Marine and Conservation Biology
New Major Attracts Students, Faculty

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Passion Fuels New Marine Biology and Conservation Major

BY GLENN YASUDA, ASSOCIATE PROFESSOR OF BIOLOGY

Our mission statement proclaims passionately that Seattle University is deeply dedicated to building leaders who will create a better world. What better place to start than in offering an opportunity for science students to explore that world by studying the rich biology of the region?

This fall the College of Science and Engineering launched a new Bachelor of Science degree in marine and conservation biology (MCON). This new program will enable students to deeply investigate the critical issues affecting marine and terrestrial ecosystems throughout the world.

These new courses enhance the department’s curriculum by adding exciting new opportunities on campus and at the Blakely Island Field Station. In addition, the MCON major has an innovative education abroad program. All MCON majors will extend their education to include a global experience directly applicable to their major; an educational experience which, while satisfying academic requirements, will also permit the student to apply knowledge and skills to research problems in marine and terrestrial ecosystems in Australia, Costa Rica, Bonaire, South Africa, or the Galapagos.

These unique attributes, combined with the enthusiasm of students and faculty members, bode well for the new program. The drive to further explore marine and conservation issues at both local and global levels has been shown by the popularity of this new major, setting the stage for students to excel at Seattle University and later in the pursuit of graduate school or other professional opportunities.

The Blakely Island Field Station is an ideal location for teaching and research in marine and conservation biology.

OPPOSITE PAGE Students paddle across Spencer Lake to gather data on its biological, chemical, and physical characteristics.

ABOVE Biology students Michael Van Nuland ’11 and Kaitly Zech ’11 wade into Taggart Pond to collect data on aquatic invertebrates for research projects.

Blakely Island Provides New Opportunities for Undergraduate Research

BY LINDSAY WHITLOW, ASSOCIATE PROFESSOR OF BIOLOGY

The College of Science and Engineering has established an exciting new partnership to expand opportunities for our students to take classes and conduct research in the San Juan Islands at the Blakely Island Field Station. The station’s location provides unique access to marine, forest, and freshwater habitats where students can work with faculty on projects in ecology, marine biology, conservation, and environmental science. This undergraduate research-focused field station will offer students from many majors a rich opportunity to test scientific concepts through hands-on experiences in the field. The new student research opportunity is the result of our College’s long collaboration with Seattle Pacific University.

Message from the Dean

In the last few months there has been a lot of talk about massive open online courses (MOOCs). Stanford, M.I.T., Harvard, Princeton, and other prominent universities have put free college-level courses online. People are wondering: Do MOOCs represent a threat to traditional universities, or are they simply a way to serve the millions of people who would never have the opportunity to attend a traditional university?

I know that what we are doing here at Seattle University is qualitatively better than what’s available online, and it’s not just my opinion. In What Matters in College: Four Critical Years Revisited, an extensive study of more than 20,000 students at 200 colleges and universities, Alexander Astin found that students who have frequent interactions with faculty members, who take essay exams instead of multiple-choice exams, who give presentations in their classes, and who do independent research reap more benefits from college than students who do not have these experiences.

We have an inherent advantage over MOOCs because our faculty members engage students face-to-face in our classrooms and laboratories, but the existence of online lectures means we have to ensure that our classes really are engaging. That’s why we plan to continue to help our faculty members learn more about bringing “active learning” into their classes. “Active learning” refers to a variety of instructional methods that place more of the responsibility for learning on the students themselves. It’s a proven way to help students master the material. In early October, the College brought two renowned experts to campus to conduct a half-day workshop. A quarter of our faculty members stayed late on a Friday afternoon to learn new methods for incorporating these dynamic methods into their own classes.

As planning continues for the new science building and the renovation of the Bannan Building, we are gaining appreciation for the many ways new facilities will raise the quality of the educational experiences offered to all students at Seattle University. In the new classrooms we will see more small-group discussions and problem-solving activities. In the new research laboratories, we will increase opportunities students have to learn from each other as well as from faculty members.

Dr. Michael J. Quinn, Dean

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BILOGY

Associate professor Peggy Hudson’s article, “Easy, cheap, and fun: Role-play on endocrine regulation and negative feedback” was awarded the “NAABT BioClub Recognition” and will appear in the Nov-Dec 2012 issue of The American Biology Teacher.

