DIVISION OF NATURAL SCIENCES AND MATHEMATICS

2012-2013 ANNUAL REPORT
EXECUTIVE SUMMARY AND SWOT ANALYSIS

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I. EXECUTIVE SUMMARY

A. Division Highlights

The 2012-2013 academic year was associated with sustained enrollment and significant infrastructure development in the Division of Natural Sciences and Mathematics (NSM). The primary focus for the year involved the continued construction of the new DeVolder Family Science Center. The NSM design team included the division chair (Taylor) and faculty-staff representatives each from the Chemistry (Courtney, Flatt, Poston, Kazerouni, Clinton) and Biology Departments (LeMaster, Mueller-Warrant), working in conjunction with WOU Physical Plant, Fortis Construction and Soderstrom Architects. The DeVolder facility is designed to augment and expand the existing infrastructure in the Natural Sciences Building. Project highlights include: (1) construction of a new stand-alone DeVolder science center that will house all of the Chemistry Department and the Anatomy & Physiology component of the Biology/Pre-Professional Program, (2) facilities upgrades in lab technology, hood/ventilation systems, environmental safety equipment, and (3) expansion of the remainder of the Biology and Earth and Physical Science Departments into the space vacated in the current Natural Science Building. The new facilities will directly result in complete upgrade of the entire chemistry program, improvement to the Biology/A&P facilities, much needed expansion of BI100 and ES100 into vacated NS space, and significant increase in the number of research spaces across all disciplines. Year 2 of the DeVolder project focused on construction and implementation. Program moves are scheduled for late July-August 2013, with grand opening before the start of classes in late September.

Other events of note in the NSM Division include: (1) sustained pre-nursing/pre-professional enrollment trends (Biology/Chemistry 100-200 levels), (2) sustained demand for lower-level mathematics service courses (MTH70-95-100 levels), (3) conversion of visiting instructor to a new tenure-line assistant professor in Mathematics, (4) completion of NS Building greenhouse renovations and NS204 smart-lab upgrades, (5) development of new programming in Geographic Information Science, (6) continued need, enrollment demand, and profitability in the LACC laboratory science courses (ES100, BI100), (7) ancillary technology and equipment upgrades across all disciplines, and (8) retirement of long-time Administrative Program Assistant Niki Winslow, with subsequent hire of APA replacement Jeanie Stuntzner. At the same time, dedicated faculty and staff advanced other program areas and continued offering high-quality educational opportunities for the greater student population at Western Oregon University.

The following is a summary of program highlights within the NSM division.

- A team of 55 NSM faculty and staff are highly dedicated to supporting the university mission and guiding students to the highest levels of personal and professional success.
- Academic programs that focus on quality teaching, close student-faculty interaction via individualized mentoring, small upper-division class sizes, inquiry-based laboratory and field experiences, and promotion of undergraduate research.
- The highly subscribed LACC 100-level lab science courses for non-majors significantly contribute to the Liberal Arts mission at WOU and provide students with opportunities for relevant, real-world problem solving. These courses also provide the content foundation for pre-nursing and pre-education students.

- NSM faculty continuously strive to improve their respective curricula, embrace a technology-enriched learning environment, and implement meaningful assessment methodologies.
- NSM faculty actively serve as leaders on campus committees and regularly participate in a variety of professional service positions, both at the state and national levels.
- NSM faculty members are actively engaged in a spectrum of peer-reviewed research, publications, grantsmanship, and related professional development.
- NSM division students are actively engaged in independent research projects, internships, and scholarship at the local, state, and national levels
- The Biology program is notably robust with a strong number of majors and graduates, a well-developed scholarship fund, a consistent record of post-baccalaureate student placement, and continued enrollment demand at all levels. Graduating majors are at record levels.
- The Chemistry program provides rigorous training for professional scientists, has established a significant record of alumni placement in graduate school, has forged a strong collaboration with regional forensics laboratories, and is experiencing sustained enrollment demand in health science-related service courses.
- 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 serves approximately 1100 students per year, is a common first destination for entering freshman, and has a notably high retention rate between fall, winter, and spring terms. The Earth Science major is directly linked to state licensure for registered professional geologists.
- The Mathematics Department is nationally recognized for its math education program and is making significant contributions in the area of teacher preparation. This recognition combined with strong enrollment numbers at all levels attest to the success and assessment-driven curriculum work by the faculty. Graduating majors are at record levels.
- 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.

B. Biology Department

- Biology enrollment continued to grow (over 3100 students took Biology-related coursework in 2012-2013, including lectures and labs). Non-majors enrollment was sustained with over 2200 students and the major grew by nearly 100 students compared to the previous year (~850 students, including lectures and labs).
- Biology students have been successful in their post-graduate pursuits. At least 6 current or former majors were accepted into professional schools and advanced degree programs (e.g. Education, Pharmacy, Physical Therapy). Another 4 found employment in positions spanning several disciplines of Biology. At least 42 Pre-Nursing advisees were accepted into professional undergraduate programs.
- The Biology department continued to enhance laboratory space and technology. Dr. Baumgartner was awarded $27K in WOU Academic Infrastructure Committee (AIC) funding for Biology 100 series compound and dissection microscopes. Dr. Dutton was awarded $25K in AIC funding for "smart-lab" upgrades in our major-serving NS204 facilities. Additional infrastructure upgrades were also accomplished in Cell-Molecular-Microbiology, Organismal-Ecology, Botany coursework/facilities, and Human A&P. Ongoing faculty/staff effort (Dr. LeMaster and Piper Mueller-Warrant) was expended to provide support for construction of the DeVolder Family

Science Center. Drs. Boomer, Baltzley, and Latham worked with the WOU Textbook Rental Program to acquire ~150 audience-response clickers for a BI 211-focused program to promote active learning.

- Biology Faculty published 4 papers in peer-reviewed journals. They were also involved in 13 refereed presentations at state or national meetings and workshops. Nine of these combined activities were co-authored by current or former WOU students.

- Biology Faculty continued successful work in the area of research and grant writing. Dr. Latham continued to work as a collaborator with the NSF ADVANCE Project awarded to Gonzaga University ($600K), aimed at advancing the careers of women in STEM at PUI's. Dr. Howard continued her LTER research project at Oregon State University ($25K NSF-ROA Supplement). Drs. Haberman and Baumgartner completed Sea Grant funding ($8K, no-cost extension March 2013). Submitted last year, Dr. Baumgartner served as the Co-PI on a $500K NSF Research Network Grant Proposal, co-authored with other members of the Northwest Biosciences Consortium (Stasinos Stavrianeas, Willamette University, PI). Dr. Dutton and division collaborators (Taylor, E. Dutton, P. Aldrich) submitted a U.S. Department of Justice grant ($827K), which is currently in review. In addition, the following faculty applied for and received WOU Faculty Development funding for research and/or travel: Dr. Baltzley was awarded nearly $5K; Dr. LeMaster was awarded $3.5K; Dr. Latham was awarded $1.2K; Dr. Haberman was awarded $3.7K, and Dr. Howard was awarded over $2K.

- Biology Faculty contributed to WOU governance, with notable representation on Faculty Senate, Institutional Review Board, Program for Undergraduate Research Experiences (PURE), Faculty Evaluation Committee, Scholarship Committee, and the University Personnel Review Committee. Faculty advised approximately 350 students per term. Six Biology Faculty served as mentors for 24 undergraduates engaged in research projects, including 2 Honors Theses.

- The Biology Department awarded more than $30,000 of scholarships to undergraduate Biology majors.

- The pending completion and grand opening of the new DeVolder Family Science Center represents the start of an exciting new chapter for the Biology program at WOU. In addition to gains in office-storage-research space, a total of two new Anatomy and Physiology labs will be on line for the start of classes in September 2013. The project includes over $250,000 of investments in new technology, equipment and instrumentation. The investment in upgraded Biology facilities at WOU is much needed and appreciated.

C. Chemistry Department

- The CH100 sequence continued sustained enrollment related to students attending WOU in the pre-nursing program. To accommodate the sustained enrollment, CH100 trailer sections in the sequence are being offered throughout the academic year. Pre-enrollment data for Fall 2013 shows continued demand for this sequence with all sections, both lecture and lab, highly subscribed.

- Enrollments in other areas remained strong including upper division courses. Although few programs in other departments have continued to require organic chemistry (Ch 334-336), enrollments remained relatively constant due to the number of second year chemistry majors and students pursuing chemistry minors and forensic science minors. Other upper division courses showed strong enrollments during 2012-2013 as well. Pre-enrollment data for Fall 2013 show sustained demand for the science majors' general chemistry (Ch 221) and organic chemistry (Ch 334). Additional CH200 laboratory and lecture seats had to be incorporated in the past two years to accommodate this sustained enrollment. To aid incoming students who either do not meet the prerequisites or who feel they need to refresh their chemistry background for success in the

CH200 sequence, the department has developed an intensive preparatory chemistry course (CH 150) which will be offered Fall 2013 on an experimental basis as a limited seat section.

- The Department implemented a new Environmental Chemistry option. This option provides training in an area of intense regional interest. The department also further advanced the new Medicinal Chemistry/Pharmacology option and two new minors, Medicinal Chemistry and Pharmacology: Natural Science Track and Medicinal Chemistry and Pharmacology: Health and Community Track. As part of this program, a group of WOU students are traveling to China during Summer 2013, to study traditional Chinese medicine.

- Two faculty members within the Department experimented with new methods of delivering course content, including the "flipped classroom" model. In this instructional style, lectures are recorded for students to watch online outside the classroom. The in-class time is devoted to active learning activities. This mode of instruction was used in Ch 334, 335, 336, and a few experimental sections of the CH100 sequence. Initial results were promising, but more data are needed before evaluating the experiment.

- The Department has begun offering selected upper division courses in online and hybrid options to allow for greater student access. Expansion in this area will occur during 2013-14.

- The Chemistry Department graduated five majors in 2012-2013 (1 B.A., 4 B.S. degrees). Western's chemistry graduates are consistently competitive in the employment market and in admissions to graduate and professional schools. There are currently a number of chemistry alumni (5 to10) at various stages in graduate and professional programs throughout the United States. Our Forensic Option graduates have been very successful in obtaining positions in the Oregon State Police (OSP) forensic labs as well as labs in other states.

- The pending completion and grand opening of the new DeVolder Family Science Center represents the start of an exciting new chapter for the Chemistry program at WOU. In addition to gains in office-storage-research space, a total of four new chemistry labs will be on line for the start of classes in September 2013. The project includes over $350,000 of investments in new technology, equipment and instrumentation. The investment in upgraded Chemistry facilities at WOU is much needed and appreciated.

D. Earth and Physical Sciences Department

- 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 Program for Undergraduate Research Experiences (Templeton), and representation on the Collective Bargaining team (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), co-chair Geology section of Oregon Academy of Science (Myers), and collective faculty membership and participation in professional societies (American Institute of Physics, American Educational Research Association, 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 Association for Interpretation, National Science Teachers Association, Oregon Academy of Science, and Paleontological Society of America).

- Earth and Physical Science faculty members are actively engaged in a wide spectrum of peer-reviewed research, publication, and related professional development. Dr. Myers conducted professional consulting work focusing on paleofloras in California. Dr. Schoenfeld continued work as the PI on a Global Climate Change Education project funded by NASA. Dr. Taylor

continued watershed research in western Oregon and submitted a proposal to the National Institute of Justice to continue work on finger print analysis project with Biology colleagues (Dutton, Dutton, and Aldrich). Dr. Templeton continued research on silicic volcanic rocks at Newberry Volcano in central Oregon. Mr. Wade co-authored a manuscript with A. Courtney (Chemistry) that discusses their long-term work using video projects in the classroom. Current (2012-2013) active research grants and pending proposals related to EPS Department faculty total approximately $1.4M.

- Earth and Physical Science faculty members continue to actively engage high-quality undergraduate teaching, learning, and curriculum development. With 4 tenured faculty and 4 adjunct instructors, the EPS department generated over 7600 student credits hours (SCH) during the 2012-2013 academic year, accounting for 23% 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 robust, and upper-division Earth Science course enrollments are solid and growing.

- The 2012-2013 academic year was associated with a continued growth in the undergraduate research program in Earth Sciences. Earth Science students continue to be actively engaged in undergraduate research project under the guidance of faculty mentors. Research projects focused on geographic information systems, watershed research, river restoration, petrology of volcanic rocks, landslide hazard studies, and cinder cone analysis and landscape modeling with high resolution Lidar. A number of students presented their work at the WOU Academic Excellence Showcase, and one student presented at the Association of Engineering Geologists national meeting in Salt Lake City.

E. Mathematics Department

- The mathematics department faculty are active in all areas of teaching, research and service. Our program is strong and our graduates have success getting jobs and earning entrance into graduate schools. The 2013 graduating class was our largest yet, with 19 graduating with a mathematics degree and 2 with the mathematics-computer science degree.

- Our students are doing notable work. Seven students presented work at national conferences, 18 seniors presented their senior projects at a local conference and 1 student was co-author of a paper that has been accepted for publication. Our students continue to be accepted into nationally recognized programs: 2 undergraduates will be attending summer Research Experiences for Undergraduates and 7 have been accepted to graduate school.

- The Mathematics Department remains committed to serving the needs of remedial and lower level mathematics students. Enrollment in pre-college level courses accounted for over 3500 student contact hours during the academic year. Two initiatives that seem to be successful are the tutoring in the Math Center and the development of the ALEKs Prep courses. Laurie Burton has spearheaded the drive to increase the number of hours of tutoring available for students in the Math Center and to hire qualified tutors. Further, we have developed a new course to help students build their skills in preparation for their college level courses, MTH 67 and MTH 68, using the “ALEKs Prep” system.

- Mathematics Department faculty continue to engage community outreach. Cheryl Beaver, Laurie Burton, Matthew Ciancetta, Breeann Flesch and Ron Wiebe are working with Ash Creek elementary school on the “Math Buddy” project to engage in a problem solving pen-pal activity. In addition, Cheryl Beaver organized a Math and Science night at local elementary schools and is involved in a Math-Science Partnership (MSP) grant with the Oregon Aquarium for teachers in Lincoln and Tillamook counties. Matthew Ciancetta is involved with a project that examines the effects of a physical activity intervention on math performance in 6th grade students at Talmadge

Middle School. The math department also held its 8th annual Sonia Kovalevsky Mathematics Day for high school girls and their teachers. Finally, Breeann Flesch sponsored the amazing "Beauty of Art" exhibit in the library, to provide the community with a deeper appreciation of our academic discipline.

- Matthew Nabity developed and offered the math department's first online courses, MTH 111 and MTH 112. Both classes filled quickly and the students seemed to like the model. Matthew has also developed an online MTH 243 course that will be offered next year.

- All Mathematics Department faculty are engaged in ongoing research projects. Three papers were accepted to peer-reviewed journals and Laurie Burton and Cheryl Beaver edited a book focusing on middle school teacher preparation. Faculty engaged 11 presentations at conferences, as well as actively serving in professional roles as journal referees and members on service committees.

- The mathematics faculty is also involved in the governance of the university. We had representatives on the Faculty Senate, Faculty Development, Curriculum and University Accreditation Committee, and the Joint Committee on Faculty Evaluation. Scott Beaver serves as Chief Bargaining Officer for faculty on the WOUFT and on the executive committee for PURE. Scott was also a SB242 Oregon Retirement Plan Committee Member.

- Visiting Assistant Professor Matthew Nabity was converted to a new tenure-track assistant professor, and will begin his new role in Fall 2013. He has made significant contributions to the students and department, we welcome his addition to our tenure-line complement.

II. SWOT ANALYSIS

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

1. Biology

- Biology Faculty are strongly committed to undergraduate education. All are active in all aspects of the university, including teaching, governance, and research.

- As a department, we have continued to enhance our laboratories and budget decision-making processes to upgrade equipment, and emphasize more cutting-edge laboratory exercises. Construction of the new DeVolder Family Science Building will provide much need space for offices, research and support services.

- Biology Faculty have embraced assessment as a means to provide empirical evidence for making programmatic and/or course changes with a specific emphasis on improving student preparation, managing enrollment, and better tracking/advising students. That our numbers of majors grew this year and more were retained, we believe, is testimony to our strategic efforts.

2. Chemistry

- The Chemistry Department is composed of four tenured faculty, four adjuncts, and two specialty instructors from the Oregon State Police crime laboratory. This faculty is capable and versatile with each member able to teach in more than one area within the program and is the department's most valuable resource.

- A primary strength of the department is the commitment of the faculty to integrate innovative activities and projects into the curriculum.
    - Students work on research projects as part of laboratory coursework
    - Innovative use of technology
        - Project-based content learning through video production, web authoring, computer application design, etc
        - Use of clicker methodology to assess student learning during lecture

- Use of alternative methods of delivering course content
- Hands on use of laboratory instrumentation including the opportunity to set up and learn how to operate instruments from manuals, etc.

- WOU possesses the only program within the OUS system that is uniquely designed to train students in the area of Forensic Chemistry while using OSP professionals to teach the techniques currently used in the working forensic lab.

- The Department is the only chemistry program within the OUS system offering unique concentrations in pharmacology, medicinal chemistry, and environmental chemistry at the undergraduate level.

- The Department has cultivated a program geared toward providing chemists trained in the area of environmental analysis

- The quality of WOU chemistry graduates is demonstrated by competing favorably for employment within the region.

- The quality of WOU chemistry alumni is demonstrated by success in graduate programs. We currently have graduates pursuing advanced degrees at Oregon State University, the University of Utah, Oklahoma State University, Colorado State University, the University of Oregon and the John Jay College of Criminal Justice (the foremost graduate program in forensics in the U.S.).

3. Earth and Physical Sciences

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 1100 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.

4. Mathematics

- The high quality of Mathematics faculty is evidenced by their positive teaching evaluations, publication records and leadership roles in local and national organizations.

- The Mathematics Department has a strong commitment to undergraduate education. Smaller class size, one-on-one advising of senior projects, and easy accessibility of faculty to students are some examples of contributing factors to the high quality education we provide.
- The success of the program is demonstrated in part by the success of our students.
    - Mathematics students have been successful in gaining admittance to competitive summer research programs (REUs).
    - Students regularly attend both local and national conferences and present work (some win awards).
    - Students regularly score high as a group on the Major Field Test.
    - Students regularly earn positions teaching, in industry, or in graduate school upon graduation (7 students accepted to graduate school in 2012-13).
- The mathematics preparation of pre-service K – 8 teachers at Western has been recognized by the National Council on Teacher Quality.
- The department employs innovative teaching strategies both in the education and major courses. Examples include discovery-based learning, hands-on group work, flipped classrooms and use of technology.
- The department is committed to self assessment and is always looking for ways to inform our teaching and improve the quality of our education.
- Mathematics faculty play a role in the service to the larger campus community serving on a variety of committees and in leadership positions.
- The Mathematics department is committed to improving student achievement in all level of courses. The Math Center extended its tutoring hours and has become a valuable resource for students. The ALEKs mathematics preparation courses (MTH67 and 68) offers great promise in helping students be more successful on placement tests and in subsequent course work.

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

1. Biology

- Enrollment growth provides an opportunity, so long as it is appropriately managed and supported.
- The diverse capabilities of Biology Faculty allow for a good balance of new research programs and experienced leadership, so long as other workload demands remain in check.
- The 2012-13 academic year was associated with strong scholarship productivity, particularly in the area of undergraduate mentoring efforts with an emphasis on Academic Excellence Showcase presentations.

2. Chemistry

- Opportunity exists to attract students in pre-nursing by packaging current forensic course offerings, as well as a new courses in toxicology/pharmacology, into a 12-hour upper division block that could be used in the nursing program to prepare students for the rapidly developing area of Forensic Nursing.
- Fresh opportunities exist with respect to upgrading our offerings in the areas of biochemistry, toxicology, environmental chemistry, medicinal chemistry and pharmacology to prepare students for graduate work in these areas.
- Continue our interaction with the OSP crime lab by integrating lab experts into our curriculum and maintaining student intern positions within the laboratory. After working with OSP

professionals, our students fare well in acquiring forensic employment within the system in an area that has a limited employment market.

- Opening of the new DeVolder Family Science Center will provide the chemistry department with totally updated facilities and opportunities for continued program growth.

3. Earth and Physical Sciences

Key opportunities for the Earth Science program include the following:

- An emerging opportunity for the Earth Science program is the development of a new Geographic Information Science minor with a focus on course work in Geographic Information Systems (GIS) and Remote Sensing Technology. GIScience is in widespread application across all sectors of the global economy including scientific research, natural resource management, government, industry and business. This new programming is in direct alignment with goals of the Oregon University System, and the Legislative "40-40-20 Goal" for Oregon (ORS 351.009). New course and program proposals are currently pending final review at the Faculty Senate Curriculum Committee, and WOU Administration has supported program expansion in this area with approval of a new tenure-line position to be hired for the start of classes in Fall 2014. In addition to the GIS curriculum, this new tenure line will also provide much needed support in the lower-level LACC ES100 curriculum, and related electives.

- Lower-division Earth Science enrollments have been increasing over the past 9 academic years (2004-2013). Total student credit hour production increased by 15% and ES100 enrollments by 10%. 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 (~350 SCH per faculty-staff) and a low salary:SCH ratio. In sum, the Earth Science program is a significant profit center for the university.

- 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.

- Completion of the new DeVolder Family Science Center will provide opportunities for Earth Science program expansion into new spaces vacated by Chemistry when they move from the existing Natural Science building in Fall 2013.

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.

4. Mathematics

- Faculty members have been increasingly engaged in collaborative projects that will create new opportunities through community outreach (e.g. Ciancetta work with Talmadge Middle School and C. Beaver work with MSP program at the Oregon Aquarium, described above).
- Matthew Nabity developed and offered the math department's first online courses this past year (MTH111, MTH112, MTH243, described above). Online deliveries of summer courses in particular help us reach the student population who leave for the summer and tend to take our courses elsewhere.
- Cheryl Beaver worked with a state Mathematics Specialist Task for to help establish an Elementary Mathematics Instructional Leader Specialization for a teaching license. The proposal was approved by the Teachers Standards and Practices Commission in February. Cheryl Beaver and Laurie Burton will work with Rachel Harrington (College of Education) next year to create courses that will allow teachers to earn this specialization through WOU. These added courses will not only contribute to this program, but will also increase our offerings for the MS in Ed with a math focus.

