DIVISION OF NATURAL SCIENCES AND MATHEMATICS
2009-2010 EARTH AND PHYSICAL SCIENCES DEPARTMENT REPORT

Compiled by Steve Taylor and Jeff Templeton, August 16, 2010

I. EXECUTIVE SUMMARY

The Department of Earth and Physical Science consists of two program areas – Earth Science and Physics. The Earth Science program provides a liberal arts core education in geoscience with an emphasis on the scientific method, problem solving, and interdisciplinary science education. A key objective of the program is to prepare undergraduates for careers as professional geoscientists and educators. The Earth Science program also promotes the development of an informed citizenry for wise decision-making on issues related to natural resources, environmental quality, and sustainability in Oregon and beyond. The Physics program fosters a small-group active learning environment in which students explore and discover the laws of physics in a state-of-the-art laboratory. Students develop connections that link fundamental concepts in physics with phenomena covered in their Biology, Chemistry and Earth Science classes. The Physics program provides out-of-classroom experiences in space science and teacher training through membership in the NASA Oregon Space Grant Consortium.

The following is a summary of departmental highlights from the past year.

- Earth and Physical Science faculty members actively served as leaders on a number of campus-wide initiatives including NSM Division Chair in the College of LAS (Taylor), the Academic Excellence Showcase planning committee (Templeton), advisor to the WOU Honors Program (Myers) and NSM division representatives to the Collective Bargaining team (Schoenfeld and Wade).

- Earth and Physical Science faculty members actively served as professional leaders in their fields. Professional service activities include: leadership in state-level geoscience advisory boards (Taylor), participation in NASA Oregon Space Grant Program (Schoenfeld), and collective faculty membership and participation in professional societies (American Association of Physics Teachers, American Geophysical Union, Association of American Geographers, Council on Undergraduate Research, Friends of the Pleistocene, Geological Society of America, International Organization of Palaeobotanists, National Association of Geoscience Teachers, National Science Teachers Association, Oregon Academy of Science).

- Earth and Physical Science faculty members continue to be actively engaged in a wide spectrum of peer-reviewed research, publication, and related professional development. Dr. Myers conducted an analysis of Late Miocene Anaverde Flora in southern California and continued collaboration with several colleagues on Eocene-Miocene paleobotany of the John Day Basin, Central Oregon. Dr. Templeton conducted sabbatical research on tephra geochemistry at Newberry Volcano, Oregon and was PI on an NSF grant proposal to upgrade the ES100 laboratory curriculum at WOU (with Taylor and Wade as Co-PIs). Dr. Taylor continued watershed research in western Oregon and embarked on a new NIJ-funded finger print analysis project with Biology colleagues (Dutton, Dutton, Aldrich). Dr. Schoenfeld, Physics, conducted NASA-funded sabbatical research on children's book content and reading perceptions related to Earth system science. Current (2009-2010) active research grants and pending proposals related to EPS Department faculty total approximately $1M.

- Earth and Physical Science faculty members continue to actively engage high-quality undergraduate teaching, learning, and curriculum development. With 4 tenured faculty and 6 adjunct instructors, the EPS department generated approximately 8500 student credit hours (SCH) during the 2009-2010 academic year, accounting for over 25% of the total production in the Division of Natural Sciences and Mathematics.

- The Earth and Physical Science programs continue to grow in a sustainable manner, in parallel with overall university trends. ES100 LACC enrollments and retention are very strong. In 2009-

2010, the program actively advanced with respect to opportunity funding and infrastructure development in NS017 and NS101.

