Oregon State University
College of Science

ACADEMIC ANNUAL REPORT AY2017-18
College of Science

COLLEGE-LEVEL PERFORMANCE

The College of Science is home to the best and brightest minds at Oregon State University from our students to our exceptional faculty. We prepare students to be global leaders in science and to tackle our most pressing challenges by providing them an outstanding science education, undergraduate research opportunities, transformative experiences and leadership skills. As this report illustrates, transformative experiences develop students' capacity for deep reflection and critical thinking on the decisions they make, and the paths they follow. Our longstanding dedication to academic excellence grows stronger each year. Science has done more to advance human knowledge and wellbeing than any other human endeavor: together, we will transform the world through science.

This report details the College of Science's performance on key strategic metrics this past academic year. We have many extraordinary accomplishments especially in the areas of teaching and learning, research success, enhanced visibility through outreach and engagement, diversity and inclusion, faculty and staff development, and stewardship of resources. One of our top honors this year was OSU being selected as one of three institutions nationwide to receive the 2018 Award for Improving Undergraduate Physics Education from the American Physical Society.

In terms of key strategic metrics, the College of Science continues to lead the university with the most high-achieving students (50.5%, unweighted). We have seen strong progress in other areas of student success, retention and graduation. We had our highest six-year graduation rate in 15 years (67.6% from OSU and 41.5% began in our College). Once again, we are proud to have the highest number of minority students (32.4%) of any college. But we have work to do in this critical area since we are performing below OSU with overall retention rates of 84.8% at the university and 69.5% in a college.

This spring, we had our highest six-year graduation rate—41.5%—in 15 years, which exceeds OSU's graduation rate of 40.8% among students who graduate from the same college they started in. We graduated 655 undergraduate students, a five percent increase from 2017. While more than 71% of our graduates were in the life sciences, we graduated the largest class of mathematics students at 59, the largest biochemistry and biophysics at 36 (an increase of 33% thanks to the popular new biochemistry & molecular biology major), and the largest physics class with 27. The physics graduates include many high achieving, underrepresented minority students who are now pursuing graduate degrees at top institutions including Oxford, Imperial College (London), Brown University, USC, UC Santa Barbara, Stanford University, Ohio State University and the University of Kansas.

We were proud to see the graduation rate of students rise to 67.6%, which meets our 5-year strategic goal and is above OSU's overall graduation rate of 65.3% (but not nearly good enough!) Our 4-year graduation rate among junior transfer students who graduate from OSU is 59.3%, representing a slight increase from last year by and above the university's rate of 56.1%. We saw our highest percentage of junior transfer science students graduate with 41.5%; but this is below OSU's transfer student graduation rate of 49.5% from a College. We clearly have more work in this area and are hiring a full-time Transfer Recruiter and Advisor to better support and advise these students in order to increase graduation rates. We maintain a very strong connection with local community colleges, especially LBCC, which provide a pipeline of first generation students into our physics major that is specifically designed for transfer students from community colleges.

Diversity is a core value in Science and our focus on diversity and inclusion efforts have contributed to our success in attracting underrepresented minority students, which currently comprise 32.4% of our students—the most of any College at OSU and above the university's minority student population (24.8%). We are on target to meet our strategic plan goal of 35% underrepresented students. We do need to develop strategies to recruit more international students in science. In 2017-18, we saw our highest number of international students at 7.2%, but that is far below the number

at OSU (11.5%) and our 2020 strategic goal of 13%; this will be challenging in the current political and international environment.

We have attracted the best and brightest minds in science who have been recognized with some of the most prestigious awards in higher education, including Fulbright, Gilman, Goldwater, NSF CAREER, NSF GRFP and National Science Board's 2018 Vannevar Bush Award just to name a few. An Integrative Biology professor was named a AAAS Fellow. Our faculty continue to receive recognition for outstanding teaching, scholarship and leaders in across campus, the nation and the world. Our faculty have won Phi Beta Kappa Society Best Mentor/Advisor award, OSU's 2017 Elizabeth P. Ritchie Distinguished Professor award, the American Chemical Society NW Region Partners for Progress and Prosperity Award, OSU's Excellence in Postdoctoral Mentoring award, 2018 OSU Promising Scholar Award and the 2018 Honors College Eminent Professor Award for outstanding teaching and mentoring. Chemist Mas Subramanian received the 2018 Indian Institute of Technology Distinguished Alumnus Award. The College of Science continues its tradition of having the most University Distinguished Professors at 20, with Professor of Physics Janet Tate being named one this year.

