The John A. and Katherine G. Jackson School of Geosciences is an extraordinary and unique environment for the scholarship of research, education, and service. We have many advantages. Our fields of study are of compelling interest to society. There is a high demand for our students and our students are highly successful. Our research accomplishments are recognized around the world. The Jackson School includes three centers of excellence, each with unique strengths and core constituencies addressing different societal needs. In concert, we can claim a breadth and depth that places us within the premier programs in the nation. We can significantly strengthen our scholarship just by continuing to promote synergism between our exceptional cadre of faculty and scientists. This fact alone indicates much about our potential. However, our opportunity is much greater.

The Jackson School has an endowment built through decades of generosity from our alumni and friends, creating a unique opportunity for excellence. The generosity of John and Katherine Jackson, the continuing commitment of our alumni and friends, and our supporting partners from industry and government enable us to define The University of Texas at Austin as the center of geosciences scholarship. The magnitude of the Jackson gift is remarkable, but it is their trust in our potential that allows us to reach for preeminence. The Jackson gift has truly simple guidelines—to support the geosciences, both in basic and applied research, particularly in the areas of water, energy, minerals, and the environment. Their goal was to catalyze the path to excellence rather than prescribe it. It is a vision whole-heartedly supported by our alumni and friends through our Advisory Council. Together, these friends have created an unprecedented sense of empowerment, even a sense of destiny.

Obviously, destiny is not an entitlement. Rather, for the Jackson School of Geosciences, excellence is now an imperative. No other school in the geosciences can match our combination of foundational strength and remarkable opportunity. An extraordinary standard has been set—a standard that depends on the support of the State of Texas to our programs, the University commitment to our role in its continued ascendance as a premier public research university, the commitment of the time and intellect of our faculty and scientists, and the remarkable generosity of our alumni and friends. These resources represent an unprecedented catalyst for excellence, but if we are to meet the real standard that has now been set, our vision and the vision of all of our partners must reach well beyond the Jackson gift and the breadth of our endowments.

This strategic plan is designed to be a significant step in our path to excellence. It reflects the wisdom of our faculty, scientists, administrators, staff, students, alumni, and friends. It is founded on plans and ideas developed by the Bureau of Economic Geology, the Institute for Geophysics, the Department of Geological Sciences, and our Advisory Council, as well as through our program in Energy and Earth Resources. It calls for placing the Jackson School at the forefront of research and the forefront of education. It is also designed to be “only the beginning.”
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The Jackson School represents one of the largest and most comprehensive earth science research and education enterprises at any university, and yet we also have an unparalleled opportunity to grow in depth, breadth, and excellence. At most institutions, the opportunities to catalyze new research directions are rare. This ability is tightly tied to opportunities to attract new talent and to add “glue” between existing areas of excellence. Hiring is usually a highly focused effort based on the selection of a specific discipline that fills an equally specific core mission requirement or promotes a specific research thrust or partnership. Occasionally, a top-tier institution has the opportunity to seek the most promising candidate, whose potential for excellence is considered to be more important than seeking a representative of a specific sub-discipline. Even more rarely, a college-level unit has the opportunity to define a whole new strength with the critical mass needed to ensure its success. The Jackson School has the opportunity to explore all three of these approaches simultaneously. But, with this opportunity comes the imperative that the investment in breadth and depth yields an institution that is at the forefront of research.

This imperative demands a focus on hiring truly exceptional individuals and then the actions to ensure their success. We recognize that submitting proposals, giving presentations, and the act of publishing peer-reviewed literature serve as opportunities to test and refine our ideas, and that this, in turn, leads to an even greater spectrum of opportunities for support and even greater recognition of our accomplishments. Therefore, our goals are focused on incentives for research productivity and for the constant testing of Jackson School ideas and proposals in the scientific marketplace.

**Goal 1: To attract cutting-edge scientists and faculty regardless of specific discipline**

Narrowly defined advertisements tend to attract fewer responses, increasing the likelihood that a search will not yield a top-notch candidate. In addition, most narrowly defined searches are less likely to capture truly emerging disciplines or individuals that are at the vanguard of new frontiers simply because the search seeks a defined area of expertise. Further, narrowly defined advertisements are less likely to present opportunities to foster diversity, primarily because the pool of candidates tends to be small. Success in hiring the best and brightest also tends to reflect a search process which is active—seeking and recruiting—rather than passive, merely responding to applications. The Jackson School should always be positioned to seek the best and the brightest, regardless of specific discipline.

**Action:** Maintain an open-position announcement that enables the Jackson School to focus on opportunity hires, and include annual advertisements that call for hiring truly cutting-edge scientists and faculty, regardless of discipline or rank, and regardless of Jackson School unit.

**Action:** Foster a culture of recruitment designed to constantly seek truly innovative and gifted faculty and scientists.
Goal 2: To maintain and strengthen our core areas in the geosciences

The core of the geological sciences consists of a number of important areas of study, including geophysics, geochemistry, tectonics and structure, paleontology and paleobiology, stratigraphy and sedimentology, petrology and geochronology, and hydrogeology. These areas serve as the foundation of the Jackson School, and our strength and reputation depends not only on our breadth, but on our depth in these core areas.

Action: Ensure that the core areas of the geosciences are strong and that we are diligent in seeking new faculty and scientists as required to maintain and strengthen the foundational areas of the Jackson School.

Action: Increase our strength in the biogeosciences, particularly in geobiology and geomicrobiology.

Goal 3: To expand the depth and breadth of the Jackson School by creating new and broadening our existing strengths.

The Jackson School and its units have remarkable strengths and well-deserved reputations for excellence. An examination of our strengths and weaknesses highlights areas of emphasis that can take advantage of our strengths, ensure we are highly competitive in each significant area of the geosciences, and expand our domain as a forward-looking institution. We propose to focus on four major areas of research and educational focus—each in direct response to the bequest of John and Katherine Jackson. Each is designed to attract a critical mass of expertise, which in turn will establish the Jackson School at the forefront of significant research areas and serve to attract a very high caliber of faculty, scientists, and students. The four themes are:

1) Solid-Earth dynamics
2) Surface and hydrologic process
3) Energy, environment, and policy research
4) Climate systems science.

In turn, these areas enable additional partnerships in critical areas of growing interest and great promise. Three areas are recognized as emerging cross-cutting themes:

- Water and water resource sustainability
- Computational geosciences
- Rapid-response research.
Much of the research and education within the Jackson School serves the needs of society. For this reason, the opportunity to enhance geosciences-related policy development and to promote improved capabilities to inform decision-makers is evident in each of the themes.

The major themes and cross-cuts represent the combined wisdom of the three Jackson School units, with each theme described in the individual strategic plan of two or more of the units. The themes and cross-cuts suggest an unprecedented opportunity for synergism and an opportunity to bring the unique capabilities and perspectives of the Bureau, Institute, Department and Energy and Earth Resources program to bear on exciting problems of great interest to society. This strategic plan endorses efforts to promote joint hiring among Jackson School units as a mechanism to enhance synergism and interaction. It also recognizes the importance of exercising care to ensure that the creation of any joint position occurs with realistically defined contributions to teaching and research, and commitment to the success of the individual units and their missions. These themes also provide substantial opportunities to develop a strong educational component that serves the needs of students and society. Hence, we propose an approach to hiring and to enabling research that crosses all units and signals to the geosciences community that a major effort is underway to advance the scope and quality of the Jackson School.

**Action:** Promote cluster hires (six or more faculty and scientists) in four major thematic areas that will define areas of additional or expanded strength in the Jackson School. Each theme will seek and welcome partnerships and joint hiring opportunities that promote strong interaction across the University and the Jackson School. The four proposed focus areas are as follows:
MAJOR RESEARCH FOCUS 1:

**Crust/Mantle/Core dynamics: How do the core, mantle, crust and surface interact to shape the physical and chemical evolution of the Earth?**

We propose to build a premier research program in the areas of mantle and crustal dynamics, and to take full advantage of the significant investments of the National Science Foundation and NASA in observing active margin systems and deeper Earth processes via EarthScope, MARGINS, and other programs. The data and computational methods derived from this national and international investment are providing new views of Earth’s interior structure and surface deformation. The Jackson School has the potential to build upon its existing strengths in tectonics, marine geophysics, structural geology, petrology, geochronology, paleobiology, geochemistry and seismology and, combined with other campus research units, to create an exceptional program focused on the interaction and coupling of physical and chemical processes in the core, mantle, and crust. Hiring within this thematic area will expand our program into new areas and create a critical mass in solid Earth geophysics and geochemistry, filling significant gaps in our core programs.