Assistant professor Lindsay Whillow partnered with alumna Hillary Laurent (Biology ’09) to author an article on the impacts of invasive slugs in the Pacific Northwest entitled “Ecological effects of invasive slugs, Arion Rufus, on native Cascade Oregon grape, Mahonia nervosa” in the journal Northwest Science.

Assistant professor Cheryl Wotus received a second “Fund for Engagement” award to bring the Seattle Audubon Society’s “Finding Urban Nature (FUN)” Program to Bailey Gatzert Elementary School (BGES). Seattle University students serve as group leaders, teaching eight distinct one-hour lessons throughout the school year and introducing 3rd grade students to the scientific method while exploring plants and animals found in their schoolyard.

CHEMISTRY

Professor Vicky Minderhout and associate professor Jenny Loertscher have received a $539,000 NSF grant through the Transforming Undergraduate Education in Science, Technology, Engineering, and Math program. The project, “Transforming undergraduate biochemistry education: A community approach linking learning, assessment and curricular innovation,” seeks to improve undergraduate biochemistry education by engaging faculty nationally in the development of active learning and assessment tools targeting threshold concepts in biochemistry. These threshold concepts, once grasped, can change the way one ultimately masters a discipline. Dr. David Green, Director of the Center for Excellence in Teaching and Learning, will also contribute his expertise. This project is an extension of Minderhout and Loertscher’s previously-funded grant to develop, test and disseminate active learning materials for biochemistry.

Assistant professor Eric Watson, SJ was awarded a Cotrell College Science Award from Research Corporation that will fund his undergraduate research projects for the next two years.

CIVIL AND ENVIRONMENTAL ENGINEERING

Associate professor Katie Kuder published “Mechanical properties of self-consolidating concrete blended with high volumes of fly ash and slag” in Construction and Building Materials and co-authored the paper, “Formwork, insulation, wall thickness and fly ash: Do they affect concrete maturity?” for the Modern Formwork Systems for Building Construction Workshop.

ELECTRICAL AND COMPUTER ENGINEERING

Professor emerita Pat Daniels was awarded the 2012 ASEEN Electrical and Computer Engineering Distinguished Educator Award at the 2012 ASEEN Annual Conference in San Antonio, Texas. The award was conferred “for exemplary contributions to engineering education in the USA and around the world through ASEEN, ABET, and IEEE, and especially to the establishment of outcomes-based accreditation methods that have improved program quality.”

MATHEMATICS

Assistant professor Brian Fischer co-authored the paper “Population-wide bias of surround suppression in auditory spatial receptive fields of the owl’s midbrain, in the Journal of Neuroscience, and the paper was featured on the journal’s cover. Fischer is also the principal investigator on a $49,251 grant from the National Institutes of Health supporting his research in computational neuroscience.

Following a highly productive junior faculty development leave during fall term 2011, assistant professor Allison Heinrich has received word that four of her papers have been accepted for publication. They will appear in the Journal of Knot Theory and its Ramifications, the AKCE Journal of Graphs, the American Mathematical Monthly, and Math Horizons.

Mark MacLean, associate professor, authored a paper “A new approach to the Bipartite Fundamental Bound” which will appear in the November issue of Discrete Mathematics.

MECHANICAL ENGINEERING

Associate professors Teodora Shuman and Greg Mason were awarded the 2012 ASEE Professional Interest Council (PIC) Best Paper Award for “Novel approach to conducting labs in an introduction to thermodynamics course.” The paper was chosen as one of the five best papers from the 1500+ presented at the annual conference in San Antonio. Their paper describes a new approach to thermodynamics laboratory instruction that engages students in the design and implementation of experiments and the analysis and interpretation of data. Shuman and Mason will be recognized for their work at the 2013 ASEE Annual Conference and Exposition.