We hired microbiologist Maude David, a former researcher at Stanford University and cofounder of ENOVEO, a bioremediation company. With expertise in the human microbiome and bioinformatics, she brings her collaboration with Second Genome to OSU, with which she is submitting the phase II of an SBIR and has a total budget of $2M.

This year two of seven students at OSU to receive Fulbright Scholarships were in the College of Science and both were microbiology majors. One will work on her Master's of Science in Marine Microbiology at the Max Planck Institute for Marine Microbiology in Germany. The other will was awarded a Fulbright Scholar English Teaching Assistantship to Kazakhstan where he will engage students in and out of the classroom to share the English language and culture. A biochemistry Ph.D. student conducted research in France as a 2017-2018 STEM Chateaubriand Fellow.

To address flat/declining enrollment and to attract top students, the College again invested in a personalized email campaign with microsites for students and a digital marketing campaign with Oregonian Media Group to target high-achieving students in science and parents/influencers in Oregon, Washington, Idaho and northern California. This initiative advanced one outcome of our strategic plan: to recruit high-achieving students. We also added a search engine marketing component to enhance our visibility and get on prospective students and parents radars earlier in the college admissions process. See above summary for more details.

To increase student recruitment among high-achieving students and to raise the visibility of Science at OSU to prospective students and influencers, we invested in strategic online marketing campaigns—both digital media and email marketing—for a highly targeted, sophisticated and personalized approach to student recruitment. We implemented a two-pronged approach to target and engage STEM high school students from top schools in Oregon, California, Idaho and Washington: 1) Digital Media campaign with the Oregonian Media Group, and 2) A Personalized Email Campaign with customized microsites for each student. This year we launched our first search engine marketing (SEM) campaign on Google since search is the number one way prospective students research colleges. This layers on top of the other strategies and runs throughout the year so we appear when students are searching for colleges, which is starting earlier and earlier. We also launched a major redesign and update of our website, prioritizing student recruitment and philanthropic development.

The digital campaign included mobile ads driven by geographical targeting based on location and online behavior, a custom landing page and a prospective student website built by our marketing team. Our response rate was exceptional and we increased our percentage of Honors students to nearly one-third, the most of any unit. We are encouraged at our preliminary fall enrollment forecasts and gaining valuable data on high schools that perform well for us so we can further target our recruitment efforts. The personalized email campaign launched with an external vendor focused on attracting, learning about, and responding to applicants with relevant content for each student during each phase of the recruitment cycle. This highly personal approach is needed because today's students prefer to respond and research online using a personalized microsite with relevant content and offers high responsiveness. We had extraordinary response to the emails: overall 65% responded compared to 51% last year; the national average

is 20-25%. We outperformed all of the vendor's clients across the country for yield response rates and they are looking to feature our results as part of a case study. We also had more students in the campaign, which indicates that our other marketing efforts are paying off and we are attracting more applicants to OSU. We continue to see more responses and engagement from California applicants. This year affordability dropped slightly (65% said it was a factor compared to 71% last year). We had less success converting "yes" responses to deposits (81% compared to 88% last year) and converted fewer "undecided" responses (26% compared to 34% last year). We will improve the follow up by advisors and work with the new recruiter in our College to improve results next year.

Our College faced a few challenges in other key areas of student success.

Our enrollment fell 2.54% overall, with undergraduate majors dropping by 2.42% and graduate students declining by 3.78%. Our performance in these key metrics is below OSU. After taking a heavy hit in 2017 due to financial challenges, we have grown our graduate program in physics to an optimal size of 11 for fall 2018. Overall enrollment at OSU increased by 1.7% year over year, with undergraduate students increasing 1% to a record number of 25,838 students and graduate enrollment slightly down from 2017. We are collaborating more closely with Ecampus to market our online master's degree and graduate certificate in data analytics, which had strong market response. It offers the opportunity for high growth in one of the fastest growing careers in the nation. We are looking for ways to accelerate the growth of this program to generate significant revenue for the College. Our Accelerated Master Platforms (4+1 program) across all departments are another strategy to drive graduate enrollment. For example, Microbiology department accepted three students into its Accelerated Masters Program, providing an opportunity for high-achieving undergraduates to jump-start their graduate education. The new biochemistry and molecular biology major that has led to a 50% increase in number of majors and we expect further growth. With the majority of our students in the life sciences, we saw a 28% increase in Ecampus SCHs last year, due to strong growth in BI20X class. We are on schedule to launch our first fully online degree – Zoology – in fall 2019.

