-oriented and focusses on how magmas form and erupt. He and his students are currently working on a study of subduction processes in the Wrangells of Alaska, funded by the National Science Foundation.

Dr. Joel Spencer also joined the department in 2007, developing a lab for Optically Stimulated Luminescence (OSL) geochronology. The OSL lab was completed in spring 2008 and is one of the few OSL labs operating in the United States. Dr. Spencer's research ranges

from the geochronology of fault movement along the San Andreas to the stratigraphy of attic dust, all based on the OSL methodology. He teaches Geomorphology and Field Methods.

Dr. Abdelmonean Raef and Dr. Saugata Datta joined the Geology Department in 2008. Dr. Datta teaches courses in hydrogeology, low temperature geochemistry and water resources. His research focuses on studies on trace elements and oxyanion migration and contamination in the environment including groundwater, urban air particulates, subway microenvironments and unproductive soil environments using hydrological and geochemical tools, including synchrotron spectroscopy. Saugata has won numerous grants from NSF, NASA, DoE, and other funders.

Dr. Raef teaches courses on geophysics, seismic data processing and seismic analysis. His research interests focus on 3D and 4D seismic studies of CO<sub>2</sub> injection for enhanced oil recovery and carbon sequestration, non-invasive location of fractures in highway foundations, and the use of geophysical tools in forensic geology. Both Dr. Raef and Dr. Datta established new research labs in the basement of Thompson Hall to support their teaching and research activities.

Sabreen Gad and Raad Al-Ani were recruited as Teaching Assistant Professors in 2010 and 2011, respectively, to teach Earth in Action (GEOL 100) and Earth through Time (GEOL 102).

In 2012, the department recruited biogeochemist Dr. Matthew Kirk in order to expand departmental expertise into this growing disciplinary area. Dr. Kirk added a new geomicrobiology laboratory to the department in 2013 and has since been carrying out research in geomicrobiology and hydrogeology on issues such as the impact of agricultural contamination on the groundwater of the High Plains aquifer, controls on arsenic mobility in groundwater and factors that influence biological formation of natural gas in unconventional reservoirs. Dr. Kirk was recently successful in winning an NSF grant to work on biogeochemical drivers of interspecies electron transfer from Fe reducers to methanogens.

### **New Scholarships and Departmental Support**

Two new scholarship funds were established between 2007 and 2013. The Hydrogeology Scholarship – Bill Johnson '56 was established to honor the geological profession, with a particular focus on students interested in the study of groundwater. The Gary and Kathie Sandlin Geology Scholarship was established to provide financial support for graduate students in geology. For nearly ten years, Chesapeake Energy provided generous support for two graduate students per year who had an interest in petroleum Geology. In 2016, when the funds available from Chesapeake were insufficient to support the two students stipulated by the Memorandum of Understanding for the fund, Troy Johnson (KSU B.S. 2001) provided additional funds to continue this support for another year. Other industrial support for students came from The Haliburton Geology Scholarship (2011-2013)

## **The Paul and Deana Strunk Geology Fellowship**

For over ten years, from 2008 to 2018, the Paul and Deana Strunk Geology Fellowship has provided generous support for over 100 students. Paul was well known for his philanthropy and was awarded the AAPG Foundation's L. Austin Weeks Memorial Medal. In addition to his support through the Fellowship fund, Paul made generous contributions to the Geoscience Building Fund and provided co-funding for the department's new X-ray diffractometer. Through these and other efforts Paul and Deana Strunk have provided valuable educational opportunities to an entire generation of geoscientists.

## **Recognizing Our Alumni**

In 2012 Chris Steincamp (B.S. 1989) received the Alumni Merit Award for distinguished service to the university and his public engagement with numerous agencies during his career in the legal profession. Chris is an active member of the Geology Alumni Advisory Council, serving as past president. He has also been a member of the Dean's Council for the College of Arts and Sciences at Kansas State University. He is managing partner at Depew Gillen Rathbun & McInteer L.C. in Wichita. Among his many accomplishments he has authored the environmental law chapter of the Kansas Annual Survey of Law for 15 years and is one of the authors of the Kansas Bar Association Environmental Handbook.

## **CHAPTER IX – A TIME OF CHANGE**

### **Faculty Changes 2013 - 2018**

The period from 2013 – 2018 has been a time of significant staff turnover. In 2013, Pamela Kempton, an igneous petrologist and isotope geochemist, was recruited as the new Head of the Geology Department, replacing George Clark as interim Head. Pamela had previously spent nearly 30 years in the U.K., first as a research scientist at the NERC Isotope Geosciences Laboratory and later as Head of Research and Interim Director of Science at the Natural Environment Research Council.

In 2014 and 2015, several long-serving faculty members retired. Charles "Jack" Oviatt retired in 2014 after nearly 30 years of service to the department, including six years as Department Head; George Clark retired in May 2015 after 38 years of service, also including six years as Department Head; and Al Archer retired in 2015 after more than 26 years with the department. Raad Al-Ani left the department in 2015 to return to Oman to take up a position at the German University of Technology in Muscat

Geology was given permission to hire four new faculty members over the following two years to fill the vacant positions. Brice Lacroix joined the department in October of 2015 as a structural geologist with expertise in fault zones and structural controls on ore deposits. Karin Goldberg, whose research focuses on sedimentology, petroleum geology, and

paleoclimatology, joined the department in 2016 to expand the petroleum geology group. Claudia Adam, a solid Earth geophysicist, was recruited to broaden the department's expertise in geophysics and to include research that links surface observations with deep mantle processes. The department also hired Dr. Aida Farough as a Teaching Assistant Professor and undergraduate advisor. Her research focuses on modelling of fluid flow and heat transfer to seafloor hydrothermal systems at mid ocean ridges.