II. ENROLLMENT TRENDS

- The Earth Sciences program has experienced a steady number of graduates (range: 4-8) since 2001 and a stable enrollment in upper division major-minor courses (range: 6-18, average: 11). Earth Science enrollments have been increasing over the past 4 academic years (2006-2010). Total student credit hour production increased 15%, ES100 enrollments 11%, and ES200 enrollments have stabilized at ~30-35 students in fall term. The upper division population is steady, with a consistent range of 7 to 15 students per course. Cumulative growth rate in these areas is around 10% annually, approximately paralleling overall university trends. Ten-year average annual student credit hour production (SCH) in the program is ~8200, second in magnitude to Biology in the division (average annual ~9100 SCH over the same time period). The program is economical and efficient, with the highest annual credit-hour production per faculty-staff member (~400 SCH per faculty-staff) and the lowest salary:SCH ratio in the NSM Division.

- The Earth Science student population is quite diverse in terms of skills, interests, and career goals, ranging from Earth Science majors with focused career objectives to Environmental Studies minors and Integrated Science Education majors. The average annual number of majors and minors in the Earth Science program ranges from 40 to 50, with 1400 students tracking through the LACC ES 104-105-106 sequence. Most ES 100 students are in their freshman or sophomore years, and over 60% list their major as "pre-education". Enrollment in upper-division specialty courses ranges from 8-15, with 25 to 45 in more accessible lower and upper division courses (e.g., ES 201-202-203 Principles of Geology, ES 331 Oceanography, and ES 390 Meteorology).

- Demographically, our students are predominantly white/Caucasian, 20-24 years of age, with a female-to-male ratio of 1:3. Preliminary analysis of select course data from 1999-2005 (S. Taylor upper-division class rosters; n = 176) indicates that approximately 75% of our upper-division students are declared Earth Science majors and minors. The remaining 25% are working on graduate education degrees, free electives, and ancillary minors such as Environmental Studies.

- A total of 63 WOU Earth Science graduates were informally tracked for the period extending from 1999-2010. The following is a breakdown of post-baccalaureate employment outcomes: No Information Available = 22.2%, Science Education = 11.1%, Geotechnical-Environmental-Water Resources-Mining-Construction = 27.0%, GIS-Geospatial Technology = 6.3%, Other-Retail-Miscellaneous = 33.3%. Based on the above data, approximately 45% of Earth Science graduates are confirmed to have engaged gainful employment as a professional geoscientists or science educator's, 33% are working in other sectors of the economy, and no information is available for 22% of the population. In addition, approximately 5% of WOU Earth Science graduates continue on to graduate school in science or education, in direct alignment with standard student achievement measures and grade distribution curves (i.e. most of the top academic achievers, "A+" students" are motivated to continue on to graduate school).

- Enrollments remain steady in the Physics-200 level service courses with 25 to 30 and 10 to 15 starting out Fall term in the algebra-based (PH201-202-203) and calculus-based (PH211-212-213) sequences, respectively. Fall 2010 enrollment in PH201 is notably high with ~40 students. Improving Physics-sequence retention from Fall to Spring terms is an ongoing concern, and is the focus of curriculum development activities by program faculty.

III. SUMMARY OF PROGRAM CURRICULUM CHANGES

- This past year the Geology faculty implemented several modifications to the Earth Science program curriculum as part of the 2009-2010 catalog. These changes included the following: (1) addition of four new courses and updates to course numbers, titles and/or descriptions for eight existing Earth Science courses; (2) changes to the Earth Science Major, including incorporation of the new courses into the degree plan, addition of three new Mathematics options, revision of the Computer Science requirement, and concomitant credit hour change; and (3) modifications to the Earth Resources, Earth System Science, and Geology Minors to reflect to the course changes. These modifications represent a fine-tuning of Earth Science curriculum, the goal of which is to strengthen and modernize the major to best serve student needs.

- Philip Wade proposed a new "science education methods" course (GS 325) for K-8 Education majors. This course, which will be implemented in the next academic year, is aligned with the broad revisions to the Teacher Education program that were proposed and adopted this past year at the University level.

- A new ES199 Special Topics in Earth System Science, was proposed to be included as an alternative option in the ES100 sequence, but was shelved by the curriculum committee to allow time for division-wide review of LACC course criteria. The LACC criteria review was completed in Spring 2010.

