Materials linked from the November 20, 2009 Graduate Council Agenda

GRADUATE FIELD MODEL
PROPOSAL

Summary: This proposal is to transform existing graduate programs to cross-department fields of study in order to increase the visibility of key strategic programs, tighten the focus of our graduate programs, and enhance their stature. This change will generate savings of current expenditures on a large number of graduate majors, separately funded interdisciplinary programs, and address issues of graduate program viability by providing a mechanism for reducing the number of small enrollment graduate programs, as suggested by the ACBSP.

Background
The development of institutions of higher education in the US has produced a commonly followed model of organizational structure generally consisting of departments or schools organized within colleges. This departmental model historically has been reflected in the manner by which intellectual subject matter is organized for the purpose of assembling faculties and offering academic programs. That is, typically, departments of chemistry have offered academic programs in chemistry; departments of history have offered academic programs in history, and so forth.

For the past century, this approach to the organization of knowledge was logical. However, such is no longer the case. Intellectual fields are rapidly emerging that have little regard for historic departmental lines in the research and graduate education enterprise. Thus, we have observed the establishment of interdisciplinary, multidisciplinary, and multidepartmental graduate programs. At OSU, the graduate programs in water resources and environmental sciences are excellent examples of the emergence of new programs built around intellectual themes and societal problems that are both too broad and too complex to be adequately addressed through a traditional, departmentally based graduate program. This evolution is particularly evident within the life sciences which has become a challenge for many universities today.

It is now common for individuals from a number of different departments to be members of a graduate faculty that offers a particular advanced degree. The recent NRC Assessment of the Research Doctorate revealed this pattern to be the case at OSU, with the majority of faculty members belonging to more than one graduate faculty. It has been estimated that the average OSU Graduate Faculty member serves on about 3 different graduate faculties including directing doctoral dissertation research in those programs. At OSU, one faculty member was discovered to be active in 10 different graduate programs.

In a recent New York Times Op-Ed (April 27, 2009), Mark C. Taylor argued for restructuring university curricula. He wrote, “The division-of-labor model of separate departments is obsolete and must be replaced with a curriculum structured like a web or complex adaptive network. Responsible teaching and scholarship must become cross-
disciplinary and cross-cultural.” Taylor maintained that restructuring graduate education in this manner would lead to a transformation of “fields of inquiry and methods of investigation” better situated to address today’s critical questions. He offered water as an example.

Proposal

All graduate programs at OSU will be converted into graduate fields independent of departmental, school, or college structures. The proposed model is based on the field model in place at Cornell University. Like Cornell, graduate fields at OSU will be led and managed by a director provided by an academic department or school. The vision is that both the host department/school and the director will freely move from among the departments that house the participating members of the field graduate faculty.

The criteria for establishment of a graduate field at OSU will include:

- An identifiable and recognized intellectual core must be clearly articulated.
- The field must have institutional strategic relevance.
- An academic department or school must express willingness to serve as host.
- An academic department or school must express willingness to provide the resources required to sustain the field including providing the director’s FTE.
- A minimum of 25 graduate faculty members must be actively engaged in offering the field.
- A minimum of 30 students must be enrolled in the field.
- An annual minimum of 5 master’s and 2 doctoral students must complete degrees in the field.
- There must be an understood approach to student support. In cases where the expectation is that students are financially supported, the source(s) of funding must be identified.

The Provost should immediately commission a faculty work group with leadership from the Graduate School to develop an implementation plan that includes an initial presentation of graduate fields and detail sufficient to launch the new model by fall, 2010.

The following principles guide this proposal:

- The graduate field model is consistent with the complex nature of today’s pressing questions and should be pursued.
- Graduate fields will be established to align with OSU’s strategic direction.
- Graduate fields will enhance the visibility of OSU’s intellectual strengths.
- There will be no net costs associated with the transition to the graduate field model.

Goals

- Increase graduate student per tenure track faculty member ratio.
- Replace current graduate majors with about half as many graduate fields.
- Find cost savings as a result of fewer specialized programs and/or fewer redundant course offerings, and so forth.
Establish graduate fields that will meet enrollment guidelines suggested by the ACBSP (i.e. award a minimum of 5 master’s and 2 doctoral students per year).
Create the new model by the end of the 2009-10 academic year.

Issues
The Deans presenting this proposal believe it presents significant opportunities for OSU and are strongly supportive of the approach. At the same time, the proposal for restructuring graduate programs at OSU represents a very significant change. Such change presents challenges as well as the opportunities that underlie the resolve to undertake the planned change. The following issues are not meant to be inclusive but are meant to acknowledge that the effort to enact the proposal will require substantial resolve.

