The School of Physical Sciences Strategic Plan, 27 May 2016
Spring 2016 – Spring 2021

Our Mission
The Mission of the UCI School of Physical Sciences is to provide world-class education and research discoveries in chemistry, earth system science, mathematics, and physics & astronomy in order to spark breakthroughs in fundamental science, drive innovation, improve society, and ignite curiosity and creativity.

Our Vision
Our Vision is to drive innovation, improve society, and ignite curiosity and creativity through education, exploration, and discovery.

Our Role
Our teaching is a core component of university education, ranging from general to highly specialized. We help incoming students achieve skills necessary for their various fields and train our undergraduate majors and graduate students to excel at independent discovery. We foster collaboration and an inclusive culture for our dynamic and diverse group of scientists, educators, students, and staff. Our influence extends from helping underprivileged students prepare for entrance into university, to starting companies that bring our innovations to the public sphere, to informing decision makers and the public about issues affecting the world. The UCI School of Physical Sciences encompasses the finest spirit of science.

The School of Physical Sciences is very much in accord with UCI's aspirational motto: Bright Past, Brilliant Future. As outlined below, the School has played an important role in UCI's rapid rise to an internationally recognized university. We seek to move into the upper echelon of our University of California sister campuses and also ever closer to top ten ratings of our departments on various national rankings. Our metrics for measuring this success are (1) Continuous growth in publications, citations, and external research funding; (2) Recruitment of top graduate student candidates, improvement in time-to-degree, diversity, degree completion, and placement; (3) Continued innovation in undergraduate education, retention, mentoring, and placement; (4) Growth in the number of patents awarded and intellectual property transferred to the general public; and (5) Increasingly effective outreach to the K-12 system to help prepare students to join us in our journey toward educating students to be effective citizens in the rapidly changing 21st century world. A corollary of each of these aspirations is that the School will continue to diversify its student body, faculty, and staff to better reflect the population of California, while continuing to forge interdisciplinary frontiers of convergent science.

I. OVERVIEW OF THE SCHOOL

The School of Physical Sciences is comprised of four highly ranked departments: Chemistry, Earth System Science, Mathematics, and Physics & Astronomy. In 1995, the School garnered international prominence when founding faculty members F. Sherwood Rowland (chemistry) and Frederick Reines (physics) each received the Nobel Prize, making UCI the first public university with faculty receiving the award in two different fields in the same year. All our departments have National Research Council S-rankings above the 90th percentile and the Academic Analytics rankings are even higher: Chemistry 92%, Earth System Science 100%, Mathematics 99%, Physics & Astronomy 96%. These rankings are based on the overall quality of the research program and faculty productivity. Our graduate programs are among the most productive in the nation, ranking in the top 20 nationally for Ph.D. production. School of Physical Sciences Ph.D. production has more than doubled in the last 10 years. Eleven faculty members of the School have been elected to the National Academy of Sciences, and 12 belong to the American Academy of Arts and Sciences (AAAS).

The School of Physical Sciences teaches 85% of UCI freshmen during their first two quarters, helping them achieve the basic skills necessary for their various majors. Teaching becomes much more specialized as we prepare our majors for careers and entry into graduate and professional programs, and as we train graduate students to excel at independent discovery and application of knowledge. Nearly all of our graduate student alumni have careers that employ their UC Irvine education. Typically they become university faculty, work in industry or national laboratories. A growing cohort is pursuing an entrepreneurial career.

The School of Physical Sciences is committed to inclusive excellence at all levels: faculty, staff, graduate and undergraduate education. Twenty eight percent of our faculty members are women, a doubling in percentage over the previous decade. In the past two years, we have hired a Native American faculty member and an African American female faculty member. Our favorable record in gender diversity and policies related to equity was recognized by the Clare Booth Luce program (Henry Luce Foundation), which gave us a $500k award to further recruit and support female faculty members. For student inclusion, the National Science Foundation just awarded us nearly $1 million for scholarships and research into the best ways to support low-income and academically meritorious students in physics, building on the strong mentoring that already exists.

The School of Physical Sciences has played a prominent role in UCI's bright past, and will provide similar leadership toward our brilliant future. We will participate fully in the four pillars: growth that makes a difference, first in class, great partners, and new paths toward our brilliant future.