IV. PROGRAM ASSESSMENT ACTIVITIES AND RESULTS

- The Earth Science program continues to implement a comprehensive evaluation plan that includes the following strategies: (1) formative embedded assessment, (2) summative assessment of the degree program, and (3) survey-based tracking of current students and graduates. The evaluation strategies described below began during the 2008-09 academic year with formative assessment strategies and will continue through 2012 when we plan to conduct our external review of the Earth Science program.

- Formative Embedded Assessment: Formative assessment of the Earth Science Program is currently being conducted via a series of Embedded Assessment Strategies. Initiated in Spring 2008, these strategies specifically link student performance on course activities to program outcomes. A variety of methods and course activities are used for embedded assessment, including inquiry-based lab exercises, field studies, writing assignments (informal short essays and longer-form research papers), active-learning exercises, oral group presentations, and multi-media work samples. These types of embedded assessment strategies are incrementally being deployed in all Earth Science courses.

- Summative Assessment of Degree Program: The capstone course, Senior Seminar (ES 407), continues to serve as the primary Degree Program Assessment mechanism for Earth Science graduates. The objective of Senior Seminar is for students to conduct in-depth study and research on current topics in the Earth Sciences. By requiring Earth Science students to draw on information from the full range of major courses they have completed during their time as an undergraduate, students must demonstrate proficiency in a broad range of Earth Science content areas. Students are required to complete ES 407 during the final term of their senior year and must satisfactorily complete the capstone course to graduate from the program. Senior Seminar has been successfully incorporated into the campus-wide, Academic Excellence Showcase event sponsored by the Program for Undergraduate Research Experiences and Phi Kappa Phi.

- In conjunction with seminar inquiry-based, work-sample method described above, standardized exit exam models are currently being explored by Earth Science faculty members. Several ideas have been pilot tested. One model utilizes an online exit exam based on national standards established by the Educational Testing Service in the 1990's that comprised part of the Advanced

Geology Graduate Record Exam. A second model utilizes the education-based PRAXIS exam for teaching candidates with an emphasis in Earth and physical science content. The third summative assessment tool currently under evaluation is the nationally standardized Fundamental Geology Exam that forms part of the Oregon State Board of Geologist Examiners (OSBGE) professional licensing process. Select student test groups have engaged each of above summative models over the past 8 years, their collective effectiveness and practicality are currently being evaluated. Since this initiative began, a total of 6 WOU Earth Science alumni have taken the OSBGE Fundamental Geology (FG) exam and all have met the passing requirements.

V. SWOT ANALYSIS

a. Strengths *(Key words: capabilities, resources, assets, marketing, innovative aspects, value, quality)*

The strengths of the Earth Science program are summarized as follows:

- The Earth Science program has a faculty:student ratio that is conducive to one-on-one contact, personalized instruction, and promotion of undergraduate research.
- The Earth Science program is one of the campus leaders with respect to service contributions to the Liberal Arts Core Curriculum and pre-education programs. The ES100 sequence (ES 104-105-106) that serves approximately 1400 students per year, is a common first destination for entering freshman, and has a notably high retention rate between fall, winter, and spring terms. ES100 encourages real-world problem solving and is appealing to non-science majors.
- Earth Science faculty members embrace a technology-based curriculum and are working to implement standardized program assessment tools.
- Earth Science faculty members actively serve as leaders on a number of campus-wide committees and serve in a variety of professional capacities.
- Earth Science faculty members are enthusiastically engaged in a wide spectrum of peer-reviewed research, publications, and related professional development.