This change is likely to greatly increase the visibility and competitiveness of OSU’s strategic areas of strength (such as conservation biology and ecology). However, it may cause visibility of long established, traditional programs to be lessened. This will require clear communication with all stakeholders, internal and external.

The strong college model at OSU may limit our ability to produce a deep philosophical as well as operational shift. Host departments/schools will be challenged to think and act beyond traditional boundaries represented on organizational charts. However, we note the commitment of the group making this proposal to the proposed model and accompanying philosophy.

Admission procedures across organizational structures that are the sources of student funding will required coordination. For example, the awarding of GRA and GTA appointments must be reconceptualized within the admissions procedure. Existing programs have differing policies regarding matters such as whether or not students may be offered admission independent of funding or whether students must identify a major professor as a condition of admission. Faculty groups in each field will need to establish clear criteria for admission and departments funding GTAs or GRAs must be clear on the expectations for the assignments of admitted students.

The Incentives for this approach require that departments are credited with the students who work with their faculty members. An accountability mechanism will need to be created such that student enrollment accrues to the department/school home of the major professor. We do this now for most of the interdisciplinary graduate programs.

Hiring must be coordinated across organizational boundaries to ensure that the needs of graduate fields are met and must be coordinated with the needs of other graduate fields, undergraduate instructional programs as well as the research and outreach missions of the University. Departments struggle with this tension now, so the issue is not new, but it will demand coordination.

Support and coordination of student recruiting activities will be required. Graduate Council policies may need to be created or revised to support the field model. For example, graduate faculty membership should be revised to require active
participation of faculty members who are associated with each field.

Field Examples
Three examples of graduate fields that could be established are presented below. The three fields are ecology, nutrition, and material science. OSU currently offers a graduate major in both nutrition and material science; there is no major in ecology even though OSU is recognized as having exceptional strength in the field of ecology. All three examples provide evidence that there already exists a critical mass of faculty, students, and intellectual strength to support creation of the field.

Example I: Graduate Field in Materials Science
Purpose and Outline: Materials science research and education at OSU involves over 50 faculty members from 10 departments and is a key area of research for our strategic aspirations in innovation. The synthesis of new materials and the identification of new uses for materials provide some of the most powerful tools for creating new businesses and economic opportunity. OSU scientists work on problems from transparent electronics to fiber composites and are leading the development of a new generation of materials. Particular emphasis exists in electronic materials, composite materials, magnetic materials and superconductivity, structural materials, optical materials, and biomaterials.
The program will offer the M.S. and Ph.D. degrees. Students in the program will be required to take 4 credits of ME 570 (Structure-Property Relationships in Materials) as well as three (for a M.S.) or four (for a Ph.D.) classes from each of these five categories: Thermodynamics of Materials; Kinetics/Rate Processes of Materials; Mechanical Behavior of Materials; Electronic/Magnetic Behavior of Materials; and Characterization of Materials.
The M.S. requires an additional 9 credits in a concentration, 8 credits of electives selected in consultation with an advisor, and 12 thesis credits. The Ph.D. requires an additional 12 credits in a concentration, 13 credits of electives selected in consultation with an advisor, and 63 thesis credits. Proposed concentrations are in Mechanical Behavior of Materials; Electroceramics; Polymer Materials; Electronic Materials; Nano-processing of Materials; and Fiber-based composite materials.
There is demand for graduates of this program in the emerging solar industry, alternative engineering, biotechnology and information technology companies, chemistry companies, and telecommunications firms.
Anticipated graduation rate: Based on the existing student populations in the relevant programs and the distribution of faculty members, we anticipate 25 graduates from the program annually, once the transition is complete from existing degree programs.
Departments participating: Chemistry; Physics; Civil & Construction Engineering; Mechanical, Industrial and Manufacturing Engineering, Electrical Engineering and Computer Science; Nuclear Engineering and Radiation Health Physics; Forest Engineering, Resources, and Management; and Wood Science and Engineering.
Facilities: Existing laboratories and equipment in the Colleges of Forestry, Science, and Engineering and the Center for Advanced Materials Research, with the University’s Electron Imaging Facility, provide an excellent core for this program.
Support: The School of Mechanical, Industrial and Manufacturing Engineering will serve as the host unit for the Materials Sciences Field of Study. Teaching assistantships for first and second year students will be provided by School of Mechanical, Industrial and Manufacturing Engineering, the Department of Physics, and the Department of Chemistry.