II. OVERVIEW OF THE FOUR DEPARTMENTS

The **Department of Chemistry** operates one of the largest chemistry teaching enterprises in the U.S., graduating 100-140 B.S. majors each year – a number in the top five nationwide. The Department now offers lecture videos of its entire lower division undergraduate curriculum, in addition to videos of most of its upper division lecture classes and three graduate courses (http://ocw.uci.edu). The Department of Chemistry has considerable research strengths in synthesis; hard and soft materials science and nanoscience; physical chemistry and time dependent spectroscopy; and chemical theory. Atmospheric chemistry remains an area of notable strength, especially with the strong overlap with the Department of Earth System Science. The Department of Chemistry has trained nearly 1,500 graduate students – one third are industry scientists (working at companies such as Pfizer, GlaxoSmithKline, Amgen, Gilead Sciences, and KLA Tencor); one quarter are industry executives and managers; and one quarter are teachers at universities, colleges, and high schools. The Department is already close to an appropriate size for a major research university. After the current build-out of the atmospheric science program, further departmental growth will be aimed mainly at strategic synergy with interdisciplinary programs across campus.

The **Department of Earth System Science** is the prototype for successful convergent science on the UCI campus. It is the world's first department designed to bring together a diverse group of scientists to study global climate change, and to contribute through research and teaching to a fundamental scientific understanding of the Earth as a coupled dynamic system. The department offers two bachelor's degrees: Environmental Science B.A. and Earth System Science B.S., and teaches geosciences and climate science to a large number of undergraduates as part of their general education courses. Research strengths in the department include atmospheric science, oceanography, marine and terrestrial ecology including carbon cycle studies, and ice sheet dynamics; the Department of Earth System Science has a cluster of the world's leading glaciologists. As an inherently interdisciplinary field, each area of strength is synergetic with several other departments on campus. It is also a young department that has trained over 100 graduate students thus far; more than half have faculty careers, almost a quarter have careers at national or university laboratories, and a quarter are in industry positions, and most continue to do research related to climate change or deal with environmental issues. Emphasis for new faculty member hires will be in areas related to the broader impact of climate change – the intersection of the human system with natural systems – as well as modest growth of polar science.

The **Department of Mathematics** has research excellence in both basic mathematics and the application of mathematics to interdisciplinary problems. Areas of strength include analysis and partial differential equations, geometry, number theory, computational mathematics, mathematical biology, cryptography, and financial mathematics. The bulk of the Department's undergraduate teaching is to non-math majors, but the growth of mathematics majors over the past decade has been dramatic. Within the mathematics major, the Department now offers specializations/concentrations in mathematics education, applied and computational mathematics, mathematical biology, and mathematical finance. The Department of Mathematics has trained more than 800 graduate students. Three quarters of the graduate student alumni are faculty members and the remaining

quarter are in industry (working at companies such as Wells Fargo and Google). The research excellence and enrollment growth has resulted in significant teaching workload increases, as both undergraduate and graduate students are attracted to the Department. It is crucial that the faculty of the Department of Mathematics grow significantly over the near term to adequately meet its rapidly increasing teaching workload.

The **Department of Physics & Astronomy** is home to preeminent faculty working to understand the universe at its most fundamental levels. World-class research within the Department of Physics & Astronomy spans the smallest scales in nature (particle physics) to the largest scales observable (astrophysics and cosmology); it explores matter from cold quantum systems (condensed matter) to the living world (biophysics) to the frontier of fusion energy (plasma physics). The undergraduate curriculum provides degrees in physics and in applied physics with concentrations in biomedical physics, computational physics, physics education, philosophy of physics, and a specialization in astrophysics. The Department of Physics & Astronomy ranks 15th in the nation in Ph.D. production and has trained over 800 graduate students. About half of these graduates become industry scientists and engineers (working in companies such as Intel, Google, Boeing, and Tri Alpha Energy); one quarter have careers in national laboratories or university research groups. Future growth will focus on attracting preeminent scholars who complement and build upon existing research strengths, with an eye towards the most cutting-edge science appealing to the best and brightest students in the world.