This expertise will allow us to address compelling questions in the earth sciences, including:

- How does the mantle convect? What are the relative roles of mantle plumes, layered convection, and chemical stratification, and what is the time dependence of convection over Earth’s history (i.e. periodic superplume eruptions)? How does water affect the rheology and dynamics of the mantle transition zone?

- What drives plate tectonics and how has plate tectonics varied with time? How are forces generated in the upper mantle and then transferred to the crust during continental collision and breakup? How are chemical and physical processes acting in the Earth’s interior manifested at the surface and how do surface processes affect Earth’s interior? What are the effects of Earth processes on climate and life?

- What controlling influence do fluids have on geological processes, including magma movement and volcano deformation, earthquake nucleation and rupture, tectonic deformation, metamorphic reactions, mineralization processes, and mantle convection? What are rates of interrelated lithosphere and mantle processes? How is continental crust differentiated from its mantle sources over geologic time?

- How do plate margins deform, evolve and interact? How can active tectonic processes and present-day plate motion be reconciled with the rock record? Can we understand the strong disconnect discovered through new measurement techniques between current activity and that recorded in the recent geologic record? How can we maximize this understanding to both evaluate deep time and help society anticipate future activity?

To build a premier research program in crust, mantle and core dynamics, we need to hire outstanding geoscientists with expertise in:

- Geodynamics
- Seismology
- Remote sensing of active and surface deformation
- Fluid dynamics
- Geochronology
- Mineral physics
- Geochemistry
- Computational geosciences focusing on the modeling, simulation and inversion of complex earth systems and processes.

Our intent is to create a cadre of scientists, keenly interested in establishing an interdisciplinary environment with partnerships across the JSG and University creating a world class center of excellence for studying crust, mantle and core dynamics.
Earth Surface and Hydrologic Processes:
How are surface and hydrologic processes
influenced by their dynamic setting at the
interface of the lithosphere, atmosphere,
ydrosphere and biosphere?

The Jackson School of Geosciences is poised to
develop an international reputation in the research of
Earth surface and hydrologic processes. The Earth’s
surface is a dynamic setting driven by physical and
chemical processes that are strongly influenced by
the interrelationship of the lithosphere, atmosphere,
ydrosphere, and biosphere, as well as by human
activity. Understanding the Earth surface and
hydrologic processes that are influenced by this
interrelationship is critical for predicting how our
environment will respond to change and for mitigating
detrimental consequences. This understanding is of
tremendous societal importance, from determining
the availability of fresh water and arable soil to
coastal zone management impacted by rising global
sea level. Improved knowledge of surface and
subsurface hydrologic processes is equally critical for
investigating the long-term evolution of the surface
of the Earth: e.g., for determining the coupled
influence of climate and tectonics on landscape and
ecosystem evolution, and the transport of water,
sediment, and nutrients from source to sink on a
range of temporal and spatial scales.

The Jackson School’s current strengths and capabilities
create an opportunity for excellence. These include
internationally recognized expertise and facilities in
hydrogeology, geochemistry, coastal dynamics, clastic
and carbonate sedimentology and stratigraphy,
shallow and deep marine geomorphology, as well as
field capabilities in ocean, land, and ice
environments. The School is invested in physical,
geochemical, and biological studies of aquifers,
aerogeophysical studies of ice sheets, airborne
topographic LIDAR, GPS, GIS, and data visualization.

This foundation allows us to integrate strengths from
all three units to create new synergies and a premier
program in Earth surface and hydrologic processes
with the hiring of new faculty and research scientists
in the following areas:

- Quantitative geomorphology and numerical
  modeling of landscape dynamics.
- Interface of hydrologic and biologic science,
  including interactions between ecosystems and
  hydrologic and geomorphic systems, geobiology,
  geomicrobiology, and biogeochemical modeling
  at watershed to global scales from present day
to deep geologic time.
- Remote sensing and shallow, environmental
  geophysics, involving groundwater-surface water
  interactions, and coastal depositional systems.
- Marine geophysics and aerogeophysics, including
  the capabilities for developing a rapid-response
  program and for monitoring groundwater systems,
  coastal systems, and watersheds (e.g., hydrologic
  observatories) to create an unprecedented
  capability to collect time-sensitive data in
  high-impact regions.
- Societal impacts, including the sustainability of
  water, soil, ecosystem services and other Earth
  surface and near-surface natural resources.

In particular, attracting this expertise will enable
cross-cutting opportunities in 1) the interactions
between climate and hydrologic systems, 2) the
influence of tectonics on climate, ecosystem, and
surficial processes, and 3) the co-evolution of these
Earth-surface transport systems and biogeochemical
cycles. Further, an emphasis on the transfer of this
cutting-edge science to effective policy will address
a large and growing societal need. Together, these
elements establish the Jackson School at the
forefront of research in a major area of critical
importance to society.
An Emerging Cross-Cutting Theme—Water and Water Resource Sustainability

Water emerges as an element of the discussion in almost every proposed research frontier, and hydrogeology is already recognized as a core strength of the Jackson School. The research frontier proposals call for new expertise in geomorphology, watershed modeling, groundwater-surface interactions, sustainability, hydro-energy, basin-scale modeling, statistical climatology, climate variability, and ecosystem evolution. In concert with existing strengths, this yields a powerful focus on water and water resources in the Jackson School. The potential is noteworthy.

Water is essential for human life and ecosystems, and the sustainability of our water resources is critical for the future of humanity. Water scarcity is becoming a critical issue as global population expands. Globally agriculture consumes ~80% of global fresh water resources. In the developed world electric power production consumes nearly 50%. Water as the universal solvent strongly influences biogeochemical cycles of carbon and nitrogen and other non-nutrient salts. Strong linkages and feedbacks between water and vegetation are increasingly being recognized in the newly developed field of ecohydrology. Understanding the climate and climate variability controls on the water cycle is becoming increasingly important for developing sufficient predictive understanding to support sustainable management of water.

The state of Texas provides an excellent field laboratory that provides a microcosm for global issues because of the range of climates, land uses, biomes, aquifers, and prevalence of hydrologic extremes. The subsurface contains a vast archive of water cycle response to climate variability and land-use change on decadal to millennial timescales that is being addressed through newly developed satellite approaches (GRACE satellite), a host of ground-based observational systems, and modeling.

Investment in the major research themes within this strategic plan creates an opportunity to develop a state-of-the-art program in water and water resource. The success of this investment presages a future area of additional hiring and focus, with additional areas of expertise in the areas of remote sensing, ecohydrology, water cycle modeling, geoinformatics/cyberinfrastructure for water resources, sustainability, and policy and societal impacts.

In addition, we should actively seek partnerships with the Center for Space Research and Civil and Environmental Engineering (NSF Cyberinfrastructure center) to promote a comprehensive water research and education program. We have the potential to create a remarkably broad and high quality program if we are deliberate in promoting a program that cuts across our themes and builds upon our current strengths.
MAJOR RESEARCH FOCUS 3:

Energy, Environment, and Policy Research:
How can we create an energy future that is sustainable and environmentally and economically robust?

The University of Texas at Austin is poised to be the leading academic energy research institution in the world. Fundamental to that vision, and based on realistic energy trends, is the necessity to host the world’s leading fossil energy, environment, and policy research program, led by the Jackson School of Geosciences in concert with other outstanding departments and research units across the University. The program must be comprehensive. Energy, the environment, and the economy are inextricably linked. An understanding of historical trends provides the foundation for a realistic look into the future. Fossil energy supplies 85% of global energy resources, decreasing 2% per decade. In the near term [<25 yrs], transportation will continue to require liquid fuels: conventional oil, unconventional oil, gas to liquids, and coal to liquids. In the mid term [25-50 yrs], electricity is likely to play a major role, with heat to turn turbines coming largely from coal, coal gasification, unconventional natural gas, and uranium. Longer term [>50 yrs], electricity storage and transmission improvements have the potential to allow solar energy to become a major part of the electricity supply, with other energy forms—wind, biofuels, hydro, and geothermal—as important supplements. The Jackson School and the University can provide the leadership and research capabilities that promote each of these phases of our energy future. As the energy supply transitions to non-carbon forms, we must be positioned to drive cutting-edge research that serves the critical energy needs of our society.