Key Faculty and Area of Focus:
- **Sundar Atre** - Polymers/Composites, Electronics/Ceramics
- **Brian Bay** - Biomaterials, Structural/Mech. Behavior
- **Ralf Busch** - Metallic Materials
- **David Cann** - Electronics/Ceramics
- **Chih-hung Chang** - Thin Films, Electronics/Ceramics
- **John Conley** - Electronics/Ceramics, Thin Films
- **Pallavi Dhagat** - Electronics/Ceramics
- **John Gardner**
- **Michael Gao** - Computational Mat. Sci.
- **Brady Gibbons** - Thin Films, Electronics/Ceramics
- **Chris Higgins** - Structural/Mech. Behavior
- **Chen Hsiou-Lien** - Polymers/Composites
- **Jason Ideker** - Structural/Mech. Behavior
- **Albrecht Jander** - Electronics/Ceramics
- **Goran Jovanovic** - Biomaterials
- **Fred Kamke** - Polymers/Composites, Structural/Mech. Behavior
- **Doug Keszler** - Electronics/Ceramics, Thin Films
- **Shoichi Kimura** - Biomaterials
- **Andrew Klein**
- **Milo Koretsky** - Thin Films
- **Jay Kruzic** - Structural/Mech. Behavior, Biomaterials
- **Mike Lerner** - Electronics/Ceramics
- **Kaichang Li** - Polymers/Composites
- **Ethan Minot** - Electronics/Ceramics
- **Jeff Morrell** - Structural/Mech. Behavior
- **Lech Muszynski** - Structural/Mech. Behavior, Polymers/Composites
- **Brian Paul** - Polymers/Composites
- **Shalini Prasad**
- **Vince Remcho** - Biomaterials, Thin Films
- **Skip Rochfort** - Polymers/Composites
- **Guenter Schneider** - Computational Mat. Sci.
- **John Simonsen** - Polymers/Composites
- **Mas Subramanian** - Electronics/Ceramics
- **Janet Tate** - Electronics/Ceramics, Thin Films
- **John Wager** - Electronics/Ceramics, Thin Films
- **William Warnes** - Electronics/Ceramics
Example II: Graduate Field in Ecology and Evolutionary Biology

Purpose and outline: Broadly defined, ecology and evolutionary biology have been distinctive and high profile programs at OSU for many decades. In fact, they are internationally renowned programs. Ecology and evolutionary biology are foundational to OSU’s internationally premier applied Land Grant programs in forestry, agriculture, rangelands, freshwaters, and marine resources. The Colleges of Agricultural Sciences, Forestry, Ocean and Atmospheric Sciences, and Science have a large and active group of biologists, ecologists, evolutionary and conservation biologists and related disciplines in multiple Departments (Botany and Plant Pathology, Fisheries and Wildlife, Rangeland Ecology and Management, Forest Engineering, Resources and Management, Forest Ecosystems and Society, Zoology, and Geosciences), whose research collectively spans a broad range of levels of organization (molecules to ecosystems), habitats (marine, freshwater, terrestrial), and organisms (invertebrates, vertebrates, non-vascular and vascular plants). These OSU scientists work closely with affiliated federal and state scientists on campus and off, including numerous international collaborations in the Field.

Focal systems for research include rocky intertidal and adjacent coastal marine ecosystems, salt marshes, coastal dunes, coral reefs, ponds and lakes, streams and rivers, grasslands, old-growth and managed forests, chaparral systems, rangelands, and insect-plant systems. The diverse and relatively unspoiled habitats of Oregon provide opportunities for much of this research, an unmatched outdoor laboratory. In addition, many research programs incorporate a broader geographic element, for example, a regional focus (e.g., West coast of North America) or international settings (e.g., the Bahamas, New Zealand, Central and South America, Central and South Africa).

Particular strengths and cross-cutting themes in the Field include Conservation Biology and Ecology, with active programs on the ecology of invasive species, population declines and extinctions, restoration ecology, marine reserves, environmental policy, and biodiversity conservation.

Subjects:
Ecology
Evolutionary Biology
Conservation Biology and Ecology
Concentrations
Forests
Freshwaters
Marine
Arid lands
Populations
Ecosystems

The program will offer and M.S. and Ph.D. degrees. Students in the Field will be required to take or have taken 16 credits (core of the Field) of Z 345 (Introduction to Evolution), Z 527 (Paleobiology), Z 581 (Biogeography), and ATS 520 (Principles of Climate) as well as three (for a M.S.) or four (for a Ph.D.) classes from these five categories: Ecology, Physiology, Conservation Biology and Ecology, Evolutionary Biology, and Oceanography.