Two other long-serving faculty members retired in 2017. Professor Sambhudas Chaudhuri, who joined the Geology Department in the Fall of 1966, retired after nearly 52 years of service. Throughout that time, he taught introductory geology, environmental geology, introductory geochemistry, sedimentary geochemistry, clay mineralogy and isotope geology. We estimate that in his 52 years with K-State, Sam taught well over 15,000 students! The quality of his teaching and his devotion to his students were recognized in 1994 with a Stamey Teaching Award from the College of Arts and Sciences.

Keith Miller retired in May 2017 after 27 years at K-State. Keith actively promoted public science literacy and worked to counter the widespread public skepticism of science in general, but particularly geologic and climate science.

In spite of a compounding set of budget cuts (see below), the department was allowed to recruit a new faculty member to fill the vacancy created by Sam Chaudhuri's retirement, and Dr. Behzad Ghanbarian joined the Geology Department as an Assistant Professor of Engineering Geology in the fall of 2017. His research focusses on modelling fluid flow and solute transport in heterogeneous porous rocks, fracture networks, oils and sediments.

Over this same period the department also benefited from the recruitment of several post-doctoral research assistants. Janet Paper joined the department in 2014 to work with Matt Kirk for a year on the biogeochemical controls on microbial iron and sulfate reduction. In summer of 2016, Sara Vero joined the Critical Zone project, *Seeding Growth of a Critical Zone Observatory for Water Research in Kansas* funded through a grant to Kempton, Kirk and Datta. Arash Kamari was hired in 2017 to enhance the petroleum geology research group, working on linking rock physical properties to seismic data to enhance exploration in unconventional reservoirs. His position is funded through the generosity of the Advisory Council and the Distinguished Geology Professorship Foundation Account. Dr. Harshad Kulkarni joined the department in 2018, working part time as a post-doctoral researcher with Saugata Datta and part time as an instructor of introductory geology.

### **Crumbling Infrastructure**

Thompson Hall was built in 1922 for instruction in institutional management and once served as the campus cafeteria. The building was last renovated in 1954 when Geology and Geography were co-located there after Home Economics and the cafeteria moved to Justin Hall and the Student Union, respectively. A few department and university classrooms (Rooms 201, 216, 101 and 213) were provided with a facelift in the late 1990s, when these

rooms were repainted and installed with computers, projectors and technology equipment. In 2011, thanks to the generosity of alumni, particularly George R. Jones ('48), the Geology Teaching Lab Renovation Fund was established, which resulted in a complete refurbishment of the department geochemistry teaching facility. University funding has also helped to make specific repairs to individual faculty labs and offices. However, the building as a whole has not seen significant investment for over 60 years. As a result, K-State Geology lags behind peer institutions in terms of access to modern facilities and equipment for teaching and research. Its location on the southern margin of campus, physically distant from the other STEM disciplines, is a significant barrier to collaborative teaching and research and diminishes the educational experiences of our students. The consequences are significant. With insufficient state-of-the-art classrooms, offices, laboratories and equipment for research and training, we risk becoming uncompetitive in our ability to recruit the brightest and best students, our students become less competitive in the job market, and our faculty are hindered in their ability to obtain external funding through extramural grants and awards. In an effort to raise funds for a new geoscience facility, the Geoscience Building Fund was opened in 2014. The total cost of the building is estimated at \$35 million. As a contribution toward this goal, the university is trying to raise \$10 million through private philanthropic gifts. Including both gifts and commitments, we are approximately 20% toward our goal.

### **Growth of Online Learning**

K-State has been experimenting with distance education for over 50 years, but within the last 15-20 years the centrality of this mode of delivery has increased dramatically. In 2017, over 10,000 students took at least one course through K-State Global Campus. Geology became involved in online teaching in the early 2000s, when Al Archer began offering GEOL 102 (Earth through Time) in this format. At the time, the financial model for teaching online returned the majority of the proceeds directly to departments to be allocated as salary and to cover other departmental expenses. George Clark recognized this as an opportunity to compensate for the progressive decline in state funding to higher education and the consequent reduction in departmental budgets. As a result, departments like Geology have increasingly relied on online teaching as a source of income to remain solvent, with the number of course sections offered online increasing markedly. In 2018, Geology offered 19 sections of 100-level courses throughout the year (i.e. GEOL 100 – Earth in Action, 102 – Earth through Time, 103 – Intro Geology Lab, 115 – Environmental Geology, 125 – Natural Disasters), along with three upper-level courses (GEOL 510 – Geology of Planets, GEOL 740 – Regional Geology). GEOL 315 (Geology of National Parks) is the latest addition to our list of online courses, offered for the first time in Summer 2017 by Sabreen Gad. The drivers of this change in mode of course delivery may be partly financial, but more importantly it reflects a change in student preference. In summer 2018, for example, the face-to-face section of GEOL 125 was cancelled in favor of an online offering. Enrollment increased from just 10 students to over 30.

Beginning in FY19, the university will operate under a new budget model. In this new

budget model, Global Campus as a source of revenue for the departments will no longer be available—all Global Campus earnings will be returned centrally and then distributed along with other forms of tuition according to a formula. We do not yet know the details of allocations at a department level, but loss of this income is a significant concern at this time.