Six Faculty Members are Promoted

We are very pleased to announce the promotion of three College faculty members to the rank of (full) professor:

Jeff Boersma, Mathematics
Ph.D. in Mathematics, University of Oregon
B.A. in Mathematics and Philosophy, Calvin College

John Carter, Mathematics
Ph.D. in Applied Mathematics, University of Colorado
B.S. in Mathematics, University of Puget Sound

Phil Thompson, Civil and Environmental Engineering
Ph.D. in Environmental Engineering, University of Iowa
B.A. in Biology, University of Iowa

We are also happy to announce that three assistant professors in the College of Science and Engineering have been granted tenure and promoted to the rank of associate professor:

Dylan Hellwell, Mathematics
Ph.D. in Mathematics, University of Washington
B.S. in Mathematics, Harvey Mudd College

Wes Lauer, Civil and Environmental Engineering
Ph.D. in Civil Engineering, University of Minnesota
B.S.E. in Civil Engineering, Walla Walla College

Lindsay Whitlow, Biology
Ph.D. in Ecology and Evolutionary Biology, University of Michigan
B.S. in Biology, Duke University

A gaggle of associate professors from three departments – Chris Stipo, Frank Shih, Wes Lauer, Kathleen Kuder, and Ryan McLoughlin — recently received word from the National Science Foundation that their $265,908 proposal to the Major Research Instrumentation program was funded. The title of their project is, “Acquisition of a Raman and laser-induced breakdown spectroscopy microscope for interdisciplinary research and research training at Seattle University.”

PHYSICS

Professor Mary Alberg attended the 2012 Conference on the Intersections of Particle and Nuclear Physics, in St. Petersburg, Florida, where she presented an invited talk “Meson cloud contributions to the nuclear sea.” An article on the talk will be published in the conference proceedings. Alberg’s National Science Foundation support was renewed in June with a three-year grant of $163,000 for the project “RUI: Hadronic structure and interactions.”

Associate professor Joanne Hughes Clark was featured as a successful “character” for the on-line travel website Kayak.com. Much of the video was shot on campus. You can find the video at vimeo.com/48969123.

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An engaged group of faculty, including Agnieszka Miguel, Frank Shih, Leanne Robertson, Charity Lovitt, Henry Louie, McLean Slaughter, Carolyn Coffin, Annie Dai, and Al Moser worked for months to create engaging exhibits with such interesting names as: “Can you make squishy electricity?”, “Are you a block architect?”, “What color is cabbage?”, and “What does sound look like?” Visitors to the booth were excited to meet our students-in-red and engage with our science and engineering faculty members. They eagerly tested their skills at making circuits out of play dough, solving math puzzles, painting with (weak) acids and bases, seeing how different materials vibrate, creating their own electricity, using ultrasound to find hidden objects, and more.

The Seattle University booth was one of the busiest booths at Seattle Center, attracting a constant stream of families. Our student-volunteers worked closely with young booth visitors to make science approachable, exciting and fun. Gina Schatterman, who runs science fairs in the state of Iowa, marveled at how engaged the visitors were. She said it was the best booth created by a small college that she had ever seen! Recognizing the outstanding success of our booth, the Pacific Science Center has asked us to prepare a “how to” sheet to help future exhibitors.

Guests received a large magnifying glass with the inscription, “Look at Seattle U!” Indeed, this event gave thousands of people the chance to see what makes Seattle University special: close faculty-student interactions, a passion to share knowledge, and a desire to reach out to our community. It was an exciting and successful event, and we have already begun planning next year’s booth and activities!
Student Research Notes

UNDERGRADUATE SUMMER RESEARCH PROGRAM

The annual summer research program held its open house on July 26th. Visitors toured laboratories and ate ice cream made with liquid nitrogen. A total of 48 undergraduate students participated in research this past summer under the supervision of 22 faculty members. Chemistry professor Sue Jackels recently stepped down after serving as director of the undergraduate summer research program for the past four years. The College is grateful for her unflagging commitment to the success of this program, which has prospered under her leadership. This fall Dean Quinn announced that Joanne Hughes Clark, associate professor of physics, would become the new director of the undergraduate summer research program.

Seattle University ranks #1 in the country for the percentage of women professors among universities with at least 10 engineering faculty. More than one-third of the engineering professors are women, giving female students in these programs plenty of role models and mentors!