The M.S. requires an additional 9 credits in a concentration, 8 credits of electives selected in consultation with an advisor, and 12 thesis credits. The Ph.D. requires an additional 12 credits in a concentration, 13 credits of electives selected in consultation with an advisor, and 63 thesis credits. Proposed concentrations are in forests, freshwaters, marine, arid lands, populations and ecosystems.

There is high demand for graduates of this program in academia, government research agencies, and domestic and international conservation organizations.

Anticipated graduation rates: Based on the existing student populations in the relevant programs and the distribution of faculty members, we anticipate a minimum of 50 graduates from the Field annually, once the transition is complete from existing degree programs.


Facilities: Existing laboratories and equipment at Hatfield Marine Science Center, H. J. Andrews Experimental Forest, Hatchery Research Center, on campus and at various Agricultural Experiment Stations around the state provide an excellent core for this program.

Support: A new School of Ecology and Evolutionary Biology in the College of Science will host the Field of Ecology and Evolutionary Biology. Teaching assistantships for first and second year students will be provided by contributing Departments. Sally S. Volunteer from the School of Ecology and Evolutionary Biology will serve as Graduate Director for the Field, and will be provided release time by her home department.

Key Faculty:
Steve Arnold - Systematics, Population Structure, Evolutionary Genetics, Molecular Evolution
Michael Blouin - Systematics, Population Structure, Evolutionary Genetics, Conservation Ecology
Aaron Liston - Systematics, Population Structure, Molecular Evolution
Joseph Spatafora - Systematics
Frank Moore - Molecular Evolution
Stephen Giovannoni - Molecular Evolution
Bruce Menge - Marine and Coastal Ecology, Community Ecology, Ecosystem and
Earth Systems Ecology
Mark Hixon - Marine and Coastal Ecology, Conservation Ecology
Peter McEvoy - Terrestrial Communities, Behavioral and Population Ecology, Conservation Ecology
Bruce McCune - Terrestrial Communities, Plant Ecology
Pat Muir - Terrestrial Communities, Plant Ecology
Mark Wilson - Terrestrial Communities, Community Ecology, Plant Ecology, Conservation Ecology
Julia Jones - Ecosystem and Earth Systems Ecology, Spatial Analysis in Ecology
Kate Lajtha - Ecosystem and Earth Systems Ecology, Plant Ecology
Lynne Houck - Behavioral and Population Ecology
Paul Murtaugh, - Statistical Ecology
Dan Schafer - Statistical Ecology
Alix Gitelman - Statistical Ecology
Virginia Lesser - Statistical Ecology
Dee Denver - Nematode Evolution
Dominique Batchelet - Ecological Modeling
John Bolte - Ecosystems Analysis
Yangzhen Fan - Environmental Sensing
Bruce Dugger - Wildlife
Dan Edge - Wildlife
Clint Epps - Wildlife
Jesse Ford - Fisheries
Eric Forsman - Wildlife
Tiffany Garcia - Wildlife
Stan Gregory - Fisheries
Scott Heppell - Fisheries
Selina Heppell - Fisheries
Markus Horning - Wildlife
Robert Hughes - Fisheries
Robert Lackey - Fisheries
Dixon Landers - Fisheries
Bruce Mate - Marine Mammals
Jessica Miller - Marine Fisheries
David Noakes - Hatchery Research Center
Doug Robinson - Wildlife
Dan Roby - Wildlife
Dan Rosenberg - Wildlife
Philippe Rossignol -
David Sampson - Fisheries
Brian Sidlauskas - Fisheries
Michael Borman - Rangeland Ecology
Doug Johnson - Rangeland Ecology and Restoration
Ricardo Mata-Gonzalez - Plant Ecology and Ecophysiology
Jeff Miller - Entomology
Richard Miller - Plant and fire Ecology
Steven Sharrow - Autecology, Agroforestry
Larry Larson - Range Ecology
Mark Abbott - Biological Oceanography
Hal Batchelder - Biological oceanography
Kelly Benoit-Bird - Biological Oceanography
Lorenzo Ciannelli - Biological Oceanography
Tim Cowles - Biological Oceanography
Ricardo Letelier - Biological Oceanography
Barry Sherr - Biological Oceanography
Eveln Sherr - Biological Oceanography
Yvette Spitz - Biological Oceanography
Pete Strutton - Biological Oceanography
Rob Wheatcroft - Biological Oceanography
John Bailey - Forest Ecology and Fire
Temesgen Hailemariam - Forest Biometrics
David Hann - Forest Modeling
Doug Maguire - Silviculture
Jeff McDonnell - Hydrology
Robin Rose - Reforestation
Bev Law - Forest-Climate
Mark Harmon - Forest Ecology and Carbon
Barbara Bond - Forest Ecophysiology
Steve Strauss - Forest Tree Genetics
Glen Howe - Forest Tree Genetics
Klaus Puettman - Forest Ecology and Silviculture
David Hibbs - Hardwood Forest Ecology
Darrell Ross - Forest Entomology
David Shaw - Forest Entomology
Paul Doescher - Arid Land Ecology and Restoration
Bill Ripple - Landscape Ecology and Trophic Cascades
Lisa Ganio - Ecological Statistics
Matt Betts - Wildlife Landscape Ecology
Example II: Graduate Field in Nutrition