### **Course and Curriculum Changes (2013-2018)**

In 2014, the department developed a new vision and strategy focused on three broad research areas: Energy and Mineral Resources, Earth Surface Processes, and Evolution of the Solid Earth. As part of the strategy development, the department conducted an external undergraduate curriculum review. Among other recommendations, the review advised that the department should reduce the number of required courses and increase flexibility within the curriculum for students to tailor their degree to better reflect their areas of interest. As a result, the faculty identified a set of nine core courses (Earth in Action, Earth through Time, Intro Geology Lab, Mineralogy, Petrology, Structural Geology, Sedimentation and Stratigraphy, Field Methods and Field Camp). Students were then allowed to select their remaining electives from three groups:

#### **Group I**

- GEOL 605 - Intro to Geochemistry
- GEOL 640 - Intro to Geophysics

#### **Group II (Energy and Natural resources)**

- GEOL 702 – Economic Geology
- GEOL 730 – Petroleum Geology
- GEOL 743 – Seismic Data Interpretation

#### **Group III (Surficial Processes & the environment)**

- GEOL 520 – Geomorphology
- GEOL 611 – Hydrogeology
- GEOL 650 - Geomicrobiology

While the revised curriculum has served the department well over the past four years, enrollments have declined, dropping from nearly 80 majors in 2015 to about 45 in 2018. The university as a whole has witnessed a significant decline in enrollment over the same time period, so the decline in numbers of majors is not attributed to the curriculum changes. Nonetheless, Geology faculty decided that further revision to the curriculum might aid in student recruitment and retention; in particular, through introduction of specific disciplinary tracks that are more explicitly linked to potential career pathways. Therefore, a proposal has been submitted to the university to develop tracks in Petroleum Geosciences and Environmental Geosciences, as well as retain the current curriculum as a core Geology track.

The breadth of the graduate program, in terms of course offerings, has also expanded significantly over the years. Although we haven't been able to find detailed information about when particular courses were introduced (or sunset), the number of graduate course

available has expanded from 5 in 1968 to 13 in 1972 to 18 in 2018. Most recent additions include Biogeochemical Modelling, Engineering Geology, Economic Geology, and Introduction to MatLab. Courses that had previously been offered as a problems-based course (i.e. GEOL 790) have been established with their own course numbers as well, e.g. Formation Evaluation (GEOL 738), Fossil Fuel Sedimentology (GEOL 735), and Advanced Petroleum Geology (GEOL 835). Advanced Igneous and Metamorphic Petrology (GEOL 805) has been revised, expanded from 2 to 3 credit hours, and offered again for the first time in 2016 after having been moth-balled for many years.

### Initiative on Increasing Diversity in STEM

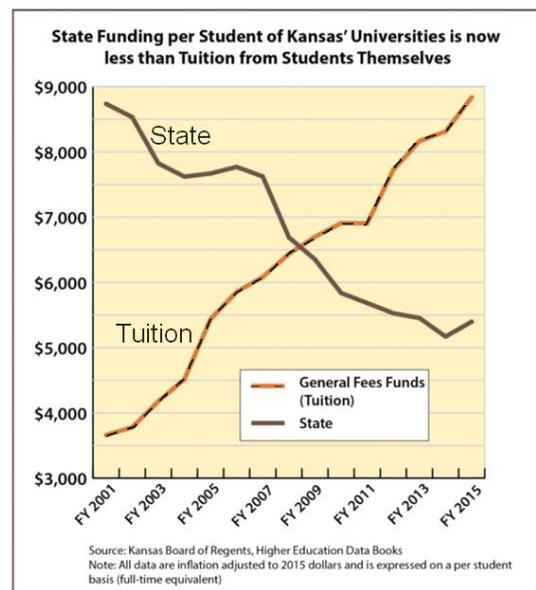
Matthew Kirk participated in the Kansas Louis Stokes Alliance for Minority Participation (KS-LSAMP) summer research immersion program in 2014. Matt mentored KS-LSAMP students through the field work and lab analyses necessary to understand controls on water quality in urban and rural researches of Wildcat Creek. The research experience helped the students gain confidence and skills in science that will improve their chances of success in the future.

### Training of STEM Teachers in High-Needs School Districts

Matt Brueseke contributed to the training of STEM teachers for high-needs school districts. K-State Geology partnered with the NSF-funded Robert Noyce scholarship program via a multi-year grant, the K-State Teach Program. The program aimed to increase the number of well-trained STEM teachers in high-needs school districts (2014).

### Increased Dependence on Grant Funding and Support of Donors

Just as students have been asked to bear an increasing proportion of the cost of higher education with the withdrawal of state funding (figure below), universities and university departments have become increasingly dependent on research grants and charitable donations from industry and alumni in order to provide high-quality programs that attract and retain good students and faculty. Geology faculty have invested heavily in efforts to obtain grant funding from a variety of sources in order to sustain and grow the department and for faculty to fund their research and that of their students. These funds have been essential in allowing the department to stay up to date with new technological advances in geology and for students and faculty to stay up to date on the latest research in their field. Donors have provided scholarships that help students cover the ever-increasing cost of



higher education (figure above) as well as provide funds to purchase instructional and research equipment. In 2008 the Geology Department brought in \$50,000 external funds. By 2011, that number had increased to \$500,000. Grant successes over the past five years have continued that upward trend and include the following:

- Matt Kirk –*Biogeochemical drivers of inter-species electron transfer from iron reducers to methanogens*
- Matt Brueseke, KSU small research grant *Rare Earth Element Economic Potential of Pilot Knob, a Pliocene(?) Alkaline Intrusive Complex in the Greater Yellowstone Region, Northwestern Wyoming*
- Pamela Kempton, Saugata Datta, Matt Brueseke., University Large Equipment Grant, providing 50% co-funding for new X-ray diffractometer (co-funded by a donation from Paul Strunk)
- Matt Kirk, *Field study of fundamental controls on methane formation in a coalbed methane reservoir*. American Chemical Society
- Pamela Kempton and Saugata Datta, KSU College International Advisory Council International Incentive Grant, *Support for International Workshop: Benefits of bringing the Critical Zone Observatory Paradigm to Konza LTER Research*
- Matt Kirk, NSF EPSCoR proposal *Experimental and Modeling Analysis of CO<sub>2</sub> as a Control on Microbial Activity in Anoxic Environments* Kansas EPSCoR – New Awards in Climate and Energy
- Matt Brueseke, collaborative research grant from the National Science Foundation for *Geological constraints on ~25 Million years of magmatism along an arc-transform junction, Wrangell Volcanic Belt, Alaska*
- Saugata Datta, National Synchrotron Light Source , Brookhaven and Stanford Synchrotron Research Lab, Stanford grant funding analytical work on surface adsorption and complexation mechanism studies for metals and metalloids
- Charles (Jack) Oviatt, emeritus faculty, collaborative research grant from the National Science Foundation for *New Constraints on the Geodynamics of Lake Bonneville*
- Joel Spencer and colleagues from Turkey, research funding from Tübitak (Scientific and Technological Research Council of Turkey)/Dokuz Eylül University, Izmir, Turkey for Active tectonics of southern margin of eastern Black Sea basin in the light of tectonic geomorphology and dating of marine terraces
- Matt Brueseke, Federal Railroad Administration grant for *Field Investigation of Concrete Tie Abrasion Wear Prevalence and Contributing Environmental Factors*
- Joel Spencer, *Dating of Attic Dust at an Abandoned Mine in Central USA*
- Brice Lacroix and Pamela Kempton, K-State College of Arts and Sciences large equipment funds for a new Raman spectrometer
- Pamela Kempton, Saugata Datta, Matt Kirk, K-State, Water Seed Grant Program: *Seeding growth of a critical zone observatory for water research in Kansas*
- Matt Brueseke, National Science Foundation REU Supplement, Collaborative Research: *Geological constraints on ~25 Million years of magmatism along an arc-transform junction, Wrangell Volcanic Belt, Alaska*
- Saugata Datta, National Science Foundation, Collaborative Research: *Chemical Hydrogeologic*

*Investigations of Tungsten: Field, Laboratory, and Modeling Studies of an Emerging Environmental Contaminant*

- Saugata Datta, US Department of Energy, *Small Scale Field Test Demonstrating CO2 Sequestration in Arbuckle Saline Aquifer and by CO2-EOR at Wellington Field, Sumner County, Kansas* US Department of Energy.
- Saugata Datta, U.S. Department of Energy. *Western Annex Modelling CO2 –with regional geochemical interpretation-Comparison of two sites in Kansas.*
- Saugata Datta, U.S. Department of Energy Recovery Act: Site Characterization of Promising Geologic Formations for CO2 Storage FOA33. *Modeling CO2 Sequestration in Saline Aquifer and Depleted Oil Reservoir to Evaluate Regional CO2 Sequestration Potential of Ozark Plateau Aquifer System, South-Central Kansas.*
- Saugata Datta, US Department of Energy. *Prototyping and Testing a New Volumetric Curvature Tool for Modeling Reservoir Compartments and Leakage Pathways in the Arbuckle Saline Aquifer: Reducing Uncertainty in CO2 Storage and Permanence*, in Collaboration with Kansas Geological Survey and University of Kansas.
- Joel Spencer, TÜbitak (Scientific and Technological Research Council of Turkey)/Dokuz Eylül University, Izmir, Turkey: *Active tectonics of southern margin of eastern Black Sea basin in the light of tectonic geomorphology and dating of marine terrace*
- Joel Spencer, US Geological Survey: *Luminescence dating of marine terraces, northern California*
- Saugata Datta, Collaborative Research: *Chemical Hydrogeologic Investigations of Tungsten: Field, Laboratory, and Modeling Studies of an Emerging Environmental Contaminant.* National Science Foundation- Hydrology Division
- Joel Spencer, Cultural Heritage, Handicraft and Tourism Organization of Iran / University of Tabriz: *Saymarreh landslide and civilization*
- Sabreen Gad, Global Campus funding for development of GEOL 115 “Environmental Geology” as an online course
- Aida Farough, IODP post expedition research fund, Brother’s Volcano Expedition
- Joel Spencer, Kansas Geological Survey: *OSL dating studies of alluvial sediments, paleo-liquefaction features, and mammoth sites in Kansas*
- Aida Farough, Large instrument fund from the College of Arts & Sciences for ARsandbox
- Saugata Datta, National Aeronautics and Space Administration PSTAR [Planetary Science and Technology through Analog Research] *Biologic and Resource Analog Investigations in Low Light Environments (BRAILLE).*
- Matt Kirk, National Science Foundation RII Track-1NSF EPSCoR: Microbiomes of Aquatic, Plant and Soil Systems (MAPS) Mediating Sustainability: An Observational and Experimental Network across Kansas (\$20 million, \$2.65 million to KSU, Matt Kirk is one of the group leaders in the project team)
- Aida Farough, Open-alternative textbook fund for GEOL 103
- Joel Spencer, TÜbitak (Scientific and Technological Research Council of Turkey): *Investigation of the timing of historical earthquakes at the ancient cities of Knidos, Hierapolis, Tripolis, and Laodikeia, western Anatolia, using luminescence dating techniques*
- Joel Spencer, TÜbitak (Scientific and Technological Research Council of Turkey): *Investigation of anthropogenic pollution and beginning of anthropocene period in Black Sea coastal sediment cores*
- Joel Spencer, USGS-STATEMAP: Geologic mapping in Kansas FY17

## **New Foundation Accounts and Donations-in-Kind, 2013 - 2018**

Three new scholarship funds have been established since 2013. One, the Iris M. Totten Memorial Scholarship, is in honor of K-State Geology faculty member Iris Totten. The purpose of the scholarship is to recognize an outstanding geology major interested in the study of geoscience. The scholarship was awarded for the first time in 2015 to Sarah Lamm, a triple major in Geology, Geography and Chemistry. Sarah plans to continue her education as a graduate student studying planetary geology. The Charles and Helen Steincamp Geology Scholarship will be awarded for the first time in 2018 to Nina Atae, a graduate student working on methods of dating tectonically active fan conglomerates in California. In 2016, Newfield Exploration Company Excellence Fund provided generous support for two graduate students interested in the energy sector. Two Foundation accounts in support of faculty were also established: the Chaudhuri-Totten Energy Research Fund and the Dr. Page Twiss Faculty Fund in Geology.