III: RESEARCH STRENGTHS IN CONVERGENT SCIENCE

Science is increasingly interdisciplinary, and our four departments have each been very active in leading UCI toward a future of highly integrated scientific inquiry, education, and innovation. Several key examples include the following:

AirUCI is dedicated to understanding and solving the urgent challenges related to air pollution, climate change, water quality, and green technology, at the local and global level. The center has 23 UCI faculty member affiliates across the disciplines of chemistry, physics, engineering, and medicine as well as national and international collaborators. Director: Barbara Finlayson-Pitts, Professor of Chemistry. http://airuci.uci.edu/

CalTeach is a UC-wide effort to prepare more students for teaching careers. UCI has the only program in the state that allows a student to earn a B.S. degree and qualify for a K-12 teaching credential in four years of study. UCI CalTeach is jointly sponsored by the Schools of Physical Sciences, Biological Sciences, and Education. http://calteach.uci.edu/

Chemistry at the Space-Time Limit (CASTL) is a National Science Foundation funded center that develops the essential science and technology to probe single chemical events in real space and time. In addition to bringing together faculty in the UCI Schools of Physical Sciences and Engineering, there are center members from Northwestern University, University of Pittsburgh, University of Utah, and Penn State University. Director: V. Ara Apkarian, Professor of Chemistry. http://www.castl.uci.edu/

Center for Complex Biological Systems (CCBS) integrates expertise and perspectives from diverse scientific fields to develop a deeper understanding of systems biology, includes faculty member representation from all four of our departments, and is affiliated with the graduate program: Mathematical, Computational, and Systems Biology. http://ccbs.uci.edu/

Center for Cosmology brings together particle physicists and astronomers to explore links between the largest and smallest scales in nature. The Cosmology Center takes advantage of the fact that Physics and Astronomy have a combined department at UC Irvine. It further benefits from strengths of both groups to create an environment of nationally recognized excellence.

Chao Family Comprehensive Cancer Center brings together a multidisciplinary group to discover, teach and heal within the broad discipline of cancer medicine. Members from the Departments of Chemistry and Mathematics play an important role in this center. http://www.cancer.uci.edu/

Data Science Initiative coordinates and links the activities of researchers and students across campus involved in various aspects of data science. James Randerson, Professor of Earth System Science, is on the Advisory Board. http://datascience.uci.edu

Institute for Mathematical and Behavioral Sciences (IMBS) is a specialized research center that facilitates interaction among scientists to formulate precisely and test theories of human behavior. The Institute is in the School of Social Sciences but faculty members in the Department of Mathematics play a key role. Director: Donald Saari, UCI Distinguished Professor of Economics and Mathematics. www.imbs.uci.edu

Irvine Materials Research Institute (IMRI) is an umbrella institute for materials research at UCI, and provides major instrumentation and staff support for materials characterization for UCI, other universities, and industry. School of Physical Sciences faculty members play a major role in developing and managing IMRI.

Southern California Center for Galaxy Evolution, led by UCI Department of Physics & Astronomy, brings together members from five University of California campuses to promote research in how galaxies are formed. Director: James Bullock, Professor of Physics & Astronomy. http://www.cge.uci.edu/

UCI OCEANS (Oceans, Changing Environments, Arts, and Nearshore Societies) is a campus-wide initiative that tackles, through research and education, pressing marine and on-shore environmental concerns and investigates questions at both global and local scales. The initiative brings together faculty from 12 (is this the right number?) UCI Schools. Director: Adam Martiny, Associate Professor of Earth System Science. http://oceans.uci.edu/oceans-initiative/

UCI Applied Innovation brings together a large number of faculty members to work with community leaders to support job creation and economic growth. http://innovation.uci.edu/

Water UCI facilitates seamless collaboration around questions of fundamental and applied water science, technology, management, and policy, and includes participation from faculty and students in the Department of Earth System Science. http://water.uci.edu

IV. STRATEGIC GOALS – JULY 1, 2016 - JUNE 30, 2021

By the end of fiscal year 2021, we intend to achieve six critical and long term goals, each of which is essential for our School to continue to improve delivery of its promise of exceptional education, opportunities to explore the big challenges, ideas and questions that confront our community, nation and planet, and to achieve breakthrough discoveries that will benefit all. We will continue to work within the framework of the campus commitment to the four pillars of excellence.

Strategic Goal 1: Undergraduate Education

Goal 1 is to better identify and meet our students' learning needs. Our efforts will focus on (1) improving the retention of our undergraduate majors by 10%; (2) evening up the retention rates of underrepresented minority, first-generation, and low-income students; and (3) reaching a career placement success rate of 90% for our graduates.