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

1. Biology

- The greatest challenge facing Biology at this time is retention, particularly in the major. This year's promising enrollment gains are the result of strategic efforts and heavy workload commitments given ongoing challenges with student preparation, attendance, etc.
- Once again, challenges regarding research were frequently stated in faculty annual reports. Primary concerns include equipment access, space, time, equity, expectations, and support (e.g. FTE recognition for mentoring undergraduates). While undergraduate mentoring remained high this year, sustained effort in the areas of publications and grantsmanship will be required.
- Enrollment continues to grow without a concomitant hiring of additional tenure-track faculty.

2. Chemistry

- Finite resources for maintenance of the Department's instrument holdings, upgrading of instruments to state-of-the-art models and acquisition of expensive forensic instrumentation and basic chemical instrumentation such as a nuclear magnetic resonance spectrometer. Such instrumentation frequently costs in excess of $100,000 for the initial purchase and brings with it ongoing operational costs. Opening of the new DeVolder Family Science Center will help catalyze funding for equipment upgrades and provide new space for housing instrumentation, but purchase of higher dollar instrumentation is an ongoing challenge.
- There is a limited market demand for forensic specialists. This challenge is met within the curriculum by providing our Forensic Option majors with the skills needed to be marketable as bench chemists.
- A significant challenge lies in accommodating any further growth of the CH100 sequence to meet the demand of the pre-nursing program, without making sacrifices in other programmatic areas.
- Weakness in the area of Quality Assurance/Quality Control training within our curriculum. This is an area that would increase the desirability of our students to potential employers.
- Development of the new DeVolder Family Science Center will require much additional work outside of already booked staff/faculty schedules to set up shop in the new facility. It is anticipated that there will be growing pains associated with the move to the new space.

3. Earth and Physical Sciences

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

- The most immediate challenge facing the Department of Earth and Physical Science at present is the pressing need for a full-time lab preparator. We currently share a half-time position with the Biology Dept. Growth in both the ES100 and BI100 introductory LACC laboratory science courses has made it challenging for the current staff member to accomplish all of the tasks that could and should be completed. A full-time, dedicated EPS lab preparator would remedy this situation.

- Another key challenge facing the Department of Earth and Physical Science 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 tenured 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".

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.
- A high number of weekly student contact hours (typically 15-16) prevents the sole physics faculty member 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.
- The availability of using the DataStudio software in NS101 is hit and miss; sometimes it works perfectly, other times the software just won't load.
- Issues with scheduling conflicts between upper-division Mathematics courses and upper-division Physics. Also, difficulties in convincing the Mathematics department to require that Applied Math majors take calculus based physics as part of their LACC.

4. Mathematics

- As the university continues to grow and the number of course offerings expand, it has become an increasing challenge to find office and classroom space.

- Over the past few years, the number of students with very poor mathematics skills seems to have increased. Enrollment in pre-college level courses (MTH 67,68,70 and 95) accounted for over 3500 student contact hours during the last regular academic year. Although we have been working to develop resources for them through the new ALEKS Prep course (MTH67& 68) and the Math Center tutoring, this population tends to get discouraged and is hard to motivate. If we had more resources available for the Math Center and a dedicated person thinking about this issue, it would go a long way to helping this population.

- In spite of limited time for the immersion required by mathematical research, we have worked hard as a department to stay active in our academic areas, but this is always a challenge.

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

1. Biology

- Advising continues to remain a serious vulnerability because it consumes our collective workload, detracting from other equally important efforts. Exacerbating this problem, the numbers of stated Human Biology Minors has soared to 237 this year.

- We have long prided ourselves in offering broad training in the field of Biology for undergraduates. Nonetheless, some advanced courses remain low-enrolled given ongoing student gravitation toward certain degree tracks.

- Increases in tenure-track faculty positions have not kept pace with increases in student numbers. We believe that the department has been able to build a strong reputation in recent years but, without investing in additional tenure-track faculty positions, we foresee drops in recruitment and retention as we increase class sizes, reduce class availabilities, and continue to see diminished student satisfaction.

2. Chemistry

- Reliance on adjunct personnel to meet the demands of pre-nursing program students in the CH100 sequence. This reliance places us in jeopardy due to the volatile nature of such teaching positions. For example, we lost one excellent adjunct instructor when a more lucrative industrial position became available during the 2009-2010 academic year.

- Added pressures to increase enrollments in upper division electives. Cancelling courses that are offered in an alternate-year mode is damaging to students in programs such as the Environmental Studies minor, and removes the ability of students to explore some of the non-core areas of chemistry. Students have commented that they do not want to register for some upper division electives due to the fear of those courses being cancelled due to low enrollment numbers.

- Lack of a consistent source of funding to upgrade and acquire higher-dollar instrumentation. For example, the Chemistry Department has never been able to fund the acquisition of a nuclear magnetic resonance spectrometer, a fundamental laboratory instrument.

3. Earth and Physical Sciences

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.

4. Mathematics

- As the number of students increase, human resources, classroom space and office space become scarce. If we are unable to support the demand, students will fall behind in their ability to complete their graduation requirements on time.

DIVISION OF NATURAL SCIENCES AND MATHEMATICS
Faculty and Staff Roster 2012-2013

STAFF

Patrick Aldrich, DOJ Fingerprint Grant Project Manager
Sharon Clinton, Chemistry Lab Preparator
Julie Grammer, Biology/Earth Science Lab Preparator
Piper Mueller-Warrant, Biology Lab Preparator
Dennis Pemble, Chemistry Lab Preparator
Sharon Price, Office Specialist
Jeanie Stuntzner, Administrative Program Assistant
Niki Winslow, Administrative Program Assistant (Retired)

FACULTY

Biology Department

Michael Baltzley, Assistant Professor
Erin Baumgartner, Associate Professor
Lindsay Biga, NTT Instructor
Karen Bledsoe, NTT Instructor
Sarah Boomer, Professor
Bryan Dutton, Professor
Emma Dutton, Research Associate
Karen Haberman, Associate Professor
Amy Harwell, NTT Instructor
Ava Howard, Assistant Professor
Kristin Latham, Associate Professor
Michael LeMaster, Professor
Scott MacDonald, NTT Instructor
Jeffrey Snyder, NTT Instructor

Chemistry Department

Arlene Courtney, Professor
Ray Dandeneau, NTT Instructor
Patty Flatt, Associate Professor
Stacy Henle, NTT Instructor
Rahim Kazerouni, Associate Professor
Marzio Leban, NTT Instructor
Pete Poston, Professor
Spence Russell, NTT Instructor
James Kramer, NTT Instructor

Earth and Physical Science Department

Don Ellingson, NTT Instructor
Jeffrey Myers, Professor
Jeremiah Oxford, NTT Instructor
William Schoenfeld, Associate Professor
Grant Smith, NTT Instructor
Steve Taylor, Professor
Jeffrey Templeton, Professor
Phillip Wade, NTT Instructor

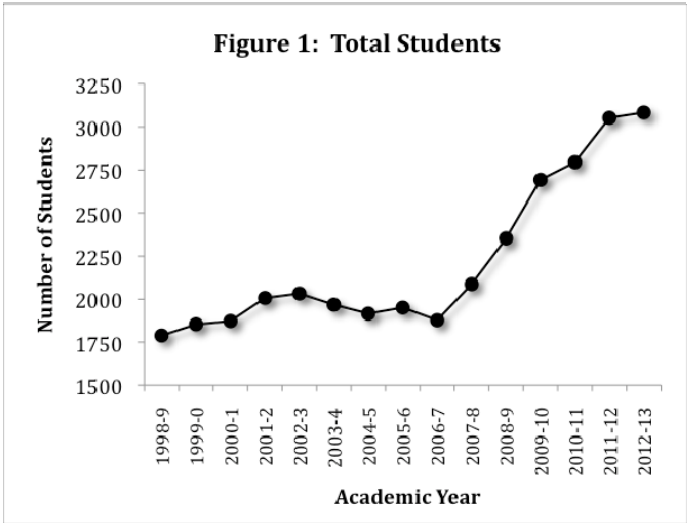
Mathematics Department

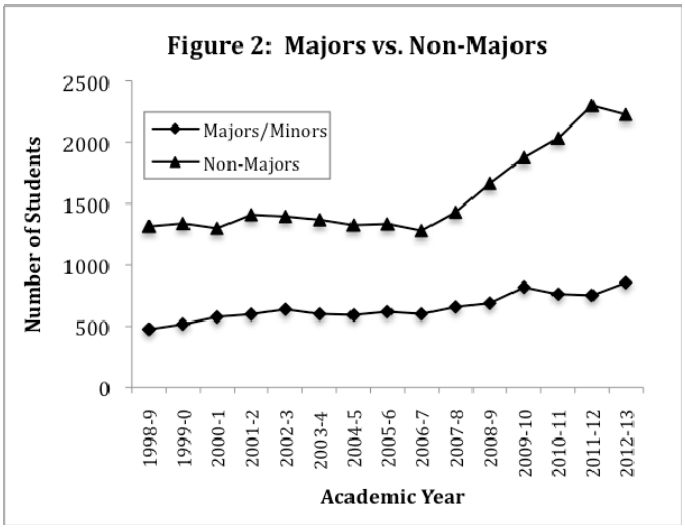
Catherine Aune, NTT Instructor
Cheryl Beaver, Associate Professor
Scott Beaver, Associate Professor
Hamid Behmard, Professor
Laurie Burton, Professor
Matthew Ciancetta, Assistant Professor
Avery Cotton, NTT Instructor
Breeann Flesch, Assistant Professor
Stanley Leung, NTT Instructor
Christopher Mock, NTT Instructor
Matthew Nabity, NTT Instructor
Andrew Nerz, NTT Instructor
Dennis Spencer, NTT Instructor
Laura Waight, NTT Instructor
Michael Ward, Professor
Ron Wiebe, NTT Instructor

Biology Department Report, 2012-2013
Submitted by Sarah Boomer June 20, 2013

I. EXECUTIVE SUMMARY

A. Enrollment and Growth: Enrollment continued to grow (nearly 3100 students took Biology coursework in 2012-2013, Figure 1). Non-majors enrollment was slightly down (over 2200 students, Figure 2; more in Section II). Enrollment in the major grew by nearly 100 students (~850 students, Figure 2; more in Section II).





B. Major/Minor Success: Our students have been successful in their Biology-related pursuits. At least 6 current or former majors were accepted into professional schools and advanced degree programs (e.g. Education, Pharmacy, Physical Therapy). Another 4 found employment in positions spanning several disciplines of Biology. At least 42 Pre-Nursing advisees were accepted into professional undergraduate programs. Please see Appendix 1.III for a complete list of all outstanding student achievements.

C. Enhanced Infrastructure: Our department continued to enhance laboratory space and technology. **Dr. Baumgartner** was awarded $27K in WOU Academic Infrastructure Committee (AIC) funding for Biology 100 series compound and dissection microscopes. **Dr. Dutton** was awarded $25K in AIC funding for "smart-room" upgrades in our major-serving NS204 facilities. Using Department, Pre-Nursing, and/or Division support, additional major equipment or infrastructure upgrades were made for Cell-Molecular-Microbiology ($6.5K), Organismal-Ecology ($8.5K), Botany coursework/facilities ($5K), and Human A&P upgrades ($6.5K). Ongoing faculty/staff effort (**Dr. LeMaster** and **Piper Mueller-Warrant**) was expended to provide input for the in-progress DeVolder Family Science Center). Finally, **Drs. Boomer, Baltzley,** and **Latham** worked with the WOU Textbook Rental Program to acquire ~150 Clickers ($5K) for a BI 211-focused program to promote active learning.

D. Publications and Presentations: Biology Faculty published 4 papers in peer-reviewed journals. We were involved in 13 refereed presentations at state or national meetings and workshops. Nine of these combined

activities were co-authored by current or former WOU students. Please see Appendix 1.II for a complete list of all publications and presentations.

E. Grants: Biology Faculty applied for and received grant monies for their research. **Dr. Latham** continued to work with the NSF ADVANCE Project awarded to Gonzaga University ($600K), aimed at advancing the careers of women in STEM at PUI's. **Dr. Howard** continued her OSU LTER research project ($25K NSF-ROA Supplement). **Drs. Haberman** and **Baumgartner** completed Sea Grant funding ($8K, no-cost extension March 2013). Submitted last year, **Dr. Baumgartner** served as the Co-PI on a $500K NSF Research Network Grant Proposal, co-authored with other members of the Northwest Biosciences Consortium (Stasinos Stavrianeas, Willamette University, PI). **Dr. Dutton** and colleagues submitted a U.S. Department of Justice grant ($827K), which is currently in review. The following faculty applied for and received WOU Faculty Development funding for research and/or travel: **Dr. Baltzley** was awarded nearly $5K; **Dr. LeMaster** was awarded $3.5K; **Dr. Latham** was awarded $1.2K; **Dr. Haberman** was awarded $3.7K, and **Dr. Howard** was awarded over $2K.

F. University Service: Biology Faculty contributed to WOU governance, with notable representation on Faculty Senate, Institutional Review Board, Program for Undergraduate Research Experiences (PURE), Faculty Evaluation Committee, Scholarship Committee, and the University Personnel Review Committee.

G. Advising: Tenure-track (TT) faculty advised ~350 students each term, the majority carried by **Dr. LeMaster** (~125 Pre-Nursing,) and **Dr. Dutton** (~90 Pre-Medicine). This year, we noted a significant increase in the number of students seeking Human Biology minors – with 237 stated advisees (based on a database search May 2013). Improved efforts to track and communicate with this cohort are being undertaken by a new team of Human Biology advisors (**Drs. LeMaster, Latham, Boomer, Dutton,** and **Howard**).

H. Research and Scholarship: Six Biology Faculty served as mentors for 24 undergraduates engaged in research projects, including 2 in-progress Honors Theses. Approximately 50 undergraduates participated in course-based research projects, the majority in **Dr. Haberman's** General Ecology and **Dr. Dutton's** Systematic Field Botany. All projects involved students engaged in original research, generating original data. Eleven projects (a three-fold increase from last year) were presented at the Academic Excellence Showcase. Please see Appendix 1.II for a complete list of all research students, publications, and presentations.

I. Professional Leadership: Biology Faculty were involved in an astonishing array of professional societies beyond WOU, with several assuming leadership roles at the local, regional, and national levels.

J. Scholarships: Our department awarded approximately $30K of scholarships to undergraduate Biology majors, with TT faculty providing valuable service on our departmental Scholarship Committee.

K. Faculty/Staff Changes: **Dr. Lindsay Biga** (Biology 211 labs/100 series) joined our staff in 2012-3.

II. ENROLLMENT TRENDS:

As described in Sections I.A and I.G, there has been continued enrollment growth in many Biology courses. During the 2012-13 academic year, the Biology Department teaching personnel included 8 TT faculty (2 full professors, 3 associate professors, and 3 assistant professors) and 5 NTT faculty (all full-time or nearly full-time). Although classroom hours available for our current faculty total 513 (1.0 FTE = 36 hours/TT faculty; 45 hours/NTT faculty), this value does not represent the actual hours available given reassignment time awards (~30 hours), including Department Head, 100 Series Coordinator, PLTL Coordination, and Faculty Development-supported release time.

Enrollment Trends – Non-Majors

Figure 3: Non-Majors 100 Series

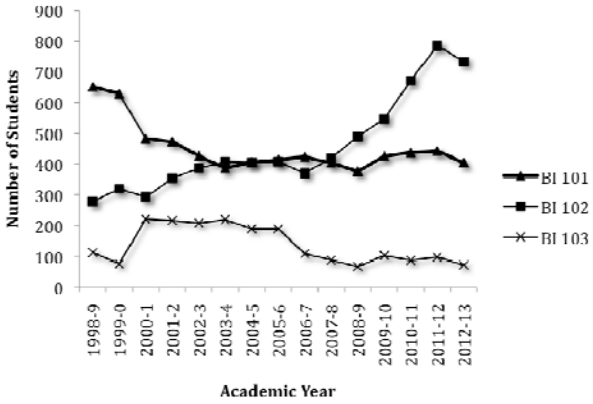
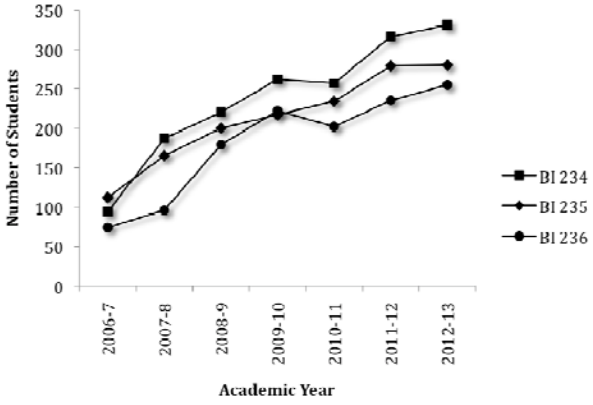


Figure 4: Non-Majors A&P



100 Series: (Figure 3, adjacent)

100 series enrollment declined slightly this year. After shifting some BI 101 from fall to spring, we are concerned that pre-requisite misinformation is partially to blame. We also eliminated our usual winter offering of BI 103 as a result of budget concerns; in hindsight, this was a mistake.

Non-Majors A&P/BI 234-5-6: (Figure 4, adjacent)

All A&P series enrollment was up slightly this year.

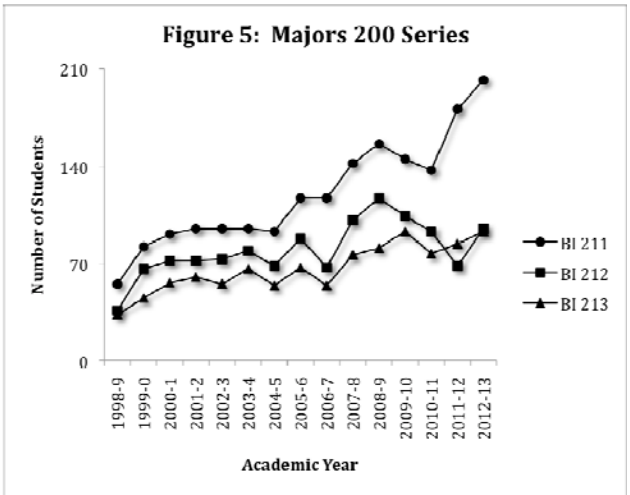
Non-Majors Microbiology/BI 318: (no figures)

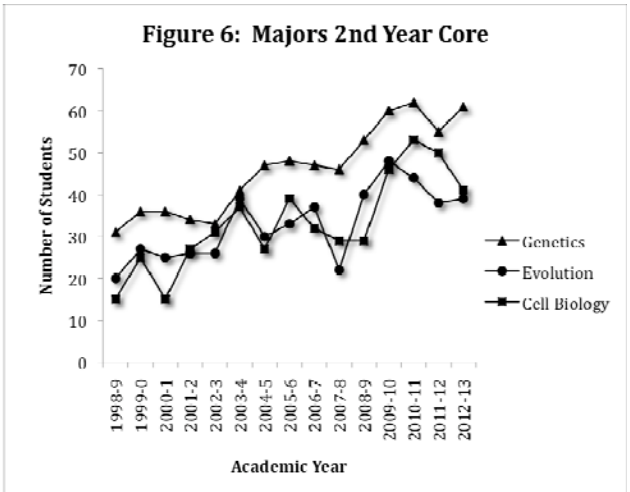
Despite the NS201 remodel and new summer offerings, all sections filled. Given ongoing growth, we will begin offering a new fall section next year.

Human Heredity/BI 441: (no figures)

Once again, we capped enrollment and turned students away; some took Environmental Science, which became a permanent part of the Human Biology minor option this year. Given ongoing growth, we will begin offering a new fall section next year.

Enrollment Trends – Majors





200 Series: (Figure 5, adjacent)
Although all BI 211 sections filled (up 10%), many students were not retained. Even so, greater BI 211 enrollment and ongoing teaching efforts increased overall retention in this series, with BI 212 up 30%. We anticipate the newly implemented BI 211 Placement Test will further improve the teaching, learning, and advising experience.

Second Year Core/BI 314-5-6: (Figure 6, adjacent)
Given growth in the majors 200 series, we observed growth in Genetics (BI 314) and Evolution (BI 316).

Other Advanced Coursework: (no graph)
Nearly all other advanced coursework showed flat enrollment. It should be noted that this is the first year we offered both human (BI 334-5-6) and animal (BI 324, 434) A&P series and, given strong advising efforts, we remain pleased that both series show strong enrollment. We do want to note a 300% increase in students enrolling for Independent Study/Research-based credit.

III. SUMMARY OF PROGRAM CURRICULUM CHANGES

As stated, we noted a significant increase in the number of students seeking Human Biology minors this year. Given access challenges in key minor coursework (e.g. Human Heredity and Non-Majors Microbiology), we changed the minor to add more flexibility, including adding the new option of taking Environmental Science (now called Humans and the Environment/BI 370). The following summarizes these changes:

Course	Nature of Change	Status	Justification
BI 370	Title and description change Added pre-req – BI 102 Human Biology Minor option	In New Catalog (INC)	Adding this revised course will provide flexibility as minors will now choose to take any two of the following three courses: Heredity, Microbiology, or Environment.
BI 441/541	Description change Human Biology Minor option	INC	See above.
HE 300/400	Human Biology Minor option	INC	Working with Health/PE, we also added more flexibility to previous Health/PE coursework.
PSY 300/400	Human Biology Minor option	INC	Working with Psychology, we also added more flexibility to previous Psychology coursework.

IV. PROGRAM ASSESSMENT ACTIVITIES AND RESULTS

Biology Faculty continued to develop and facilitate programmatic and/or course assessment. Given the diversity of collected data, Biology Faculty efforts have been summarized in the following assessment table. Additional information about our comprehensive assessment plan is found in Appendix 2.