To complement OSU's Marine Studies Initiative, we launched new offerings in this area. We developed a new aquatic microbiology option with an innovative lab course that provides students experience working on a ship off the Oregon coast to examine patterns of microbial communities. In fall 2018, we are a launching an online microbiology minor and an online "Oceans in Peril" Bacc Core synthesis course. Due to its popularity, we are now offering the course "Field Methods in Ecological Restoration" annually at the Cascades campus.

We saw encouraging trends in math and physics. For example, the number of math majors increased by 4.5% to a total of 277 in AY2017/18—a new record reflecting an interest in STEM fields training. Hispanics students represent 10% of math majors, women 32.5% and international students 14% of our students. We also graduated a record number of math students: 60 students earned a BS majoring in 2018.

In addition, we are encouraging Ph.D. students to pursue a concurrent master's degree. For instance, Chemistry is educating their large Ph.D. student population about the advantages of obtaining a concurrent master's degree and is also providing incentives to them. We anticipate an increase of at least 10 master's degrees in chemistry annually via this concurrent degrees program, which will generate additional revenue for degree completion under the new budget model.

Our top priority is to enhance student success through recruitment, faculty and peer mentoring, retention and graduation rates. In turn, these efforts will address decreasing student credit hours, particularly in our mathematics and chemistry courses. Our student credit hours (SCHs) are down about 2.54% (compared to 5.4% last year). We are down in all areas—lower division courses (2.5%), upper level courses (2.28%) and graduate courses (3.78%). In comparison, OSU SCHs are up 1% overall, flat in lower division courses and up 2.24% in upper level courses.

A key performance metric that we need to continue to improve is our student credit hours, which have continued to decline substantially. We have increased the number of undergraduate math courses offered through INTO, a partnership that has grown into a Graduate Pathway in Mathematics. Students who complete 15 credit hours of graduate courses with a grade of B or better will be admitted into the master's program in mathematics. The

Graduate Pathway has a strong potential for growth by attracting international students to key areas of mathematical research. Chemistry had six new students enter their pathways program this year and expects nearly all of this cohort to begin their master's program in fall 2018. This will increase enrollment in graduate courses, generate revenue via degree completion and provide an entry path for the strongest candidates into their Ph.D. program.

To better understand the decline in student credit hours, we created a special committee of department heads to analyze the data further and develop some strategies and recommendations for the College leadership team to review. Our hypothesis is that the following are contributors: More students are taking lower division requirements elsewhere and transferring them to OSU, other colleges across campus are changing curriculum requirements that impact our SCHs, and the Oregon Promise grants that encourage students to go to community colleges. We have implemented several student success initiatives, such as the Math Summit, Peer Advisors, hiring a Transfer Advisor, additional tutoring help, more proactive advising and others, as well as continuing investing in Learning Assistants, redesigning introductory math courses and learning from those efforts. We are leading OSU in launching a Faculty-Student Mentor Program that we expect to boost retention rates. We developed new college policy around getting grades early and frequently into Canvas so that students know where they stand in every class.

To improve four-year graduation rates, we are emphasizing proactive advising and have launched an Integrated Professional Development platform and career development programs to motivate students to complete their degrees to embark on satisfying careers in science. These programs will also decrease attrition, prepare career-ready graduates, promote internship opportunities by connecting students with our 28,000+ alumni, and market career development opportunities to students to foster networking. We launched the course Professional Development for Biologist II to more than 300 transfer and first-year science students to promote student success and engagement.

Science research is central to the mission of OSU and must grow to ensure our path to global excellence. In January 2018, the College appointed Dr. Bettye L. Maddux as Director of our new Office of Research Development (ORD). She has helped integrate groups across departments and disciplines to collaborate and apply for grants through NSF, federal agencies, and other funders. The results have already been impressive, with a 30% increase in the value of submitted proposals over previous years while also increasing the number of proposals by about 6%. This year Chemistry and Biochemistry/Biophysics faculty joined forces and received a Murdock Foundation grant ($545K) to acquire a single-crystal X-ray diffractometer (SCXRD). Together, they will launch a regional SCXRD facility at OSU. Another biochemist received an Army Medical Research grant to study "Nitrated Proteins as a Target for Drug Development in Neurofibromatosis Type 2" ($653K). A statistician received a National Security Agency grant to continue his very successful Research Experiences for Undergraduate ($250K). Tom Sharpton received an NIH grant to study "Interactions Between Gut Microbiome Natural Products and Intestinal Helminths" ($221K). The Howard Hughes Medical Institute awarded OSU $1M, one of 33 universities to participate in its Inclusive Excellence Initiative. Science researchers will play a lead role on an interdisciplinary team to engage students across scientific disciplines.