Tactics

To achieve Goal 1, we will

- *Track meaningfully student progress and success* in collaboration with central administration using the new Student Information System and with assessment resources from the UCI Division of Teaching and Learning.
- *Pursue best methods to retain our increasingly diverse student body* by building upon our best practices that include student communities, academic support, and research and industry internship opportunities.
- *Increase our emphasis on mentorship via peer mentoring, faculty mentoring, and alumni mentoring.*

- *Expose majors and non-majors to diverse career paths available with a degree in the physical sciences* via lectures on career options in large enrollment freshmen classes and through alumni engagement.
- *Continue to encourage and promote undergraduate research opportunities* with individual faculty laboratory opportunities, inquiry-based and industry-relevant experiments in laboratory classes, and internship programs.
- *Improve the departmental and School climate for our rapidly growing number of underrepresented minority, first generation, and international students.*

The School of Physical Sciences trains students to apply quantitative thinking to the world around us, from the smallest subatomic particles, to the molecules that make up the human body, to the forces transforming our planet, all the way to the structure of the cosmos. Humanity is at the middle of these vast scales of time and space. By far, non-majors make up our greatest classroom constituency. The School of Physical Sciences is responsible for about one-sixth of undergraduate instruction at UCI, mostly at the lower division. Among freshmen who entered UCI in 2015-16, 46% took a mathematics course in their first quarter, 36% took a chemistry course in their first quarter, 23% took a physics course in their second quarter, and 5% took an Earth system science course in their second quarter.

For our undergraduate majors, we continue to upgrade and modernize our curriculum and teaching infrastructure to prepare them for 21st century careers. Over a third of chemistry majors and almost half of physics majors participate in laboratory research. The average time to degree for our majors is close to the 12-quarter ideal but attrition is still higher among underrepresented groups pursuing bachelor's degrees. The Department of Physics & Astronomy recently obtained federal funding for scholarships and research into the best ways to support low-income students in physics. This award is a great opportunity for the School to understand retention issues and proactively address these issues across all four departments.

Peer mentoring with our peer advisers is available through Physical Sciences Student Affairs. Additionally, the Physical Sciences Undergraduate Mentoring program matches current UCI students with mentors from local companies (also see Goal 5). To improve faculty mentoring, we will encourage the development of a group of faculty advisers in each department (following the example of the Department and Physics & Astronomy) and create resources for these advisers to better understand the challenges faced by underrepresented minority, first-generation, low-income and international students.

The School has initiated an Inclusive Excellence team to address departmental and School climate. The Physical Sciences Student Affairs Office will assess student climate with annual satisfaction surveys.

Strategic Goal 2: Graduate Education and Research

Goal 2 is to move our departments even closer to the top ten ratings on various national rankings. Our efforts will focus on (1) raising the quality of our graduate programs, (2) increasing graduate degree production from 83 Ph.D.s per year to over 90 Ph.D.s per year, and (3) increasing the School's research expenditures to $60 million annually (from today's $50M/yr).

Tactics

To achieve Goal 2, we will

- *Support and expand graduate student preparation programs,* such as our Mathematics Summer Jumpstart and Chemical and Materials Physics (ChaMP) programs.
- *Increase our existing interdisciplinary and convergent science activities,* including the new doctoral Math, Computational, and Systems Biology graduate program and high-impact hiring program concepts.
- *Mentor incoming students, especially while navigating their first year in graduate school, proactively support them throughout graduate school, and continue to encourage them to apply for prestigious fellowships.*
- Reduce time to degree and retention/completion rates via targeted mentoring strategies *Increase the visibility of our graduate programs and develop more effective recruitment programs.*

- *Attract and retain underrepresented minorities and women at both the graduate student and faculty levels.*
- *Increase proposal funding rate, number of submitted applications, and award size* by (1) mentoring young faculty members in the art of proposal writing, (2) working with the new Vice Chancellor of Research to increase funding for making personal contact with funding officers, and (3) providing research development staff support for large, multi-investigator proposals.
- *Increase funding from philanthropic organizations, encourage business partnerships, and enhance research partnerships with government laboratories.* The School will continue to provide the needed staff support and will initiate a Visiting Scientists Program.

Graduate education and research is not only a key pillar of our success, it is also often the focal point for rating our programs. In an increasingly technological economy, physical sciences graduate education is crucial for the economic success of the State of California and the nation. We desire to continue to recruit the best students from a diverse pool, and will continue to develop effective programs coordinated with UCI Graduate Division and the California State University system for graduate recruitment, with special focus on underrepresented minorities. We will build on current departmental efforts such as the Department of Chemistry's undergraduate symposium day and the Department of Physics & Astronomy's mentorship via the Cal-Bridge program. More emphasis will be placed on expanding our recruitment network and establishing contact with School alumni who are now in schools that can feed our graduate programs.