The strengths of the Physics program are summarized as follows:

- The physics program offers small class size with opportunities for close student-faculty interaction. Upper level students engage in personalized independent studies.
- The physics laboratory represents a state-of-the- art active learning environment.
- Students have opportunities to participate in a wide range of activities through our affiliation with the NASA Oregon Space Grant Consortium.

b. Opportunities *(Key words: market developments, industry trends, nice markets, innovation, partnerships)*

Key opportunities for the Earth Science program include the following:

- Lower-division Earth Science enrollments have been increasing over the past 3 academic years (2006-2009). Total student credit hour production increased by 15% and ES100 enrollments by 11%. The upper-division population remains steady with a consistent number of degrees awarded. The program is economical and efficient, with a high annual credit-hour production per faculty-staff member (~400 SCH per faculty-staff) and a low salary:SCH ratio.

- A key aspect of the program is the close alliance with faculty in physics, chemistry, biology, and education. Faculty members from different disciplines work directly together on a daily basis and cultivate a multi-disciplinary, collegial atmosphere that is unique compared to other institutions. The cross-disciplinary alliance in NSM provides a superb opportunity for faculty and students with diverse interests to interact in a rich and stimulating academic environment. Earth Science plays an important role by providing a nexus for studies in the biological and physical sciences. In this regard, Earth Science faculty are instrumental in supporting a growing alliance of NSM faculty and programs that provide integrated, interdisciplinary field-based courses and research opportunities in Natural Science disciplines. In addition, there is a common linkage between

majors and minors in Earth Science, Geography, and Environmental Studies. As such, a significant number of students share common classes in each of these programs.

Key opportunities for the Physics program include the following:

- The Physics program is actively engaged in K-12 community outreach and improving science teacher training in the State of Oregon. Linkages with NASA-based grants programs provides WOU student scholarships and supports teacher training opportunities with a focus on global climate change in the Earth system. The application of Physics to real-world problems in Earth Science represents an innovative opportunity for cross-collaboration between faculty and students.

c. Challenges *(Key words: market demand, sustainability, obstacles, weaknesses)*

Three primary challenges to advancing the Earth Science program at WOU include: (1) over-dependence on adjunct faculty and lack of tenure-line positions, (2) limited faculty time available for scholarly activities, program assessment, and faculty development, and (3) student enrollment and retention.

- The primary challenge facing the Department of Earth and Physical Sciences is the over-dependence on adjunct faculty and lack of tenure-line positions compared to other departments in the division. The adjunct faculty ratio in Earth Science ranges up to 65%, almost double that of other NSM Division programs. The Earth Science program is currently in need of at least one tenure-track faculty position. Adjunct pay levels, teaching loads, and contract procedures at WOU are such that there is relatively high turnover in these positions, which ultimately destabilizes curricular programs and inhibits long-term development. Institutional stability, continuity, and future growth are dependent upon the stock of tenure-line faculty. Adjuncts represent short term investments with high turnover rate and curricular instability. Not only do tenure-track faculty members add to the vitality of individual courses and program curricula, they also represent an institutional investment in advanced levels of service, scholarship, and grant writing that is not typically possible for adjunct instructors. The Earth Science program is challenged by this instability.

- An ongoing challenge is also associated with the teaching load required of faculty. The standard teaching assignment requires 12 contact hours per week (36 FTE contact hours per academic year), with lecture hours counting for 1 FTE contact and lab hours counting for 0.66. The teaching load combined with maximum-capacity class sizes results in little time available for other faculty duties such as scholarly research, program planning / assessment, and professional service. As such, the bulk of the latter activities must be conducted after hours, on weekends, and during the summer. An additional challenge presented by the relatively high teaching load is that associated with depletion of creative energy and "teacher burnout".