We are particularly interested in addressing many of the key challenges in energy, environment, and policy research, including: How do fluid-rock interactions, and the interplay between mechanical and chemical processes, influence geologic systems? Can we overcome the challenging impediments to the recovery of unconventional oil and gas resources?

What resource identification and recovery advances can be achieved by comprehensive integration of information at a regional or basin scale, by the development of integrated numerical models, and by innovative observing strategies? Can we develop a more comprehensive understanding of the relationships between sequence stratigraphy and tectonics? Can we solve the compelling environmental issues associated with the extraction and use of fossil fuel energy sources, including water and land use, and carbon sequestration? Can we develop energy policies founded on solid scientific and engineering information that will simultaneously promote environmental stewardship and energy security? What advances will drive the transition of the energy supply to non-carbon forms?

The expertise of the Jackson School provides a foundation for energy research and education, encompassing a broad range of geoscience, engineering, economic, and policy expertise across several major programmatic areas. However, we must strengthen these programs, add new interdisciplinary initiatives that can provide pioneering research and train future generations of researchers and industry leaders focused on energy security and sustainability.

This vision requires not only continued expansion of existing strengths in sedimentary processes, structural geology, salt tectonics, and reflection seismology, but also new talent in several research fields, including:

- Sorbed gas systems
- Subsurface sensing
- Rock/fluid systems
- Carbon management
- Energy economics and policy
- Resource and reserve geoinformatics

Our success will help society build towards sustainable energy, and robust environmental, economic, and institutional systems. We have the potential to help transform the investment of U.S. universities in energy research and education.
Emerging Cross-Cutting Theme: Computational Geosciences

Modeling and simulation offer tremendous opportunities for improving our understanding of the Earth system, addressing geoscience grand challenges, and providing decision-support tools for geoscience policy-makers and industry. The theme of computer modeling cuts across the four major research foci described in this document. These and other challenging problems in the geosciences are characterized by complex, large-scale nonlinear models that couple multiple physical, chemical, and biological processes over a wide range of length and time scales. These models are usually too complex to be solved analytically, and their solution requires advanced numerical algorithms running on high-performance computers. The increasing importance of computation as a powerful tool for prediction and decision-making in the geosciences is driven by advances in three areas: the rapid expansion of our ability to instrument and observe the Earth; sustained improvements in computational models and solution methods for complex geoscience systems; and the relentless growth in computing power.

Today, large-scale simulations of the dynamics of earthquakes, crustal evolution, climate change, subsurface flows, and mantle convection, to name a few, are routinely carried out with increasing fidelity. Improved observational capabilities lead to better characterization of uncertainties in these models, which in turn drive enhancements in observational capabilities.

A central challenge in computational geosciences is the systematic assimilation of observational data into large-scale simulations to identify and address model uncertainties. The Jackson School has been a leader in the development of inverse methods for data assimilation and their application to such areas as seismology and climate modeling. The computational geosciences cross-cutting theme will energize research at the interfaces of modeling and data.

Another challenge in computational geosciences is its inherent interdisciplinarity. Tackling the big problems requires expertise in geosciences, applied mathematics, and computer science, among other areas. The Jackson School must broaden its collaborations with leading programs in these areas on campus. In particular, excellent opportunities exist to partner with the Institute for Computational Engineering and Sciences (ICES), perhaps the leading institute in the world for computational mathematics and scientific computing, and the Texas Advanced Computing Center (TACC), home (as of Fall 2007) of the world’s most powerful supercomputer. The close proximity of Jackson School buildings with ICES and TACC will facilitate partnerships.

A final challenge is to promote a stronger culture of large-scale modeling and simulation within the Jackson School. This will be accomplished by hiring faculty and research staff with expertise in computer modeling, establishing centers of excellence (such as the proposed Stochastic Geosystems Modeling Center), creating a distinguished visitors program for computational geoscientists, developing a curriculum that will produce a new generation of computational geoscientists, and modernizing the computational research infrastructure. The Jackson School is well positioned to assume leadership in data-driven modeling and simulation of complex earth systems and assessment of their impact on society by capitalizing on the considerable talents of its researchers and students and the powerful resources and expertise at UT.
Climate Systems Science: What controls the rates of change and variability of the earth system? Can we improve our ability to anticipate these changes and to determine the potential impacts on society?

The Jackson School has steadily expanded its focus on the fluid envelope of the Earth system over the last decade, gaining expertise in atmospheric sciences, physical oceanography, and atmosphere-land surface interaction, including both physical and biologic processes. Combined with an excellent reputation in ice and ice dynamics and land-surface modeling, we have a growing expertise in the elements of the Earth system that respond and change on the time scales of human endeavors. Superb faculty and researchers are in place, but a greater concentration of expertise is required to achieve a world-renowned reputation for a center of excellence. We have the potential to create a cohesive program that attracts students and addresses key questions on the nature of the climate system. Our program has the opportunity to become exceptional through its ability to address questions concerning uncertainties in future predictions at both the global and regional scale, and its ability to join the Earth sciences in a comprehensive understanding of climate change and variability and its impacts.

Our ability to work directly on issues that impact society, along with fellow geoscientists, biologists, economists, and policy-makers, yields tremendous potential to help translate the implications of global change and variability to better serve society.

Understanding and quantifying uncertainties in the processes that control sensitivities and rates of change and variability at regional and global scales are at the forefront of climate systems science. How do global cycles of energy, water, and carbon affect climate change and variability? How can we improve our understanding and modeling of the processes that are poorly represented in climate models? How will climate change affect freshwater availability and air quality? How will global warming affect cryospheric contributions to future sea level? What are the processes that drive the ocean’s deep overturning circulation? How well can advanced models of the climate system reproduce the variability and changes in the mean state of the climate system that is evident in geologic archives of climate? What are the dominant modes of variability at decadal to century time scales? What processes affect the frequency or intensity of extreme climate and weather events such as floods, droughts, or hurricanes? How can we improve intraseasonal to interannual climate prediction? What processes and new research areas are critical to improving our ability to protect life and property, promote economic vitality, and enable environmental stewardship?

The Jackson School must increase our expertise in the following disciplines if we want to advance our growing reputation:

- Ice-sheet modeling
- Basin-to-continent-scale hydrology
- Statistical climatology, particularly at the interface of combining process studies, global climate models, and climate records to evaluate hypotheses concerning the forcing and response of observed changes in climate
- Paleoclimatology, paleoceanography, and paleobiology focusing on using the climate archives of the Earth to quantify the response of the Earth system to climate forcings
• Global carbon cycle modeling
• Atmospheric dynamics, bringing a deeper understanding of the under-constrained processes important to global change
• Physical oceanography, specializing in ocean observations that builds connections to a variety of observational platforms
• Remote sensing of atmospheric and Earth-surface processes
• Societal impacts and vulnerability.

The climate system science initiative would be strengthened by deliberate efforts to build a center of excellence, such as a Climate Impacts and Vulnerability Center (CIVC), whose mission is to carry out climate research that balances basic theoretical and modeling work with impact assessment and societal applications, and to reduce vulnerability to and possibly take advantage of the impacts of climate change and variability on Texas, the Gulf Coast, and on global scales. An emphasis in climate system science provides enormous opportunity for cross-cutting research and education in such important areas as surficial and hydrologic processes, the link between climate and tectonics, the intersection of ice sheet interaction, global mass fluxes and lithosphere geodynamics, and the interaction of climate with biological systems, including geomicrobiology.

A focus on climate systems science creates specific needs for institutional infrastructure, including significant computational resources, investments in facilities such as the proposed Center for Stochastic Geosystems Modeling, a stable isotope laboratory, multi-instrumented aerogeophysics coupled with a rapid response capability, and Earth system visualization.

This investment in people and facilities has the potential to move an existing strong foundation in climate science to a level of national prominence.
An Emerging Cross-cutting Theme—A Rapid Response Research Capability

Earth’s natural history is punctuated by important events (e.g., large earthquakes, volcanic eruptions, hurricanes, floods) which usually have tremendous environmental and societal impact and often leave a profound mark on the geological record. Such events may be more important to the evolution of the Earth’s systems than the slow and steady background processes. However, as a community geoscientists are hamstrung in our ability to make critical, time-sensitive observations regarding transient events because we usually must write proposals to obtain funding for field work after the event has taken place. A new paradigm is required to enable rapid collection of data when the urgency is greatest.