Biochemistry faculty received NIH and NSF grants to study cellular senescence in Alzheimer's disease, the aging circadian clock, mechanisms of gene silencing in fungi and seed funding for work on a central regulatory protein. Joe Beckman's Lab continues to make progress on a promising ALS treatment (Cu-ATSM) is now in phase 2B clinic trials. Biochemist David Hendrix and a team of researchers developed a computer program that illuminates the connections between mutant genetic material and disease. A physics professor discovery on light and pollination may have an impact on the $15 billion bee economy. She also discovered an organic pigment secreted by wood-eating fungi that holds promise as a semi-conducting material. A mathematician showed how we to use statistical models to address uncertainties in climate science. These are a few of the important accomplishments from science faculty this year.

To cultivate transdisciplinary research, the ORD represents the College in the "Cross-college Collaborative Research Exchange" (CARE) to support faculty training and to improve policies and procedures. ORD also develops strategies to increase funding rates of submitted proposals, sponsors proposal-writing workshops. In FY18, ORD awarded the first COS Impact Award to seed a new research project in the College. Our faculty have strong collaborations across the Colllege, across campus, and with industry, including HP, Apple and others. For instance, seven physics faculty are part of the Materials Synthesis and Characterization (MASC) facility, with physicist Janet Tate serving on its Board and a

few supervise Ph.D. students in Materials Science. In conjunction with Ecampus and Smart Sparrow, Chemistry has been working through a major redevelopment of their virtual lab software slated for fall 2018. The College provided seed money to extend the work into a second phase that adds narrative and immersive content and Ecampus provided over $300K in principal funding. The labs will be freely available to all OSU students, online and on campus.

The College is committed to advancing OSU's priorities of student success and equalization, a transformative educational experience and strengthening OSU's impact through outreach and engagement in Oregon and beyond. We invested in transformative educational experiences for science students, including undergraduate research, career development and internships opportunities, living learning communities, mentorship, experiential learning, community service and outreach. We have highlighted examples of our collective achievements and their impact on students, OSU, Oregon, the nation and the world. This list represents just some of our successes this past year.

PROGRAMATIC ACHIEVEMENTS

I. Teaching and learning that provides a transformative educational experience for all learners.
The College enhanced the learning environment to raise and equalize student success in a number of ways.

Mathematics faculty successfully implemented Adaptive Learning methods in MTH111 and MTH103 last year. MTH111 has a historically high failure rate and has been identified as a roadblock course for student success. Supported by a grant from the Bill and Melinda Gates foundation through APLU, a team of math instructors integrated the software teaching tool ALEKS into their teaching to enhance student engagement, self-pacing and active learning. Early indicators reveal reduced DFWU rates in these courses, a reduction on the achievement gap across different populations and increased student retention. The work of these instructors, known as Team MATH, was recognized with the 2018 Faculty Senate Student Learning and Success Teamwork Award. The newly developed Calculus and Probability for Life Sciences has been well received and had a spring enrollment of 90 students. This course offers life sciences students an alternative to calculus. We are continuing to collaborate with the Academic Success Center to train undergraduate learning assistants (LA) for high-enrollment anatomy and physiology course series.

DFWU rates in Spring 2018 in the online MTH111 were 34% compared to 60% last year. More than double the number of students completed the course successfully this year than in 2017 (factoring in the 6.5% increase in enrollment). We will continue to monitor this progress in other courses to ascertain the long-term impact of the changes made in MTH111.

To improve success in our general chemistry courses, faculty collaborated with the American Chemical Society to offer Supplemental Instruction tables in our introductory chemistry sequence.

To advance learning, we redesigned our upper division physics courses (in the second year of the NSF-funded redesign) and shifted two courses to the sophomore year. These courses address relevant topics in physics while training students in advanced problem solving methods. Last year, those courses attracted 50-60 students, more than double their past enrollment. Preliminary results indicate that students are better prepared for junior year courses. We also instituted studio-based active engagement in the introductory calculus-based sequence in physics. This has resulted in a drop in DFW rates from 20-30% to less than 10%. We have redesigned the physics major to provide support and an early onramp for majors through two new courses. The department provides 55 hours/week of tutoring in the "Wormhole" and regularly log 500 student visits each week.

To improve career-readiness, we launched for-credit courses and programs focused on first-year experience for biology students and a three-term sequence on professional skills facilitating internships/experiential learning called Science Professional Pursuits Program (SP^3) for sophomores, juniors and seniors. Part of our Integrated Professional Development Platform, SP^3 is the College of Science's first internship and experiential program open to student across all majors and departments. We integrated elements of professional development into many life science courses.