	Nature of Assessment					
Topic	Demographic	Content	Attitude	Other	**Results**	**Faculty**
BI 101	X	X	X	Exam Frequency Study Habits	Ongoing	Baumgartner Howard
BI 102	X	X	X	Exam Frequency Study Habits	Ongoing	Baumgartner Howard
BI 103	X	X	X		Ongoing	Baumgartner
BI 211	X	X	X	At-Risk Advising Active Learning	Ongoing	Boomer, Latham Baltzley
BI 212		X			Ongoing	Dutton, Haberman
BI 318	X				Ongoing	Boomer, Dutton
BI 331	X				Ongoing	Boomer
BI 314	X				Ongoing	Latham
BI 316		X			Ongoing	Dutton
BI 321		X			Ongoing	Dutton
BI 357		X			Ongoing	Haberman
ETS Exam		X		Programmatic	Ongoing	Dutton*
Exit Survey	X		X	Learning Outcomes Advising & Career Placement	Ongoing	Boomer*

*Biology Faculty who assisted with ETS/Exit Survey administration: Boomer, LeMaster, Dutton

V. SWOT ANALYSIS

a. Strengths

- Biology Faculty are strongly committed to undergraduate education. All are active in all aspects of the university, including teaching, university governance, and research.
- As a department, we have continued to update and enhance our laboratories and budget decision-making process to improve equipment, and to emphasize more cutting-edge laboratory exercises. Construction of the new DeVolder Family Science Building will solve a serious, long-term space challenge – both in terms of growing class enrollment and supporting faculty/office needs.
- Biology Faculty have embraced assessment as a means to provide empirical evidence for making programmatic and/or course changes with a specific emphasis on improving student preparation, managing enrollment, and better tracking/advising students. That our numbers of majors grew this year and more were retained, we believe, is testimony to our strategic efforts.

b. Opportunities

- Enrollment growth provides an opportunity, so long as it is appropriately managed and supported.
- The diverse capabilities of Biology Faculty allow for a good balance of new research programs and experienced leadership and mentoring, so long as other workload demands remain in check.

- The 2012-13 academic year saw strong scholarship productivity, particularly in the area of undergraduate mentoring efforts with an emphasis on Academic Excellence Showcase presentations.

c. Challenges

- The greatest challenge facing Biology at this time is retention – particularly in the major. This year's promising enrollment gains are the result of strategic efforts and heavy workload commitments given ongoing challenges with student preparation, attendance, etc.
- Once again, challenges regarding research were frequently stated in faculty annual reports – with concerns regarding equipment, space, time, equity, expectations, and support (e.g. FTE recognition for mentoring undergraduates). While undergraduate mentoring remained high this year, publications and grantsmanship were down.
- Enrollment continues to grow without a concomitant hiring of more tenure-track faculty.

d. Vulnerabilities

- Advising continues to remain a serious vulnerability because it consumes our collective workload, detracting from other equally important efforts. Exacerbating this problem, the numbers of stated Human Biology Minors has soared to 237 this year.
- We have long prided ourselves in offering a broad training in the field of Biology for undergraduates. Nonetheless, some advanced courses remain low-enrolled given ongoing student gravitation toward certain degree tracks.
- Increases in tenure-track faculty positions have not kept pace with increases in student numbers. We believe that the department has been able to build a strong reputation in recent years but, without investing in additional tenure-track faculty positions, we foresee drops in recruitment and retention as we increase class sizes, reduce class availabilities, and continue to see diminished student satisfaction.

APPENDIX 1. FACULTY AND STUDENT ACCOMPLISHMENTS

I. FACULTY AND STAFF ROSTER

Tenure-Track Faculty

• Dr. Sarah Boomer	Professor	Years of Service = 16
• Dr. Bryan Dutton	Professor	Years of Service = 15
• Dr. Karen Haberman	Associate Professor	Years of Service = 15
• Dr. Mike LeMaster	Associate Professor	Years of Service = 10
• Dr. Erin Baumgartner	Associate Professor	Years of Service = 5
• Dr. Kristin Latham	Assistant Professor	Years of Service = 5
• Dr. Ava Howard	Assistant Professor	Years of Service = 4
• Dr. Michael Baltzley	Assistant Professor	Years of Service = 2

Non-Tenure Track Faculty

• Dr. Karen Bledsoe	Assistant Professor	Years of Service = 13
• Dr. Jeff Snyder	Assistant Professor	Years of Service = 6
• Dr. Lindsay Biga	Assistant Professor	Years of Service = 1
• Scott MacDonald	Instructor	Years of Service = 6
• Dr. Amy Harwell	Assistant Professor	Years of Service = 2

Lab Preparators:

• Piper Mueller-Warrant	full-time	Years of Service = 8
• Julie Grammer	half-time Biology (half-time Earth Science)	Years of Service = 4

II. FACULTY HIGHLIGHTS

a. TEACHING - *Including Faculty-Student Collaborative Scholarship and Outreach*

- Undergraduate students participated in collaborative scholarship/research with faculty:
    - **With Dr. Howard**: Leland Cahalane, Valerie Sims, Alyssa Palmer, and Erin Cooley – with Valerie Sims, Alyssa Palmer, and Erin Cooley presenting at Academic Excellence Showcase in May 2013, and Alyssa Palmer working on an Honors Thesis.
    - **With Dr. Haberman**: Sylvia Herrold, Greg Helstrom, and Kate Claussen performed research in the capacity of field team group leaders - with all presenting at a regional conference (Heceta Head Coastal Conference). Ivan Kuletz performed paid supervised research.
    - **With Dr. Latham**: Elizabeth Mason, Trevor Roush, and Ryan Parker – with Trevor Roush and Ryan Parker presenting at Academic Excellence Showcase in May 2013, and Elizabeth Mason presenting at a national conference (54th Annual Drosophila Research Conference in 2013).
    - **With Dr. Dutton**: Carolee Buck, Alexandra Harding, and Aquilegia Leet – with Alexandra Harding and Aquilegia Leet presenting Academic Excellence Showcase in May 2013, and Carolee Buck working on an Honors Thesis.
    - **With Dr. Baltzley**: Michael Turner, Andrew Chapman, Jonathan Mersereau, and Anusha Hoda - with Anusha Hoda presenting at Academic Excellence Showcase in May 2013, and Michael Turner & Andrew Chapman presenting at a national conference (Society for Integrative and Comparative Biology in 2013).
    - **With Dr. Baumgartner**: Eric Serres, Alyssa Kruse, Morgan Livingstone – with all presenting at Academic Excellence Showcase in May 2013.
    - **With Drs. Baltzley AND Latham**: Eli Zachary, Spicie Davis, and Taylor James.
- **Drs. Haberman** and **Baumgartner** continued to provide Sea Grant-supported Salmon River Estuary research-driven methodologies in Marine Ecology (BI 361) and Science Inquiry and Design for K-8 Teachers (GS 325). They also used this project as the basis for the 2012 Estuarine Ecology Workshop for K-12 Educators: Response of Marsh Insects and Benthic Invertebrates to Dike Removal in the Salmon River Estuary: Research Approach and Update.
- **Dr. Haberman** is in her 9th year of providing class-based research opportunities to survey benthic invertebrates and assess water quality along the Little Luckiamute River in General Ecology (BI 357).
- **Dr. Dutton** has continued providing class-based research opportunities via his local Interactive Flora of Polk County and Monmouth City Street Trees projects, integrating portions into Systematic Field Botany (BI 321), as well as **Dr. Baumgartner's** Science Inquiry and Design for K-8 Teachers (GS 325).
- Several Biology Faculty have been involved in advanced teaching/research/mentoring in association with other institutions/universities:

- **Dr. LeMaster**, who received a courtesy faculty appointment at OSU (2010-present), continues to serve on the dissertation committee of Emily Uhrig (a former WOU student), and has continued to collaborate with Dr. Lutterschmidt at PSU.
- **Dr. Baumgartner** continues to work with Dr. Kanesa Duncan at University of Hawaii-Manoa (Hawaii Sea Grant Program and College of Education) on teacher professional development.
- **Dr. Howard** initiated a collaboration with David Woodruff (USDA Forest Service, Pacific Northwest Research Station, Corvallis, OR), working on the ecohydrology of white oak habitat.
- **Dr. Latham** initiated a collaboration with Drs. Barbara J. Taylor and Joyce Loper at OSU, working on *Drosophila* genetics and immune responses to *Pseudomonas*.
- **Dr. Haberman** initiated collaborations with Ayesha Gray (Earth Design Consultants, Corvallis OR) and Bob Wisseman (Aquatic Biology Associates, Corvallis OR) to complete data analysis.

b. SCHOLARSHIP

Journal Articles:

- C.J. Zabin, E.M. Danner, **E. Baumgartner**, D. Spafford, J.S. Miller, J.S. Pearse, 2012. A comparison of intertidal species richness and composition between central California and Oahu, Hawaii. *Marine Ecology*.

- **K.L. Latham,** Y.S. Liu, B.J. Taylor, 2013. A small cohort of FRU^{M} and Engrailed-expressing neurons mediate successful copulation in *Drosophila melanogaster. BMC Neuroscience*.

- C.G. Klatt, W.P. Inskeep, M. Herrgard, Z.J. Jay, D.B. Rusch, S.G. Tringe, M.N. Parenteau, D.M. Ward, **S.M. Boomer**, D.A. Bryant and S.R. Miller, in press. Community Structure and Function of High-Temperature Chlorophototrophic Microbial Mats Inhabiting Diverse Geothermal Environments. *Frontiers in Microbial Physiology & Metabolism – Special Issue on Geothermal Biology & Geochemistry in Yellowstone National Park.*

- **K.E. Bledsoe**, in press. Starch is very fatty: Understanding the logic in undergraduate student conceptions about biological molecules. *Electronic Journal of Science Education*.

- E. J. Uhrig, **M.P. LeMaster**, R.T. Mason, submitted/in review. Species specificity of methyl ketone profiles in the skin lipids of female garter snakes, genus *Thamnophis*. *Chemoecology*.

Invited Workshop:

- **K. Haberman**, 2013. Major Workshop: Sex Determination and Mating Strategies of the Bluehead Wrasse, *Thalassoma bifasciatum.* Association of Biology Laboratory Education, 2013 Annual Meeting.

Conference Proceedings:

- T. Orr, **E. Baumgartner**, 2012. Participatory science improves scientific literacy in pre-service elementary teachers. *Published on-line at Proceedings of the National Association of Biology Teachers Four-Year College and University Section 2012 Research Symposium*.

- **S.M. Boomer**, **M.J. Baltzley**, **K.L. Latham**, 2013. Active Learning and Advising Strategies in Introductory Biology II - If You Click It, a Few More Will Come. *Published on-line at Journal of Microbiology and Biology Education, American Society for Microbiology.*

Presentations: *Note – Student Academic Excellence Showcase Presentations in Section A*

- **S.M. Boomer**, **M.J. Baltzley**, **K.L. Latham**, 2013. Active Learning and Advising Strategies in Introductory Biology II - If You Click It, a Few More Will Come.

- S.B. Taylor, R. Stanley, P.R. Aldrich, E. Dutton, **B. Dutton**, S. Hidalgo, 2012. Novel Use of GIS for Spatial Analysis of Fingerprint Patterns: Abstract with Programs, Urban and Regional Information Systems Association National Meeting.

- M.A. Turner, A. Chapman, **M.J. Baltzley**. 2013. Effects of foot size and crawling speed in mucociliary locomotion. Society for Integrative and Comparative Biology.

- **K.E. Bledsoe**, **J. Synder**. 2013. Bacteria must be largest because they spread out: How undergraduate students rank-order microscale objects. Oregon Academy of Science Annual Meeting.

- **E. Baumgartner**, 2012. Participatory science benefits different learners in different ways. Conference on Public Participation in Scientific Research.

- T. Orr, **E. Baumgartner,** 2012. Participatory science improves scientific literacy in pre-service elementary teachers. National Association of Biology Teachers' Four-Year College & University Section Research Symposium.

- J. Philippoff, **E. Baumgartner,** 2012. An analysis of common student technical errors in field data collection. Conference on Public Participation in Scientific Research.

- **K.L. Latham**, A. Nicholson, J. Schneider, E. Mason, P.M. Flatt, 2013. Ingestion of *Pseudomonas fluorescens* Pf-5 by *Drosophila melanogaster* causes larval immune response dependent on bacterial media type." 54th Annual Drosophila Research Conference.

- **E. Baumgartner**, G. Helstrom, **K. Haberman**, 2012. Measurement and benthic cores. Lincoln County Math-Science Partnership Ocean Literacy Summit.

- G. Helstrom , S. Herrold , K. Claussen, **E. Baumgartner**, **K. Haberman**, 2012. Invertebrate Research and Undergraduate Leadership in the Salmon River Estuary. Heceta Head Coastal Conference.

- V. Sims, **A.R. Howard**, D. Woodruff, 2013. Decline in the health and vigor of Oregon White Oak. Ecological Society of America.

- **A.R. Howard**, **E. Baumgartner**, submitted/in review. Effects of exam size and frequency on study habits, test perceptions and achievement. Ecological Society of America.

c. SERVICE - *External or Student Organizations; Note – Outreach in Section A*

- **Dr. Baltzley** served as at judge at this year's second on-campus "Science Olympiad."

- **Dr. Baumgartner** provided leadership, consulting services, and/or commentary for the following: NABT (Four Year College & University section, and peer review), National Marine Educators Association Ocean Literacy Committee, and NSF-REU grant review. She also hosted first graders from Oaks Elementary School for an on-campus field trip.

- **Dr. Bledsoe** served as the Science Education section chair at the Oregon Academy of Science, performed educational consulting for the Northwest Evaluation Association, and reviewed manuscripts for several education journals.

- **Dr. Boomer** reviewed 2 manuscripts, 3 federal grant for the National Science Foundation, and contributed to documents defining national teaching standards for microbiology and biology education at ASM-CUE.

- **Dr. Dutton** was a co-advisor for the Natural Science Club (including leading a major field trip to Arches and Canyonlands National Parks, Utah over spring break), served as an Assistant Editor of the Vasculum, and provided service learning opportunities via the Monmouth City Street Tree Inventory and the Interactive Flora of Polk County, Oregon projects.

- **Dr. LeMaster** was a co-advisor for the Natural Science Club. He has also has continued to lead educational Human A&P Cadaver lab tours to regional high schools.

- **Dr. Howard** served as a judge for student presentations and travel awards for the Ecological Society of America. She also provided class demonstrations about biology at Monmouth Elementary School and Monmouth Montessori School.

- **Dr. Haberman** was honored as the Faculty/Staff Member of the Month by the National Residence Hall Honorary for December 2012.

III. STUDENT ACHIEVEMENTS

Acceptances to Graduate Professional Programs:

- **Jenea Perman** University of Puget Sound – Physical Therapy
- **Mattea Zabala** Pacific University – Physical Therapy
- **Chelsy Okuma** University of Idaho - Pharmacy

We were also pleased to learn in the past year that many of our recently graduated majors have successfully secured target graduate program acceptance and/or employment in biology-related fields. From the 2011 cohort: Sarah Daigle (Life Sciences Teacher, Riddle HS), Stephanie Hendrix (MAT Program, George Fox University), James Kramer (Chemistry NTT, WOU), Brandon McNellis (Ph.D. Program, UC Riverside), and Katrina Pixley (Life Sciences Teacher, Stayton HS). From the 2012 cohort: Jon Mersereau (Nursing Program, see below), Alexa Moss (MAT Program, University of Alaska), and Leigh Stringari (phlebotomy, Corvallis Clinic).

Acceptances to Undergraduate Professional Programs:

- **Katelyn Hilker** Denver School of Nursing
- **Sarah Neeld** Linfield College - Nursing
- **Brian Dillon** Linfield College - Nursing
- **Matt Luttrell** Linfield College - Nursing
- **Steven John** Linfield College - Nursing
- **Brenna Wasson** University of Portland – Nursing
- **Caroline Harper** George Fox University – Nursing
- **Koryn Tsang** George Fox University – Nursing
- **Sarah Nauman** George Fox University – Nursing
- **Michelle Szydlowski** George Fox University – Nursing
- **Angelica Cole** Washington State University – Nursing
- **Julie Ross** University of Alaska/Anchorage – Nursing
- **Emily Hellesto** Seattle Pacific University
- **Diego Navarro-Gomez** University of Washington, Seattle Pacific University – Nursing
- **Ken Irwin** Linfield College – Nursing
- **Sally Winkler** Chamberlain University – Nursing
- **Ashley Hanson** University of Nebraska – Nursing
- **Melanie Robertson** Northwest University – Nursing
- **Joshua Green** OHSU Portland – Nursing
- **Jonathan Mersereau** Capital University – Nursing
- **Courtney Navarez** OHSU Monmouth – Nursing
- **Tammy Pratt** OHSU Monmouth – Nursing
- **Erin Apodeca** OHSU Monmouth – Nursing
- **Whitney Strickland** OHSU Monmouth – Nursing
- **Kristen Buchanan** OHSU Monmouth – Nursing
- **Audry Drake** OHSU Monmouth – Nursing

- **Byanna Ward** OHSU Monmouth – Nursing
- **Pamela Cowart** OHSU Monmouth – Nursing
- **Laura Carmona** OHSU Monmouth – Nursing
- **Lindsay Comella** OHSU Monmouth – Nursing
- **Rindy Toll** OHSU Umpqua – Nursing
- **Jake Denny** OHSU Umpqua – Nursing
- **Amanda Schumaker** OHSU Mt. Hood Community College – Nursing
- **Todd Sellers** Oregon Coast Community College – Nursing
- **Moriah Pugh** Walla Walla University – Nursing
- **Erin Wilson** OHSU Portland - Nursing
- **Rebecca Carmody** University of Portland – Nursing
- **Hannah Bryant** University of Portland – Nursing
- **Amy Strickler** University of Portland – Nursing
- **Michelle Quirk** University of Portland – Nursing
- **Taylor Killen** University of Portland – Nursing

Special Recognition – NSM Awards Night:

Outstanding Academic Achievement in Biology
Jenea Perman

Outstanding Leadership in Biology
Sylvia Herrold

Outstanding Academic Achievement in Principles of Biology
Taylor James **Kindra Smith** **Su Yujin**

APPENDIX 2. LAS ASSESSMENT REPORTING

Departmental Contacts Biology is highly engaged in assessment and recognizes three faculty for key coordination efforts.	
Name	Dr. Erin Baumgartner (non-majors/LACC Assessment), Associate Professor of Biology Dr. Sarah Boomer (majors/200 Series Assessment), Professor of Biology Dr. Bryan Dutton (majors/ETS-Exit Survey Assessment), Professor of Biology
Contact	Baumgartner: baumgare@wou.edu, 8-8348 Boomer: boomers@wou.edu, 8-8209 Dutton: duttonb@wou.edu, 8-8452

Program Mission Statement and Learning Outcomes

Mission: The biology department prepares students for careers in biology and science education, and admission to graduate and professional schools in the life and health sciences. We also promote the understanding of biology as an essential part of a liberal arts education and of global citizenship.

Learning Outcomes
1. Understand key concepts from the many disciplines within the biological sciences.
2. Engage in laboratory experimentation, data analysis and interpretation, and critical thinking at all course levels.
3. Have opportunities to augment their coursework experiences with advanced studies and research within areas of particular interest.

Program Learning Outcome Assessment
The Department of Biology is engaged in 3 primary levels of assessment related to each outcome and its related mission objectives: (a) 100 Series; (b) 200 Series; (c) ETS/Exit. EACH of these levels will be described for each outcome below.

Learning Outcome 1	Understand key concepts from the many disciplines within the biological sciences
Target *Describe what level of proficiency or percent student attainment of the stated learning outcome.*	a. BI 101-2-3 targets a level of proficiency for all students in which they can recognize and define basic concepts. All survey and indicator questions represent this level of knowledge, as do 70% of the exam questions. We assume students performing to this level can earn a C in a BI 100 series course. An additional 20% of exam questions require students to put together at least two concepts and apply information in a way that has been demonstrated in class to perform at B-level. A final 10% of questions require students to put together multiple concepts presented during the course of the term and apply knowledge in new ways to perform at the A-level. a. BI 211-2 targets a level of proficiency for all students in which they can recognize and define basic concepts. We assume students performing to this level can earn a C in a BI 211-2 course. c. Although graduating Biology majors have taken the ETS exam since 1996 (it is now a stated graduation requirement that 100% graduates take), we have not defined a target for proficiency on this exam because background data (i.e. other institutional data) and relative percentiles have changed over the years.
Data Source *Describe where and when data will be collected, how and if students will be sampled, and estimated sample size.*	a. Dr. Baumgartner coordinates all concept assessment in our 100-level non-majors series/LACC coursework (BI 101-2-3) year-round. She and the 100 instructional team are also engaged in collecting demographic and attitudinal information. All students participating in BI 100-series courses are invited to complete anonymous pre- post-course surveys. Survey return rate is approximately 50-70% per course. Survey items include demographic indicators, Likert-scale attitude statement response questions, and multiple choice content questions. Students also complete indicator questions aligned to learning outcomes on course exams, and all BI 100 series instructors

	develop exams using a common template that aligns question difficulty to our grading scale. b. Several instructors (Boomer, Latham, Baltzley, Dutton, and Haberman) in our majors/200 series (BI 211-2) are engaged in concept assessment, which employ multiple choice content questions given via a pre-test followed by embedded mid-term and/or final questions. Given its key position and role in retention, the BI 211 team (Boomer, Latham, Baltzley) is also engaged in collecting demographic and Likert-scale attitude statement response information. For BI 211, the starting sample size was approximately 200; for BI 212, the sample size was approximately 70. c. Dr. Dutton coordinates majors/ETS-Exit Survey assessment, which is given at the end of spring term to all graduating majors. NOTE: Several other instructors (see Department Report) are also engaged in content assessment in other majors coursework, primarily utilizing multiple choice content questions given via a pre-test followed by embedded mid-term and/or final questions.
Means of Assessment *Describe in detail the method of assessment you will be using (e.g., capstone project, course-embedded assessment, standardized instrument, etc.).*	a. Concept mastery in BI 101-2-3 is assessed via multiple choice indicator questions that have discrete answers. Individual instructors administer and grade questions and report results to Dr. Baumgartner. Content mastery is also assessed via pre- post-survey questions. Students complete anonymous surveys via the online program Survey Monkey, which are then collected and tabulated by Dr. Baumgartner, who conducts statistical analysis comparing pre- and post- concept scores. b. Concept mastery in BI211-2-3 is based on administering a pre-course exam, and comparing data to embedded post-exam questions. All multiple choice indicator questions have discrete answers. Individual instructors administer and grade questions. c. The Department of Biology supports and administers the national ETS Field Test in Biology, including paying (approximately $600 this year) for this access. Additionally, we have developed an in-house Exit Survey designed to collect demographic, attitudinal information related to career/training placement, basic skills, research, and advising satisfaction.
Means of Scoring *Describe how you will score the assessment. For example, will you use a rubric or answer key, or will it be scored by a testing company?*	a. All survey data is electronically archived, in accordance with IRB-approved protocols by Dr. Baumgartner. Student performance on exam indicator questions is aggregated and stored electronically by Dr. Baumgartner. b. Concept mastery in BI211-2-3 utilizes multiple-choice style questions that have discrete answers. Course instructors administer and grade all questions, and maintain assessment scoring records. Because BI 211 assessment is utilized in faculty research, all data is archived in accordance with IRB-approved protocols (PI's = Drs. Boomer, Latham, and Baltzley) c. The ETS Field Test in Biology is administered by available Biology faculty (the 2.5 hour exam was given 2 times this spring), sealed, and mailed to ETS for grading. Dr. Dutton receives scores in the summer and maintains assessment records.