In addition to charitable donations through the K-State Foundation, the Geology Department has benefited greatly in recent years from in-kind donations from industry. Donations of state-of-the-art software, data and equipment have helped our students to be at the cutting edge of their research. Some of the more recent donations include: a \$54 million contract award from Schlumberger to Matt Totten and Abdelmoneam Raef for PETREL, TECHLOG, PETROMOD, and GEOX software; OpendTect Seismic interpretation Software (\$28,000); and RokDoc Seismic interpretation and rock physics modeling software (\$50,000). Valuable data sets were donated by Woody Leel (3D seismic dataset from Australia) and Ken Walker, Stroke of Luck (3D seismic data).

In addition to data and software, in 2016 the department received donation of a 1000-channel seismic array from Paragon Geophysical of Wichita valued at over \$600,000. The array will support the research of Matt Totten and Abdelmoneam Raef into the relationships between reservoir properties in Kansas and their seismic expression. Acquisition of this system makes K-State the only university in the region to have this capability. The equipment will allow the team to acquire several miles of 2D data, or develop more focused 3D shoots. They will be able to design the collection of data specific to their research needs, as well as process and interpret the acquired data in new and novel geometries.

### **Recognizing our Alumni**

In 2014, Gary Sandlin ('55 BS Geology '57 MS Geology) was recognized by the university as a KSU Distinguished Alumni Fellow for his more than 50 years of service as a geologist in the oil industry. Upon receiving his BS degree from K-State, he worked for Dowell Inc. as a junior service engineer until 1956, when he returned to K-State as a graduate student. After earning his master's degree in geology in 1957, Sandlin worked as a geologist with Pubco Petroleum in Casper, Wyo. In 1959 he transferred to Albuquerque, N.M., to work as a

district geologist in the Mid-Continent and Denver Basin regions. In 1961, he was transferred to Denver, Colo., where he worked in the same capacity until 1965, when he began his career as an independent geologist. In 1977, Sandlin incorporated Sandlin Oil Corporation, of which he was owner and president until his death in 2017.

Troy Johnson (2001 KSU Geology B.S.) has been awarded the Eisenhower Circle Young Alumni Award for 2018 in honor of his generous donation of time, talent and money in support of K-State's Department of Geology. The award is sponsored by the Dean's Council, the President's Office and the K-State Alumni Association, and it recognizes alumni who have distinguished themselves in their careers. Fellows are chosen by each college to return as distinguished guests and as mentors, friends and counselors. Troy is currently Senior Staff Geologist for Chesapeake Energy Corporation. He has been an active member of the department's Advisory Council for many years and from October 2017 he has been chair elect of the Geology Department Advisory Council.

### **Faculty Recognition**

Charles (Jack) Oviatt, emeritus faculty, was elected a Geological Society of America Fellow in honor of his decades of exemplary published work on the stratigraphy, sedimentology, chronology, geomorphology and paleolimnology of Lake Bonneville.

Pamela Kempton received the 2016 James Madison University Department of Geology Distinguished Alumni Award and the 2017 James Madison University Alumni Association's College of Science and Mathematics Distinguished Alumni Award.

Saugata Datta was awarded a one year (2017-2018) endowed visiting chair position in the Departments of Geology & Geophysics at Texas A & M University, the Michel T Halbouty '30 Visiting Chair Professorship. The purpose of Halbouty Chair is to "promote excellence in the teaching and research of the Department of Geology and Geophysics at TAMU." Datta used the opportunity to expand into new research directions as well as develop new teaching methods that he could bring back with him to K-State.

### **Raising the Departmental Profile**

From June 18-20, 2015, the department hosted the 10<sup>th</sup> New World Luminescence Dating Workshop, a geochronology workshop, where some of the latest technique developments and specialist applications of luminescence dating in the fields of Quaternary geology and archaeology were discussed. Joel Spencer organized the workshop with the assistance of colleagues from the USGS-Denver and University of Nebraska-Lincoln, KU Anthropology, KSU Global Campus, and KSU department of geology students, staff, and faculty. Thirty-one delegates, comprising graduate students, postdocs, and faculty from geoscience, physics, and archaeology disciplines, attended the meeting from the U.S., Brazil, Germany, and

France; the majority of luminescence laboratories in the U.S. were represented.

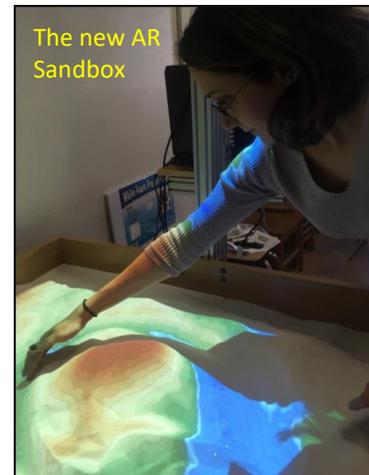
In 2019, K-State Geology will bring GSA to the Little Apple! This will be a first-of-its-kind triple meeting that involves not only south central GSA, but also north central and Rocky Mountain regions—three of the six GSA regions! Matt Kirk has been leading the effort, with help from other K-State Geology faculty: Joel Spencer, Matt Brueseke, Aida Farough and Saugata Datta.