- Student enrollment and retention is an ongoing challenge at all levels of the University, including the Earth Science program. While Earth Science 100-level course enrollments are increasing, the numbers of majors have been relatively steady, and growth has been slower than expected. The 100-level enrollment trends in large part mirror that of the university as a whole. The most significant challenge to growth of the Earth Science program results from the general lack of geology/Earth Science in the high school curriculum at the state level. In the state of Oregon, K-12 Students are only required to take Earth Science in 8th grade. Geology-related course offerings at the high school level occur sporadically on a district-by-district (teacher to teacher) basis, and are not prominently required in the same way as chemistry, biology, or physics. This deficiency is notable given the prominent role that the geosciences are currently playing in the state and national dialogue about oil and gas resources, energy production, water supplies, sustainability, and global climate change. The lack of an advanced placement (AP) test in Earth Science and absence of an explicit Oregon teaching endorsement are exacerbating factors. The net result is that students receive minimal exposure to Earth Science or Geology in high school, with little understanding of career options or the importance of Earth Science to natural resources

issues in the state of Oregon. This deficiency propagates as students enter college, thus stagnating opportunities for freshman enrollment growth.

Physics program challenges include the following:

- The most urgent challenge faced by the physics program is the lack of a second tenure line which limits the ability to offer upper division courses and to plan for programmatic upgrades. The physics program is caught in a classic "Catch-22" predicament. Low enrollment in upper level physics courses ensures departmental and division discussions for future hires go to disciplines other than physics. The lack of a major in physics, and regular upper level course offerings prevent the already small number of interested students from actually choosing physics. Student enrollment numbers in physics courses outside of require engineering coursework across the country have been low for many years now, and is likewise manifested at WOU.
- A high number of weekly student contact hours (typically 15-16) prevents faculty from fully engaging in scholarly and professional activities.
- Another challenge involves entering students who are ill-prepared for the quantitative problem solving demands that a university level physics class thrusts upon them.

d. Vulnerabilities (*Key words: gaps in capabilities, financials, cash flow, supply chain, disadvantages)*

Vulnerabilities for the Earth Science and Physics program are summarized as follows:

- The Earth Science program, along with others in the division, lacks a consistent source of funding for large-scale instrumentation and facility infrastructure. While we have worked diligently to upgrade and support laboratory infrastructure, the Earth Science program still lags behind other science program areas in terms of modern laboratory equipment and resources.
- While the need is clearly documented by staffing and enrollment data, there is a notable lack of institutional commitment to securing a long overdue tenure-line addition of an Earth and Physical Science education specialist, comparable to that recently added to the Biology faculty complement.
- The primary vulnerability for the Physics program is lack of office space, course-load equivalency and adequate long-term funding for a second tenure-line physicist.

VI. PROGRAM PLANNING AND INITIATIVES

- The Earth Science Program prepared and submitted a 5-year program review to the Oregon University System in August 2010.

VII. OTHER ITEMS

VIII. PUBLIC RELATIONS ITEMS FOR PROGRAM PROMOTION

- Three WOU Earth Science majors were recently awarded research funding under the supervision of Dr. Steve Taylor, Professor of Geology. Kelsii Dana, Earth Science major, received a 2010-2012 Undergraduate Research Fellowship for $45,000 from the U.S. Environmental Protection Agency. The title of her project is: "The Distribution and Occurrence of Nitrate in Groundwater Supplies of the Mid-Willamette Valley: Implications for Water Resources Management in the Monmouth-Independence Area, Oregon". This is the first such EPA award granted in the State of Oregon and these levels of undergraduate research support for an individual science student is unprecedented at Western Oregon University. Two other Earth Science majors are actively engaged in research grant projects from the 2010 NASA Oregon Space Grant: (1) Ryan Stanley received $5000 of support for a project entitled: "Land Cover Analysis Utilizing Aerial Photography, Remote Sensing and Geographic Information Systems: Application to Riparian Zones in the Mid-Willamette Basin, Oregon"; and (2) Brandon Snook applied for funds to support a project entitled: "Comparative Hydrogeomorphic Analysis of Western Oregon Watersheds Using Airborne Laser Swath Altimetry (LIDAR)".