Evidence Storage *Describe how/where the evidence pertaining to the assessment process is being archived. Electronic archive is preferred when possible.*	In general, the Biology Department will save analyzed assessment data to an accessible network drive (e.g., "I"). These data will be backed-up on a nightly basis through an automatic process overseen by WOU's University Computing Services (UCS). In addition, every month, the UCS archives the contents of the entire file system as extra data protection. The latest backup tapes are housed in a secure off-campus location in case of a major disaster such as a fire or earthquake. These redundant backup measures will assure the safety of assessment data. Analyzed data will be available for both internal and external reviewers upon request. As stated, key assessment projects are also integral to faculty research, and additional IRB-approved data storage methods are utilized for raw data containing sensitive student information. For example: a. All BI 101-2-3 survey data is electronically archived, in accordance with IRB-approved protocols by Dr. Baumgartner. Student performance on exam indicator questions is aggregated and stored electronically by Dr. Baumgartner. b. All BI 211 survey data is archived (hard-copy and electronically, in accordance with IRB-approved protocols by Drs. Boomer, Latham, and Baltzley.
Learning Outcome 2	Engage in laboratory experimentation, data analysis and interpretation, and critical thinking at all course levels.
Target	Given that we just collected our first official round of preliminary data, we have yet to formally define a target level of proficiency for each component of this outcome.
Data Source	Preliminary first-time data was just collected via our aforementioned Exit Survey process (point c in the content section). As stated, this survey is given to all graduating seniors.
Means of Assessment	For this preliminary first-time analysis, the department designed 2 sets of assessment questions related to this learning outcome: (1) students self-rate their abilities in terms of key skills related to this outcome (e.g. experimental design, technology/equipment, data analysis, graphing, writing/critical analysis); and (2) students rank/list top key courses/labs from our inventory of majors-level courses (both core and advanced elective) that most positively contributed to key skills. This analysis will serve as a stepping stone towards defining more specific course projects and assessment tools in future years.
Means of Scoring	Collected data at this point represents student self-ratings and a coursework/lab inventory; no discrete grading is required.
Evidence Storage	Please see previous Evidence Storage section.
Learning Outcome 3	Have opportunities to augment their coursework experiences with advanced studies and research within areas of particular interest.
Target	Given that we just collected our first official round of preliminary data, we have yet to formally define a target level of proficiency for each component of this outcome. As further noted by several faculty, providing undergraduates independent study-style research opportunities remains a challenge, given lack of support; despite a high level of such research engagement this last year, concerns exist about the sustainability of such a level and thus we need to analyze these data longer term.
Data Source	Presently, research engagement data is being collected via: (1) For students who are engaged in research via formal independent study credit, formal "course by arrangement" (which contain research contract information) forms are maintained.

	(2) Because a number of students avoid paying for formal research credit (for financial reasons), we additionally survey graduating seniors using the aforementioned Exit Survey. This survey samples all graduating biology majors. (3) We also track research engagement via records of PURE/Academic Excellence Showcase participation (i.e. the number of student presentations – poster or talks – per year). (4) Faculty annual reports (assembled into Department annual reports) are also required to contain citations regarding research mentorship (credited or unofficial) and research presentations (PURE/Academic Excellence Showcase or beyond).
Means of Assessment	Our methods enumerate the number of students engaged in research projects with faculty – based on counting/reporting independent study credits, unofficial research (self- or faculty-reported), and authorship on presentations (on campus via PURE/Academic Excellence Showcase, or beyond).
Means of Scoring	Our approach uses no rubric. Please see previous sections.
Evidence Storage	Please see previous Evidence Storage sections.

DIVISION OF NATURAL SCIENCES AND MATHEMATICS
2012-2013 EARTH AND PHYSICAL SCIENCE DEPARTMENTAL REPORT
Compiled by Jeffrey Templeton, Chair; Submitted: July 17, 2013

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.

- An emerging opportunity for the Earth Science program is the development of a new Geographic Information Science minor with a focus on course work in Geographic Information Systems (GIS) and Remote Sensing Technology. GIScience is in widespread application across all sectors of the global economy including scientific research, natural resource management, government, industry and business. This new programming is in direct alignment with goals of the Oregon University System, and the Legislative "40-40-20 Goal" for Oregon (ORS 351.009). New course and program proposals are currently pending final review at the Faculty Senate Curriculum Committee, and WOU Administration has supported program expansion in this area with approval of a new tenure-line position to be hired for the start of classes in Fall 2014. In addition to the GIS curriculum, this new tenure line will also provide much needed support in the lower-level LACC ES100 curriculum, and related electives.
- 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 Program for Undergraduate Research Experiences (Templeton), and representation on the Collective Bargaining team (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), co-chair Geology section of Oregon Academy of Science (Myers), and collective faculty membership and participation in professional societies (American Institute of Physics, American Educational Research Association, 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 Association for Interpretation, National Science Teachers Association, Oregon Academy of Science, and Paleontological Society of America).

- Earth and Physical Science faculty members are actively engaged in a wide spectrum of peer-reviewed research, publication, and related professional development. Dr. Myers conducted professional consulting work focusing on paleofloras in California. Dr. Schoenfeld continued work as the PI on a Global Climate Change Education project funded by NASA. Dr. Taylor continued watershed research in western Oregon and submitted a proposal to the National Institute of Justice to continue work on finger print analysis project with Biology colleagues (Dutton, Dutton, and Aldrich). Dr. Templeton continued research on silicic volcanic rocks at Newberry Volcano in central Oregon. Mr. Wade co-authored a manuscript with A. Courtney (Chemistry) that discusses their long-term work using video projects in the classroom. Current (2012-2013) active research grants and pending proposals related to EPS Department faculty total approximately $1.2 M (Refer to Appendix 1. Faculty Reports for additional information.)
- Earth and Physical Science faculty members continue to actively engage high-quality undergraduate teaching, learning, and curriculum development. With 4 tenured faculty and 4 adjunct instructors, the EPS department generated over 7600 student credits hours (SCH) during the 2012-2013 academic year, accounting for 23% 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 robust, and upper-division Earth Science course enrollments are solid and growing.
- The 2012-2013 academic year was associated with a continued growth in the undergraduate research program in Earth Sciences. Earth Science students continue to be actively engaged in undergraduate research project under the guidance of faculty mentors. Research projects focused on geographic information systems, watershed research, river restoration, petrology of volcanic rocks, landslide hazard studies, and cinder cone analysis and landscape modeling with high resolution Lidar. A number of students presented their work at the WOU Academic Excellence Showcase, and one student presented at the Association of Engineering Geologists national meeting in Salt Lake City.

II. ENROLLMENT TRENDS

- Overall, enrollment in the Earth Science program has been exceedingly strong and robust over the past nine years. Since 2004, Earth Science has experienced a steady number of graduates (range: 3-8; annual average = 6) and stable enrollments in upper division major-minor courses (range: 6-18, average = 11). The number of Earth Science majors has been steadily increasing over the past 9 academic years (2004-2013), with an average of 30 per year. Likewise, the number of students choosing to minor in Earth System Science, Earth Resources, and Geology has increased, with a cumulative average of 18 per year. On the whole, total student credit hour production, ES100 enrollments, and ES200-400 enrollments continue to be vigorous. The upper division population is stable, with a consistent range of 10 to 15 students in specialized ES courses. Ten-year average annual student credit hour production (SCH) in the program is ~8000, second in magnitude to Biology in the division (average annual ~9400 SCH over the same time period). The program is economical and efficient, with the highest annual credit-hour production per faculty-staff member (~350 SCH per faculty-staff) and the lowest salary:SCH ratio in the NSM Division. The program

generates $400,000 to $500,000 of net profit, above faculty/staff salary costs, on an annual basis.

- 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 is ~50. In the ES 104-105-106 sequence, ~1100 students continue to track through these LACC courses on an annual basis. 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 10-15, with 20 to 40 in more accessible lower and upper division courses (e.g., ES 201-202-203 Principles of Geology, ES 331 Oceanography, and ES 390 Meteorology).
- Enrollments remain steady in the Physics-200 level service courses with 35-45 and 15-20 starting out Fall term in the algebra-based (PH201-202-203) and calculus-based (PH211-212-213) sequences, respectively. Improving Physics-sequence retention from Fall to Spring terms remains ongoing concern.

III. SUMMARY OF PROGRAM CURRICULUM CHANGES

The following program curriculum changes were undertaken this year:

- Dr. Myers proposed changes to three of his courses: ES 392, ES 431/531, and ES 491/591.
- An emerging opportunity for the Earth Science program is the development of a new Geographic Information Science minor with a focus on course work in Geographic Information Systems (GIS) and Remote Sensing Technology. GIScience is in widespread application across all sectors of the global economy including scientific research, natural resource management, government, industry and business. This new programming is in direct alignment with goals of the Oregon University System, and the Legislative "40-40-20 Goal" for Oregon (ORS 351.009). New course and program proposals are currently pending final review at the Faculty Senate Curriculum Committee, and WOU Administration has supported program expansion in this area with approval of a new tenure-line position to be hired for the start of classes in Fall 2014. In addition to the GIS curriculum, this new tenure line will also provide much needed support in the lower-level LACC ES100 curriculum, and related electives.

IV. PROGRAM ASSESSMENT ACTIVITIES AND RESULTS

Earth Science Program:

- 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 2015 when we hope to conduct an external review of the Earth Science program, pending institutional support.
- Formative Embedded Assessment: Formative assessment of the Earth Science Program is currently being conducted via a series of Embedded Assessment Strategies. 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 have been deployed in all upper-division Earth Science courses taught during spring term.

- 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.
- In conjunction with seminar inquiry-based, work-sample method described above, standardized exit exam models have been explored by Earth Science faculty members. One summative assessment strategy that has been pilot tested is the nationally standardized Fundamental Geology Exam that forms part of the Oregon State Board of Geologist Examiners professional licensing process. 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.

Physics Program:

- The "Force & Motion Concept Evaluation", a national assessment exam, is employed as part of the Fall term finals for both introductory physics sequences. In addition, MCAT-type multiple choice questions are used on exams for the algebra based physics course.

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 1100 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.
- 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:

- Earth Science enrollments have been increasing over the past 9 academic years (2004-2013). Total student credit hour production increased by 15% and ES100 enrollments by 10%. The upper-division population remains steady with a growing number of Earth Science degrees awarded. The program is economical and efficient, with a high annual credit-hour production per faculty-staff member (~350 SCH per faculty-staff) and a low salary:SCH ratio. In sum, the Earth Science program is a significant profit center for the university.
- 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) need for a full-time Departmental Laboratory Preparator, (2) over-dependence on adjunct faculty and lack of tenure-line positions, and (3) limited faculty time available for scholarly activities, program assessment, and faculty development.

- The most immediate challenge facing the Department of Earth and Physical Science at present is the pressing need for a full-time lab preparator. We currently share a half-time position with the Biology Dept. Growth in both the ES100 and BI100 introductory LACC laboratory science courses has made it challenging for the current staff member to accomplish all of the tasks that could and should be completed. A full-time, dedicated EPS lab preparator would remedy this situation.
- Another key challenge facing the Department of Earth and Physical Science 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 0.75. 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".

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.
- A high number of weekly student contact hours (typically 15-16) prevents the sole physics faculty member 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.

- The availability of using the DataStudio software in NS101 is hit and miss; sometimes it works perfectly, other times the software just won't load.
- Issues with scheduling conflicts between upper-division Mathematics courses and upper-division Physics. Also, difficulties in convincing the Mathematics department to require that Applied Math majors take calculus based physics as part of their LACC.

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 poor student retention in both introductory sequences and lack of support for a second tenure-line physicist.

V. PROGRAM PLANNING AND INITIATIVES

None to discuss at this time. Refer to above.

VI. OTHER ITEMS

None to report or discuss at this time.

VII. PUBLIC RELATIONS ITEMS FOR PROGRAM PROMOTION

None to report at this time.

APPENDIX 1. FACULTY AND STUDENT ACCOMPLISHMENTS

Provide bullet line items related to individual faculty and student achievements.

I. FACULTY AND STAFF ROSTER

Tenured Faculty Members

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

Non-Tenure Track Faculty Members

Don Ellingson, M.S., Instructor
Jeremiah Oxford, M.S., Instructor
Grant Smith, PhD, Instructor
Phillip Wade, M.S., Instructor

Staff

Julie Grammer, Laboratory Preparator, Biology-Earth Science

II. FACULTY HIGHLIGHTS

(See attached annual faculty reports for supporting documentation and further details).

a. Teaching

- **Jeff Myers**: ES 407 (Senior Seminar) was a new preparation. Students conducted independent research on the geological hazards impacting US 101 from Newport to Cape Foulweather and presented their results at the 2013 Academic Excellence Showcase. Began revising the sedimentology /paleobiology / Earth history series of courses. Conducted field trips for ES 407 and ES 491/591.
- **Bill Schoenfeld**: Added a lab exam to PH 201. Introduced a number of new lab experiments and lecture demonstrations, including a laboratory on standing waves, two sessions dedicated to optics experiments, and a new experiment to determine the period of a physical pendulum.
- **Grant Smith**: Implemented "TurningPoint" software and clicker technology into his ES 100 courses, which enabled him to perform formative assessment within the classroom. He also piloted a video assignment exercise using the Moodle platform.
- **Steve Taylor**: Developed a new online course focusing on Medical Geology; conducted several field trips in ES473; ES 202 was a Writing Intensive course.
- **Jeff Templeton**: developed Moodle Online Resource pages for most of his courses. Conducted weekend field trip for ES 321. ES 201 was Writing Intensive.
- **Philip Wade**: GS 325 (Science Inquiry and Engineering Design for K8 Teachers) continues to require substantial preparation time because of the project oriented nature of the course. GS 202H/202HL was a new preparation. The GS 203H/203HL class participated in the 2013 Academic Excellence Showcase.

b. Scholarship

Reports, Publications, and Peer-reviewed Abstracts:

Erwin, D.M., and **Myers, J.A.** 2012. *Securidaca*-like samaras from the late Eocene Badger's Nose paleoflora, Modoc Co., CA, USA. Paleobotanical section, Botanical Society of America Annual Meeting, Columbus, OH (Erwin presenting).

Myers, J.A. and Erwin, D.M., 2013, An Enigmatic Winged Fruit from the Latest Eocene Badger's Nose Flora, Ne California. Oregon Academy of Science Annual Meeting, Willamette University.

Taylor, S.B., Stanley, R., Aldrich, P., Dutton, B., Dutton, E., Hidalgo, S., 2012, Novel Use of GIS for Spatial Analysis of Fingerprint Patterns: Proceedings of the Urban and Regional Information Systems Association (URISA) Annual Meeting, Portland, Oregon.

Stanley, R., Dutton, E., **Taylor, S.**, Aldrich, P., and Dutton, B., 2012, Geographic Information Systems and Spatial Analysis – Part 1: Quantifying Fingerprint Patterns and Minutiae Distributions: Proceedings of the American Academy of Forensic Sciences National Meeting, Atlanta, GA.

Dutton, E., **Taylor, S.**, Aldrich, P., Dutton, B., and Stanley, R., 2012, Geographic Information Systems and Spatial Analysis – Part 2: A Monte Carlo Approach to Estimating Probabilities for Latent Print Identification: Proceedings of the American Academy of Forensic Sciences National Meeting, Atlanta.

Hidalgo, S., Dutton, B., Stanley, R., Aldrich, P., Dutton, E., and **Taylor, S.**, 2012, A Geometric Morphometric Approach to Fingerprint Analysis: Proceedings of the American Academy of Forensic Sciences National Meeting, Atlanta, GA.

Templeton, Jeffrey H., 2013, Petrographic Problem-Solving Assignments: An authentic assessment strategy for undergraduate petrology courses: Geological Society of America Abstracts with Programs, v. 45, p. 8.

Templeton, Jeffrey, 2012, Petrographic Problem-Solving Assignments: Science Education Resource Center, Teaching Petrology in the 21st Century Collection: http://serc.carleton.edu/NAGTWorkshops/petrology/teaching_examples/58133.html.

Fisher, Kara, and **Templeton, Jeffrey H.**, 2012, Investigating petrologic linkages between dacitic ash-flow tuffs at Newberry Volcano through analysis of plagioclase phenocrysts: Association of Environmental & Engineering Geologists 55th Annual Meeting Program with Abstracts.

Wade, P. and Courtney, A., 2013, Using Video Projects in the Classroom. **Paper accepted** for publication in monograph *New Trends in Earth Science Outreach and Engagement: The Nature of Communication*. (Drake, Kontar and Rife editor). Springer International Publishing, Inc.

Courtney, A., and **Wade, P.**, 2012, Project-based learning as a vehicle for teaching science at the university level. American Geophysical Union 2012 Fall Meeting. Abstract ID# ED11C-0749.

Wade, P. and Courtney, A., 2012, Writing Assignments in Disguise: Lessons Learned Using Video Projects in the Classroom. American Geophysical Union 2012 Fall Meeting. Abstract ID# PA24A-02 (Invited talk).

Presentations:

Myers, J.A., 2012. Oregon's Rich Paleobotanical History. North American Research Group Annual Meeting, Portland, OR.

Schoenfeld, W., Presentation at GSA in Charlotte, NC November 2012.

Grants and Funding:

Taylor, S.B.: Proposal Submission National Institute of Justice, Program for Applied Research and Development in Forensic Science: "Application of Spatial Statistics and Probabilities to Latent Print Comparisons: Connecting Research to Forensic Practice" (Co-PI with E. Dutton, P. Aldrich, B. Dutton; $1.2M; Review Pending).

Templeton, J.H.: "Field and Geochemical Study of Pleistocene Silicic Lava Flows and Domes at Newberry Volcano, central Oregon" (WOU Faculty Development Research/Major Project Grant, $2800).

c. Service

Jeff Myers:	Preview Day and SOAR advisor; Co-chair of Oregon Academy of Science Geology Section; Consulting activities with Paleoenvironmental Consultants, Altadena, CA, and Paleoresource Consultants, Sacramento, CA; Presentations and outreach activities: Monmouth Elementary School; OMSI Hancock Field Station, Clarno, OR; North American Research Group, Portland, OR.
Bill Schoenfeld:	NSM Division curriculum committee; Advisor for Physics minor and Integrated Science major; SOAR advisor; WOU Affiliate Representative to NASA Oregon Space Grant Consortium.
Steve Taylor:	Chair, Division of Natural Sciences and Mathematics; member of the NSM Division Personnel Review Committee; chair, ad-hoc "New Science Building" Committee, Budget Committee, and Building Committee; Preview Day and SOAR advisor; Member of the Oregon Geographic Information Council; Member of the Association of State Boards of Geology Council of Examiners; Participating scientist and faculty mentor in the Summer Ecosystem Informatics Institute at Oregon State University and HJ Andrews Experimental Forest.
Jeff Templeton:	Chair of the Earth and Physical Science Department; primary Department scheduler and budget manager; chair of the NSM Division Personnel Review Committee; member of Administrative Program Assistant Search Committee, Division Budget Committee, and Building Committee; served as Preview Day and SOAR advisor; member of Executive Committee for the WOU Program for Undergraduate Research Experiences; member and secretary of the WOU Academic Requirements Committee; Served as an external reviewer for National Geographic Society Research Grants Program; participated in two professional development field trips.

Philip Wade: Member 2013-2015 WOUFT Collective Bargaining Team representing Non-Tenure Track faculty; ES 100 Laboratory Coordinator; member of the WOU Institutional Review Board; Education Board Member: A. C. Gilbert Discovery Village Science Museum, Salem, OR; Session chair for 2013 Academic Excellence Showcase.

III. STUDENT ACHIEVEMENTS

- 2012-13 Academic Year Student Recognition Awards: Aquilegia Leet and Brianna Young, Outstanding Upper-division Students in Earth Science; Kathryn Roberts, Outstanding Graduating Senior in Earth Science.
- Kara Fisher presented a poster at the national Association of Engineering Geologists meeting in Salt Lake City in September 2012.
- 10 Earth Science students presented at the 2013 WOU Academic Excellence Showcase.

Appendix 1. 2012-2013 Annual Faculty Reports

Natural Science & Mathematics 2012-2013
Annual Faculty Activity Report

Due Date: June 30, 2013 *Attach a current copy of your CV and send electronic copies as email attachments to Steve Taylor, taylors@wou.edu and cc to your department chair.*

Name: Dr. Jeffrey Alan Myers
Title/Rank: Full Professor (4th year)
Initial Hire Date at WOU: Sept. 1999
Report Date: 12 June, 2013
Years in Rank: Step 24
Years of Service: 15 (one prior to WOU)

I. TEACHING AND CURRICULUM

A. Course Census

(List the courses that you have taught this year and corresponding enrollment data by term.)
FTE/course shown in ( )

Fall:
ES 104 – Earth System Science I (3) – 55 students
ES 104L – Earth System Science I (1.5) – 21 students
ES 331 – Introduction to Oceanography (3), 24 students
ES 492/592 – Depositional Systems (3), 22 students (22 UG)

Winter:
Sabbatical

Spring:
ES 106 – Earth System Science III (3) - 27 students
ES 203/203L – Historical Geology (5) – 12 students
ES 392 – Sedimentary Geology (4) – 13 students
ES 407 Senior Seminar (1) – 13 students

Total FTE: 23.5

Sum total: 187 UG students
Productivity: Average 23.4 students/class; 187 seats filled/248 seats available = 75.4% seats filled

B. Course Development and Improvement

(Indicate any courses that were new preparations, significantly revised preparations, and anything significant about your efforts in these courses. Describe new techniques, materials, or technologies that were incorporated into your classroom teaching. Include any field trips or extended learning activities that took place outside of the classroom.)

- New prep: ES 407 – Earth Science Senior Seminar. This seminar course addressed all aspects of causes and mitigation of geological hazards impacting the section of US 101 from Newport, OR to Cape Foulweather, OR. Students conducted independent research on their portion of the project, participated in group discussion and interaction, and in a 2 day weekend field trip. Results were presented in a special seminar at Academic Showcase.
- Significant course revisions: The sedimentology/paleobiology /Earth history series of courses (ES 203, ES 492/592, ES 431/531, ES 453/553, ES 392) is gradually being

revised to meet longstanding needs of students more orderly and compartmentalized learning blocks. Full implementation is anticipated in Fall, 2014. Significant revisions include: 1) The use of ES 203 as a mandatory gateway course to upper division courses in the series. Requiring ES 203 as a prerequisite prior to entering the upper division courses will provide students with a uniform knowledge base upon which to build. 2) Recalibration of ES 431/531 (Paleobiology) and 492/592 (Depositional Systems) to focus on introducing information, skills, and experiences in the field, laboratory, and lecture that will prepare students for higher level work in the discipline. 3) Recalibration of ES 392 to a 400 level course (ES 493) intended for graduating seniors in Earth Science. The course will focus on detailed analysis of sedimentary rocks at the thin section and hand sample scale, preparation of professional geological reports, and on experiences that a working geologist would expect to encounter.