The JSG can develop the capability to respond rapidly to important transient events to document their effects, install instrumentation, conduct geophysical surveys to examine their causes and development over time. We will build three rapid-response teams for the following types of events:

1. Earthquake/tsunami/volcano, landslides and mudflows
2. Glacial surges/retreats/ice-shelf collapse
3. Hurricanes/flooding/ground water.

The teams will include science partners from other institutions, agencies interested in investigating these phenomena, as well as national and international funding partners (through mechanisms such as NSF SGER grants, state, corporate, and private programs) who are concerned with events having significant societal effects. We will also have the benefit of substantial computational resources for short-term scenario modeling and assessment. The teams would need built-in redundancy and data acquisition equipment on hand to respond using vessels and aircraft of opportunity.
Goal 4: To create incentives for research productivity

The external reputation of the Jackson School and its units will be largely defined by the quality of its research productivity and by the success of our students. Our objective is to promote research productivity through incentives to compete our research in the scientific marketplace.

**Action:** Provide an institutional match for any graduate assistantship garnered through external research support, incorporating summer support if this is included in the externally funded level of support.

**Action:** Provide an incentive for attracting post-doctoral fellows by providing 50% institutional match when funded on external research grants and contracts.

**Action:** Provide a 50% institutional match on major research equipment and maintenance of major equipment in advance of the solicitation of external awards in order to promote a higher probability of success.

**Action:** Create an awards system that truly draws attention to our most accomplished researchers by developing a series of JSG-wide awards that reflect excellence in every part of our mission and by creating a JSG-level awards committee designed to promote recognition of our accomplishments external to the Jackson School.

**Action:** Promote the development of new endowed positions and effective use of current endowments to reward our highly productive faculty and research scientists.

**Action:** Create a Jackson School-wide post-doctoral and graduate student fellowship program to attract top notch young scientists as partners and beneficiaries in the Jackson School research enterprise.

**Action:** Create an environment that attracts outstanding visiting scholars to the Jackson School for short and long-term visits, including (a) establishing a Jackson School Distinguished Visitor Program that promotes long-term visits by exceptional scientists and fosters research collaboration and new research directions, (b) promoting a series of School-wide endowed lectures, and (c) funding a highly visible annual Jackson School conference/workshop on major emerging topics that serves to attract scholars and prospective graduate students.

Goal 5: To ensure that our facilities (laboratories, equipment and collections) and capabilities support research productivity

Universities tend to build laboratories and purchase state-of-the science equipment in response to the hiring of a new faculty member or scientist. The investment in facilities tends to age, unless researchers are particularly able to write proposals that create continual renewal. The utilization of space is then typically ad hoc, defined by availability and the needs of a single-scientist renovation. The Jackson School is committed to a high level of interaction and a serious effort to promote enduring partnerships and diverse connections. To do so, we must take a more comprehensive approach to facilities where beneficial, and to ensure that modernization is continual rather than a response to hiring or the near collapse of an aging facility.
Equally important is our commitment to the role of support staff in developing an efficient research enterprise. Although some areas of support are logically provided by external grants, we must ensure that support staff are in place to remove unnecessary faculty and scientist burden, and instead promote their productivity.

**Action:** Develop a financial support environment that places renovations, facilities improvement, and equipment investments serving thematic areas or groups of faculty and scientists at the top of the priority list for support.

**Action:** Create an environment in which scientists within different units have the space and capability to interact with collaborators regardless of building or unit.

**Action:** Create the budgetary flexibility in the JSG units that enables research productivity. Specifically, create a budgetary environment in which a consistent policy of return on indirect charges on grants and contracts to all units will support equipment purchase, facilities and their operation.

**Goal 6: To enhance our research partnerships with other centers of excellence**

Many opportunities for innovation occur at the intersection of disciplines and many of today’s complex problems demand a willingness to cross institutional boundaries and to create new or expanded partnerships. Our computational geosciences theme is greatly strengthened by the opportunities to partner with the Institute for Computational Engineering and Sciences (ICES) and the Texas Advanced Computing Center (TACC). Our focus on surface process and hydrology, water and water resources, and climate systems benefits from the current strengths of the Environmental Science Institute and the School of Biological Sciences.

Our growing interest in water and energy policy will likely be far more successful if it occurs in collaboration with enhancements to the Center for International Energy and Environmental Policy and the strengths of the LBJ School of Public Affairs. Our current interactions with the Center for Space Research provide a foundation for our proposed hires in remote sensing and Earth observation. The University is embarking on a plan to create a strong and comprehensive energy research and education program. The proposed energy theme in the Jackson School can stand alone as an exceptional program, but it will also benefit if we partner in an enterprise that serves to promote interaction across the campus in order to tackle major problems that sit outside the core strengths of the Jackson School.

**Action:** Seek opportunities to promote collaboration and interaction with other centers of excellence in order to strengthen the capabilities of the Jackson School and the University to address compelling problems in the Earth sciences.
The Jackson School has a long history of excellence in education in the geological sciences, beginning with its first three graduates in 1891. Today, we are one of the top geosciences degree-granting programs in the nation and our graduates are well-placed in industry, academia, and government service. Our history of excellence and our ability to successfully place our graduates has created a program in which we attract a strong group of students at both the graduate and undergraduate level based on our excellent reputation. Once here, our students find a strong geological curriculum and excellent faculty and scientists who are keenly interested in student success, and numerous opportunities.

The quality of our graduate and undergraduate students and their career success is a strong reflection of the quality of our program. Although we have much to be proud of, the current demand for well-educated geoscientists exceeds the supply. Consequently, there is intense competition for students and for high-quality students in particular. The competition comes from across the spectrum, from small liberal arts colleges that boast a close relationship between faculty and students and small classes to comprehensive research universities that stress depth and breadth of opportunity and classes taught by renowned faculty. Increasingly, cost and perceptions of value relative to the tuition dollar are governing student decisions.

The top geosciences programs are particularly competitive in seeking graduate students with a talent for research. All of these factors translate into a number of key factors that influence our ability to attract high-quality students:

- The quality of the education, with perceptions often based on national rankings or the strengths of our core disciplines
- The availability of scholarships and student support, with its importance growing as the cost of higher education increases
- A sense of community, particularly for those concerned about the typical anonymity of a large public university
- A student-centered environment, with the services that enable student success, timely degree completion, and that demonstrate a commitment to the student beyond the classroom
- Modern facilities, where classrooms and labs demonstrate the level of investment in the educational enterprise
- Employment opportunities and experiences, particularly those that improve the prospect of employment (e.g. internships, research opportunities, alumni networking, etc.).

The Jackson School is committed to attracting the best and brightest students at both the graduate and undergraduate level and we are committed to creating a comprehensive approach to education that promotes student success.
Goal 1: To develop the finest geosciences curriculum in the world

The geological sciences curriculum is strong and creates highly successful students. The responsibility for maintaining a strong undergraduate curriculum lies with the faculty and all changes to the curriculum require approval at the University level. The graduate curriculum is designed by members of the Graduate Studies Committee with each sub-discipline determining course offerings, content, and the sequence for teaching. The sub-disciplines are embodied by Curricular Groups which are also active in reviewing graduate student applications.

However, the depth and breadth of the knowledge we can transmit to our students is expanding. The Department of Geological Sciences now incorporates a range of expertise that extends well beyond traditional fields in the geological sciences. We also have a cadre of talented research scientists who are interested in educating undergraduates and graduate students and who bring remarkable opportunities to expand our offerings. The breadth of the Jackson School presents challenges as well as opportunities. Both our breadth and depth places pressure on us to increase our offerings, but it has also begun to challenge the notion of what set of courses or requirements is sufficient to designate an individual as a geologist or geoscientist.

At an undergraduate level we have the opportunity to map an expansion of our offerings while maintaining a strong and coherent geology degree. For example, we can provide a set of specific, more directed requirements, adding to our current set of degrees and degree options (B.A., B.S. with options in General Geology, Geophysics, and Hydrogeology-Environmental Geology, and B.S. in Geosystems Engineering and Hydrogeology). We can contemplate a set of minors which serve to enhance a geosciences degree and broaden the graduate study opportunities for our students. We may also find that our expertise grows sufficiently that we are able to attract new types of students. In such a case, we should be prepared to offer new programs or majors rather than attempt to redefine our current geology and geophysics degree programs.