APPENDIX 1. EPS DEPARTMENT FACULTY AND STUDENT ACCOMPLISHMENTS

I. FACULTY AND STAFF ROSTER

Staff

Julie Grammer, Laboratory Preparator, Biology-Earth Science

Tenure-Tenure Track Faculty

Jeff Myers, PhD, Professor
Bill Schoenfeld, PhD, Associate Professor
Steve Taylor, PhD, Professor
Jeff Templeton, PhD, Associate Professor and Department Chair

Non-Tenure Track Faculty

Karen Brown, M.S., Instructor
Don Ellingson, M.S., Instructor
Jeremiah Oxford, M.S., Instructor
Grant Smith, M.S., Instructor
Phillip Wade, M.S., Instructor
KC Walsh, PhD, Assistant Professor

II. FACULTY HIGHLIGHTS

a. Teaching

- Jeff Myers: conducted a field trip and incorporated microscopy into the ES392 curriculum; developed personalized curriculum approaches for ES407 Senior Seminar; completed syllabi reformatting in alignment with best practices at Cal State University, Monterey Bay.
- Steve Taylor: Advanced integration of Moodle and Classroom Response Systems ("clickers") into the ES202 curriculum.
- Jeff Templeton: Conducted a two-day field trip to Sunset Bay/Cape Arago and the Roseburg area for ES 321.
- Phil Wade: Revised the GS313/312 curriculum in response to Oregon Dept. of Education Core Science Standards Revisions; new course development in GS203 with increased integration of multi-media technology into student course outcomes; designed new course GS325 with Erin Baumgartner as part of the changes to the COE Teacher Preparation program.

b. Scholarship

Reports and Publications:

Myers, J.A., Pratt, A.R., Buche, M.V., 2009. Paleontological Resource Impact Mitigation Program, Final Technical Report of Results and Findings. Prepared in support of Antelope Valley Recycling and Disposal Facility, Inc., Landfill II, Phase V (VA-1 and VA-2) Palmdale, Los Angeles County, California, Prepared for Paleoenvironmental Consultants, Altedena, California.

Dillhoff, R.M., Dillhoff, T.A., Dunn, R.E., **Myers, J.A**., and Strömberg, C.A.E., 2009, Cenozoic Paleobotany of the John Day Basin, central Oregon, in O'Connor, J.E., Dorsey, R.J., and Madin, I.P., eds., Volcanoes to Vineyards: Geologic Field Trips through the Dynamic Landscape of the Pacific Northwest: Geological Society of America Field Guide 15, p. 135–164

Winningham, Robert G., **Templeton, Jeffrey H.,** Dutton, Bryan E., and Scheck, Stephen H., 2009, A grassroots, faculty-driven initiative to institutionalize undergraduate research: The ins and outs of cultivating administrative support: Council on Undergraduate Research Quarterly, v. 30, p. 29-34.

Taylor, S.B. *to appear*, The Occurrence of Small-Scale Debris Fans in Sandstone Landscapes of the Central Appalachians: Case-Study Supplement to accompany the "Key Concepts in Geomorphology" textbook by P. Bierman and D. Montgomery, W.H. Freeman Publisher.

Taylor, S.B. *to appear*, Volcanic History and Cinder Cone Erosion at Newberry Volcano, Oregon: Case-Study Supplement to accompany the "Key Concepts in Geomorphology" textbook by P. Bierman and D. Montgomery, W.H. Freeman Publisher (anticipated release date Fall 2010).

Presentations:

Myers, J.A. served as field trip leader, Cenozoic Paleobotany of the John Day basin, Central Oregon. Geological Society of America 2009 Annual Meeting in Portland, OR.

Taylor, S.B. Fall 2009, "Geology, Geomorphology and Hydrology of the Luckiamute Watershed, Central Oregon Coast Range", Willamette University Institute for Continued Learning (invited talk).

Taylor, S.B., Fall 2009, "Just the Facts: Licensing, Compliance, & the Role of the State Board of Geologists: Applications to the Water Resources Profession in Oregon", Oregon State University, Water Resources Graduate Program, Fall Seminar Series (invited talk).