### Progress in spite of Economic Challenges

The years from 2013 to 2018 have been a time of regular and increasing budget cuts (see table, right). In spite of financial challenges created by these severe reductions, the Geology Department has managed to make significant gains. Unlike most other departments across the university, faculty numbers have been maintained, one GTA position was added (making a total of 11), GTA stipends were increased, grant funding and research outputs have increased, and a number of equipment acquisitions were made and new facilities established, including:

	Budget Cut
<b>FY13-14</b>	1.20%
<b>FY14-15</b>	2.00%
<b>FY15-16</b>	2.21%
<b>FY16-17</b>	2.52%
<b>FY17-18</b>	4.48%

- *Panalytical Emperian X-Ray Diffractometer*
- *Digital inverted fluorescence microscope (EVOS)* for capturing multi-channel fluorescence images at high resolution.
- *Electrical resistivity and induced polarization system (SuperSting R1)* for near-surface environmental and engineering geophysical investigations.
- *Brüker Tracer III handheld XRF*, a portable instrument for analysis of major and trace elements for classroom and research use.
- *Zeiss reflected light petrographic microscope* for study of sedimentary organic matter or ore minerals in polished sections.
- *Student computer lab enhancements* through a rolling plan of annual upgrades
- Four new Leica DM750 P petrographic microscopes for student instruction
- *Gas chromatograph (Gow Mac 580 series)*
- *Ion chromatography system (Dionex ICS-1100)*
- *UV-Vis spectrophotometers Fluid inclusion analysis system*
- *Frantz Magnetic Separator*
- \$30,000 upgrade to Thompson Hall wireless system
- *AR Sandbox* for 3D visualization and creation of topographic models by shaping real sand, which is then



augmented in real time by an elevation color map projected onto the sand

- *Field Gamma Spectrometer* for teaching and research in areas such as core-logging, geochronology, geomorphology, and field techniques
- *Raman spectroscopy system* for the analysis of organic and mineral molecules present in gases, liquids or solids.
- *Total Organic Carbon Analyser-Shimadzu* (for both liquids and solids)



## CONCLUSIONS

In the conclusion to his history of the *Department of Geology at Kansas State University (1866-1988)*, Professor Chelikowsky predicted that “the need for geologic information to solve engineering and environmental problems will insure a bright future for the science and profession of Geology”. While I believe his prediction will hold true in the long term, Chelikowsky could not have foreseen the consequences of a major global economic downturn in world markets during the late 2000s and early 2010s. Although the economic crisis originated from the real estate markets, it obviously had a negative impact on oil companies and other geology-related industries, with large job losses and a slow return to pre-recession employment levels. According to data compiled by Houston-based consulting firm Graves & Co.<sup>1</sup>, by early 2017 the total number of oil and gas layoffs around the globe had reached over 440,000. Similarly, data from the American Geosciences Institute<sup>2</sup> indicate that hiring of recent graduates at graduation has been at its lowest in 5 years for all degree levels. This has created a challenging time for geoscience graduates and has had an obvious knock-on effect in terms of student enrollments in geology programs. Not only did many geologists change careers amid the economic downturn, but also many high school graduates scrapped their plans to pursue oil and gas-related degrees in higher education.

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[https://www.rigzone.com/news/oil\\_gas/a/148548/more\\_than\\_440000\\_global\\_oil\\_gas\\_jobs\\_lost\\_during\\_downturn/](https://www.rigzone.com/news/oil_gas/a/148548/more_than_440000_global_oil_gas_jobs_lost_during_downturn/)

<sup>2</sup> <https://www.americangeosciences.org/>

The good news is that, according to NES Global Talent<sup>3</sup>, 2018 will be the first year since 2014 in which there will be more new hires in oil and gas than layoffs. Furthermore, the *majority of geoscientists in the workforce (not just the energy sector) are within 15 years of retirement age and the number of younger employees is only half of the number of those approaching retirement*. The U.S. Bureau of Labor Statistics predicts that jobs in the geosciences will grow faster than average (10%) over the next 10 years, with median annual pay of nearly \$90,000<sup>4</sup>. Areas of environmental science are predicted to grow even faster (11-12%). As predicted retirements are realized, and job growth kicks in, there will be a significant shortfall of geological talent—which bodes well for the employment prospects of graduates.

Geoscience skills are essential to the future of society. Geologists are needed at every step of the energy cycle, from location of energy sources through to their safe reliable extraction, use and subsequent disposal or recycling of wastes. Geologists help meet the need for water through their understanding of water movement and aquifer behavior as well as identifying and mitigating water contamination. Climate change will drive the need for geoscientists to work on problems related to coastal erosion and water resources. Interest in carbon sequestration will produce employment for geoscientists (where and how sequestration will proceed, impacts on water resources, potential for induced seismicity). And, geoscientists will continue to play critical roles in hazard prediction.

The broad spectrum of geoscience-related challenges facing society means that there is likely to be a greater variety of career pathways for geoscience graduates in the future. In 2013 74% of graduates with a Master's degree went into the oil and gas sector, and 36% of graduates with a BS degree did the same. In 2017, only 28% of MS degree holders and 5% of BS degree holders secured employment in the energy sector. Instead, many graduates accepted jobs in state and federal government (34% of MS degrees and 18% of BS degrees vs 18% and 11%, respectively, in 2013) and the environmental sector (17% of MS degrees and 30% of BS degrees vs 4% and 21%, respectively, in 2013). 2017 has also seen the rise of new areas demanding geoscience expertise, such as information services (4%) and information technology (2%) .

So, all things considered, I suspect that Chelikowsky will turn out to be right in the long run: the future is bright for geoscientists!