There are some remarkable signs of cohesion at the graduate level. Our curricular groups have been expanded to incorporate the full range of interest in any sub-discipline across the School. These groups become a powerful opportunity to develop a graduate curriculum that reflects our range of expertise and to link research and graduate education.

In addition to developing educational programs that celebrate both our depth and our breadth, we are committed to excellence in both content and delivery. Across the nation, there is growing interest in the scholarship of education in the geosciences—where experts in our field are writing proposals and developing delivery methodologies that support education excellence, and then publishing their contributions to pedagogy in peer-reviewed literature.

This strategic plan calls for even greater investment in educational excellence and scholarship, while increasing the opportunities for our students that reflect our expertise. We are on the verge of being able to create powerful additional areas of concentration that allow both our undergraduates and our graduate students to delve more deeply and to create stronger disciplinary career opportunities. We are on the verge of attracting a whole new set of students into areas of study of significant importance to society. If we are committed, we can also attract expertise in the scholarship of education taking on introductory courses and general education requirements with an eye toward promoting the discovery of our discipline and students better prepared to successfully navigate our majors.

Our educational offerings and the management of our process should be designed to develop the finest geosciences curriculum in the nation.

Action: Develop a consistent set of guidelines and financial support that enables research scientists to contribute to the scholarship of education.

Action: Empower the Curricular Groups, to broaden their perspective to one that champions strengths
and partnerships in research, education and their intersection, and, where warranted, enables a positive debate and outcome on the value of additional options in our undergraduate curriculum and areas of concentration in our graduate curriculum.

**Action:** Consider opportunities to expand our offerings, to promote the development of minors for undergraduates that enhance a geological degree or that further a geological education for students in other majors.

**Action:** Carefully consider whole new areas or programs of study that may lead to allied undergraduate majors and cross-disciplinary graduate programs designed to attract a new set of students that can benefit from our growing expertise.

**Action:** Promote opportunities by which courseware developed in the Jackson School can become a national and international standard of education that can be freely shared and that can demonstrate our contributions to the scholarship of education.

**Action:** Reward faculty and scientists who are extraordinarily committed to our students and to their education.

**Action:** Promote the hiring of geoscientists who seek grants in support of developing advanced new pedagogies, who work to develop the finest general education and introductory courses, who publish in the peer-reviewed educational literature, and who become recognized and rewarded for their contributions to the scholarship of education.

**Action:** Take advantage of the planned revisions in the undergraduate curriculum at the University to promote a geosciences connection to signature classes and to a wide variety of the “flags” that constitute a University of Texas education.

**Action:** Ensure that outstanding courses, options and programs are available to help develop the workforce required by industry, including programs such as our professional master’s degrees, new tailored five-year programs, or undergraduate options in applied geology and geophysics.
Goal 2: To provide student services which promote learning, accomplishment, and timely completion of degree requirements

Three student services promote success: advising, tutoring, and career development. First, substantial evidence is available suggesting that professional advising, by motivated individuals who understand the rules and requirements and have a sense of the common pitfalls, are of considerable importance in the timely completion of degree requirements, retention, and overall satisfaction with any program. Such knowledgeable advisors act in support of the faculty and scientists whose knowledge is the field of geosciences and the opportunities for students. Second, success in the geosciences requires considerable supporting knowledge and capability. For example, the undergraduate curriculum at the University is increasingly focused on ensuring that our students are capable of communicating, particularly in writing. Job opportunities in the geosciences that do not demand effective communication skills are very limited. A significant part of the geosciences curriculum also demands a high level of supporting knowledge in physics, mathematics, biology, and chemistry. We ask our undergraduate students to take challenging classes, sometimes reserved for majors in other disciplines. Our objective should be to ensure that our students do not just survive these classes, but rather succeed in gaining the critical knowledge that serves as a foundation for excellence in the geosciences. Third, career development and career placement services directly support the job aspirations of both our undergraduate and graduate students. The Jackson School has a remarkable cadre of corporations that recruit our students. Services that promote success by enabling recruiting, ensuring that our students are successful in the interview process, and providing guidance for different career options indicate our commitment beyond the classroom.

Action: Create student services within the Jackson School to ensure that every student is assigned a knowledgeable professional advisor, that tutoring is available for writing, mathematics, physics, chemistry, and technology, and that each student is in a position to launch a successful career.

Goal 3: To create an environment that promotes scholarship and student success

Student services and mentoring functions enable student success and send a message that our institution is committed to supporting a high-level of scholarship. But a commitment to promoting scholarship and highly successful students implies a more comprehensive approach to experiences outside the traditional classroom.

First, we must ensure that our most gifted and most dedicated students have opportunities for a closer interaction with our faculty and researchers that cements their interests in the geosciences and ensures a future of deeper investigation and eventual contribution to our field.

Second, for undergraduates we need to expand beyond a traditional honors course of study offered in all major universities to create an environment of scholarship defined by more than grade-point, small classes, and thesis work for our most gifted undergraduate students. Today, accomplishment is also defined by a willingness and ability to take advantage of opportunities, engage in a variety of experiences, and promote life-long learning and success. The Jackson School should promote true "scholars" where a scholar is defined not just by classroom performance but by a willingness to be involved in experiences such as undergraduate research, student governance, internships, study abroad, unique field experiences, on-line education that promotes life-long learning, and service education. Many of these activities are already well-supported by our program, but we are capable of launching an organized Scholars Program that encourages students to engage in opportunities and gives our students a distinct advantage over other those from other programs. We are capable of promoting an enhanced interaction between...
undergraduates and our wealth of experts in the Bureau and Institute through undergraduate research, internships, and mentoring. This requires that we develop an organized and rich set of experiences that would allow those undergraduates with interest and drive to graduate with the distinction of being a Jackson Scholar.

Third, our graduate students are facing an increasingly large array of issues related to new teaching skills and technologies, ethics, intellectual property, writing proposals, and professional speaking. Our graduate students should be provided with the opportunities for professional growth and professional development.

**Action:** Promote the continued development of a strong honors program that attracts and engages our most gifted students.

**Action:** Develop a Jackson School Scholars Program for undergraduates designed around experiences and opportunities that promote an environment of learning, that enable student success, and that provide advantages for our students in comparison with peers at other geosciences programs.

**Action:** Provide opportunities for professional development that support successful careers for our graduate students.

**Goal 4:** To create student-centered facilities, including a student center that houses student services and creates a home for our majors and graduate students, which is adjacent to a modern classroom environment

A prospective undergraduate student exploring the Jackson School today enters a nondescript office, with minimal waiting space, to meet with our sole undergraduate advisor. Enrolled students enter and exit our School as they take classes or go to an appointment with a professor. The most advanced of our undergraduates take advantage of research that places them in laboratories or our undergraduate student computer lab. Whereas we have a reputation among graduating students as a close-knit community of teachers and students, our space and the services we provide treat undergraduates as daily transients. A prospective graduate student entering the Jackson School is greeted by a similarly nondescript office with a graduate coordinator, but also by a cadre of current graduate students eager to promote our strengths. Enrolled graduate students quickly move to offices and develop partnerships with faculty and scientists that provide a home base. However, their opportunity to enjoy and take advantage of the remarkable talents of their fellow students is limited. The design of our student spaces is not a surprise—they are much like other departments across the country. However, we have the potential to create an environment in which our space and our services help recruit students and help build a sense of community. By creating a home for our majors and our graduate students, we create a welcoming environment that encourages interaction, strengthens the identification of our students with our program, and enables success, and hence also promotes retention. It is equally important to ensure that Jackson School space, utilized for teaching our majors, is not neglected. There is substantial evidence that a modern, well illuminated classroom or lab serves both teacher and student well throughout the educational process.

**Action:** Renovate and expand the GEO building to include a modern and inviting student center to house both graduate and undergraduate advisors, tutors, student government, and include conference space, a student computing area, student work areas, casual space designed for interaction, and a recruiting center with career placement services.

**Action:** Systematically renovate classrooms that are designed to serve our majors and attract new students, creating and maintaining flexible, modern, technology classrooms and teaching laboratories that match the quality of our curriculum. Seek opportunities to renovate and develop a classroom environment that is co-located with the student center to promote the use of student services.

**Action:** Create a student-centered workspace at the Pickle Campus that promotes student access to our research scientists and facilities.