- Field trips: ES 492/592: 1 day trip to the Oregon Coast for the purpose of producing a stratigraphic column of the Miocene Astoria Formation in order to interpret the depositional environment of the formation. ES 407: 2 day trip to the Moolack Beach and Beverly Beach region of the Oregon coast for the purpose of examining geological hazards associated with US 101 on this stretch of the coastline.

C. Program Assessment Activities

(Provide a bulleted summary of assessment activities that you have been involved within the past year, e.g. embedded assessments, exit exams, assessment planning, assessment-based curriculum changes, related professional development, etc.)

- Continued refinement of mechanisms to quantify student learning in ES 104/105/106. Students are presented with set of multiple choice questions that measure prior knowledge. Questions focus on general knowledge that is tied to the mission goals of the LACC. The same questions, slightly reworded are included in the final exam. This makes possible quantification of learning.

D. Curriculum Changes

(Provide a bulleted summary of curriculum changes that you were involved within the past year.)

- ES 392: Renumber to ES 493, add prerequisites ES 491/591 or ES 431/531.
- ES 431/531: Add prerequisite ES 203
- ES 491/591: Add prerequisite ES 203; add active learning component and increase from 3 to 4 credits.

II. RESEARCH & SCHOLARSHIP

A. Research Projects

(Provide a bulleted summary of research projects you have worked on this year. Indicate any student involvement or collaborations in these projects.)

- Professional consulting with Paleoenvironmental Consultants, Altedena, California. Paleobotany of the late Miocene Anaverde Formation. Salaried student participation: Jacob Cruser, Senior Earth Science. This project involved the most recent phase of the Antelope Valley Recycling and Disposal Facility, Inc., Landfill II, Phase V (V-2-A) Palmdale, Los Angeles County, California. Results of this project, and of two previous studies in 2008 and 2009 form the basis for an in preparation manuscript on the late Miocene flora and vegetation of the Anaverde Formation.

- Continued study of the fossil genus *Paleosecuridaca* from the late Eocene Badger's Nose flora of NE California. This work has produced a nearly complete manuscript

– slated to be completed in Summer, 2013. Two talks have resulted from this work: 1) Erwin, D.M., and Myers, J.A. 2012. *Securidaca*-like samaras from the late Eocene Badger's Nose paleoflora, Modoc Co., CA, USA. Paleobotanical section, Botanical Society of America Annual Meeting, Columbus, OH. 2) Myers, J.A, and Erwin, D.M. 2013 AN ENIGMATIC WINGED FRUIT FROM THE LATEST EOCENE BADGER'S NOSE FLORA, NE CALIFORNIA. Oregon Academy of Science Annual Meeting, Willamette University.

B. Peer-Reviewed Publications

C. Presentations and Refereed Abstracts

- MYERS, J.A. AND ERWIN, D.M. 2013. AN ENIGMATIC WINGED FRUIT FROM THE LATEST EOCENE BADGER'S NOSE FLORA, NE CALIFORNIA. Oregon Academy of Science Annual Meeting, Willamette University.
- Erwin, D.M., and **Myers, J.A.** 2012. *Securidaca*-like samaras from the late Eocene Badger's Nose paleoflora, Modoc Co., CA, USA. Paleobotanical section, Botanical Society of America Annual Meeting, Columbus, OH. (Diane Erwin presenting)
- Myers, J.A. 2012. Oregon's Rich Paleobotanical History. North American Research Group Annual Meeting, Portland, OR.

D. Grant Writing Activities
(Include proposal title, authors, funding source, amount, and status on funding request.)

E. Professional Certifications, Licenses, Other Specialty Credentials

III. FACULTY SERVICE

A. Student Advising
(Provide a bulleted list of activities related to academic advising, number of advisees, programs in which you advise, etc.)

- Earth Science Major: 15 major advisees
- Earth System Science Minor: 3 advisees
- Integrative Science: 4 advisees

B. WOU Institutional Service
(Provide a bulleted list of department-division-university service duties that you have carried out, e.g., scheduling, recruiting activities, student clubs, search committees, faculty senate, mentoring, etc.)

a. Preview days and SOARs
b. No institutional committees during this sabbatical year.

C. Leadership, Professional Service and Community Outreach
(List professional service completed this past year, include consulting activities and leadership roles.)

- 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.
- Presentations on paleontology and the importance of college education to students of Monmouth Elementary School
- Outreach to high school students interested in a career in paleontology at the OMSI-operated Hancock Field Stion, Clarno, Oregon.
- Professional outreach through lectures and volunteer activities with the North American Research Group (NARG), Portland, OR, involving amateur paleobotanists.

D. Professional Societies
(List memberships in professional organizations.)

- Oregon Academy of Science –President 2007-2009; Co-Chair, Geology Section, 2007-present.
- Paleontological Society of America, Cordilleran Section (Chair, 2002-2003)
- International Organization of Palaeobotanists, 1996-present
- Great Basin Institute (Co-Director), 1994-present
- Botanical Society of America, Paleobotanical Section, 1999-present
- Native Plant Society of Oregon
- Santa Barbara Botanic Garden
- Geological Society of America 1996-present

IV. HONORS AND AWARDS
(Provide a bulleted list of honors and awards that you received in the past academic year.)

V. CHALLENGES AND PLANS FOR PROFESSIONAL GROWTH
(Provide a bulleted list of challenges and barriers to achievement in your role as a faculty member at WOU. Also list any plans for professional growth and/or mitigation of challenges.)

- No challenges at all.
- Plans for professional growth focus on becoming more familiar with successful techniques and instruments for establishing quantifiable measures of student learning.

VI. MISCELLANEOUS (Provide a bulleted list of any other items not covered above.)

VII. PUBLIC RELATIONS AND PROMOTIONAL HIGHLIGHTS
(From your above summary, list the highlights of your faculty scholarship, student scholarship and service-related activities that you would like to see prominently promoted on the university web site, in news media, campus brochures, newsletters, and other public-relations materials. Provide a short blurb for each item with any recommendations on how you would like news of your work disseminated.)

Natural Science & Mathematics 2012-2013
Annual Faculty Activity Report

Name: William Schoenfeld **Report Date:** 6-30-2013

Title/Rank: Associate Prof **Years in Rank: 9 years**
Initial Hire Date at WOU: Fall 2002 Years of Service: 11 years

I. TEACHING AND CURRICULUM

A. Course Census – 39 credits – 13 every term

PH201 (lecture & 2 lab sections) – 42 students – 7 credits
PH211 (combined lecture & lab) – 14 students – 6 credits

PH202 (lecture & 2 lab sections) – 21 students – 7 credits
PH212 (combined lecture & lab) – 9 students – 6 credits

PH203 (lecture & 2 lab sections) – 19 students – 7 credits
PH213 (combined lecture & lab) – 5 students – 6 credits

B. Course Development and Improvement

PH201 had a lab exam, which is something I've never done before. Students were given the opportunity to choose a partner and sign up for a two hour time slot during finals weeks in which they were tasked to devise an experiment (with all the appropriate equipment provided) that demonstrated one of the important principles studied during the first tem (Newton's Laws, Conservation of Energy, Conservation of Momentum). Mostly it was my attempt to force each and every student to become proficient in using PASCO Datastudio. While a few students struggled with the physics involved in the analysis of their experiment, most everyone was able to handle the interface and software. It was successful enough so that it will become part of the first term final examination.

A number of new lab experiments and lectured demonstrations were introduced. I now have enough lab setups for an excellent lab session on standing waves: 3 stations for standings waves on a string, 3 stations for standing waves in a column of air. PH203 had two never before employed full lab periods devoted to a variety of optics experiments. PH212 had a new experiment on the period of a physical pendulum that required comparison of experimental data with the predicted minimum period obtained by using calculus to find the extrema of a function. In performing the required derivative, students had to utilize multiple differentiation rules learned in Math 251, so that even math majors were challenged by the assignment.

C. Program Assessment Activities

PH211 took the FCME (Force & Motion Conceptual Examination) as both a pre-instruction and post-instruction (part of their final exam). PH201 took the exam only as post-instruction.

D. Curriculum Changes

(Provide a bulleted summary of curriculum changes that you were involved within the past year.)
Same material (the laws of physics determined between 1680's and 1865), but new lecture demonstrations to help in their understanding.

II. RESEARCH & SCHOLARSHIP

A. Research Projects

(Provide a bulleted summary of research projects you have worked on this year. Indicate any student involvement or collaborations in these projects.)

- Continued work as the PI on WOU's NASA Global Climate Change Education Grant. The Grant formally ended December 31st but Adele & I still have additional work we plan on pursuing. The group made three presentations this year. I presented a poster at the GSA national meeting in Charlotte, NC and was asked by the AGU Education & Public Outreach Manager to consider presenting at AGU this December in San Francisco.
- LAUNCHWOU – Worked with three students (2-OSU physics majors, 1-WOU math major) in launching and recovering our first high altitude weather balloon. (Balloon reached an altitude of 90,000 ft and traveled 45 northeast during its few hour flight). Data recorded, while less expected, will serve as a benchmark for comparison with future flights.

B. Peer-Reviewed Publications

C. Presentations and Refereed Abstracts

- Presentation at GSA in Charlotte, NC November 2012.
- Proposal accepted for presentation at NSTA regional meeting in Portland, OR Oct 2013.

D. Grant Writing Activities

(Include proposal title, authors, funding source, amount, and status on funding request.)
Too busy to think about writing another proposal!

E. Professional Certifications, Licenses, Other Specialty Credentials

III. FACULTY SERVICE

A. Student Advising

(Provide a bulleted list of activities related to academic advising, number of advisees, programs in which you advise, etc.)
Physics minors, Integrated Science majors – just a few students. More time is spend advising students which of the two physics sequences is best for them, and how they need to prepare for the mathematical challenges that lay ahead.

C. WOU Institutional Service

(Provide a bulleted list of department-division-university service duties that you have carried out, e.g., scheduling, recruiting activities, student clubs, search committees, faculty senate, mentoring, etc.)
Departmental curriculum committee, Medical School Letter of Recommendation – 3 students (Michael Akins, John Guy, Michael Turner)

C. Leadership, Professional Service and Community Outreach

(List professional service completed this past year, include consulting activities and leadership roles.)
WOU Affiliate Representative to Oregon Space Grant Consortium – attended statewide consortium meeting- Sept 2012, Salem (turned down offer to serve again as Associate Director),

served on scholarship committee – expect an announcement any day concerning one WOU student who applied for scholarship (it was very competitive this year).

D. Professional Societies
(List memberships in professional organizations.)
AAPT, NSTA

IV. HONORS AND AWARDS
(Provide a bulleted list of honors and awards that you received in the past academic year.)

V. CHALLENGES AND PLANS FOR PROFESSIONAL GROWTH
(Provide a bulleted list of challenges and barriers to achievement in your role as a faculty member at WOU. Also list any plans for professional growth and/or mitigation of challenges.)
The usual:

- The layout of NS101 is ill suited for lecture demonstrations, and the computer system periodically decides to not recognize the PASCO interface. As soon as class enrollment approaches 25, I'll move the algebra-based class to the physics labs where demonstrations are much easier, and always work. In addition, in response to specific questions I have access to my equipment and can create demonstrations on the spot.
- I am a one person program area trying to maintain three year long sequences. Physics 201/202/203 and 211/212/213 are 5 or 6 credit courses at virtually every other public institution in the state, but are 4 credit courses here. Given fewer contact hours, and significant numbers of students with weak math backgrounds I tend to cover less material than some other institutions, particularly in the calculus based sequence. Following in the footsteps of Eastern Oregon University I have decided to offer the calculus based sequence on an alternating year schedule.
- Scheduling conflicts with other departments within the division: last year I cancelled Modern Physics due to the fact that math (against my prior warnings) moved around linear algebra and calculus IV. Four students wanted to signed up, and a fifth was interested, but the class sequence was cancelled. Two chemistry majors/phys minors switched their minor to math, one math major/phys minor switched his minor to ASL. This past year I also lost 5 bio majors (4 of whom were excellent premeds) to Chemeketa CC due to biology deciding (as a dept) to move Boomer's microbiology class. I've told Biology I won't let WOU students taking physics at Chemeketa borrow physics lab equipment.
- Too many students either don't buy a textbook, or don't think it is important to read it. I will begin to explore creating a flipped classroom this summer and try to have as many in class activities, demonstrations, and problem solving as possible.

VI. MISCELLANEOUS (Provide a bulleted list of any other items not covered above.)

VII. PUBLIC RELATIONS AND PROMOTIONAL HIGHLIGHTS
(From your above summary, list the highlights of your faculty scholarship, student scholarship and service-related activities that you would like to see prominently promoted on the university web site, in news media, campus brochures, newsletters, and other public-relations materials. Provide a short blurb for each item with any recommendations on how you would like news of your work disseminated.)

Lisa Catto at PR has expressed an interest in participating in the next WOU balloon launch and writing a story about it. I've discussed it with Adele, and it might very well be a joint project involving some physics students and her science methods students or in service teachers.

Natural Science & Mathematics 2012-2013
Annual Faculty Activity Report

Due Date: June 30, 2013 *Attach a current copy of your CV and send electronic copies as email attachments to Steve Taylor, taylors@wou.edu*

Name: Steve Taylor **Report Date:** July 2, 2013

Title/Rank: Professor of Geology **Years in Rank:** 3
Initial Hire Date at WOU: September 15, 1999 **Years of Service:** 14

I. TEACHING AND CURRICULUM

A. Course Census

(List the courses that you have taught this year and corresponding enrollment data by term.)

Term	Course No.	Course Name/Section
Fall 2012	ES322	Geomorphology
Winter 2013	ES202	Physical Geology Lec/Lab
Winter 2013	ES341	Fundamentals of GIS
Spring 2013	ES473/573	Environmental Geology
Spring 2013	ES302	Quantitative Methods
Summer 2013	ES408-508	River Environments

*** Note: 2012-2013 Taylor was on 0.5 FTE course load release to serve as NSM Division Chair*

B. Course Development and Improvement

(Indicate any courses that were new preparations, significantly revised preparations, and anything significant about your efforts in these courses. Describe new techniques, materials, or technologies that were incorporated into your classroom teaching. Include any field trips or extended learning activities that took place outside of the classroom.)

Course Development

Summer 2012	Developed new online elective course ES408/508 Medical Geology, targeting health and nursing majors.
Fall 2012-Spring 2013	Continued development of multi-media, Moodle and online resources for a spectrum of Earth Science courses including ES202, ES322, ES473, and ES341.
Winter 2013	Update of tutorials and software curriculum associated with ES341 Fundamentals of Geographic Information Systems.

Field Trips

Summer 2012	Trip participant: “Geomorphic Evolution of the Owyhee River Canyon, Jordan Valley, Orgon”. Field trip in conjunction with Pacific Cell Friends of the Pleistocene.

Winter 2013 River Restoration Northwest Applied Field Methods: "Case Study of Johnson Creek Flood Mitigation Project, Portland, Oregon", Portland Environmental Services.

Spring 2013 Trip leader: "Solid Waste Management and Hydrogeology at the Coffin Butte Landfill, Benton County, Oregon". Field trip in conjunction with ES473/573 Environmental Geology.

Spring 2013 Trip leader: "Groundwater and Soil Remediation Strategies at the Taylor Wood Treatment Facility, Sheridan, Oregon". Field trip in conjunction with ES473 Environmental Geology.

C. Program Assessment Activities

(Provide a bulleted summary of assessment activities that you have been involved within the past year, e.g. embedded assessments, exit exams, assessment planning, assessment-based curriculum changes, related professional development, etc.)

Fall 2012 Updated ES program demographic and alumni data.

Fall 2012-Spring 2013 Continued embedded assessment activities in ES322, ES341, ES302, ES407 and ES473. Instruments included laboratory portfolios ("work samples"), embedded exam questions directly linked to the ES program mission, and research-based student poster presentations.

D. Curriculum Changes

(Provide a bulleted summary of curriculum changes that you were involved within the past year.)

Spring 2013 Developed and proposed new curriculum associated with a Geographic Information Science minor at WOU. Project involves addition of new courses and hiring a new tenure line in Earth & Physical Science (proposal pending approval at July 2013 Faculty Senate Meeting)

II. RESEARCH & SCHOLARSHIP

A. Research Projects

(Provide a bulleted summary of research projects you have worked on this year. Indicate any student involvement or collaborations in these projects.)

Fall 2012-Spring 2013 Research Project: "Bedrock Control on Landslide Occurrence in the Nehalem Watershed, Tillamook County, Oregon" (with undergraduate student Cristina Francisco)

Fall 2012-Spring 2013 Research Project: "Aquifer Assessment of the lower Luckiamute River Basin, Polk County, Oregon" (with undergraduate student Carlie Bulen)

Fall 2012-Spring 2013 Ongoing compilation of research literature and reference library related to watershed analysis, regional geomorphology, hillslope / fluvial processes.

Summer 2013 Ongoing research project: "Cinder Cone Analysis at Newberry Volcano" (with Dr. Templeton and undergraduate students).

B. Presentations and Refereed Abstracts

Taylor, S.B., Stanley, R., Aldrich, P., Dutton, B., Dutton, E., Hidalgo, S., 2012, Novel Use of GIS for Spatial Analysis of Fingerprint Patterns: Proceedings of the Urban and Regional Information Systems Association (URISA) Annual Meeting, Portland, Oregon.

Stanley, R., Dutton, E., Taylor, S., Aldrich, P., and Dutton, B., 2012, Geographic Information Systems

and Spatial Analysis – Part 1: Quantifying Fingerprint Patterns and Minutiae Distributions: Proceedings of the American Academy of Forensic Sciences National Meeting, Atlanta, GA.

Dutton, E., Taylor, S., Aldrich, P., Dutton, B., and Stanley, R., 2012, Geographic Information Systems and Spatial Analysis – Part 2: A Monte Carlo Approach to Estimating Probabilities for Latent Print Identification: Proceedings of the American Academy of Forensic Sciences National Meeting, Atlanta.

Hidalgo, S., Dutton, B., Stanley, R., Aldrich, P., Dutton, E., and Taylor, S., 2012, A Geometric Morphometric Approach to Fingerprint Analysis: Proceedings of the American Academy of Forensic Sciences National Meeting, Atlanta, GA.

D. Grant Writing Activities

(Include proposal title, authors, funding source, amount, and status on funding request.)

Spring 2013 Proposal Submission National Institute of Justice, Program for Applied Research and Development in Forensic Science: "Application of Spatial Statistics and Probabilities to Latent Print Comparisons: Connecting Research to Forensic Practice" (Co-PI with E. Dutton, P. Aldrich, B. Dutton; $1.2M; Review Pending).

E. Professional Certifications, Licenses, Other Specialty Credentials

Maintained active registration as a Professional Geologist in the State of Oregon (Registration Number G1968), State Board of Geologist Examiners, Salem, Oregon.

III. FACULTY SERVICE

A. Student Advising

(Provide a bulleted list of activities related to academic advising, number of advisees, programs in which you advise, etc.)

Continued as faculty advisor in Environmental Studies and Earth Science programs. Awarded 2012 Outstanding Faculty Advising Merit Award, National Academic Advising Association.

D. WOU Institutional Service

(Provide a bulleted list of department-division-university service duties that you have carried out, e.g., scheduling, recruiting activities, student clubs, search committees, faculty senate, mentoring, etc.)

(1) Lead Faculty Facilitator on Construction of the DeVolder Family Science Center at WOU.
(2) Member of NSM Personnel Review Committee at WOU.
(3) Chair of NSM Technology Planning Committee at WOU.
(4) Member of the NSM Building Infrastructure Planning Committee at WOU.

(5) Continued as ESRI GIS licensing liaison for WOU. Part of this work includes ongoing implementation of a central GIS server for use by both the colleges of Education and LAS.

(6) Served as one of the Earth and Physical Science faculty representatives at Preview Days and SOAR at WOU.

(7) Informally worked on career placement for Earth Science-related graduates from WOU (maintain a job board and placement contacts for students in government and industry); developed a comprehensive advising and career guide for Earth Science majors.

(8) Continued soliciting funds and campus-wide services to further develop the Geo-Data Processing Lab in NS218A. The Geolab has received greater use the past year by Earth Science students and faculty for research and teaching activities.

(9) Served as ad-hoc administrator of the WOU Earth Science program web site and related public relations activities.

C. Leadership, Professional Service and Community Outreach
(List professional service completed this past year, include consulting activities and leadership roles.)

(1) Division Chair of Natural Sciences and Mathematics, Western Oregon University. The wide array of duties in this position include: budget management (~$250,000 supplies and services), personnel supervision (~55 faculty and staff), class scheduling, liaison with upper administration, student grievances, signatory duties on division paperwork, strategic planning, tenure and promotion work, building management.

(2) Continued serving as faculty advisor and university liaison to the Oregon Geographic Information Council, Salem Oregon. The function of the organization is to set standards for acquisition of Geographic Information Systems data in the state of Oregon.

(3) Continued serving as faculty advisor and university liaison to the State Geologic Map Advisory Committee, Oregon Dept. of Geology and Mineral Industries, Portland, Oregon. The function of the committee is to provide guidance and set priorities for state and federal geologic mapping initiatives in Oregon.

(4) Served as participating scientist and faculty mentor in the Summer Ecosystem Informatics Institute at Oregon State University and HJ Andrews Experimental Forest. The six-week program involves 15 graduate and undergraduate students from institutions around the country.

D. Professional Societies
(List memberships in professional organizations.)

Maintained active membership in the following professional organizations: Geological Society of America, American Geophysical Union, Association of American Geographers, Friends of the Pleistocene.

IV. HONORS AND AWARDS
(Provide a bulleted list of honors and awards that you received in the past academic year.)

Awarded 2012 Outstanding Faculty Advising Merit Award, National Academic Advising Association.

V. CHALLENGES AND PLANS FOR PROFESSIONAL GROWTH
(Provide a bulleted list of challenges and barriers to achievement in your role as a faculty member at WOU. Also list any plans for professional growth and/or mitigation of challenges.)