Source: 2010 survey by the American Society for Engineering Education

BIOPHYSICS

Michael Van Nuland ('11) received a prestigious NSF Graduate Research Fellowship to study community and evolutionary biology. Michael was an outstanding student who collaborated with associate professor Lindsay Whittow on research addressing the effects of urban development on terrestrial ecosystems. He is now a graduate student at the University of Tennessee.

CHEMISTRY

Competing against post-doctoral fellows, graduate students, and other undergraduate students, junior biochemistry major Lauren Ryon won the RNA Theme Poster competition at the National Meeting of the American Society of Biochemistry and Molecular Biology in San Diego. Her faculty mentor is assistant professor Ian Suydam.

CIVIL AND ENVIRONMENTAL ENGINEERING

Alumnus Stephen Hueffeld ('88, '95) invited seniors in civil and environmental engineering to visit his Willapa Hills dairy in Doty, Washington. Assistant professor Mike Marsalek accompanied the students to test an ultrafiltration system for cleaning whey wastewater. The dairy manager also took time to teach the students how to milk the sheep. The ultrafilter is a membrane separation unit with pore sizes between 1-100 nm. It is the same system used for drinking water treatment, but here it is being used to treat whey wastewater, which is extremely high in organic and nutrient concentrations. The student group included Kevin Cook, Jim Shannon, Lisa Stenberg, Kyler Flores, Anneliese Sytma, Cindy Halim, Anna Sigel and Scott Kennedy.

Undergraduate research students pose with their faculty mentors at the end-of-summer barbeque celebration.

COMPUTER SCIENCE AND SOFTWARE ENGINEERING

Undergraduates Josh Gummersall, Jason Hall, and Chris Whitten attended AT&T’s Mobile Hackathon event over the summer to learn the basics of the mobile domain. They designed a native Android app called “Alki Trivia” and successfully pitched their product to industry representatives, other competitors, and more than 100 spectators, earning them the Amazon Web Services prize of $1500.

MATHEMATICS

Senior Lee Johnson worked closely with assistant professor Allison Henrich and undergraduates from other universities on knot theory research. They are preparing a paper to submit for publication with Henrich’s collaborator, Slavik Jablan.

MECHANICAL ENGINEERING

Alumni Chad Brown (BSE/MEng ‘12) and Ed Guevara (BSE/MEng ‘12) have worked with associate professor Chris Stipe to develop an instrument to measure the age of geological materials on the surface of Mars, using Laser-Induced Breakdown Spectroscopy (LIBS). The instrument is under consideration as part of the next Mars rover. They have published their results in Spectrochimica Acta Part B: Atomic Spectroscopy. Brown and Guevara have also helped to develop a new instrument to improve worker safety in underground mines by measuring the silica in the air. Inhalation of silica, released during drilling operations, can lead to silicosis, an incurable and fatal lung disease. This paper will appear in Applied Spectroscopy later this year.
The College of Science and Engineering thanks its alumni and friends for their financial support over the past year.

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Announcing the 2012 Arvanitidis Fellows

Established through the generous support of Seattle University alumnus, Nicolaos Arvanitidis ’63, The Arvanitidis Fellowship in Memory of Father Francis P. Wood, S.J., provides financial support to undergraduate engineering students. Honoring legendary electrical engineering professor Father Francis P. Wood, S.J., a mentor to Dr. Arvanitidis, the endowment provides stipends and support to students who have demonstrated academic excellence and exhibit a deep desire to attend graduate school following completion of a degree at Seattle University. Two students received the inaugural Arvanitidis Fellowships.

Daniel Reeve is a junior mechanical engineering major who is working with associate professor Teodora Shuman on the design of a continuous-flow electrolytic flocculation/flotation device, a cost-efficient method for dewatering microalgae, which is a required step in food and fuel production. The results of his research will contribute to peer-reviewed publications and patent research.

Joseph McIntosh, a senior in electrical engineering, is working with associate professor Agnieszka Miguel in the area of image set compression, which utilizes concepts of redundancy to minimize file size while maintaining decompressed image quality. Joseph is also pursuing a B.S. degree in mathematics. This research project is designed to enhance his creativity, independent thinking, and problem-solving skills.

The Science & Engineering Newsletter is published semiannually by the Seattle University College of Science and Engineering.

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