**Action:** Consider the potential of creating a more active and engaging library environment that promotes its use as a student facility.
Goal 5: To create a strong sense of community and collegiality

A large campus environment often presents itself as a real challenge in the transition from high school, and many parents and students alike will select small colleges because “the professors will know my daughter.” The University of Texas at Austin is a very large university, but every member of the Jackson School recognizes that the professors truly know the students—a sense of community is part of our long-standing culture in part because of our size, and also our commitment to field courses. We can improve upon this culture in three ways: (1) ensuring that students gain a strong sense of community on their very first day, (2) encouraging events that promote interaction among the faculty, scientists and students, and (3) making sure that prospective students and their parents recognize that our sense of community actually exceeds that of a small liberal arts college.

**Action:** Establish a unique three to four day event just prior to the start of the school year designed to build community within the incoming class and promote interaction with upperclassmen, faculty, scientists, staff, and the School leadership.

**Action:** Charge student government, at both graduate and undergraduate levels, to propose events that will promote interaction among students, faculty and scientists, and staff, and utilize these proposals to create a set of lasting events and traditions that build community.

Goal 6: To actively recruit the best and brightest students through scholarship offerings and other financial support, through personal contact, and by highlighting the unique opportunities offered by the Jackson School

Graduate students and undergraduates are drawn to the quality of a Jackson School education and the career potential that we offer. We can rightfully boast about both the size and the quality of our student body. We can also rightfully boast of student opportunities and our commitment to provide support for our graduate students. Yet, both the demand and the competition for students are growing. We can no longer afford to attract students solely by reputation when other programs at the University actively recruit among our pool of interested students; the very top students within our pool are being enticed to other schools with offers of scholarships, and many top students (particularly those outside of Texas) are not within our applicant pool. For undergraduates, we have utilized our scholarship funds to reward current students, with little or no funds being committed to recruiting new students. Much of our competition is focused on freshman or four-year scholarships to attract the best undergraduates. Similarly, it is imperative that we effectively recruit the very best graduate students by ensuring that our funding is competitive, considering “top-off” awards to attract truly superior students, and ensuring that we actively promote visits and interactions that highlight our breadth and depth. The path to preeminence in the geosciences must include a comprehensive and active commitment to recruiting the best and brightest students and a commitment to providing the talent required by industry, government and academia in the geosciences.
Action: Develop an active recruiting model for undergraduates which includes (a) providing outreach activities to our high schools, (b) accessing student records of high national SAT scores as a base for providing information on the Jackson School, (c) accessing student records within the University applicant pool with strong physics, chemistry, biology, and math backgrounds as a potential additional recruitment pool, (d) providing scholarship offerings to high-quality students with a guarantee for specific levels of support scaled to their grade-point in subsequent years, (e) incorporating a process of deliberate and active contact with prospective students from current students, advisors, faculty, scientists, and highly successful alumni and friends, and (f) playing a more active role in University recruiting efforts.

Action: Encourage visits to the Jackson School by high quality graduate student and undergraduate applicants, as higher yield rates are well correlated with face-to-face interaction and direct experiences with our programs. Such a process also assures us that these students are well-suited to receive our scholarship or graduate support offerings.

Action: Actively recruit top-notch graduate students. Add an element of prestige and financial benefit by developing a preeminent category of scholarship or fellowship that is designed to allow us to compete nationally and internationally for the highest caliber of graduate student.

Action: Improve our ability to partner with the University to ensure that our students are included in the pool of University Fellows.

Action: Ensure that access to a Jackson School geosciences education is not limited by economic capability, by providing the needed financial resources while not having Jackson School funds simply act as a substitute for other sources of grants, scholarships, or job programs.
CREATING THE FABRIC OF A GREAT COLLEGE

The level of excellence in any university is defined by the quality of the faculty, scientists, and students, and the staff that support their success. At the same time, a truly great college has a number of other key attributes:

- A sense of community and collegiality—encouraging interaction and creating a collaborative work environment that promotes both opportunity and success
- A commitment to the future of the geosciences—attracting and enabling the next generation of highly qualified and educated geoscientists
- A sense of service to societal needs—providing leadership, developing partnerships, and disseminating knowledge that serves our community, our state, our nation, the international community, and our profession
- A life-long relationship with our graduates—ensuring that the Jackson School is always viewed as an opportunity, a partner, and a connection

In each case, the Jackson School has the foundation necessary to create a truly great college, but we propose the following as additional steps toward realizing our potential:

**Goal 1: To create a collaborative, collegial, and interactive work environment across the Jackson School units**

The School combines three highly regarded units, each characterized by different research and educational cultures and by different modes of operation. In total, the set of scientists within these three units represents one of the largest and most diverse collections of geosciences expertise in the world. Yet, neither our capability nor our reputation reflects the added benefits that can be gained from synergism and from the intellectual stimulus of interaction and partnership. The reasons are simple—we have only a short history of interaction as a School and our units are physically separated. As a School, we must take deliberate steps to promote interaction and to develop a strong sense of community and collegiality.

**Action:** Utilize existing speaker endowments to create a JSG-wide seminar series limited to the truly outstanding speakers that have the potential to attract the entire School, where a reception is funded, dedicated bus transport is available, and the individual units take turns acting as the host.

**Action:** Empower curricular or theme groups to promote participation and interaction between faculty and scientists with similar interests.

**Action:** Develop and institutionalize a series of social events that provide opportunities for interactions among faculty, scientists, staff, students, alumni and friends including Jackson tailgates, Jackson Picnics, the Jackson holiday party, and our awards banquet.

**Action:** Build interactive video-conferencing facilities at locations within BEG, UTIG, DGS, and the Dean’s office to facilitate participation at seminars and committee meetings to minimize travel time.

**Action:** Find and renovate collaborative spaces at both Pickle and GEO that provide a location for JSG faculty, scientists, and students coming from the other campus to work and interact.

**Action:** Minimize the time and cost of travel between Pickle and main campus by exploring options such as JSG dedicated van transport, dedicated parking at the GEO building for designated vehicles, and parking validation.

**Goal 2: To increase our commitment to the future of the geosciences**

The geosciences lag behind all other sciences in our ability to attract scholars that reflect the diversity of our state or our nation. A failure to address this issue will become a failure to serve the needs of this nation because we will be unable to provide an educated and quality workforce to address the compelling issues in the geosciences such as those related to energy, water, minerals, natural hazards, and the environment. We can substantially improve upon our commitment to faculty and scientist development.

In contrast, the Jackson School and each of its units can be very proud of its commitment to K-12 education. As just one example, the School
pioneered GeoFORCE, a highly successful effort to promote interest in the geosciences at the middle school and high school level and to ensure a diverse population of future students. There are many successful programs in each of our units (ranging from workshops and field experiences that support K-12 teachers to outreach seminars to organized pre-college student activities to the role of the State Geologist in providing public information). Our success is clearly tied to individuals deeply committed to empowering the next generation of geoscientists. Still, we can do much to promote their success.

**Action:** Ensure that our advertisements for new faculty and scientists are both broad and open, so that we can attract the broadest possible pool of exceptional candidates.

**Action:** Continuously advertise for the very best geoscientists regardless of field and use this focus on “opportunity hires” to actively seek top notch female and minority geoscientists and other targets of opportunity.

**Action:** Develop the mechanisms to support the hiring of dual career geosciences couples within the JSG community.

**Action:** Provide mentoring and career planning for young faculty and scientists to promote their success.

**Action:** Develop a comprehensive approach that yields an enduring end-to-end commitment to the study of geosciences at all levels (K-12, undergraduate, graduate, and post-graduate) designed to ensure a diverse and capable future workforce, including actions specifically to:

- **a)** expand K-12 programs such as GeoFORCE that attract young students to the geosciences
- **b)** support teachers and curriculum development that enables K-12 course development and promotes a strong Earth and Space Science capstone in our high schools and expands efforts such as the Texas Regional Collaboratives for Excellence in Science Teaching, enabling dissemination of rigorous, standards-aligned K-12 science curriculum.
- **c)** explore the potential of partnerships with the College of Education or through UTeach that will promote the development of geosciences-trained teachers
- **d)** develop scholarship programs that ensure access to a University of Texas at Austin education, including specific programs tailored to need-based students through loan forgiveness
- **e)** develop mentoring programs (math, writing, physics, chemistry, and biology) that help ensure the success of our undergraduates and promote interest in continued educational or professional development
- **f)** broaden the participation and impact of career development efforts, such as the annual Geoscience Career Day held by BEG as part of National Earth Science Week, and increase our participation in Explore UT.
- **g)** continue to develop a strong outreach lecture series
- **h)** seek partnerships with national organizations and other colleges and universities that promote increased diversity in the geosciences.