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<sup>3</sup> <https://www.nesgt.com/>

<sup>4</sup> U.S. Bureau of labor statistics <http://www.bls.gov/ooh/life-physical-and-social-science/geoscientists.htm>

## APPENDIX I

### Chronological Listing of Geology and Geography Staff (Instructor or Higher)

Benjamin F. Mudge	Professor of Natural Science and Mathematics (taught Geology)	1866-1874
George H. Failyer	Professor of Chemistry and Mineralogy (taught Geology and Mineralogy)	1878-1897
William A. Kellerman	Professor and Head of Botany and Zoology (including Geology)	1883-1891
Edwin A. Popenoe	Professor and Head of Entomology and Zoology 1894 ( plus Geology)	1879-1907
Theophilus H. Sheffer	Member of Entomology-Zoology Staff (taught Geology)	1907-1910
Robert K. Nabours	Professor and Head of Dept. Zoology 1912 (taught Geology). Ph.D. University of Chicago 1911	1910-1921
Porter J. Newman	Staff member in Chemistry (taught Geology)	1917-1920
Arthur B. Sperry	First Professor of Geology 1927; First Department Head Geology and Geography 1946. B.S. University of Chicago 1920	1921-1953
Frank E. Byrne	Professor of Paleontology 1946. Ph.D. University of Chicago 1940	1930-1953
Joseph R. Chelikowsky	Professor of Structural and Regional Geology Head of Geology and Geography Department 1953-1968. Ph.D. Cornell University 1935	1937-1977
Karl Stacey	Professor of Economic Geology 1959. Ph.D. Clark University; 1955	1943-1974
Charles Harned	Instructor in Geology 1945. M.S. Kansas State University 1940	1945-1947

Louis Riseman	Assistant Professor of Mineralogy and Economic Geology 1946. M.S. Tufts College 1936	1946-1980
Oscar W. Tollefson	Associate Professor of Geomorphology 1954 Ph.D. University of Colorado 1954	1946-1954
Margaret H. Smith	Instructor in Geography 1946. M.A. University of North Carolina 1936; M.S. University of Chicago 1947, Ph.D. University of Texas, Austin 1957.	1946-1961
Sara C. Larson	Instructor in Geography 1946. Emeritus Instructor 1964 M.S. University of Chicago 1942.	1946-1964
Claude W. Matthews	Instructor in Geology 1947. M.S. Kansas State University 1949	1947-1949
Henry V. Beck	Professor of Geomorphology, Ground Water and Pleistocene Geology 1961. Ph.D. University of Kansas 1955	1947-1985
Huber Self	Assistant Professor of Physical Geography and Kansas Geography 1947 M.S. Oklahoma State University 1947	1947-1980
John W. Branson	Assistant Professor of Geology 1947 B.S. Kansas State University 1950	1947-1948
Harold K. Brooks	Instructor in Geology 1947. B.S. Kansas State University	1947-1948
Denzil W. Bergman	Instructor in Geology 1948. M.S. Kansas State University 1949	1948-1950
Charles P. Walters	Associate Professor of Field Methods and Subsurface Geology 1959 Ph.D. Cornell University 1957	1948-1985
John D. Wells	Instructor in Geology 1949. M.S. Kansas State University 1950	1949-1951
Harold L. Metz	Instructor in Geology 1949.	1949-1951

	M.S. Kansas State University 1954	1953-1954
Claude W. Shenkel	Professor of Stratigraphy and Historical Geology 1958. Ph.D. University of Colorado 1952	1949-1984
Michael E. Davis	Instructor in Geology 1951. M.S. Kansas State University 1951	1951-1953
Joseph St. Jean, Jr.	Instructor in Paleontology 1951. Ph.D. University of Indiana	1951-1953
Harry W. Smedes	Instructor in Petrology 1951 Ph.D. University of Washington	1951-1953
Harold D. Holt	Instructor in Geology 1952. B.S. Kansas State University 1952	1952-1953
Clarence L. Harr	Instructor in Geology 1952. B.S. Kansas State University 1951	1952-1953
Robert M. Hutchinson	Assistant Professor of Petrology 1953 Ph.D. University of Texas, Austin 1953	1953-1956
Page C. Twiss	Associate Professor of Clay Minerogy and Sedimentary Petrology 1964 Ph.D. University of Texas, Austin 1959 Head of Geology Department 1968-1977	1953-1955 1959-1995
Kenneth N. Watkins	Instructor in Geology 1956. M.S. Kansas State University 1957	1956-1957
William K. Clark	Instructor in Paleontology 1956. M.S. Kansas State University 1950	1956-1972
Harold D. Pilkington	Instructor in Petrology 1956. . M.S. University of Colorado 1954	1956-1959
Willis L. Estlow	Assistant Professor of Geography 1956 Ed.D. University of Colorado 1960	1956-1965
Leverett P. Hoag	Assistant Professor of Cultural Geography 1957. Ph.D. University of Minnesota 1957	1956-1958

Paul S. Wingard	Assistant Professor of Optical Mineralogy and Petrology 1961. Ph.D. University of Illinois 1961	1957-1965
Herbert L. Rau	Associate Professor of Geography of Latin America and Urban Geography 1963 Ph.D. Northwestern University 1958	1958-1963
Charles M. Nevin	Distinguished Visiting Professor of Structural Geology and Tectonics, 1960 Ph.D. Cornell University 1925	1960-1961
William R. Siddall	Associate Professor of Transportation Geography 1965. Chairman of the Geography Department 1966-1979. Ph.D. University of Washington 1959	1962-1995
Hans D. Pflug	Exchange Professor of Palynology and Paleontology Justus Liebig University, Giessen, Germany 1962. Doctor's Degree University of Bonn 1951 and Mining College of Freiberg 1956	1962-1963
Douglas G. Brookins	Associate Professor of Geochemistry and Petrography 1966. Ph.D. Massachusetts Institute of Technology 1963.	1963-1971
John K. Olson	Instructor in Geography 1963. Ph.D. University of Kansas	1963-1964
Harry F. Lane	Instructor in Geography 1964. Ph.D. University of Kansas	1964-1965
John F. Cutler	Instructor in Paleontology 1964. Ph.D. Columbia University	1964-1965
Stephen L. Stover	Assistant Professor of Historical and Agricultural Geography 1964. Ph.D. University of Wisconsin 1960	1964-1989
Thomas E. Bridge	Assistant Professor of Geology 1965. Ph.D. University of Texas, Austin 1964	1965-1966