Science faculty teach every student at OSU during their undergraduate education and carry heavy teaching loads. For example, mathematics faculty teach 13.7% of the total SCH in the Honors College, the second largest contributor for Honors student credit hours and the most of any College of Science department. To avoid hiring more part-time math instructors, several faculty agreed to overload their regular teaching loads, although this increase in duties is not sustainable. The department closely monitors service and supply expenses and is looking to reduce the unfairly high amount for internet access, a benefit to the large number of students taking classes in Kidder Hall. This single expense accounts for more than one-third of the expenses in the department's services and supplies. To operate within budget, Chemistry is reducing GTA positions by five in fall 2018 and by a total of eight next fall. This will decrease result in an annual spending by approximately $350K in fall 2019. To offset this reduction, Chemistry will rely on computer adaptive technologies to enable group recitations and will make other efficiencies in how undergraduates are supported by GTAs. Microbiology is also reducing its number of GTAs to remain within budget.

We are committed to providing science students with undergraduate research experiences, which deepen classroom learning, develop teamwork skills and foster critical thinking. *Every physics major* works with a faculty research advisor and must complete a substantial written thesis. Last year, 29 senior physics students took the senior thesis course.

To attract students to Science, we strengthened our BioHealth Sciences degree by developing a new curriculum available this fall. The program blends a strong biological and physical science foundation with a variety of health and social science courses to meet the challenges of the increasing diversity in our nation. The innovative training in cultural competence and cross-cultural issues will greatly benefit will benefit the 700-plus majors who will become our future health care professionals.

As the College with the most high-achieving students, we are proud of our students excellence and leadership. Two science students received Goldwater Scholarships, the top undergraduate award in the country for sophomores and juniors in STEM fields; and three science students and alumni received Fulbright Awards. A biohealth science student started a new pre-osteopathic student club that earned national recognition as Chapter of the Year in its first year of operation.

We enhanced the diversity of many of our graduate programs. A team of statistics instructors made significant improvements and incorporated adaptive courseware to both the on-campus and online versions of our 300-level statistical methods sequence. One instructor created her a welcome video each quarter to introduce herself, offered peer discussion forums for students and developed micro-lectures featuring animations, video recordings, quizzes with instant feedback and over 200 YouTube videos that include R software and Ti-84 calculator tutorials. The statistics team developed a 10-week training program for Graduate Teaching Assistants to train them about their roles as teaching assistants in the classroom.

A math instructor is using donor funds, the Ben and Elaine Whiteley Faculty Scholar Award for Teaching Excellence, to help train graduate teaching assistants implement active learning techniques in the classroom. After participating in the Advance @ OSU Seminar last year, a mathematics professor worked with a graduate student to develop modules in Equity, Inclusion and Social Justice for the first-year experience course for math grad students. These modules are now being modified for other courses at OSU to help prepare GTAs create an environment of inclusion in the classroom that eliminates hidden biases and intersectionalities to help underrepresented minority students succeed at OSU. Two of the eight ADVANCE Fellows for 2018 are science faculty.

The College invested in substantial renovation of the Mathematics and Statistics Learning Center (MSLC), our cornerstone of student success in computational sciences that provides out of the classroom support for students in math and statistics courses. This marks its 40th year of operation.

II. Research and creative work that builds preeminence in the three signature areas of distinction.

Ultimately, it is our people who create positive change through science. Our faculty have applied for and received numerous federal grants. In Statistics, three statistics faculty received a 4-year, $770K R01 grant by the National Institute of General Medical Sciences for their project "Network-based statistical methods to decode

interactions within microbiomes." Statistics and math faculty hosted two summer Research Experience for Undergraduates (REU) sponsored by the American Statistical Association and the National Science Foundation. One of our highly accomplished assistant professors Tom Sharpton received five grants last year. In addition to the two grants listed above, he was a Co-PI on an NIH R24 grant, a co-PI USDA grant, and PI on an NIH R21 grant. He led an REU that exclusively included students from underrepresented backgrounds in the field of biostatistics. Sharpton is not only advancing our research agenda in key areas of distinction, but he is also bringing national recognition to OSU Science.

Microbiologist Rebecca Vega-Thurber is co-lead on the NSF-funded Global Coral Microbiome Project, a global survey of reefs that aims to establish a baseline understanding of how coral microbiomes function. Department Head Jerri Bartholomew's Lab received a five-year, $404K renewal of the Fish Health Graduate Research Fellowship in Microbiology by the Oregon Department of Fish and Wildlife, reinforcing a longstanding and fruitful collaboration that benefits fish health and sustainable economic growth in Oregon.