Once our students matriculate, we provide first-class facilities, research support, and mentoring. Most of our mentoring efforts will be at the departmental level. The School will put more resources into the Science Scholar Pathways (SSP) initiative that facilitates career and networking opportunities for graduate students and postdocs. This quarterly speaker series features presenters from prominent companies and institutions around the nation. We will continue our very successful fellowships workshop: in the last five years, through such mentorship, the School of Physical Sciences has had 42 National Science Foundation Graduate Research Fellowship Program (GRFP) awardees.

We will redouble our efforts to place our students in jobs that will help each of them meet their personal goals and optimally contribute to society. At present, approximately 65% of the School of Physical Sciences incoming doctoral students complete the doctoral degree. Nearly all of our graduate alumni (including master's degree graduates) have careers using the disciplines in which they trained. About 25% become university faculty and the remaining have industry, national laboratory, or teaching careers. As part of the newly initiated School of Physical Sciences Alumni Employment Network, detailed information about alumni career paths and notices of employment openings with be available to students.

Federal extramural support has become a smaller fraction of the nation's federal budget as Social Security and Medicare have risen to approximately 60% of national budget allocations. The National Science Foundation and the Department of Energy research support has remained relatively flat in the last decade, while costs and technology needs have increased. Federal proposal research funding rates have dropped from around 30% of applications to approaching 20%. Participation with private philanthropy, defense and cyber security agencies, and business partners must be expanded as well as an increase focus on convergent science. Businesses now account for about two thirds of the nation's research and development activities, up from one-third decades ago. The federal government is playing a reduced role in technology development; private sphere engagement with the University must be expanded. Areas of interest for interdisciplinary efforts are medical/optical physics, imaging, and materials science.

The School's Inclusive Excellence team will address the issues of attracting and retaining underrepresented minorities and women at both the graduate student and faculty levels. Greater diversity requires a more concerted effort to expand our recruitment pool and provide a welcoming environment to all persons. Success requires full faculty ownership of this issue.

We are committed to the growth in quantity and quality of our graduate programs, and are developing mentoring and placement efforts that we expect to significantly enhance our success. Funding graduate students continues to be a top priority.

Strategic Goal 3: Research and Teaching Faculty

Goal 3 is to continue to recruit and retain the best faculty, promote an inclusive environment, and establish an advancement pathway to leadership positions for underrepresented minorities and women.

Tactics

To achieve Goal 3, we will

- *Over the next 5 years, recruit 10 faculty members to the Department of Mathematics.* The distribution of these positions will be based on the disciplinary and other needs of the department and opportunities for excellence.
- *Over the next 5 years, recruit 5 faculty members to the Earth System Science Department.* These positions will build on current strengths in glaciology and sea level rise, hydrology, and the social and economic impact of climate change.
- *Apply to special campus-wide initiatives such as the mid-career distinguished faculty program.* The School will strongly encourage and incentivize departments and faculty to submit to these special programs, especially in areas of identified strengths.
- *Promote an inclusive environment, and provide support for the advancement of underrepresented minorities and women to School leadership positions.*
- *Continue to base faculty hiring, merits, and promotion on Ph.D. student production and the ability to bring in extramural funding support*. The School will work with the departments to develop further incentives.
- *Continue to make faculty retention a top priority.* The School will work with the departments to be proactive in identifying the needs of our “rising stars” and address these needs prior to outside offers.

Our strategic goals depend on our ability to recruit and retain excellent faculty. Faculty form the foundation for which the School of Physical Sciences does high-impact science, educates the next generation of scientists and leaders, and interfaces with the local and global community. Critical to the School’s future reputation, influence, and levels of research funding is the addition of faculty in key strategic areas and the retention of our highly recognized and productive faculty.

The four Departments have the following number of faculty members: Chemistry: 47, Earth System Science: 24, Mathematics: 35, and Physics & Astronomy: 45. As science becomes ever more interdisciplinary, connections to other schools are vital to our mission. We currently have 13 joint appointees from other UCI schools; and 24 of our faculty members have joint appointments in other UCI schools. Each of our Departments would like to grow in synch with the campus strategic plan. However, for the foreseeable future, growth of experimental programs will be severely limited by space availability. The Department of Mathematics is both severely understaffed relative to its workload and must grow its faculty in several areas; it has the least need for space per faculty member. Projected growth in Earth System Science is also less space intensive, and we foresee additional growth.