**Action:** Create a collaborative management structure within the JSG that is designed to energize and enable committed individuals in each unit to join forces where beneficial and to become even more successful.

**Action:** Reward efforts that bring competitive grants into the Jackson School that are focused on outreach and the development of educational programs by providing additional central support for key personnel and by creating an award structure for outstanding outreach activities.

**Goal 3: To promote a strong sense of service to societal needs**

Ours is a discipline that has a global reach and the issues we address are of compelling and enduring interest to society. The impact of a great school goes beyond its specific research accomplishments and beyond its ability to educate resident students. We have an obligation to promote human capacity building across the globe, to guide and promote
the frontiers of our science through advisory and policy-setting bodies and leadership in professional societies, and to recognize the societal needs ranging from promoting economic vitality to enabling environmental stewardship.

**Action:** Promote the next step in the development of the Latin American Forum, by developing a mode of interaction that supports collaboration and interaction on specific research, education, and policy projects.

**Action:** Expand the University participation and School commitment to engaging and serving our state and federal legislators, specifically by advancing activities such as the Decision Makers Field Trip, which is currently led by the Bureau and held biannually for Texas legislative and agency staff.

**Action:** Establish a Jackson School Distinguished Lecturer award that is designed to promote the travel of a JSG faculty member or scientist to small liberal arts colleges, minority-serving institutions, or universities in developing countries.

**Action:** Establish a visiting scientist program developed specifically to promote long-term visits from scientists in developing nations, minority-serving institutions, or undergraduate-only colleges and designed to promote research interaction and efforts to enable geosciences education.

**Action:** Develop formal ties with specific international universities or groups that enable collaborative research, promote human capacity building, and provide student experiences and exchange.

**Action:** Build upon current BEG efforts to develop a professional or continuing education program with an outstanding reputation as an influential intellectual exchange and a unique service.

**Action:** Expand and reward efforts to communicate JSG discoveries and knowledge to the public.

**Action:** Establish an award system that celebrates a commitment to service, rewarding efforts that range from unit service, testimony, professional course development, professional society leadership, public communication, and international activities that extend above and beyond the expectations of a faculty member or scientist.

**Goal 4: To create a life-long relationship with our graduates and friends**

The Jackson School has a body of alumni and friends that are both extraordinarily successful and extremely dedicated to geosciences at the University of Texas at Austin. Their commitment is directly tied to our current success. Yet, as a new school we do not have a constituent alumni society, nor have we taken all of the steps necessary to create a network that incorporates the full spectrum of our graduates and that seeks to tie faculty, scientists, and our current and prospective students to this remarkable set of individuals.

**Action:** Establish a constituent alumni and friends society for the Jackson School, including:

- a charter that defines membership and local chapters
- a governing board that meets at least two times a year and is empowered to promote interaction between the JSG and our alumni and friends,
- a mechanism to induct graduates and friends

**Action:** Utilize the alumni and friends society to promote specific alumni activities, including:

- a recruiting of prospective students (e.g. high school lectures and visits)
- b) acting as student mentors
- c) enabling professional development and promoting internships
- d) promoting interaction between faculty, scientists, students and alumni and friends through sponsorship of activities such as alumni field trips
- e) promoting alumni and friends events that increase interaction at different locations and professional society meetings
- f) establishing a series of awards that celebrate the achievement of our graduates
INCREASING OUR COMPETITIVENESS IN ATTRACTING AND RETAINING TOP TALENT

The peer group for the Jackson School of Geosciences includes all of the highest ranked Earth Science programs in the United States. These programs are within universities recognized for their excellence, and for their commitment to recruit exceptional faculty and scientists. The demand for geoscientists is growing substantially. Industry is in an aggressive growth phase. Universities are experiencing significantly greater student interest and are opening new faculty lines. Major government labs and centers are anticipating a wave of retirements. Today, the best and the brightest often receive multiple offers and existing top talent is subject to deliberate recruiting by competing institutions. The Jackson School will not achieve its objective of being a preeminent program unless we are deliberate in eliminating the barriers to attracting and retaining top talent. The following goals and actions are designed to increase our ability to attract and retain truly outstanding faculty and scientists.

**Goal 1: To demonstrate a commitment to our research scientists by providing improved job security**

The majority of the Jackson School research community obtains a significant part or all of their annual salary through competition for external grants and contracts. Institutions with this model, including the Jackson School, pride themselves on the extent to which the “soft” money environment promotes cutting-edge science and engineering and a constant testing of ideas and capability in the peer-review marketplace. The Jackson School is proud of our history of retaining scientists who have successfully competed for grants and contracts for many years and decades. At the same time, many of our peer institutions provide a safety net for researchers to ensure that the vagaries of funding agencies or federal and state budgets do not result in the loss of salary for a highly valued and productive employee. Our lack of a safety net has particular implications for recruiting young scientists with families, for fending off attempts by other institutions to recruit our best, or for providing a sense of commitment to all of our employees.

**Action:** Create a safety net for productive research scientists, defined by performance and rank, based on (a) recommendation by the unit leader that there is reasonable expectation for renewed funding in the short-term future and (b) increased level of support at each level of rank (i.e. three, six, and nine month backstop levels with the longest backstop period associated with the highest rank).

**Goal 2: To provide a base level of support for all Ph.D. scientists in order to foster our ability to attract external funding and to promote institutional participation**

The units within the Jackson School all have very different policies of base support for their scientists. The Institute for Geophysics provides six months of support for new scientists, renewed annually based on performance and State funding, and then increased with appointment to the most senior rank. Support staff must be funded on grants and contracts. The Bureau of Economic Geology utilizes its State support to fund support staff, and thereby requires all scientists to fully fund their salaries. Departmental research scientists are frequently assigned specific functions that provide support or co-support for their salary. The Jackson School is committed to maintaining an environment that promotes cutting-edge research and that promotes a drive to compete for grants and contracts.

However, three issues arise from our current funding models that make us less likely to recruit talented individuals, decrease the opportunity for these individuals to participate in the institution, and restrict their ability to tackle some of the most innovative problems. First, a 12-month soft money funding model yields a philosophy in which taking earned vacation, writing a new proposal or paper, or participating in institutional activities is viewed as problematic because it is not billable time. Second, we are less able to recruit the best young scientists, and they are also less likely to take chances in tackling innovative problems, if we send a message that our job offer is solely a license to hunt for dollars when other institutions provide some base support. Third, and importantly, the current
difference in funding models among the three units is likely to create significant biases in the ability of individual units to attract new talent. This is particularly important for the proposed new thematic areas. It is the intent of our proposed research themes to energize and advance the entire Jackson School and each of its units. This is less likely to occur if potential recruits are drawn to the highest level of hard salary commitment. In addition, the Jackson School should be open to exploring joint appointments, including a percentage of faculty time, which may have the added benefit of promoting interaction across the units, enabling participation in both education and research, and improving key metrics used by external evaluators and prospective students.

**Action:** Provide a minimum base salary of at least one month for all research scientists

**Action:** Institute a uniform model for funding new positions related to the emerging thematic areas for research and education within this strategic plan when employing the Jackson endowment, providing six months of support for research positions within any unit and traditional nine-month faculty position support.

**Action:** Carefully review all hires within the emerging thematic areas, for both research and education opportunities, and consider their potential hiring as joint appointments, with at least a percentage of faculty time.

**Goal 3: To develop a leave program for faculty that matches or exceeds sabbatical programs in every other top university**

The peer institutions of the Jackson School have defined sabbatical programs, in which faculty are encouraged to create new partnerships, develop new approaches to problems, and re-invigorate their research and teaching programs. Most institutions accept proposals for a sabbatical after a defined period of employment (e.g. six years), and fully support one semester of leave or two-thirds of an annual leave. It is not an entitlement, but rather a commitment to promoting an enduring level of excellence. At the Jackson School, our faculty are alone among our peers in their inability to work for an extended period in the field or at another institution simply because of their commitment to teaching, and the University of Texas System does not allow sabbaticals. There is no doubt that the Jackson School is at a competitive disadvantage in hiring faculty in comparison with our peer institutions if we do not provide an opportunity for leave designed to promote renewal and innovation.