Charles F. Bussing	Physical Geography. Ph.D. University of Nebraska 1966	1964-
Norris Jones	Instructor in Optical Mineralogy 1966 M.S. University of Minnesota 1962	1965-1966
Robert E. Dickinson	Distinguished Visiting Professor of Urban Geography, Historical Geography and the Geography of France, Germany, and Italy 1966 Ph.D. London University 1932	1965-1966
Mary Lou True	Instructor in Geography Spring 1966. B.S. Michigan State 1961	1965-1966
Richard W. Vian	Assistant Professor of Optical Mineralogy and Petrology 1966. Ph.D. University of Michigan 1965	1966-1971
Christine Leigh	Assistant Professor of Geography 1966 B.A. University of Leeds, England 1963	1966-1967
David Kromm	Assistant Professor of Geography 1967 Ph.D. Michigan State University 1966	1966-2001
Sambhudas Chaudhuri	Professor of Geochemistry and Petrology Ph.D. Ohio State University 1966	1966-2018
Ronald R. West	Professor Palaeobiology Ph.D. University of Oklahoma 1970	1969-2015
Bedrich Boucek	Visiting Professor, Invertebrate Paleontology and President International Association of Paleontology; Prague, Czechoslovakia	1970-1971
Robert L. Cullers	Professor Geology 1976. Ph.D. University of Wisconsin	1971-2006
Donald O. Whittemore	Geology. Ph.D. Penn State University 1972	1972-1978
George R. Clark	Professor Paleoecology and Interim Head of Geology Department 2007-2013 Ph.D. California Institute of Technology 1969	1977-2015

James R. Underwood, Jr.	Structural Geology. Head of Geology Department 1977-1985. Ph.D. University of Texas, Austin 1962	1977-1996
Joseph L. Graf Jr.	Economic Geology and Head of Geology Department 1985-1995. Ph.D. Yale University, 1975	1980-1995
Greg S. Conrad	Assistant Professor Ph.D. Idaho State University, 1980	1980-1981
Richard M. Busch	Stratigraphy. Ph.D. University of Pittsburgh 1984	1984-1988
Charles G. (Jack) Oviatt	Geomorphology and Quaternary Geology Head of the Department of Geology 1995-2001 Ph.D. University of Utah 1984.	1985-2014
Stephen A. Shaver	Geology. Ph.D. Stanford University 1984	1985-1987
David A. McConnell	Assistant Professor of Structural Geology Ph.D. Texas A & M University 1987	1987-1989
Peter R. Rose	Distinguished Professor of Geology Ph.D. University of Texas, Austin 1968	1988-1989
James E. (Jed) Day	Geology. Ph.D. University of Iowa 1988	1988-1989
William Maury Harris	Geology and Earth Science Education. Ph.D. Texas A & M University, 1987	1989-1991
Allen W. Archer	Sedimentology and Stratigraphy Ph.D. Indiana University 1983	1989-2015
Lois Jones	Geology and Geochemistry. Ph.D. Ohio State University 1969	1990-1993
Keith Miller	Sedimentology and Paleoecology Ph.D. University of Tochester	1990-2017
Mary S. Hubbard	Structural Geology and Head of Geology Department (2001-2007). Ph.D. Massachusetts Institute of Technology 1988	1996-2007

Monica Clement	Geophysics and Geothermal Energy MS University of Utah	1998-2003
Stephen Gao	Geophysics Ph.D. University of California, Los Angeles 1995	1999-2006
Kelly H. Liu	Geophysics and Computational Seismology Ph.D. University of California, Los Angeles	2000-2006
Kirsten Nicolaysen	Petrology and Geochemistry Ph.D. Massachusetts Institute of Technology	2002-2006
Iris Totten	Geology. Ph.D. University of New Orleans	2005-2012
Matthew Totten	Sedimentary Petrology & Petroleum Geology Ph.D. University of Oklahoma 1992	2005-
Michael Lambert	Assistant Teaching Professor Ph.D. in geology, University of Kansas, 1992	2006 -
Matthew Bruseke	Igneous Petrology, Volcanology, and Tectonics Ph.D. Miami University	2007-
Joel Spencer	Optically Stimulated Luminescence Geochronology Ph.D. University of Glasgow	2007-
Saugata Datta	Low temperature Geochemistry, Hydrology, and Environmental Geology Ph.D. University of Western Ontario	2008-
Abdelmoneam Raef	Geophysics, Seismic Data Processing Ph.D. AGH, Krakow, Poland	2008-
Sabreen Gad	Assistant Teaching Professor Ph.D. Saint Louis University, 2007	2010 -
Raad A. Al-Ani,	Assistant Teaching Professor Ph.D. Colorado State University, 1992	2011-2016
Matthew Kirk	Geomicrobiology, Geochemistry, Hydrogeology and Environmental Geology Ph.D. University of New Mexico	2013-

Pamela Kempton	Igneous Petrology and Isotope Geochemistry Department Head 2013 - Ph.D. Southern Methodist University	2013-
Brice LaCroix	Structural Geology, Mineralogy and Geochemistry Ph.D. Universite de Franche-Comte	2015-
Claudia Adam	Geophysics. Ph.D. Institute of the Physics of the Globe, Paris-	2016
Aida Farough	Applied Geophysics Ph.D. Virginia Tech	2016
Karin Goldberg	Sedimentology, Paleontology and Geochemistry. Ph.D. University of Chicago	2016-
Behzad Ghanbarian	Environmental and Engineering Geology Ph.D. Wright State University	2017-