The School of Physical Sciences has made great strides in gender diversity. Eleven women have their primary senate faculty appointment in the Department of Chemistry, nine in the Department of Earth System Science, five in the Department of Mathematics, and eight in the Department of Physics & Astronomy. Greater diversity in our faculty population requires a more concerted effort to expand our recruitment pool and provide a welcoming environment to all persons. The School has initiated an Inclusive Excellence team to address this issue. Additionally, the School Equity Adviser will continue to be a key player and interface one-on-one with our faculty. The School will include all faculty members in the planning and implementation of developed strategies.

Strategic Goal 4: Research and Teaching Infrastructure

Goal 4 is to invest over $3 million in the next five years in research and instructional infrastructure.

Tactics

To achieve Goal 4, we will

- *Sustainably invest in research infrastructure that aligns with the research areas of faculty growth and new areas of science inquiry.* Through collaborations with other Schools, we will develop a growth plan that aligns with convergent science initiatives.
- *Continue to support our crucial and state-of-the-art facilities*. The School supports the Greenplanet high performance computing cluster and eight user facilities as well as the campus-wide Irvine Materials Research Institute (IMRI).
- *Continue to support technical facility staff.* Similar to retaining excellent faculty, we also must invest in and retain the outstanding staff scientists that run our various research facilities.
- *Continue to renovate and invest in equipment for lower and upper division laboratories* to provide an industry-relevant experience and to create laboratory arrangements conducive to collaborative learning.

The School of Physical Sciences is heavily committed to campus-wide and School research infrastructure including research user facilities, high performance computing, and staff support. Within the School, we support the following facilities: Greenplanet high performance computing, mass spectrometry, nuclear magnetic resonance (NMR), laser spectroscopy, X-ray crystallography, molecular modeling, nuclear reactor, biomolecular spectroscopy, the W.M. Keck carbon cycle accelerator mass spectrometer, glass blowing, stores, and electronics and instrumentation development. In terms of new initiatives for cross-disciplinary research, the School of Physical Sciences has committed significant funds to build up the new Irvine Materials Research Institute (IMRI). These facilities are imperative to the research success of our faculty members, the growing rankings of our Departments, and our ability to be competitive for extramural research support; we will continue to invest and upgrade these facilities. Areas of interest for immediate growth include bulk characterization of biological, soft, and hard materials; small sample size radiocarbon dating for carbon cycle studies; electron paramagnetic resonance (EPR) spectroscopy for biological applications; and a comprehensive field measurement facility for atmospheric compounds.

The School of Physical Sciences focuses immense resources on service teaching for majors in other Schools as well as training its majors to compete with the world's top trained scientists in areas and skills that are now relevant to academic and industrial research. About one-fourth (24% in 2014-15) of the lower division enrollments are in hands-on laboratory courses; laboratory courses are resource intensive because student safety is a nonnegotiable requirement. The School has already invested funds for the renovation of and equipment for lower division teaching laboratories in both the Departments of Chemistry and Earth System Science. This investment will continue over the next several years with key investments in upper division chemistry laboratories including staff support via an advanced laboratory director.

Strategic Goal 5: Technology Transfer and Sponsored Research

Goal 5 is to increase the number of invention disclosures by 30% to over 20 annually and increase the number of industry-partnered programs and projects to 10, growing by 1 net new company each year.

Tactics

To achieve Goal 5, we will

- *Build a strong partnership with UCI Applied Innovation and provide institutional support for entrepreneurial efforts.*
- *Facilitate relationships with local industry and cultivate connections through the Dean's Leadership Council.*
- *Advance the School of Physical Sciences Alumni Employment Network* to develop relationships that will provide employment and internship opportunities to our students and sponsored research possibilities.

In the past five years, the School has disclosed an average of 13 inventions per year. To markedly increase this number and technology transfer in general, we are (1) closely cooperating with UCI Applied Innovation to improve technology transfer and marketing; (2) providing School Innovation Awards, with support provided from Don Beall, to encourage entrepreneurial participation of our faculty and graduate students; and (3) building relationships and knowledge via the Dean's Leadership Council. An example of a successful School start up is Tri Alpha Energy, which is the largest employer of UCI Physics and Astronomy graduate alumni and further provides direct research support to UCI via graduate student support and associated research expenses.