(1) The anomalously high adjunct/tenure line faculty ratio (60%) in the Dept. of Earth and Physical Science is a major barrier to program development. Our perennial request for an Earth / Physical Science Education Specialist was denied by admin. Given that our department has only 4 tenured faculty members out of a total of 10 faculty, we are chronically hindered by lack of horsepower to contribute to departmental service tasks and development/assessment activities. As a result, only a couple faculty members are able and motivated to take on the service/reporting chores for the department. It's tiring and demoralizing to watch other better-staffed departments in the division advance, while we are hindered by a lack of tenure-line work horses who are committed to the long term mission of the institution.

(2) There is a chronic lack of time for scholarship outside of teaching and service. My research moves along at a slow pace, with the use of student assistants, but finding the time and space to publish manuscripts is very limiting to professional advancement. This is a chronic problem at WOU.

(3) Increasing administrative demands for assessment reports: faculty workload is increasing with persistent calls for assessment data by upper administration, however there has been little to no investment in FTE, professional development, or faculty support services to help manage the growing expectations for administrative reporting.

(4) Teaching load reduction associated with Division Chair duties has resulted in removing me from the ES100 teaching rotation. ES100 is one of our most important program activities and benefits from the diverse participation of all faculty. My reduction in ES100 service load is a deficiency and weakens our program position during the interim while serving as NSM Chair.

VI. MISCELLANEOUS (Provide a bulleted list of any other items not covered above.)

(1) Maintained an employment / internship bulletin board for Earth Science students.
(2) Participated in the year-end Natural Science and Mathematics Awards Ceremonies.
(3) Participated in WOU commencement ceremonies.

VII. PUBLIC RELATIONS AND PROMOTIONAL HIGHLIGHTS

(From your above summary, list the highlights of your faculty scholarship, student scholarship and service-related activities that you would like to see prominently promoted on the university web site, in news media, campus brochures, newsletters, and other public-relations materials. Provide a short blurb for each item with any recommendations on how you would like news of your work disseminated.)

Natural Science & Mathematics 2012-2013
Annual Faculty Activity Report

Name: Dr. Jeffrey Templeton **Report Date:** June 30, 2013

Title/Rank: Professor of Geology **Years in Rank:** 1 year
Initial Hire Date at WOU: January 1995 **Years of Service:** 18+ years

I. TEACHING AND CURRICULUM

A. Course Census

List the courses that you have taught this year and corresponding enrollment data by term.

Fall Term 2012: ENROLLMENT
- ES 201W – Principles of Geology lecture .....29 students
- ES 201L – Principles of Geology labs (2 sections) .....13+16 students
- ES 301/301L – Petrographic Microscopy .....14 students
- ES 321 – Structural Geology .....11 students
- 0.25 FTE Reassignment for EPS Department Chair

Winter Term 2013:
- ES 450 – Introduction to Petrology .....10 students
- 0.25 FTE Reassignment for EPS Department Chair
- 0.25 FTE Faculty Development Course Reassignment for Scholarly Activities

Spring Term 2013:
- ES 106 – Earth System Science III lecture .....50 students
- ES 354 – Volcanoes and Earthquakes .....24 students
- 0.25 FTE Reassignment for EPS Department Chair

Summer Term 203:
- ES 106 – Earth System Science III lecture .....15 students
- ES 106L – Earth System Science III lab .....15 students

B. Course Development and Improvement

Indicate any courses that were new preparations, significantly revised preparations, and anything significant about your efforts in these courses. Describe new techniques, materials, or technologies that were incorporated into your classroom teaching. Include any field trips or extended learning activities that took place outside of the classroom.

- ES 201, taught during Fall term 2012, was again offered as a Writing Intensive course.
- During Fall term, I conducted a two-day field trip to Sunset Bay, Cape Arago, and the Roseburg area for Structural Geology (ES 321).
- During Winter term in Petrology (ES 450), I continued to engage students with "Petrographic Problem Solving" assignments, which are a series of active-learning strategies that require students to use petrographic microscopy techniques to solve geologic problems. Four are conducted over the course of the term, and each requires a class presentation and 2-page paper, so assessment is rather time consuming. As highlighted below, I published an abstract and presented a talk on this strategy at the *Geological Society of America Rocky Mtn. Section meeting* in May 2013.
- In Spring term, I taught ES 354 (Volcanoes and Earthquakes) for the third time. This course focuses on earthquake phenomena and volcanic processes, with an emphasis on their impact to people, infrastructure, and natural resources in Oregon and the western United States. I continued to revise all of the lecture materials for this course. I also updated in-class activities, active learning strategies, and laboratory exercises that are designed to engage students in the learning process.
- The most significant improvement to my teaching, courses, and curriculum during this past academic year was the development of **Moodle Online Resource** WebPages for most of my courses. I focused on ES 201 in fall term, ES 450 in winter term, and ES 106 and ES 354 in spring term. For each course, I compiled a comprehensive set of classroom materials, including PowerPoint presentations, handouts, review sheets, and other ancillary materials. I will continue to upgrade these courses and add additional courses during the upcoming academic year.

C. Program Assessment Activities

Provide a bulleted summary of assessment activities that you have been involved within the past year, e.g. embedded assessments, exit exams, assessment planning, assessment-based curriculum changes, related professional development, etc.

- Worked on the "Earth Science Program Assessment Plan: Student Learning Outcomes" document as requested by Dean of College of Liberal Arts and Sciences. Was not completed owing to the ambiguity of the document and no follow up by relevant administrators.

D. Curriculum Changes

No formal curriculum changes were undertaken this past year.

II. RESEARCH & SCHOLARSHIP

A. Research Projects

Provide a bulleted summary of research projects you have worked on this year. Indicate any student involvement or collaborations in these projects.

- I continued to work on two research initiatives at Newberry Volcano near Bend. Key outcomes from the past academic year are summarized in the following paragraphs.

1. The objective of the first project is to constrain the petrogenetic evolution of the Newberry magma system using the Pleistocene ash-flow tuff deposits. During the past year, I expanded this project to consider the silicic lava flows and domes on the flanks of Newberry that may be co-genetic with the ash-flow tuffs exposed on the east side of the volcano. In Winter term, I received a WOU Faculty Development Grant to conduct this research with support to undertake field work this upcoming summer and acquire geochemical analyses from samples collected during field studies over the next academic year. In addition, I continued to work with the glass and mineral geochemical data collected via electon microprobe analyses at Oregon State University and to mentor an undergraduate student (Kara Fisher, B.S., Earth Science, June 2013) in an independent research project this past academic year. Kara has been working on a detailed study of textural and compositional attributes of plagioclase phenocrysts within pumices from two compositionally similar dacitic ash-flow tuffs using microprobe data and photomicrographs collected during my sabbatical in 2010. Of particular note, we published an abstract for the national Association of Engineering Geologists meeting held in September 2012, where she presented the results of this project. As with all scholarly endeavors at WOU, finding time to make meaningful headway on research projects is always a challenge, but I continue to push forward.

2. The second research project centers on the numerous cinder cones that punctuate the landscape at Newberry Volcano. I am collaborating with Dr. Steve Taylor on this project, and we have actively involved students in collecting digital map data using GIS software and analyses. The cinder cone project is ripe for publication, and Taylor and I need to find the time to prepare a manuscript, hopefully in the next 1-2 years.

- I have continued to work on disseminating the results of a curriculum improvement project that was funded through the National Science Foundation. For this project, I have developed a pedagogical model that integrates geologic problem solving with petrographic microscopy and digital image analysis in two courses in the Earth Science major at WOU. Following up on my contribution to the NSF-supported Science Education Resource Center Teaching Petrology collection in January 2012, which provides a detailed description of the learning activity, I published an abstract and gave a presentation in a special session focusing on novel approaches and current research in geoscience education at the *Geological Society of America Rocky Mtn. Section meeting* in May 2013. A goal of mine in the next several years is to prepare a manuscript for the *Journal of Geoscience Education* discussing the pedagogy and related assessment of student learning gains in the petrology curriculum.

- The long-term geoscience education project centered on developing inquiry-based laboratory curriculum for the introductory LACC Earth System Science (ES 100) courses at WOU is currently on the back burner as we consider alternative funding sources for this project. If any administrators reading this report have any creative ideas in this regard, I would love to hear them.

B. **Peer-Reviewed Publications**

No peer-reviewed publications were prepared this past year.

C. Presentations and Refereed Abstracts

Templeton, Jeffrey H., 2013, Petrographic Problem-Solving Assignments: An authentic assessment strategy for undergraduate petrology courses: Geological Society of America Abstracts with Programs, v. 45, p. 8.

Fisher, Kara, and **Templeton, Jeffrey H.**, 2012, Investigating petrologic linkages between dacitic ash-flow tuffs at Newberry Volcano through analysis of plagioclase phenocrysts: Association of Environmental & Engineering Geologists 55th Annual Meeting Program with Abstracts.

D. Grant Writing Activities

Include proposal title, authors, funding source, amount, and status on funding request.

Title	Authors	Funding Source	Amount	Status
Field and Geochemical Study of Pleistocene Silicic Lava Flows and Domes at Newberry Volcano, central Oregon	Jeffrey Templeton	WOU Faculty Development Research / Major Project Grant	$2800	Funded
Professional Travel to Conference – Official Capacity (GSA, Spring 2013**)**	Jeffrey Templeton	WOU Faculty Development Travel Grant	$1200	Funded
Attend Geological Society of America Rocky Mtn. Section Meeting	Jeffrey Templeton	WOU Division of NSM Travel Funds	$480	Funded

III. FACULTY SERVICE

A. Student Advising

Provide a bulleted list of activities related to academic advising, number of advisees, programs in which you advise, etc.

- Major Adviser for Earth Science and Integrated Science Teacher Education (~17 advisees).
- Adviser for Earth Resources, Earth System Science, and Geology minors (~6 minor advisees).

E. WOU Institutional Service

Provide a bulleted list of department-division-university service duties that you have carried out, e.g., scheduling, recruiting activities, student clubs, search committees, faculty senate, mentoring, etc.

Departmental/Program service duties

- Continue to actively serve as **Chair of the Earth and Physical Science Department**.
- Responsible for all scheduling, staffing, and related tasks for the Earth System Science sequence (ES 104, 105, and 106) lecture and lab courses, lower- and upper-division Earth Science courses, and Physics lecture and lab courses.
- Managed the departmental budget, which was over $50,000 this year.
- Supervised the Earth System Science lab preparator.
- Ordered equipment and materials for Earth System Science and Geology courses.

Divisional service duties

- Served as the Chair of **Division of Natural Science and Mathematics Personnel Review Committee**.
- Served on the **Administrative Program Assistant Search Committee**. Reviewed 18 applications, participated in interviews of 4 candidates, and played a role in successfully hiring Jeanie Stuntzner.
- Worked with department heads of Biology, Chemistry, and Math to distribute Division Travel funds.
- Member of the **NSM Division Budget Committee** and **Building Committee**.
- Represented the Earth Science program at one **Academic Fair/Preview Day** (October 20, 2012). Updated the presentation/display for prospective students.
- **SOAR** (July 12, 2013). Assist incoming students in the Earth and Physical Science Department with scheduling.

University-wide service

- Continued serving on the **WOU Faculty Senate Academic Requirements Committee**; served as secretary for the ARC during the past academic year.
- Continued serving as an active member of the **Executive Committee** for the **Program for Undergraduate Research Experiences** at WOU.

C. Leadership, Professional Service and Community Outreach

List professional service completed this past year, include consulting activities and leadership roles.

- Served as a **Reviewer** for the National Geographic Society Research Grants Program.
- Served as a **Textbook Reviewer** for Norton Publishing Co. Conducted comprehensive reviews of three chapters for an introductory Earth Science textbook that is currently under development by Norton. Reviewed the following chapters: Prelude, "*And Just What is Earth Science?*"; Ch. 1, "*From the Big Bang to the Blue Marble*"; Ch. 4, "*Rock Groups and the Rock Cycle*".
- Attended and actively participated in the Geological Society of America, Rocky Mountain section field trip entitled "From Ignimbrite to Batholith: NE San Juan Mountains, Colorado" held May 14, 2013.
- Attended and actively participated in the Joint Pacific Northwest/Rocky Mountain Friends of the Pleistocene field trip entitled "'Frankly, my dear, I don't give a dam'- Owyhee River, southeastern Oregon" held August 23-26, 2012.
- Continued to serve as WOU's **Campus Representative** for the Geol Soc of America.

D. Professional Societies

List memberships in professional organizations.

- **Member**, Geological Society of America (GSA); American Geophysical Union (AGU); National Association of Geoscience Teachers (NAGT); Council on Undergraduate Research (CUR).

IV. HONORS AND AWARDS

Provide a bulleted list of honors and awards that you received in the past academic year.

V. CHALLENGES AND PLANS FOR PROFESSIONAL GROWTH

Provide a bulleted list of challenges and barriers to achievement in your role as a faculty member at WOU. Also list any plans for professional growth and/or mitigation of challenges.

Challenges and Barriers:

- The Earth and Physical Science Department would be better served by having a dedicated ¾ to full time lab preparator, as opposed to the current ½ and ½ split between Biology.
- The Earth and Physical Science Department has a critical need for at least one additional tenure-track faculty position, preferably in the area of Geographic Information Science.

Plans for Professional Growth:

My plans and goals for professional growth include the following: (1) continue a research project focusing on the petrology and volcanology of Pleistocene ash-flow tuffs, and silicic domes and flows exposed at Newberry Volcano in central Oregon, culminating in the submission of a manuscript, (2) obtain external funding to improve the introductory Earth System Science laboratory curriculum at WOU; and (3) submit a manuscript to the *Journal of Geoscience Education* discussing the results of the undergraduate geoscience curriculum project that was funded through NSF.

VI. MISCELLANEOUS

Provide a bulleted list of any other items not covered above.

VII. PUBLIC RELATIONS AND PROMOTIONAL HIGHLIGHTS

- The volcanology and petrology research initiatives at Newberry Volcano might be interesting from a Public Relations and Promotional standpoint.
- The new curriculum / pedagogical model for teaching petrology that I have developed is pretty cool.

Natural Science & Mathematics 2012-2013
Annual Faculty Activity Report

Due Date: June 30, 2013 *Attach a current copy of your CV and send electronic copies as email attachments to Steve Taylor, taylors@wou.edu*

Name: Philip Wade **Report Date:** June 20, 2013

Title/Rank: NTT Instructor **Years in Rank:** 15
Initial Hire Date at WOU: 9-16-1998 **Years of Service:** 15

I. TEACHING AND CURRICULUM

A. Course Census

Summer 2012

ES 106 (enrollment – 30)

ES 106L (enrollment – 30)

ES 104 (enrollment – 30)

ES 10L (enrollment – 30)

GS325 (enrollment –10)

Fall 2012

GS 325- (2 sections)**(enrollment – 36)**
Substantial preparation time involved with project oriented course. Student projects included a 3-week engineering design project and a scientific inquiry project. Class MOODLE site constructed. Continued with COE Professor Adele Schepige a formal research project (Engineering Design: Constructing Ideas for Teachers and Students) on student learning using IRB approved research design.

ES 104 (enrollment – 62)

ES 104L (enrollment – 24)

ES 100 Lab coordinator: Constructed ES 105L instructor MOODLE sites to be used as resource for all ES instructors. Ordered ES 100 lab materials and coordinated lab schedules and lab preparation. Created Mineral Lecture Resource Sets (24 boxes) and Rock Cycle Lecture Resource Sets (24 boxes).

Winter 2013

ES 105 (enrollment – 60)

ES 105L (enrollment-24) Overload to cover colleague out on sabbatical.
GS 202H (enrollment 16) New course and new prep. Course focused on Natural Disasters. Created a student project based curriculum where students constructed a class MOODLE site.
325 (enrollment – 18) Substantial preparation time involved with project oriented course. Student projects included a 3-week engineering design project and a scientific inquiry project. Class MOODLE site constructed. Continued with COE Professor Adele Schepige a formal research project (Engineering Design: Constructing Ideas for Teachers and Students) on student learning using IRB approved research design.

ES 100 Lab coordinator: Constructed ES 106L instructor MOODLE sites to be used as resource for all ES instructors. Ordered ES 100 lab materials and coordinated lab schedules and lab preparation.

Spring 2012
GS 325 (enrollment – 15)
GS 325- (enrollment – 15)
ES 106L (enrollment – 25)
GS 203H-and GS 203HL (enrollment – 14) (co-taught with Arlene Courtney) (Honors Science – Alternative Energy) "Essentially" New Course with substantial preparation. Enhanced GS 203H Moodle Site for course. Used on-line assignments and in-class labs. Major prep time for class Video Documentary Projects (7-documentaries) that were presented at AES, 2013. Class participated in WOU Academic Excellence Showcase. Renewed formal research project on student learning using IRB approved research design.

B. Course Development and Improvement

GS 325- (enrollment – 24) New course: "Science Inquiry and Engineering Design for K8 Teachers." Substantial preparation time involved with project oriented course.

- Student projects included a 3-week engineering design project and a 3-week scientific inquiry project.
- Students were required to develop and teach two science lessons.
- Class MOODLE site constructed.
- Continued with COE Professor Adele Schepige a formal research project (Engineering Design: Constructing Ideas for Teachers and Students) on student learning of both engineering design and scientific inquiry content using IRB approved research design.

GS 202H-and GS 202HL

- Project-based course with substantial preparation. Students created GS 202H Moodle Site for course. Used on-line assignments and in-class labs. All labs were original creations and included Remote Sensing, Aerial Photography, Seismology and Volcanology. Introduced students to network available research tools.

GS 203H-and GS 203HL

- Project-based course with substantial preparation. Enhanced GS 203H Moodle Site for course. Used on-line assignments and in-class labs. Introduced new web-based content modules on energy resources (Fossil Fuels).
- Introduced students to network available research tools (e.g. Wiki).
- Major prep time for class Video Projects that were presented at AES, 2013.
- Developed (in-progress) ~100 minute DVD consisting of 8 student projects.
- Class participated in WOU 2013 Academic Excellence Showcase.

C. Program Assessment Activities

- Embedded assessment for **GS 325** consisting of Engineering Design Project evaluation using ODE Engineering Design Work-Sample criteria, 2-student created teaching lessons evaluated, and required students to conduct an "authentic" science project based on ODE Inquiry Science Work-Sample criteria. Used 2 exams as content assessment vehicles.
- Embedded assessment for **GS 203H** included on-line discussion questions, in-class laboratory activities, video project presented at AES, 2013 and exams as content assessment vehicles. Students required to use internet research tool (Wiki) to share information.
- Renewed formal IRB approved research project (Using Student Created Video Documentaries in Science Class).

- Renewed with COE Professor Adele Schepige a formal research project (Engineering Design: Constructing Ideas for Teachers and Students) on student learning of both engineering design and scientific inquiry content using IRB approved research design.

D. Curriculum Changes

GS 202H - New curriculum for new course. See comments above.

GS 325 -New curriculum for new course. See comments above.

II. RESEARCH & SCHOLARSHIP

A. Research Projects

- **Using Student Created Video Documentaries in Science Class**. IRB approved research project renewed to assess GS 203H course learning outcomes. Invited speaker to present research findings at American Geophysical Union Annual Fall Meeting in SF, CA December, 2012 for Session entitled "Is Video Replacing Writing."
- **Engineering Design: Constructing Ideas for Teachers and Students.** IRB approved research project initiated with COE Professor Adele Schepige to assess GS 325 course learning outcomes and to address a longitudinal (3-year) study to assess pre-service K8 teacher's conceptions of engineering design and scientific inquiry. Initial results presented at NSTA Seattle Conference on STEM education in December 2011.

B. Peer-Reviewed Publications

- Wade, P. and Courtney, A., (2013). Using Video Projects in the Classroom. **Paper accepted** for publication in monograph *New Trends in Earth Science Outreach and Engagement: The Nature of Communication*. (Drake, Kontar and Rife editor). Springer International Publishing, Inc.

C. Presentations and Refereed Abstracts

- Courtney, A., & Wade, P. (2012). Project-based learning as a vehicle for teaching science at the university level. American Geophysical Union 2012 Fall Meeting. Abstracts ID# ED11C-0749
- Wade, P. and Courtney, A., (2012). Writing Assignments in Disguise: Lessons Learned Using Video Projects in the Classroom. American Geophysical Union 2012 Fall Meeting. Abstracts ID# PA24A-02 (Invited talk)

D. Grant Writing Activities

E. Professional Certifications, Licenses, Other Specialty Credentials

- California single subject credential physical science, (1989)
- California supplemental credential mathematics, (1989)

III. FACULTY SERVICE

A. Student Advising

- Continued College of Education student evaluations for admittance into K8 licensure program.

B. WOU Institutional Service

- Member IRB revieiw committee (2012-2013)
- Member 2013-2015 WOUFT Collective Bargaining Team representing Non Tenure Track faculty.

C. Leadership, Professional Service and Community Outreach

- Education Board Member: A. C. Gilbert Discovery Village Science Museum, Salem OR
- Session chair for 2013 Academic Excellence Showcase.

D. Professional Societies

- National Science Teachers Association
- American Geophysical Union

IV. HONORS AND AWARDS

- None

V. CHALLENGES AND PLANS FOR PROFESSIONAL GROWTH

VI. MISCELLANEOUS (God Help Us All)

VII. PUBLIC RELATIONS AND PROMOTIONAL HIGHLIGHTS

Natural Science & Mathematics 2012-2013
Annual Faculty Activity Report

Due Date: June 30, 2013 *Attach a current copy of your CV and send electronic copies as email attachments to Steve Taylor, taylors@wou.edu and cc to your department chair.*

Name: Grant D. Smith **Report Date:** June 2013

Title/Rank: adjunct instructor **Years in Rank:5 years**
Initial Hire Date at WOU: January, 2008 **Years of Service: 5 years**

I. TEACHING AND CURRICULUM

A. Course Census

ES 106 Lecture (2 sections) – Fall 2012 – 100 students
ES 106 Labs (5 sections) – Fall 2012 – 100 students
ES 104 Lab (1 section) – Fall 2012 – 24 students
ES 105 Lecture (2 sections) – Winter 2013 – 93 students
ES 105 Labs (5 sections) – Winter 2013 – 118 students
ES 106 Lecture (2 sections) – Spring 2013 – 88 students
ES 106 Labs (6 sections) – Spring 2013 – 106 students

B. Course Development and Improvement

The biggest change I made in my courses this year was to use the Turning Point software and clickers to ask questions of the class. This allowed me to perform some formative assessment within the classroom and alter the focus of the lectures if material did not seem to be grasped by the students as well as intended. I also found that it helped break up the lecture and engage the students when properly done. In prior terms I had asked the students to print out large flash cards with the letters A-D on them to get some classroom response. I found Turning Point to be superior because of both the anonymity and, due to the clickers being provided to the lecture hall, the students did not have to remember to bring the response items to class. I got a higher response rate to questions and it also seemed to encourage more discussion between students than with my previous methods. I piloted using the clickers during the last month of my ES106 Fall term and then fully integrated them into my Winter ES105 and Spring ES106 lectures.