**Action:** Develop an opportunity for periodic release from normal teaching and committee duties to enable innovative new research and educational experiences and approaches, and extended visiting appointments at other institutions, that mirror the benefits and requirements of our peer programs.

**Goal 4: To ensure that our teaching commitments are competitive with our peer institutions.**

The first objective of a public university is to provide an exceptional and comprehensive education for our students. The Jackson School makes this commitment both for our majors and through a commitment to general education courses. A key element in achieving excellence in the scholarship of education is to attract top-quality faculty who are highly-engaged in teaching and mentorship while also able to develop a research program that brings national and international attention. Excessive teaching commitments detract from both teaching and research quality, and they can hinder our ability to attract top-quality faculty in comparison with our peer institutions. Several elements of this strategic plan promote high quality teaching and also ameliorate high teaching loads. In particular, this plan provides a process for entraining research scientists into the classroom, it calls for a number of new hires that will provide added teaching capabilities, and promotes hiring of geoscientists who focus on the scholarship of teaching and who are engaged primarily in introductory courses and general education courses. Even with these steps, the
Jackson School should be vigilant in ensuring that the teaching loads of individual faculty actively engaged in research do not place us at a competitive disadvantage with our peer research universities.

**Action:** Monitor teaching loads in the top geoscience programs in the United States and take appropriate steps (asymmetrical teaching loads, Dean’s Fellows, research scientist teaching assignments, and the like) to ensure a competitive position.

**Goal 5: To enable active consideration of dual-career hires in order to attract outstanding candidates**

Increasingly, scientists and engineers vested in their careers are also finding their personal partners within the same or related fields. Universities across the country are finding it common to interview exceptional individuals whose partners are also professionals seeking rewarding employment. Universities that fail to find worthwhile opportunities for both individuals either lose these individuals to other institutions or they hire individuals who then quickly return to the job market. It is noteworthy that failure to provide dual-career opportunities has a significant impact on recruiting outstanding women scientists. The Jackson School has the capability to seek outstanding candidates, and we cannot afford to have our search for excellence be limited because of dual-career issues.

**Action:** Create a policy for review and support that ensures that dual-career employment needs do not influence our ability to hire outstanding faculty and scientists.

**Goal 6: To ensure that our salaries and start-up packages are highly competitive**

The hiring of a new faculty member or research scientist is an investment in the future of the institution. We must consider each investment carefully and wisely, but we must also ensure that we enable our people to succeed. Start-up packages are an investment in the success of a new employee, designed to ensure a more rapid transition to the development of new research proposals and to quality teaching. Highly competitive institutions typically provide start-up time to jump start proposals and/or develop courses prior to being fully enmeshed in university life and requirements. They also invest in equipment or laboratories to enable a more seamless research transition, as opposed to waiting on the success or timing of external grants. Salaries are increasingly a negotiation, especially as institutions compete for the strongest new faculty or scientists that tend to have multiple opportunities. Institutions that are unable to provide competitive salaries or start-up packages are unable to compete for the best talent. Conversely, they may seek hires in sub-disciplines of less demand or that are outside cutting-edge research opportunities, and they may limit investment in fields of high expense, such as those heavily dependent on laboratories or high-end equipment. The Jackson School must be willing to invest in its future, and above all else, recruit the best and brightest and then ensure that they will be successful.

**Action:** Create a partnership between unit leaders, the dean, and School resources to ensure competitive salaries and start-up packages, with the commitment to providing new hires both the time and resources to start and build a highly successful research and/or teaching enterprise.

**Action:** Continuously monitor compensation for all research scientists and faculty, and correct inequities, to ensure a competitive position in comparison with our peer institutions.
The Department of Geological Sciences, the Institute for Geophysics, and the Bureau of Economic Geology have long histories of excellence. Together, as the John A. and Katherine G. Jackson School of Geosciences, they provide an extraordinary and unique environment for the scholarship of research, education and service. Despite our level of excellence as a top-ten program in the Geosciences, we are far from satisfied. Our objective is to create the preeminent program in the geosciences, with the University of Texas at Austin as the center of our disciplines. This goal appears lofty, but no other school in the geosciences can match our combination of foundational strength and remarkable opportunity. The Jackson School Strategic Plan focuses on four major themes: (1) placing the Jackson School at the forefront of research, (2) placing the Jackson School at the forefront of education, student services, and student opportunities, (3) creating the fabric of a great college, and (4) increasing our competitiveness in attracting top talent. This plan is designed as a four-year blueprint, describing our goals, investments, and commitments for the Jackson School. However, the accomplishment of the goals within this plan is not intended as an ending, but rather it is designed to be only the beginning of our effort to ensure a truly remarkable success story that serves the next generation of scholars in their pursuit of solutions to some of society’s most pressing and enduring problems.

CONCLUDING REMARKS

The Department of Geological Sciences, the Institute for Geophysics, and the Bureau of Economic Geology have long histories of excellence. Together, as the John A. and Katherine G. Jackson School of Geosciences, they provide an extraordinary and unique environment for the scholarship of research, education and service. Despite our level of excellence as a top-ten program in the Geosciences, we are far from satisfied. Our objective is to create the preeminent program in the geosciences, with the University of Texas at Austin as the center of our disciplines. This goal appears lofty, but no other school in the geosciences can match our combination of foundational strength and remarkable opportunity. The Jackson School Strategic Plan focuses on four major themes: (1) placing the Jackson School at the forefront of research, (2) placing the Jackson School at the forefront of education, student services, and student opportunities, (3) creating the fabric of a great college, and (4) increasing our competitiveness in attracting top talent. This plan is designed as a four-year blueprint, describing our goals, investments, and commitments for the Jackson School. However, the accomplishment of the goals within this plan is not intended as an ending, but rather it is designed to be only the beginning of our effort to ensure a truly remarkable success story that serves the next generation of scholars in their pursuit of solutions to some of society’s most pressing and enduring problems.
BUDGETING FOR THE PLAN

Budgeting for the strategic plan will rely on aggressively raising new funds from constituents, stakeholders, alumni, and friends while strategically allocating existing funds from the Jackson endowment. The budgets are an investment in excellence extending until 2010.
The strategic plan calls for an investment of permanent funds in approximately 30 new Ph.D.s in the Jackson School and an increase in staff support to enable the success of our students. This investment will jump start progress in each of the four major research foci as well as help maintain excellence in our core mission. This growth will require temporary fund investments in start-up funds and renovation to ensure that these new scientists and faculty members are successful. The budget also foresees “continuing temporary funds” for budget items, such as student scholarships, that will continue beyond 2010 but for which we still desire budget flexibility.
Placing the Jackson School at the forefront of research will require a considerable investment in new faculty and scientists. The plan calls for investments in four major research foci, a commitment to enhancing our core programs, and a willingness to always seek cutting-edge Ph.D.s that may not fit neatly within a specific theme. The Jackson School will invest in facilities and research incentives that will ensure that these new faculty and scientists will be competitive in the science marketplace.
The Jackson School plan to place our program at the forefront of education, student services, and student opportunities is truly comprehensive. The plan invests in a new student center, the tutoring, advising, and career placement that helps our students succeed in a timely fashion, and a level of curricular excellence that sets a national standard.
The units within the Jackson School have a long history of excellence but a short history as a college. The plan calls for a comprehensive approach to the creation of a college, ranging from an investment in the K-12 pipeline for new geoscientists, to efforts to promote collegiality and interaction within the school as a whole, to a commitment to creating a life-long connection with our alumni.
The marketplace for geoscientists has changed dramatically over the last several years. In particular, our research scientists that pay their own salaries off of external grants are constantly being recruited by other institutions offering salary commitments. Many of our salaries are not competitive. The Jackson School plan proposes a systematic approach to addressing issues that increase our competitiveness to attract and retain top talent.
MISSION

To advance understanding of the Earth, its resources, systems, and environment, for the lasting benefit of humankind.

VISION

To become the preeminent geosciences program in the country with international prominence in geology, geophysics, energy, mineral and water resources, and in the broad areas of the earth sciences, including the Earth’s environment.

To realize this vision, the Jackson School will pursue initiatives that

• Place the school at the forefront of research.

• Place the school at the forefront of education, student services, and student opportunities.

• Create the fabric of a great college.

• Increase our competitiveness for top talent.