A mathematics professor received an NIH grant through the National Center for Advancing Translational Sciences—the first mathematics faculty at OSU to receive NIH funding. Another mathematician is part of a 5-year, Howard Hughes Medical Institute grant aimed at catalyzing schools' efforts to engage all students in science regardless of background. A total of 17 math faculty will continue their research in areas of Applied Mathematics, Mathematical Biology and Mathematics Education, thanks to funding from NSF, Simons Foundation and the Bonneville Power Administration.

Physics research continues to grow and shows strong momentum with expenditures growing from $850K to $1.03M year over year, which doesn't include grants arriving in late June—a $550K NSF MRI grant as well as three NSF grants with NASA, Apple (cooperative agreement) and Department of Defense/ Small Business Innovation Research. Physicist Davide Lazzati's work on gamma ray bursts associated with black hole and neutron star mergers has garnered hundreds of citations over the past two years.

Others have strengthened our national and global reputation. Statistician Javier Rojo gave the Presidential Invited Address to the Western North American Region of the International Biometric Society and continued his REU Summer Institute of Statistics (RUSIS@OSU) last summer and will do so again this summer with NSF funding and a $125K grant from the National Security Agency. His REU in statistics was the first in the nation before we recruited him to OSU. A mathematician was named a Fellow of the Society for Industrial and Applied Mathematics (SIAM), a leading international, professional mathematical society, for contributions to the mathematical modeling of the ocean and atmosphere. A zoology professor received the Outstanding Steward of Zebrafish Award by the Zebrafish Husbandry Association for his extensive years providing training and research for the health and welfare of laboratory zebrafish.

We also are committed to improving gender balance in STEM. This past year, all seven cases for promotion and tenure in mathematics were successful—all tenure-track promotions were women. The number of women at the rank of professor in mathematics is now six of 19, and women mathematicians represent 50% of our faculty, well above the national average.

The College made tremendous strides in increasing the quality, capacity and impact of our graduate programs. We had two of the 10 OSU Ph.D. students to receive 2018 NSF Graduate Research Fellowship Program (NSF GRFP) awards in our College. NSF's GRF Program is the oldest graduate fellowship of its kind, and recognizes master's and doctoral students who have demonstrated high potential in STEM disciplines very early in their graduate training. Three math grad students received financial support from the NSF funded, Network in Research and Training grant on Risk and Uncertainty in Marine Sciences. In its third year, this grant integrates research in Mathematics, Oceanography and Social Sciences on problems of interest to Marine Sciences. The students participated in an intense two-week retreat at Hatfield Marine Science Center. A microbiologist lab transformed into "Journalists at Sea" during their research in the North Atlantic Ocean aboard the ATLANTIS and enhanced students' science communication skills.

To deepen student learning from understanding the arts-science connection, we offered a new course, "The Art of the Microbiome: An Interdisciplinary Conversation," that was taught in collaboration with the Art Department. This

interdisciplinary course allowed undergraduate and graduate students to explore the intersection between the arts and science.

The following is a partial list of notable faculty achievements.

The College continues to cultivate partnerships for innovation and promote economic growth for the university through integrated work on innovation, research, education, and engagement. College of Science spin-out companies Valliscor and Inpria moved into new pilot production and research facilities at the Advanced Technology and Manufacturing Institute (ATAMI) on the HP campus. The lease agreements with these companies and associated revenue were instrumental to the build out of the ATAMI site as a financially viable undertaking. Biochemistry researcher Ryan Mehl founded spin-off xBiologix pursuing commercial development of new technology for linking proteins to surfaces. Through the NSF NRT grant Research to Innovation to Society, the College provides leadership in STEM innovation education for faculty and students across campus. This past year, the first cohort of students completed a new series of GRADS 57Xx courses, which were designed and implemented under the NRT grant, the NSF Center for Sustainable Materials Chemistry and the College of Science. These courses represent an initial step to institutionalize STEM innovation education for the OSU. The College also played a significant role during FY18 in the University review and planning process to assemble innovation and entrepreneurial education programs across campus into an Innovation Enterprise.

We also hosted a visit with Corning, Inc. in collaboration with the College of Engineering to explore potential collaborative research opportunities. Apple awarded Matt Graham a grant to study “Photoconductive Optical Characterization of Amorphous IGZO” ($118K).

The College of Science has entered into a long-term agreement with the Oregon Museum of Science and Industry (OMSI) to host the OMSI Science Communication Fellowship Workshop each spring on campus. This workshop improves the effectiveness of student and faculty efforts in outreach and engagement. It also makes possible OSU’s participation in “Meet a Scientist” events at OMSI in Portland and creates a coordinated and evaluated outreach effort that strengthens the broadening participation sections of research proposals. Statistics Professor Sastry Pantula serves on the Board of Trustees for OMSI.