Stanley, R., and **Taylor, S.B**., 2009, Land Cover Analysis Utilizing Geographic Information Systems and Historic Aerial Photography: A Case Study of Riparian Zones in the Luckiamute River Basin, Central Oregon Coast Range: Abstracts with Programs, Geological Society of America, v. 41, n7.

Taylor, S.B., Stanley, R., MacNab, I, and Dutton, B., 2009, Historic Land-Cover Analysis of The Luckiamute River Basin, Central Oregon Coast Range: Preliminary Results from the Earth Science Program for Undergraduate Research at Western Oregon University: Abstracts with Programs, Geological Society of America, v. 41, no. 7.

Dutton, E., **Taylor, S.B.,** Aldrich, P., and Dutton, B., 2010, Application of Spatial Statistics to Latent Print Identifications: Towards Improved Forensic Science Methodologies: General Forensics R&D Grantees Meeting, Proceedings of the American Academy of Forensic Sciences, v. 16, Seattle Washington.

Aldrich, P., **Taylor, S.B.,** Dutton, E., and Dutton, B., 2010, 2010, Application of Spatial Statistics to Latent Print Identifications: Proceedings of the International Association for Identification, Spokane, Washington.

Dutton, E., Aldrich, P., **Taylor, S.B.,** Dutton, E., 2010, NIJ Project Status Report – Application of Spatial Statistics to Latent Print Identifications: Proceedings of the Automated Fingerprint Identification Systems (AFIS) 24th Annual Users Conference, Portland, Oregon.

Templeton, Jeffrey H., 2009, Geochemical constraints on the evolution of a subduction-related, rear-arc continental magma system: Newberry Volcano, central Oregon: Geological Society of America Abstracts with Programs, v. 41, p. 63.

Templeton, Jeffrey H., Winningham, Robert G., Dutton, Bryan E., and Scheck, Stephen H., 2010, PURE@WOU: Developing and implementing the Program for Undergraduate Research Experiences at Western Oregon University: Council on Undergraduate Research National Conference Proceedings.

Aas, Tanja and **Wade, Philip** (2009) Google Earth in the K-8 Classroom: Geological Society of America Abstracts with Programs, Vol. 41, No. 7, p. 318.

Grants and Funding:

Myers, J.A., WOU Faculty Development Major Research. Description of an Articulated Fruiting Head of Securidaca (Polygalaceae) from the Latest Eocene Badger's Nose Flora of NE California, $2100.00
Myers, WOU Faculty Development Travel Funds $730.00

Taylor, S.B., Fall 2009, U.S. Environmental Protection Agency, Greater Research Opportunities (GRO) Fellowship for Undergraduate Environmental Study: "The Distribution and Occurrence of Nitrate in Groundwater Supplies of the Mid-Willamette Valley: Implications for Water Resource Management in the Monmouth-Independence Area, Oregon" (Co-PI and faculty supervisor for K. Dana, WOU Student, $45,100, awarded).

Taylor, S.B., Winter 2010, NASA Oregon Space Grant: "Land Cover Analysis Utilizing Aerial Photography, Remote Sensing and Geographic Information Systems: Application to Riparian Zones in the Mid-Willamette Basin, Oregon" (Co-PI and faculty supervisor for R. Stanley, WOU Student, $5000, awarded).

Taylor, S.B., Winter 2010, Myer Memorial Trust and Oregon Watershed Enhancement Board (OWEB) Special Investments Partnership Program: "Hydrogeologic Assessment and Aquifer Characterization at the Luckiamute State Natural Area" (Taylor PI with WOU student assistants, $25,000, review pending)

Taylor, S.B., Spring 2010, Contract Agreement Upper Nehalem Watershed Council: "GIS Analysis and Results from Rapid Bio-Assessment (RBA) and Limited Factors Analysis (LFA) in the Upper Nehalem Watershed, Tillamook County, Oregon" (PI with WOU student assistants, $17,000, awarded).