A second thing that I piloted during the Spring 2013 term was to have the students complete a 30 minute video assignment hosted by the course Moodle site. This was done in lieu of lecture on Academic Excellence Day and the students had 1 week to complete the assignment. I had previously posted videos on Moodle as a make-up activity for those students that missed lecture, but that was a deployment to only a handful of students. Doing it as a full class activity was largely successful though students informed me that they experienced significant loading delays (30-40 minutes) on the day prior to the assignment being due, even though they were trying to watch it on campus computers. I suspect that a large volume of students waited until the last day and that this may have been straining the capabilities of the Moodle server to accommodate so many users as once.

C. Program Assessment Activities

In order to assess that students were achieving some of the learning goals of ES106 during the Spring term, I decided to conduct a pre-test/post-test assessment regarding some central concepts

to the course. On the first day of lecture, I asked the students nine questions through the use of the Turning Point clicker system. Three of these questions were intentionally easy so as to encourage student participation and the high scoring on these items reflected this belief. The rest were considered to be the central questions to the assessment. These questions were then asked again on the final written exam of the term. Significant improvement was observed on all of the items. The largest improvement was on a question related to energy flow during a phase change of matter. On the pre-test only 14% of students responded with the correct answer to this question correct. On the final exam 50% of the students got this correct, or an improvement of 36%. While not ideal, it does show improvement. More typical results were of 30-35% of students getting the question correct on the pre-test and 55% getting it correct on the final exam. While this is definitely showing improvement, it also suggests that I may need to employ some different engagement strategies so that more students are learning these fundamental concepts.

D. Curriculum Changes

(Provide a bulleted summary of curriculum changes that you were involved within the past year.)
As an adjunct, curriculum changes are not considered one of my duties.

II. RESEARCH & SCHOLARSHIP

A. Research Projects

(Provide a bulleted summary of research projects you have worked on this year. Indicate any student involvement or collaborations in these projects.)

B. Peer-Reviewed Publications

C. Presentations and Refereed Abstracts

D. Grant Writing Activities

(Include proposal title, authors, funding source, amount, and status on funding request.)

E. Professional Certifications, Licenses, Other Specialty Credentials

III. FACULTY SERVICE

A. Student Advising

(Provide a bulleted list of activities related to academic advising, number of advisees, programs in which you advise, etc.)
As an adjunct, I am not part of the student advisement, though I did inform a few students which professors they should contact for declaring a Earth Science major or minor.

F. WOU Institutional Service
(Provide a bulleted list of department-division-university service duties that you have carried out, e.g., scheduling, recruiting activities, student clubs, search committees, faculty senate, mentoring, etc.)

C. Leadership, Professional Service and Community Outreach
(List professional service completed this past year, include consulting activities and leadership roles.)

D. Professional Societies
Geological Society of America
National Association of Geoscience Teachers
National Association for Interpretation

IV. HONORS AND AWARDS
(Provide a bulleted list of honors and awards that you received in the past academic year.)

V. CHALLENGES AND PLANS FOR PROFESSIONAL GROWTH
The core of my courses has primarily been focused on creating lectures in PowerPoint, but I increasingly want to use additional strategies in the lecture hall. One thing I really want to expand on is the drawing of diagrams and concepts on the whiteboards or on an overhead projector device. One concern is that students see many of these diagrams in the textbook or in my PowerPoints and really do not take the time to process what it is that the diagram is telling them. Even though the textbook diagram may be a better piece of art, I think there are real benefits for the students to see me draw some of these diagrams out and, hopefully, drawing out the diagrams in their own notes. It slows the lecture down so that they take more time to process the information in the moment instead of simply noting that it is an important diagram to consider later. My target is to maybe identify 2-6 diagrams per lecture to address this way. It is a method that I used to discuss shoreline features and processes in ES106, and it seemed to pay some dividends in engagement.

In the coming year, I really wish to spend some time getting some of my dissertation work published in refereed journals. This work is not related to anything that I am currently doing in the classroom, but it would be best for my professional growth.

VI. MISCELLANEOUS (Provide a bulleted list of any other items not covered above.)

VII. PUBLIC RELATIONS AND PROMOTIONAL HIGHLIGHTS
(From your above summary, list the highlights of your faculty scholarship, student scholarship and service-related activities that you would like to see prominently promoted on the university web site, in news media, campus brochures, newsletters, and other public-relations materials. Provide a short blurb for each item with any recommendations on how you would like news of your work disseminated.)

DIVISION OF NATURAL SCIENCES AND MATHEMATICS
2011-2012 ANNUAL DEPARTMENTAL REPORT - MATHEMATICS

I. EXECUTIVE SUMMARY

The mathematics department faculty is active in all areas of teaching, research and service. Our program is strong and our graduates have success getting jobs and earning entrance into graduate schools.

The 2013 graduating class was our largest yet with 19 graduating with a mathematics degree and 2 with the mathematics and computer science degree. The work done by our students is of high quality. Seven students presented work at national conferences, 18 seniors presented their senior projects at a local conference and 1 student was co-author of a paper that has been accepted for publication. Our students continue to be accepted into nationally recognized programs: 2 undergraduates will be attending summer Research Experiences for Undergraduates and 7 have been accepted to graduate school. In an effort to connect undergraduates to our successful graduates we have begun holding an "Alumni night" for our students. This year we held our second such event and it was a great opportunity for our junior and senior mathematics majors to meet and network with successful alumni.

All Mathematics Department faculty engage in ongoing research projects. This year saw 3 papers accepted to peer-reviewed journals and the publication of a book edited by Laurie Burton and Cheryl Beaver on successful programs and courses for middle school teacher preparation. Faculty made 11 presentations at local and national conferences and workshops. Many faculty members also participate in national roles such as refereeing papers for journals and serving on national and state-wide committees.

The mathematics department spent a lot of time this year thinking about how to help students who struggle with mathematics. Enrollment in pre-college level courses accounted for 3628 student contact hours during the last regular academic year. Two initiatives that seem to be successful are the tutoring in the Math Center and the development of the ALEKs Prep courses. Laurie Burton has spearheaded the drive to increase the number of hours of tutoring available for students in the Math Center located in the library and to hire qualified tutors. Further, we have developed a new course to help students build their skills in preparation for their college level courses. MTH 67 and 68: "ALEKs Prep" are 5 week courses that are run twice per term (MTH 67 weeks 1-5; MTH 68 weeks 6-10). The courses use the software program ALEKs which diagnoses the students' weaknesses and helps them develop the skills they need to be more successful on the placement test and in their subsequent courses. The content was developed by Avery Cotton and the classes were run on a trial basis this year. We will propose they become permanent courses next year. We will monitor the students' outcomes of these courses to determine their efficacy.

Mathematics Department faculty continues to engage with outreach to the community. Cheryl Beaver, Laurie Burton, Matthew Ciancetta, Breeann Flesch and Ron Wiebe continued working with a local elementary school on the "Math Buddy" project. WOU students in MTH 396 are paired with buddies in 4^{th} and 5^{th} grade at Ash Creek elementary school to engage in a math problem solving pen-pal activity. Each term culminated with a "Fun Fair" during which ~100 Ash Creek students come to WOU and meet their buddies. Cheryl Beaver organized a math and science night at the local elementary students. WOU students volunteered their time to help with this event. Cheryl Beaver is also involved in an MSP grant with the Oregon Aquarium working with inservice teachers in Lincoln and Tillamook counties. Matthew Ciancetta is involved with a grant looking at the effects of a physical activity intervention on math performance and positive psychological well-being of grade 6 students. This work is part of a grant with other campus members and Talmadge Middle School. Finally the math department held its 8^{th} annual Sonia Kovalevsky Mathematics Day for high school girls and their teachers. This event attracts teachers and students from all over the state.

The mathematics faculty consistently enjoys favorable teaching evaluations and is always looking for ways to improve their courses. Faculty updates materials and incorporate new labs and technology to their classes on a regular basis. Many faculty research and try new and innovative methods of teaching using ideas such as the Moore Method, group work, and most recently Scott Beaver "flipped the classroom" in several classes meaning that he recorded (what amounts to) lectures, which the students watch outside of class, and essentially held in-class office hours and work sessions.

Matthew Nabity developed and offered the math department's first online courses. MTH 112 was offered in the Spring and MTH 111 over the summer. Both classes filled quickly and the students seemed to like the model. Matthew has also developed and online MTH 243 course and will offer it next year. Online deliveries of summer courses in particular help us reach the student population who leave for the summer and tend to take our courses elsewhere. We plan to develop more online or hybrid classes in the future, especially for courses targeted at inservice teachers who find it difficult to attend daytime classes.

The mathematics faculty is involved in the governance of this university. We had representatives on the Faculty Senate, Faculty Development, Curriculum and University Accreditation Committee, and the Joint Committee on Faculty Evaluation. Scott Beaver serves as Chief Bargaining Officer for faculty on the WOUFT and on the executive committee for PURE. Scott was also a SB 242 Oregon Retirement Plan Committee Member. Faculty members all participate in the Preview Days, SOAR, and T-SOAR and offer a session on "How to Succeed in Math and Science" during new student week in cooperation with our science colleagues.

Math department faculty all engaged in recording data for the department assessment plan. We met the majority of our goals with some exceptions in the remedial courses. Our efforts with the Math Center tutoring and the new ALEKS prep courses are one way we are trying to meet this goal.

Finally, we are proud of the tremendous amount of work done by Breeann Flesch to curate the amazing "Beauty of Art" exhibit in the library. The exhibit showcased some very interesting and beautiful aspects of mathematics that we hope many people were able to appreciate.

II. ENROLLMENT TRENDS

Enrollment in mathematics service classes (MTH 70, 95, 105, 111) remains high and was about the same during 2012-2103 as last year. The mathematics department maintains careful records of student enrollment and schedules appropriately.

The graduating class of 2013 was our highest yet with 19 math majors and 2 math/computer science majors graduating (compare to <10 in 2012).

The math education course enrollment also remains steady.

III. SUMMARY OF PROGRAM CURRICULUM CHANGES

Program Changes

- *Applied math degree* (Approved, in the new catalog) We changed the degree requirements for the applied mathematics track of the Mathematics major. The purpose was to 1) add rigor to the track, 2) include an important applied course (Mth 363) in the list of targeted electives, and 3) ensure that students in the applied track are exposed to Physics. The changes are as follows:
    - MTH 344 was added to the list of required courses
    - MTH 363 was added as an option in the "Choose three" category

- The requirement of three upper-division electives was changed to two upper-division electives
- The requirement was added that PH 211 is to be completed as one of the LACC science electives

- *Mathematics Education Minor* (Approved, in the new catalog) We added a track to the mathematics education minor for students who are also mathematics majors. Mathematics majors already have courses in their major that cover some of the required components of the minor so we modified the minor for these students to have a more appropriate class list. We also removed MTH 395 as one of the options for the minor as it is no longer offered. The new track for majors is as follows:

  Mathematics education minor: Mathematics majors (27-28 credits)
  - MTH 211, 212, 213 Foundations of Elementary Mathematics (12)
  - MTH 396 Elementary Problem Solving (3)
  - MTH 392 College Algebra for Elementary and Middle School Teachers (3)
  - MTH 393 Probability and Statistics for Elementary &Middle School Teachers (3)
  - MTH 394 Introduction to Geometry for Elementary Teachers (3)

    –or– MTH 494 Geometry for Middle School Teachers (3)

    Choose one (3 - 4) (Courses used to fulfill minor requirements may not be used to fulfill major requirements.)
    - MTH 346 Number Theory (4)
    - MTH 355 Discrete Mathematics (4)* –or–
    - MTH 398 Discrete Mathematics for Elementary and Middle School Teachers (3)

    * If MTH 355 is taken to satisfy any part of any mathematics major requirements, then neither MTH 355 nor MTH 398 may apply toward the mathematics education minor

Course Changes

- The rest of the math curriculum changes were minimal. They were made for the purpose of catalog clean up (removing classes that were never offered), adding credit and repeat flexibility and inclusion of a 500 level option for instructor arranged courses. All proposed changes have been approved and are in the new catalog.

Course	**Action**
MTH 401, 405, 406, 408	Dropped
MTH 402	Range of possible credits changed from 1-3 to 1-6
MTH 407/507	Range of possible credits changed from 1-3 to 1-6
MTH 409	Range of possible credits changed from 1-3 to 1-6; MTH 509 option added

Proposed Change to the BS Mathematics and Computer Science Graduation Requirements
(Proposed to faculty senate in May 2013 to be voted on in Fall 2013)

We proposed two changes:

1. At this time, there are no timeline **requirements** associated with the mathematics portion of the *Mathematics and computer science (graduation) requirements*. As a result, many students at WOU struggle with securing their mathematics graduation requirement in a timely fashion. Hence we proposed a time limit be added to the math portion of the requirement. In particular we proposed to change the wording from

   "High school mathematics skills deteriorate quickly. Students should take their mathematics requirements in their first or second year on campus."

to

"Students **must complete** the mathematics portion of their graduation requirement by the end of their sophomore year at WOU. Students who fail to meet this requirement will be put on Mathematics Notice."

2. Most students complete this 12 credit requirement with 3 classes; however often two of the classes are 4 credits and the third is 3 credits, giving them a total of 11 credits and leaving them 1 credit short. At the request of the Academic Requirements Committee we added to our proposal the suggested change of changing the required number of credits from 12 to 11-12.

IV. PROGRAM ASSESSMENT ACTIVITIES AND RESULTS

- **Exit Interview for graduating seniors**

  An exit interview is given to all graduating seniors. The interviewer types the student's spoken answers to the questions and saves them in an electronic file that we save in our records. All responses are anonymous. The exit interview's questions focus on student involvement in activities and program involving mathematics both inside and outside the department, plans after graduation, advising (academically and for a career path), and comparing their experience to their friends' experiences in other departments. The department keeps answers to the exit interview questions (without names) electronically. This year the students made some insightful observations and we will discuss them as a department in the Fall and make any necessary changes.

- **Embedded Assessment**

  The Mathematics Department has identified several populations that we serve. It is appropriate to assess the curriculum related to each population. The identified populations that were assessed during the 2012-2013 academic year are:

  (1) students who major or minor in mathematics or major in mathematics/computer science (related curriculum referred to later as "major/minor curriculum")
  (2) students taking service courses necessary to satisfy graduation requirements or prerequisites to other courses not in the mathematics department (related curriculum referred to later as "service curriculum")
  (3) K-8 education majors taking mathematics courses designed for future teachers (referred to later as "K-8 math education")

  Because the mathematics major and mathematics education courses serve such different populations we have identified a different set of learning outcome for each. The outcomes listed in the course catalog apply to populations (1)-(2) and the extended learning outcomes for pre-service and in-service K-8 teachers that can be found on the mathematics department webpage apply to populations (3)-(4).

  Results for this year's assessment are summarized in the table below:

Outcome	Population	Goal	Data for 2012-2013/ Plans for improvement
1. Develop problem solving, modeling and technological skills.	major/minor	80% of students earn grades of C- or better on course-embedded assessments.	Goal met for 3 of 4 classes assessed (66%, 89.5%, 81%, 100%)
		Each graduating cohort is in the 75th percentile in the ETS Major Field Test in	Goal not met – as a whole the class appears to be in about the 68th percentile. This is based

		Mathematics.	on comparison to previous years, the actual percentile cannot be determined until later in the year. This is the first year we have not met the goal (usually it is much higher) so it is not clear that any action needs to be taken, but we will monitor it.
1.Develop problem solving, modeling and technological skills.	service courses	A.For the B.S.: At the end of Math 111, students passing the course with a C- or better (70% or better), given a context and a set of data, should be able to apply problem solving skills to choose an appropriate model, develop a regression equation and make predictions using the model. (overall course grade, targeted exam question 1) B.At the end of Math 111, students passing the course with a C- or better (70% or better),will be able to use their graphing utility to graphically obtain local extrema for a quadratic function. (targeted exam question 2)	In the two classes assessed there were 3 measures of assessment (see assessment plan) the percent meeting the target were (overall course grade of C- or above; targeted exam question 1; targeted exam question 2): Class 1: 44%, 63%, 70% Class 2 52%, 90%, 93% The tutoring offered by the Math Center and the new Aleks Prep courses are two steps taken to help remediate this problem.
		For the B.A.: At the end of Math 105, students passing the course with a C- or better (70% or better), given a context and a set of data, should be able to apply problem solving skills to answer basic standard normal distribution questions.	One class was assessed. The percent meeting course grade, and targeted exam question were: 67%, 67% The tutoring offered by the math center is a first step in helping remediate this problem.
2.Demonstrate the ability to make rigorous mathematical arguments and work with axiomatic systems.	major/minor	80% of students earn grades of C- or better on course-embedded assessments.	Goal met for 3 of 6 classes (29%, 57%, 88%, 76.5%, 90%,90%) The two lowest percentages were in classes where the final exam is a very minor part of the grade and not the best measure. We will evaluate our assessment methods for these classes next year.
Extended learning Outcome 1. Problem Solving and Problem Writing Skills - the ability to create and	K-8 education	80% of students earn grades of C- or better on course-embedded assessments.	Goal met in 9 out of 10 cases. The Midterm, Final % reported below Class 1: 96%,100% Class 2:100%,100%

understand complicated situations, which are applications of K-8 mathematical topics and to apply learned skills and techniques to resolve them.			Class 3: 59%, 100% Class 4: 91%, 100% Class 5: 100%,100%
Extended learning Outcome 3. Communication Skills - Ability to precisely articulate (both in writing and orally) K - 8 mathematical topics in a way that is clear and understandable to elementary and middle school students.	K-8 math	80% of students earn grades of C- or better on course-embedded assessments.	100% met expectations in all 9 courses assessed

V. SWOT ANALYSIS

a. Strengths

- We have spent considerable time developing resources for remedial math students this year.
    - The Math Center extended its tutoring hours and has become a valuable resource for many students on campus.
    - We have developed two new courses to help students build their skills in preparation for their college level courses. MTH 67 and 68: "ALEKs Prep" are 5 week courses that are run twice per term (MTH 67 weeks 1-5; MTH 68 weeks 6-10). The courses use the software program ALEKs which diagnoses the students' weaknesses and helps them develop the skills they need to be more successful on the placement test and in their subsequent courses.

- The high quality of Mathematics faculty is evidenced by their teaching evaluations, presentation and publication records and leadership roles in local and national organizations.

- The Mathematics Department has a strong commitment to undergraduate education. Smaller class size, one-on-one advising of senior projects, and easy accessibility of faculty to students are some examples of contributing factors to the high quality education we provide.

- The success of the program is demonstrated in part by the success of our students.
    - Mathematics students have been successful in gaining admittance to competitive summer research programs (REUs).
    - This year 7 students were accepted to graduate school
    - Students regularly attend both local and national conferences and present work (some win awards).
    - Students regularly score high as a group on the Major Field Test.

- Students regularly earn positions teaching, in industry, or in graduate school upon graduation.

- The mathematics preparation of pre-service K – 8 teachers at Western has been recognized by the National Council on Teacher Quality.

- The department employs innovative teaching strategies both in the education and major courses. Examples include discovery-based learning, hands-on group work, "flipping the classroom", and use of technology.

- The department is committed to self assessment and is always looking for ways to inform our teaching and improve the quality of our education.

- Mathematics faculty play a role in the service to the larger campus community serving on a variety of campus committees and in leadership roles.

b. Opportunities

- Faculty members have been engaged in collaborative projects that will create new opportunities. Matthew Ciancetta is working on a grant with other WOU faculty involving Talmadge Middle School. Cheryl Beaver worked with partners from the Oregon Aquarium and the Lincoln County and Tillamook school districts on a MSP grant to develop a STEM Center. Last year they worked with about 30 inservice teachers to help them create project based learning lessons for their classroom.

- Matthew Nabity developed and offered the math department's first online courses. MTH 112 was offered in the Spring and MTH 111 over the summer. Both classes filled quickly and the students seemed to like the model. Matthew has also developed and online MTH 243 course and will offer it next year. Online deliveries of summer courses in particular help us reach the student population who leave for the summer and tend to take our courses elsewhere.

- Cheryl Beaver worked with a state Mathematics Specialist Task for to help establish an Elementary Mathematics Instructional Leader Specialization for a teaching license. The proposal was approved by the Teachers Standards and Practices Commission in February and is now an available specialization for teachers in the state of Oregon. Cheryl Beaver and Laurie Burton will work with Rachel Harrington and the College of Education next year to create courses that will allow teachers to earn this specialization through WOU. These added courses will not only contribute to this program, but will increase our offerings for the MS in Ed with a math focus and the curriculum and instruction focus which will likely increase enrollment in those programs as well. We plan to make the courses hybrid to attract more inservice teachers to the program.

c. Challenges

- As the university continues to grow and the number of course offerings increase it has become an increasing challenge to find office and classroom space.

- Over the past few years, the number of students with very poor mathematics skills seems to have increased. Enrollment in pre-college level courses (MTH 67,68,70 and 95) accounted for 3628 student contact hours during the last regular academic year. Although we have been working to develop resources for them through the new ALEKS Prep course (67& 68) and the Math Center tutoring, this population tends to get discouraged and is hard to motivate. If we had more resources available for the Math Center and a dedicated person thinking about this issue it would go a long way to helping this population.

- In spite of limited time for the immersion required by mathematical research, we have worked hard as a department to stay active in our specific areas, but this is always a challenge.

d. **Vulnerabilities**

- As the number of classes increase, the classroom space and office space is becoming scarce and we are told to restrict hiring. If we are unable to support the demand, students will fall behind in their ability to complete their graduation requirements on time.

VI. PROGRAM PLANNING AND INITIATIVES

- We will continue to develop and refine our online course deliveries started by Matthew Nabity. We hope to develop some hybrid course offerings for future teachers. We believe a more flexible course meeting schedule will attract a new population of students (inservice teachers) to the Masters of Education program with a math focus.

- In cooperation with the college of education we plan to develop a program to certify students as Elementary Mathematics Instructional Leaders

- We will apply to make our ALEKs Prep courses (MTH 67 & 68) permanent courses.