Purpose and outline:
The graduate field in nutrition is aligned with OSU strategic initiatives, represents an area of critical need for Oregonians and beyond, and is built on a foundation of a graduate faculty with existing national and international reputation. In the aggregate, these faculty members generate more than $1.5M dollars in research support annually. Thus, there is obvious programmatic strength in the area of nutrition that is not bounded by organizational lines. Input was gathered from existing web resources and in communication with various nutrition leaders on the campus. The core curriculum is modeled after comparable programs at UC-Davis, University of Wisconsin, Cornell University, and University of North Carolina. The data in this example have not been verified by multiple people, but are intended to provide a general overview of this potential graduate field.

Using a framework similar to Cornell University the proposed graduate field is Nutrition with four associated Subjects (i.e. Animal Science; Bionutrition; Human Nutrition; Food Science and Technology); four Concentrations (Biochemical/Molecular; Human Nutrition; Animal Nutrition; Food Safety and Toxicology); and three Minor Concentrations (community nutrition; epidemiology; biostatistics).

Anticipated graduation rates: Based on the existing student populations in the relevant programs and the distribution of faculty members, we anticipate a minimum of 15 graduates from the Field annually, once the transition is complete from existing degree programs.

Departments participating: Animal Science, Food Science and Technology, Veterinary Medicine, Pharmacy, and Nutrition and Exercise Sciences. Departments in Ag???

Departments in Science???

Facilities: Existing laboratories and equipment ZZZ on campus provide an excellent core for this program.

Support: Teaching assistantships for first and second year students will be provided by contributing Departments. Sally S. Volunteer from the Department of XXX will serve as Graduate Director for the Field, and will be provided release time by her home department.

Key Faculty:

Joe Beckman – Ava Pauling Chair of the LPI, Biochemistry
Tammy Bray – Dean, HHS, Nutrition and Diabetes prevention
Mary Cluskey – Human Nutrition and dietetics
Gita Cheridan – Poultry nutrition and metabolic diseases
Mark Daeschel – Food microbiology and safety
Rob Dashwood – Cancer Chemoprevention
Balz Frei – LPE Director, Oxidative Stress and Atherosclerosis
Lisbeth Goddik – Dairy products safety
Adrian Gombart – Vitamin D and molecular mechanisms
Kathy Gunter – Osteoporosis and skeletal health
Tory Hagen – Mitochondria decay and aging
Jean Hall – Fatty acids and aging
Emily Ho – Antioxidants and chemoprevention
Urzula Iwaniec – bone metabolism, cancer and nutrition
Donald Jump – dietary fat and chronic disease
Sharon Krueger – FMO metabolism
Mark Leid – Transcriptional regulatory proteins
Melinda Manore – human nutrition, exercise and disease prevention
Robert McGorrin – Flavor chemistry and spectrometry
Regis Moreau – Molecular mechanisms of lipoic acid
Michael Morrissey – Seafood safety and health
Deb Mustacich – Drug nutrient interaction
Gayle Orner – Diet and cancer prevention
James Osborne – Wine microbiology and spoilage
Jae Park – Fish proteins
Michael Penner – Biobased processes
Michael Qian – Flavor chemistry and food analysis
Andrew Ross – Wheat-based foods and bioprocesses
Mahfuzur Sarker – Bacterial pathogenesis
Tom Shellhammer - Brewing science
Ellen Smit – nutrition, health and epidemiology
Fred Stevens – Bio-organic chemistry and toxicology
Yi-Cheng Su – Seafood microbiology and safety
Maret Traber – Vitamin E kinetics
Stewart Trost –obesity prevention and physical activity
Russell Turner – nutrition, exercise and skeletal health
David Williams –Diet and Cancer
Kerri Winters-Stone – exercise, bone and cancer
Carmen Wong – immunology and nutrition
Weijian Zhang – anti-inflammation, cardiac disease and diet