Taylor, S.B., Spring 2010, NASA Oregon Space Grant: "Comparative Hydrogeomorphic Analysis of Western Oregon Watersheds Using Airborne Laser Swath Altimetry (LIDAR)" (Co-PI and faculty supervisor for B. Snook, WOU Student, $5000, review pending).

Templeton, J.H., Taylor, S.B., Wade, P., and Carter, D., Spring 2010, Transforming Undergraduate Earth System Science Curricula through Inquiry-Based Learning-for-Use Modules, National Science Foundation – Transforming Undergraduate STEM Education Program, $249,657, pending review.

Templeton, J.H., Electron Microprobe Analysis of Pleistocene Ash-flow Tuffs at Newberry Volcano, Oregon: Fine-scale Compositional Constraints on the Evolution of a Continental Silicic Magma System, WOU Faculty Development Research / Major Project Grant, $2250.

Templeton, J.H., WOU Faculty Development Grant and other Travel Funds, Attend Geological Society of America Field Trip to Long Valley Caldera, CA, $2100.

c. Service

- Jeff Myers: Senate Honors Committee, Ad Hoc Experience task Force, Division Curriculum Committee, Preview day advisor, SEP faculty discussion panel, Co-chair of Oregon Academy of Science Geology Section with Scott Burns (PSU), Consulting activities with Paleoenvironmental Consultants, Altadena, CA, and Paleoresource Consultants, Sacramento, CA.
- Steve Taylor: Division Chair of Natural Sciences and Mathematics, Oregon Geographic Information Council, chair of the Oregon State Board of Geologist Examiners (OSBGE), council of examiners Association of State Boards of Geology, State Geologic Map Advisory Committee, Oregon Dept. of Geology and Mineral Industries, Portland, Oregon.
- Jeff Templeton: Chair of the Earth and Physical Science Department, EPS Dept. scheduler and budget manager, NSM Division Building Committee, NSM Division Budget Committee, Preview Day and SOAR advisor, Executive Committee for Program on Undergraduate Research (CUR), Academic Showcase Planning Committee.
- Phil Wade: Science teaching outreach at Sheridan K-8 NASA School (~100 hours of service) (part of WOU GiFT NASA Grant Team), Oregon Department of Education Science Content Panel Member, Education Board Member: A. C. Gilbert Discovery Village Science Museum, Session chair for 2010 Academic Excellence Showcase.

III. STUDENT ACHIEVEMENTS

- Earth Science Alumna Rachel Perot completed her M.S. degree in engineering geology at Portland State University with a thesis entitled “2006 Debris Flow Occurrence on Mt. Hood”. Rachel is now working for an engineering company in Lake Oswego.
- 25 Earth Science students participated in the 2010 WOU Academic Showcase, authoring both scientific posters and oral presentations.
- Ryan Stanley and Brandon Snook both applied for NASA Oregon Space Grant Scholarships to conduct watershed research in western Oregon.
- Kelsii Dana received a $45,000, two-year undergraduate research fellowship to study nitrates and groundwater quality in the mid-Willamette Valley.
- Alumna Heather Hintz is working as a seasonal park ranger at Oregon Caves National Monument.
- Thomas VanNice, a 2010 graduate, has obtained employment with Oregon Dept. of Fish and Wildlife working in watershed restoration.
- Alumna Jamie Fisher was recently hired by Resolution Copper Mining in Arizona to work at a project geologist.
- Matt Buche, 2009 graduate obtained employment as a field geologist for Kane Geotechnical in Fresno, CA.
- June 2010 Student Recognition Awards: Kelsii Dana and Brandon Snook, Outstanding Junior Undergraduate in Earth Science; Ryan Stanley, Outstanding Graduating Senior in Earth Science.