The College developed its first two-year Annual Report touting our performance, accomplishments and progress while telling our story in a visually compelling way. The piece won OSU Marketing’s top publication award. The report was mailed to influencers—provosts, deans and donors across the country—to enhance the visibility and reputation of Oregon State Science. The feedback has been strong across a range of audiences from deans, donors, alumni across the country and campus leaders at OSU.

III. Outreach and engagement that strengthens OSU’s impact and reach throughout Oregon and beyond.

Statistician Javier Rojo was appointed to the National Scientific Advisory Committee and the Statistical and Applied Mathematical Sciences Institute. He brings further recognition of OSU Statistics, serving on the editorial board of *Involve*, a mathematics journal. He continues to win national awards for his outstanding leadership—the Etta Zuber Falconer Award and serving as a panelist on NSF’s Graduate Research Fellowship Program. Statistics Head Virginia Lesser is a member of a National Academies of Science Committee.

The College hosted local, national and international conferences, workshops and events to position OSU’s outreach and engagement programs as learning laboratories that promote high-impact learning and effectively utilize university research. A mathematics professor co-organized Frontier Probability Days at OSU in March and then in April co-organized a Workshop on Random Trees: Structure, Self-Similarity and Dynamics at the Centro de Investigaciones en Matematicas in Guanajuato, Mexico. Other math faculty organized Oregon Number Theory Days, a one-day conference in Number Theory and the Conference in Differential Geometry last August at Pennsylvania State University. The College hosted distinguished professor of mathematics Henri Beresticky from the prestigious L'École des hautes études en sciences sociales (EHESS) in Paris, France, who presented the 33rd Lonseth Lecture. Chemistry organized ACS regional meeting at OSU last summer attracting over 500 participants. For the second

consecutive year, math faculty organized the Ambitious Mathematics and Science Teaching Summer Institute at OSU. The workshop helps secondary teachers attract students to STEM fields by fostering teaching methods that promote collaborative work and a deeper understanding of concepts. Physics faculty have research collaborations in the Netherland, department head Heidi Schellman leads an international big data effort with CERN, DOE National Labs and the UK GridPP facilities. She also chairs the commission for Particle Physics in the International Union for Pure and Applied Physics. Biochemistry faculty Ryan Mehl and Kari van Zee organized the third Genetic Code Expansion Workshop with about 20 participants and will host the second international GCE Conference at OSU this August that will bring global leaders together and helped the field mature. The College also hosted the first 2017 BioNMR symposium with internationally known speakers and showcased OSU research.

Chemistry faculty uncovered new microbe chemistry that has been reported widely in the media, including OPB, KVAL, Science Daily, and World Pharma News. Mas Subramanian's blue pigment continues to garner much press for OSU including Bloomberg Business Week and media in Japan, Italy and elsewhere. He presented numerous talks including TEDX talks in Oregon and North Carolina. Another chemistry faculty generated international impact with invited talks at meetings and workshops in France and the UK, and co-authored publications with collaborators at University of Alberta and the Russian Academy of Sciences.

During the 2017 Total Solar Eclipse that kicked off OSU150 and its Space Festival in August, our College hosted many educational events. Physics faculty and students led a substantial outreach effort, including developing and distributing materials to local educators, an "eclipse packet" for children in local schools and at food banks and a series of outreach events. Astronomy instructor and Randall Milstein was featured widely on national media: he was interviewed on six radio shows, nine television shows, five podcasts and 14 newspapers and magazines. He led 22 outreach events reaching more than 6,000 people across the state.

To enhance the quality, capacity and impact of our graduate programs, we implemented and NSF Research Traineeship in Innovations in Graduate Education (IGE) that is supported by a $500K grant. The innovative educational platform—"Research to Innovation to Society"—seeks to develop STEM professionals with the research and leadership skills while cultivating their passion and acumen to innovate. The program will pilot and test Lens of the Market®, a team-based, experiential curriculum at OSU that guides basic scientific research to address market needs and provides students with professional skill development and practice. If successful, the pilot program will lay the foundation for institutionalizing this approach by graduate programs in STEM nationwide.