The School, in coordination with UCI Career Center, has launched a School of Physical Sciences Alumni Employment Network. The database spans over the School's full 50-year history, and so far the database has more than 50% of Department of Physics & Astronomy and Department of Earth System Science doctoral recipients' current information, including contact, job title, and employer. Over the next several years, the database will be built out to include all previous graduate and undergraduate alumni. We have already connected with these identified alumni; they send us job postings that we distribute to our students and the UCI Career Center.

Strategic Goal 6: Community, Alumni Engagement, and Fundraising

Goal 6 is to (1) enhance the visibility of our School's research; (2) strengthen engagement with local industry, alumni, and members of the Orange County and greater national community; (3) increase our donor base, and (4) increase philanthropic support from alumni and individuals, growing total revenue from this sector at 5% or more per year.

Tactics

To achieve Goal 6, we will

- *Fully staff the Development Office* and realign current staff to execute strategies focused on community engagement, the Dean's Leadership Council, alumni outreach, and fundraising.
- *Maintain Dean's Leadership Council at no less than 20 members per year*, with focus on engaging individual members in community outreach and fundraising efforts.
- *Launch regional Dean's Leadership Conversations* to engage alumni outside Orange County.
- *Expand donor base* through enhanced alumni, individual, and private foundation outreach.

Our School's Development Office has managed to consistently exceed all goals these past five years, however we currently lack the resources required to fully leverage fundraising opportunities. With three employees, our Development Office is particularly lean compared with other schools at UCI, and certainly in comparison with other schools and departments of our size and stature in other universities. In today's higher education environment, additional staffing is critical if we are to meet the ambitious fundraising goals before us. To bring the School on par with similar units and provide the necessary support, we need two additional staff members: (1) Director (or Associate Director) of Development /Alumni Outreach Coordinator and (2) Event and Education Initiatives Coordinator.

The School of Physical Sciences Dean's Leadership Council was launched in 2014 by the Development Office and has evolved as a powerhouse of campus Leadership Councils. The makeup, format, and synergy of this group has yielded significant short-term benefits in areas of technology transfer, has generated modest but promising financial support, and will undoubtedly play a critical role in taking our School's private fundraising and corporate relations efforts to new levels.

We have successfully engaged our local alumni through regular and special events including the Breakfast Lecture Series, Dean's Leadership Discussions, the annual Reines Lecture, and over the past year, the Reines Exhibit Dedication and alumni reception at the American Chemical Society (ACS) annual meeting. Additionally, we have sent out annual mailings to our graduate and undergraduate alumni with targeted language specific

for each department. In addition to the personal engagement, the number of donations from alumni over the past 10 years has shown ~70% increase.

Preliminary analysis of alumni data indicates opportunities to engage former students outside of Orange County, such as in San Diego, Los Angeles, the Bay Area, and possibly the east coast. We will follow the format of the “Chancellor’s Leadership Conversations” and coordinate with Alumni Affairs in coordinating efforts to engage these alumni and coordinate regional events.

With regard to community support, over the past five years, our Development team has more than doubled the individual donor base, affecting a significant trend away from corporate “in kind” philanthropic dollars toward funds raised from individuals. Over the next year, we will work with Central Advancement to establish routine reporting mechanisms to regularly track donor type and alumni engagement.

Finally, philanthropic revenue trends demonstrate dramatic progress in increasing number and source of donors, and diminished reliance on “in kind” donations from industry (such as Dell). We will continue our efforts to grow the total dollars from individuals, growing total revenue from this sector at 5% or more per year. And while the School has been highly successful in recent years with select private foundations, this sector represents an additional opportunity for growth in philanthropy; the Development Office and the School’s research development staff will work closely with the Office of Foundation Relations to increase the number of proposals submitted to foundations by 25%.

V. Conclusion

The School of Physical Sciences will play a major role in UCI’s transition from its bright past to a brilliant future. Each of our departments will set a clear path to top ten national ranking. We will do this by achieving excellence in scholarship, teaching, and research. We will monitor our performance on both quantitative and qualitative metrics. We will continue to modernize our teaching efforts to achieve efficiency and effectiveness, dramatically increase our engagement with our alumni and the Orange County community in mentoring, internships, and placement. Our service will be dedicated to intellectual property transfer to society and outreach to the K-12 students to help them prepare for a successful university experience. We will hold ourselves accountable to achieve our goals, while supporting the broader efforts of the University to achieve its ambitious and challenging campus-wide goals.