Our graduate students were active in professional conferences and workshops. For example, mathematics graduate students attended MATHFEST, the Institute of Advanced Studies workshop, a regional American Mathematical Society meeting in Utah, the Max Planck Summer School, conferences at Simon Frazer University in Canada and at University of Texas, a workshop at the University of Virginia, and a workshop organized by the Mathematical Sciences Research Institute in Berkeley. Trained as an OMSI Science Communication Fellow, a math grad student spent a year working with inmates at the Coffee Creek Correctional Facility to improve their mathematical skills.

The College hosted and sponsored many outreach events to raise the visibility of science, including two STEM Academy Camps for middle schoolers last summer, Discovering the Scientist Within, Mi Familia Weekend with bilingual events for Hispanic students and their families, Discovery Days that drew more than 3,000 elementary students to campus last year, Juntos Family Day that attracted 1,400 Latinx 8-12th graders and family members to campus, Salmon Bowl high school competition; the statewide Science Olympiad for K-12; Academy for Lifelong Learning; and others.

Science faculty help drive economic development in the region. One of our Distinguished Professors in biochemistry launched a spin-off company e-MSion is focused on new mass spectrometry technology invented at OSU and is building momentum and winning SBIR grants. A physics professor and two Forestry colleagues filed for a patent for optoelectronic applications of the fungal pigment Xylindein, which shows promise as a semiconductor material.

IV. Diversity and inclusion

Faculty in the College of Science engaged in a number of initiatives to enhance diversity and inclusion. A statistics professor served on the Strategic Plan committee for the Office of Diversity, Equity, and Inclusion. He also gave an invited talk at Spelman College—a private, historically Black, women's college—and spoke at StatFest, a mentoring and networking conference for minority students in statistics that was held at Emory University. Many science faculty attended the two-weeklong ADVANCE workshops to foster a more inclusive and diverse culture in Science.

We continue to work to diversify our undergraduate and graduate programs. We will welcome 21 incoming math graduate students, six of whom are self-supported and two received a Wei Foundation Scholarship and a Provost Scholarship for AY2018-19. Five of the incoming students are international, five are underrepresented minorities and six are women. Our physics majors are much more ethnically diverse than those in physics departments nationwide. Although we have more work to do in this area, our success may be attributed to outreach to community college, to our emphasis on an inclusive environment and on early success in physics courses. The Physicists for Inclusion in Science student club plays a major role in creating a welcoming and inclusive environment.

We established relationships with Heritage College and Central Seattle College as strategy to increase diversity in our biochemistry and biophysics graduate program; this yielded two URM REU students this summer. The program is also preparing to welcome its first doctoral student who requires a wheelchair, and they are working with DAS to be prepared with the necessary accommodations. We successfully recruited a diverse group of seven incoming graduate students in microbiology: five women and one Native American. We hosted the second overnight Juntos Chemistry Camp, which drew more than 22 high school students from across Oregon. The event is part of the OSU Juntos Program, which empowers Latino families around education and college-readiness for 8-12th grades. The goal of the project is to immerse Latinx students interested in STEM fields in hands-on lab work, give them a taste of campus life and encourage them to invest in higher education and envision their own path in a STEM career.

To engage alumni and to raise the visibility of our faculty, students and donors, the College produces seven departmental alumni newsletters: Catalyst, Bioverse, Small Talk, The Spectrometer, Fumes from the Hood, and Meta. Our marketing team continued to produce engaging stories of our students, faculty and alumni with nearly 200 stories posted on our website. We also posted these stories and others on social media and in our alumni magazine and faculty newsletters. The College continues to have one of the strongest social media presences on campus and about half of our departments are also using social media to raise the visibility of science at OSU. The College launched a LinkedIn presence this spring to engage alumni, donors and industry. This tool will enhance with our career and professional development efforts for students and emphasize outcomes for prospective students and parents.

V. Faculty and Staff Development

We are committed to providing opportunities for employees, faculty and staff that support their professional development and offer a good work-life balance. We had two statistics faculty attend the APLU (Association of Public and Land-Grant Universities) Faculty Workshop on Active and Adaptive Learning at University of Louisville last summer. We developed a mentorship plan for junior microbiology faculty to ensure their success not only in the promotion and tenure process, but also as productive faculty.

VI. Resource stewardship to enhance support for faculty and students through effective administration and resources through philanthropy.

We had a strong year for fundraising with $4.43M in gifts and exceeding our annual goal, which happened in a year that had a change in dean and a change in development officers. The philanthropic gifts support faculty, including an estate commitment of $500,000 to establish a new professorship in mathematics; research ($850K); programs ($1.08M) for the Promise Fund, and an abundance of student success gifts of nearly $2 million for fellowships in chemistry and physics and seven newly endowed funds for undergraduate and graduate student scholarships, including gifts to support diversity and experiential learning in the College.