VII. OTHER ITEMS

VIII. PUBLIC RELATIONS ITEMS FOR PROGRAM PROMOTION

- **Sonia Kovalevsky Day**: The Math Dept sponsored its 8th annual Sonia Kovalevsky Day this past February. SK Day is a program of hands-on workshops and talks for high school women students and their teachers, both women and men. The purpose of the day is to encourage young women to continue their study of mathematics and to assist the teachers of women mathematics students. www.wou.edu/math/sk

- Cheryl Beaver and Laurie Burton were editors on the book "Resources for Preparing Middle School Mathematics Teachers", MAA Notes Series #80, The Mathematical Association of America, 2013.

- Seven graduates of the mathematics program were accepted into graduate school next year.

APPENDIX 1. FACULTY AND STUDENT ACCOMPLISHMENTS

I. FACULTY AND STAFF ROSTER

Cathy Aune	Non-tenure-track faculty member
Cheryl Beaver	Associate Professor
Scott Beaver	Associate Professor
Hamid Behmard	Professor
Laurie Burton	Professor
Matthew Ciancetta	Assistant Professor
Avery Cotton	Non-tenure-track faculty member
Breeann Flesch	Assistant Professor
Stanley Leung	Non-tenure-track faculty member
Chris Mock	Non-tenure track faculty member
Andrew Nerz	Non-tenure-track faculty member
Matthew Nabity	Visiting Assistant Professor
Sharon Price	Office Coordinator
Dennis Spencer	Non-tenure-track faculty member
Mike Ward	Professor
Ron Wiebe	Non-tenure-track faculty member

II. FACULTY HIGHLIGHTS

a. Teaching

- **Hamid Behmard and Breeann Flesch** taught the senior capstone class: MTH 403 and MTH 404 (Senior Project I-II). Each worked with many senior mathematics majors on their research projects. Each student writes a significant paper and prepares a 2 hour presentation. Students also presented their work at the Pacific Northwest MAA conference and the Academic Showcase. **Mike Ward, Cheryl Beaver and Matthew Nabity** each advised one or more students on their projects. **Laurie Burton** advised one student on her mathematics education capstone in MTH 411 and MTH 412.

- **Cheryl Beaver, Laurie Burton and Avery Cotton** worked to institute a new course to address student remedial mathematics needs at WOU. Avery Cotton developed the content of MTH 067 and 068 – two 5-week courses that use the computer software system ALEKs to help target students difficulties and move them forward in their mathematics skills. The goal is to help better prepare students for the placement exam and their subsequent mathematics classes.

- **Cheryl Beaver, Laurie Burton, Matthew Ciancetta, Breeann Flesch and Ron Wiebe** continued working with a local elementary school on the "Math Buddy" project. WOU students in MTH 396 are paired with buddies in 4^{th} and 5^{th} grade at Ash Creek elementary school to engage in a math problem solving pen-pal activity. Each term culminated with a "Fun Fair" during which ~100 Ash Creek students came to WOU and met their buddies.

- **Matthew Nabity** developed and taught online versions of MTH 111 and MTH 112.

- **Scott Beaver** for the first time last year "flipped the classroom" in one of his courses, meaning that he recorded (what amounts to) lectures, which the students watch outside of class, and essentially held in-class office hours. This year he implemented this idea in two more courses: MTH 341 and MTH 112. He made a presentation on this idea at the Joint Mathematics Meetings in San Diego.

- **Matthew Ciancetta** has integrated new materials into his MTH 494/594 Geometry for Middle School Teachers class, all related to the van Hiele Levels of Geometric Thinking. This is particularly important knowledge that teachers need to effectively teach geometry.

- **Laurie Burton** was instrumental in the continued success of the drop-in tutoring lab in the library. This lab has served numerous students and is becoming a part of the culture of student learning. The hours have been expanded and the name has been changed to "The Math Center".

- **Several instructors** updated course packs, created labs, added more illustrative examples, and added technology to their teaching. Faculty is always looking for ways to improve classroom learning.

b. Scholarship

Individual Faculty Research projects

Scott Beaver

- Scott is working on two papers for publication:
    - The first regards an implementation of guided discovery methods in Advanced Calculus, to be submitted this summer.
    - The second is a synthesis of interesting known results in Linear Algebra; target date for submission is Winter 2014.

Cheryl Beaver

- Cheryl continued work on an ongoing project involving preservice teacher student's understanding of fractions as they relate to word problems.
- Cheryl co-authored the third annual KRYPTOS competition with colleague Stuart Boersma of Central Washington University. This year one hundred and five students formed 47 teams representing colleges, universities, and academies from British Columbia, Kentucky, Idaho, Iowa, Maryland, Montana, Oregon, Washington, and Wyoming.

- **Laurie Burton and Cheryl Beaver** did final editing work on "Resources for Preparing Middle School Mathematics Teachers," published by the Mathematical Association of America, 2013

Laurie Burton

- Laurie wrote *Common Core State Standards* appendix to "Mathematics for Elementary Teachers: A Conceptual Approach" published on text web site, Bennett, Burton and Nelson, edition, McGraw Hill, February, 2013.

Hamid Behmard

- Hamid worked on two problems during his sabbatical term. The first problem involved finding an error formula for reconstruction of signals using nonperiodic sampling sets. The second problem involves 3D tomography using Cone-Beam radiation. This specific problem relates to finding the appropriate group for the sampling sets. Both of these topics are ongoing projects.
- During the Winter and Spring terms, Hamid worked with 6 seniors on their senior projects. These seniors completed their expository papers and presented their results at the PNW-MAA conference and the AES. This summer, he will work with one more senior. She has already started on her project.

Matthew Ciancetta

- Matthew continued his work on the effects of a physical activity intervention on math performance and positive psychological well-being of grade 6 students. This work is part of a grant with other campus members and Talmadge Middle School.
- Matthew is also studying "off the grid geosquares". The purpose this study is to explore and describe the thinking of pre-service teachers as they engage in activities related to constructing and describing polygons on Geoboards whose vertices are "off the pegs" or "floating." He then plans to develop and refine related activities for pre-service teachers to be used in teacher training for problem solving that connects Algebra and Geometry and for in-class use with students. The expected higher level of cognitive demand could be integral in developing the in-depth understanding of geometry topics that will be required by the new Common Core State Standards in Mathematics.

Breeann Flesch

- Breeann submitted the manuscript "A characterization of 2-tree probe interval graphs" to *Discussiones Mathematicae Graph Theory*. It was accepted in May 2013 and will appear in an upcoming volume.
- Breeann has also been researching 2-tree proper interval 3-graphs and is hoping to submit a manuscript on the subject this summer or fall.

Matthew Nabity

- Matthew advised two senior projects, one in computational biology (disease modeling) and one in optimization (decision modeling). The work in disease modeling continued work done by the student at an REU and we made some progress in original work. The work in decision modeling revisited work from nearly a decade ago regarding a model to predict the winner of the Cy Young Award in professional baseball. The collaborative work led to a new model that successfully predicts current award winners and reflects the changing attitude among voters. He is working on writing up the results for publication.
- Matthew's algorithm work for the Parallel Linear Algebra for Scalable Multicore Architectures (PLASMA) and Matrix Algebra on GPU and Multicore Architectures (MAGMA) libraries continues. He is off-loading code to GPUs and testing performance as we work to optimize our code.

Mike Ward

- Mike has worked on several projects based on Cayley-Sudoku Tables, invented by some students and himself several years ago and which have turned out to have unexpected connections to classic works in loop and Latin square theorems and, tangentially, to the famous Hall-Paige Conjecture. He plans to write up his results for publication.

Peer Reviewed Papers

- "Resources for Preparing Middle School Mathematics Teachers," edited by **Cheryl Beaver**, Western Oregon University, **Laurie Burton**, Western Oregon University, Maria Fung, Worcester State University, and Klay Kruczek, Southern Connecticut State University, Mathematical Association of America, 2013

- **Cheryl Beaver**, Rachel Harrington and Klay Kruczek, *The Mathematics for Middle School Teachers Program at Western Oregon University,* in Resources for Preparing Middle School Mathematics Teachers, MAA Notes Series #80, The Mathematical Association of America, 2013.

- **Laurie Burton** and Klay Kruczek, *Visual College Algebra for Teachers*, in Resources for Preparing Middle School Mathematics Teachers, MAA Notes Series #80, The Mathematical Association of America, 2013.

- Brown, David; **Flesch, Breeann**; Lundgren, Richard. A characterization of 2-tree probe interval graphs. *Discussiones Mathematicae Graph Theory.* In Press.

Presentations

Cheryl Beaver

- "Making Sense of Problem Solving" Invited workshop leader at the First Annual Conference for Projects SPELL and LUISA, Western Oregon University, April, 2013
- "The Making and Breaking of Secret Ciphers" minicourse (co-presented with Stuart Boersma) at the Pacific Northwest Regional MAA Conference, Willamette University, April 2013
- "Math Talk: Argumentation & Discourse" Invited leader for a 6 hour professional development workshop for Lincoln County school teachers, Newport, OR, June 2013
- "Data Analysis in Project Based Learning" 2 hour presentation as part of a week-long professional development workshop for ~25 teachers working on an MSP grant, Tillamook, OR, June 2013.

Scott Beaver

- "The Flip Side of Linear Algebra," AMS-MAA Joint Mathematical Meetings, San Diego, CA, January 2013.

Matthew Ciancetta

- "Math Buddies: A Problem-Solving Partnership Between Elementary School Students and Future Teachers", TOTOM conference, Ashland, OR, September 2012.

Breeann Flesch

- *Graph Nim.* Forty-fourth annual Southeastern International Conference on Combinatorics, Graph Theory, and Computing – Boca Raton, FL, March 2013
- *Euler's Formula.* Western Oregon University Academic Excellence Showcase, Pi Mu Epsilon Induction Ceremony – Monmouth, OR, May 2013

Mike Ward

- *Magic Cayley-Sudoku Tables,* Joint Mathematics Meetings, San Diego, CA, January 2013.
- *Orthogonal Cayley-Sudoku Tables,* Pacific Northwest Section of the Mathematical Association of America, April 2013.
- *Change Ringing,* Pi Mu Epsilon Induction Ceremony, Western Oregon University, May 2013

Grant Writing Activities

- **Matthew Ciancetta** received a $500 grant from the Western Oregon University Foundation for "Learning about the Common Core Mathematical Practices for Future Teachers"
- **Matthew Ciancetta** received a $3500 Faculty Development Award – Category III, Major Project/Research, for proposal titled,"Effects of physical activity on math performance and positive psychological well-being of grade 6 students"

- **Breeann Flesch** received a grant from Association for Women in Mathematics funded by the National Science Foundation. The grant was for $942 to support our Sonia Kovalevsky Day, which is a program of hands-on workshops and talks for female high school students and their teachers.
- **All faculty members** received at least one faculty development grant in one or more categories.

c. Service

Cheryl Beaver

- Advises 22 students in the mathematics major, mathematics education major, mathematics minor, or mathematics/computer science major
- Received The Oregon Council of Teachers of Mathematics 2013 Area Recognition Award (In recognition of dedicated leadership and service to the students, staff, schools and citizens of Oregon)
- Mathematics department chair 2012-2013
- Class scheduling for the mathematics department
- Search committee member for Division Level Administrative Assistant
- Search committee for Mathematics Department NTT position
- Division Personnel Review Committee member
- Preview Days mathematics representative
- Phoned prospective WOU students who indicated interest in mathematics
- Co-organizer for the Annual Sonia Kovalevsky Day mathematics event for high school girls.
- Organized the Math and Science night at Ash Creek Elementary School

Scott Beaver

- Advises about 25 mathematics majors or minors
- Chair and Chief Negotiating Officer, WOUFT Bargaining Team
- Member, WOU PURE Executive Committee
- Organized Second Annual WOU Mathematics Alumni Night, October 2012
- Moderator, General Contributed Paper Session on Interdisciplinary Topics, AMS-MAA Joint Mathematics Meetings, San Diego, CA
- Committee Member, Statewide Oregon SB 242 Optional Retirement Plan Committee

Hamid Behmard

- Advises 16 mathematics majors or minors
- Member of the Faculty Development Committee
- Faculty member of the University Accreditation Committee (UAC)
- Served as the treasurer for The National Honor Society of Phi Kappa Phi (WOU Chapter)
- President elect of The National Honor Society of Phi Kappa Phi
- Reviewer for an article titled "Sampling High-Dimensional Bandlimited Fields on Low-Dimensional Manifolds" for the IEEE Transactions on Information Theory.
- Reviewed two papers that were submitted to the 2nd International Conference on Information and Communication Technologies and Applications ICTA 2012: ICTA 2012.

Laurie Burton

- Advises approximately 4 K – 8 math focus education majors, 1 or 2 inservice middle school teachers, and 10-12 mathematics and mathematics education (secondary
- Advises transfer students on elementary mathematics education transfer courses
- Faculty Development Committee, Fall 2013 (substitute for faculty member on sabbatical)
- NSM Curriculum Committee, 2010 – 2013

- Mathematics Department webmaster, 2010 - 2013
- Mathematics Department Budget Officer, 2011 – 2013, includes monitoring all aspects of:
  - Student Workers (hiring and budget)
  - Department budget and spending
  - Drop In Tutoring Lab (in collaboration with Learning Center, tracking all tutors, all materials used in lab, weekly reports from NTT who spend some time in the lab) and collaborative with SEP as they participated in the center.
- Sonia Kovalevsky Day 2013 session mentor and conference co-organizer
- Organized Fun fair conference: 100 Ash Creek Elementary School students attended a mathematical event run by two Math 396 classes, dead week, winter term 2013.

Matthew Ciancetta

- Advises four advisees (2 Mathematics Major, 2 Major Concentration: Mathematics Teacher)
- Advised at two SOAR events
- Math Club Advisor
- Regular department responsibilities such as being the course coordinator for Math 494/594, Assessment Committee for Math Education, etc.
- Member of University Curriculum Committee
- Sonia Kovalevsky Day 2013 session mentor
- Organized Fun fair conference: 100 Ash Creek Elementary School students attended a mathematical event run by two Math 396 classes at the WUC, dead week, Fall term 2013.
- Recruiting phone calls for prospective WOU students interested in Math Major
- Search Committee for NTT Mathematics position
- Peer Reviewer National Council of Teachers of Mathematics journals: Teaching Children Mathematics and Mathematics Teacher
- Planning Committee For TOTOM's annual conference

Breeann Flesch

- Advises 8 students seeking a math major or minor.
- Maurice Undergraduate Initiative Review Committee Member
- Faculty Senator
  - Election of New Officers Committee
- NSM Service Committee
- Breeann wrote several reviews for the American Mathematical Society
- She refereed an article for *Discrete Mathematics* in May 2013.
- Breeann curated a Hamersly Library Exhibit titled "The Beauty of Math," Spring 2013.
- Sonia Kovalevsky Day 2013 co-organizer and faculty mentor for the game fair

Mike Ward

- Advises 21 advisees in mathematics, mathematics secondary education, computer science/mathematics major (and mathematics minor)
- Mentored one advisee in applying, successfully, for a summer Research Experience for Undergraduates (REU) and assisted three other students with applications for REUs and graduate school.
- Joint Committee on Faculty Evaluation
- Preview Day, TSOAR (one each)
- Pi Mu Epsilon (national math honor society) chapter advisor

III. STUDENT ACHIEVEMENTS

- **Undergraduates in Mathematics Scholarship Winners 2012 - 2013**
  Ernie and LaVerne Cummins Scholarship*:* **Ariel Setniker** *and* **April Senner**
  Charlie Dolezal Scholarship*:* **Tyler McAfee**

- **Research Experiences for Undergraduates (REUs) 2013**
  The following students were accepted to REU's for the summer of 2013: **Andy Fry** will be one of 12 interns in the 2013 Pacific Undergraduate Research Experience in Mathematics, an NSF summer program at University of Hawaii at Hilo; **April Senner** will attend the Computing for Disasters REU, Department of Computer Science and Engineering at Texas A&M University.

- **Conferences and Papers 2012-2013**
  - **Molly Stubblefield** presented a poster at the 2013 Joint Mathematics Meetings in San Diego
  - **Casey Hansen, Anna Kralovec**, **Rosanna Mersereau**, **and Madelyn Twain**, presented papers at the 2013 Nebraska Conference for Undergraduate Women in Mathememtics
  - **Ariel Setniker** co-authored a paper "The Complement of Fermat Curves in the Plane" that has been accepted for publication in the journal Involve. This paper involves an original result from research she did over the summer at University of Wisconsin-Stout's REU. Ariel also presented on this subject at MathFest held in Madison, WI, 2012 and the Joint Mathematical Meetings held in San Diego, CA, January 2013.atics
  - 18 seniors presented their Senior Projects at the April 2013 PNW-MAA Conference at Willamette University.
- **Study Abroad**
  - **Molly Stubblefield** went fall term 2012 to the prestigious Budapest Semester in Mathematics

- **Graduate School Bound**
  - **Cassy Hansen** will enter the Ph.D. program in Mathematics Education (Research) at Arizona State University in Tempe, Arizona
  - **Anna Kralovec** will enter the M.S. in Mathematics program at Boise State University in Boise, Idaho
  - **Rosanna Mersereau** will enter the M.S. in Mathematics Education program at Ohio State University in Columbus, Ohio
  - **Ariel Setniker** will enter the Ph.D. in Mathematics program at the University of Nebraska-Lincoln in Lincoln, Nebraska
  - **Molly Stubblefield** will enter the Ph.D. in Mathematics program at the University of Oklahoma in Norman, Oklahoma
  - **Cydney Tyler** will enter the M.S. in Mathematical Sciences with a Teaching Concentration program at the University of Nevada, Las Vegas, Nevada
  - **Jonathon Woodruff** will enter the M.S. in Industrial Engineering program at Auburn University in Auburn, Alabama

APPENDIX 2. LAS Embedded Assessment Action Reports

Archival Summary Report: Departmental Learning Outcomes Assessment
(To be completed and forwarded, electronically, to division office.)

Department: _Mathematics_____Division: ___Natural Sciences and Mathematics_____

Department contact: __Cheryl Beaver_____ Date: __7/11/2013_____

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1. Program, major/minor or curriculum components reviewed—indicate which learning outcome(s) these components service:

The Mathematics Department has identified several populations that we serve. It is appropriate to assess the curriculum related to each population. The identified populations are:

(4) students who major or minor in mathematics or major in mathematics/computer science (related curriculum referred to later as "major/minor curriculum")
(5) students taking service courses necessary to satisfy graduation requirements or prerequisites to other courses not in the mathematics department (related curriculum referred to later as "service curriculum")
(6) K-8 education majors taking mathematics courses designed for future teachers (referred to later as "K-8 math education")
(7) In-service teachers pursing a MS in Ed with a focus in mathematics (related courses referred to later as "graduate education curriculum")

Because the mathematics major and mathematics education courses serve such different populations we have identified a different set of learning outcome for each. The outcomes listed in the course catalog apply to populations (1)-(2) and the extended learning outcomes for pre-service and in-service K-8 teachers that can be found on the mathematics department webpage apply to populations (3)-(4). A summary of the curriculum components reviewed this year and the learning outcomes assessed is given in the table below

Curriculum component	Learning outcomes serviced
major/minor curriculum and secondary education curriculum (assessed all together under "major" because of the overlap of the majority of coursework)	mathematics learning outcomes: (1) Develop problem solving, modeling and technological skills. (2) Demonstrate the ability to make rigorous mathematical arguments and work with axiomatic systems. (3) Effectively communicate, both in writing and orally, mathematical and logical arguments and concepts.
service curriculum	mathematics learning outcome: (1) Develop problem solving, modeling and technological skills.
K-8 math education	extended learning outcomes for pre-service and in-service K-8 teachers 1. Problem Solving and Problem Writing Skills - the ability to create and understand complicated situations, which are applications of K-8 mathematical topics and to apply learned skills

	and techniques to resolve them. 2. Ability to Model Problems - the ability to translate various real-world scenarios into mathematical models that can be explored by hands-on models, paper-and-pencil methods and technological applications where appropriate. 3. Communication Skills - Ability to precisely articulate (both in writing and orally) K - 8 mathematical topics in a way that is clear and understandable to elementary and middle school students.

2. Assessment methods (type of data reviewed):

Curriculum component	Assessment methods
major/minor curriculum and secondary education curriculum	final exam scores in select upper division courses ETS Major Field Test in Mathematics scores senior project / math education capstone papers senior project/ math education capstone presentations
service curriculum	selected questions from final exams and possibly homework questions; final course grades
K-8 math education	exam and final exam scores in select courses items from course activities in select courses lesson plan activities in select courses mentoring activity in MTH 396

3. Actions to be taken by the department:

Curriculum	Action
All	The department will keep track of assessment data and file it electronically each term.
Major/minor	Review the assessment methods – determine if final exam grades are the most appropriate way to assess 311, 312
Service	Determine if we want to rewrite the targets to be phrased with a goal of x% passing like they are for the other curricula.

4. Expected enhancement to departmental programming or support to other academic units:

As we review our learning outcomes for various curriculums it will keep our goals in focus. We will continue to emphasize our learning outcomes through class work, homework, exams and course activities. If outcomes are not met we identify and correct weaknesses.

5. Plan for follow-up actions or tracking

We will carefully archive assessment items and scores in an organized electronic folder. We will review the data on a yearly basis to see if our target goals are being met and assessed in a meaningful way.

The Mathematics Department will continue to gather data on how the drop in tutoring availability in the Math Center is working.

We have developed a new course for serving remedial students who have low placement score exams or are not doing well in the remedial classes. MTH 67 & 68, the “ALEKs” prep courses have been designed to help target and correct student deficiencies. Our hope is that after taking these courses students are more prepared for college level math. We will monitor their before and after placement scores and try to determine the effectiveness of the course and our COMPASS placement test.

Departmental Assessment Plan: Student Learning Outcomes
(Please submit, electronically, to division office.)

Program Information	
Academic Program (Major)	Mathematics, Computer Science/Mathematics
Degree	BS, BA
Department	Mathematics
Division	Natural Sciences and Mathematics
Academic Year	2012-2013
Departmental Contact Person	
Name	Cheryl Beaver
Title	Department Chair
Department	Mathematics
E-Mail Address	beaverc@wou.edu
Extension	88404
Program Mission Statement and Learning Outcomes	

1. Develop problem solving, modeling and technological skills.
2. Demonstrate the ability to make rigorous mathematical arguments and work with axiomatic systems.
3. Effectively communicate, both in writing and orally, mathematical and logical arguments and concepts.

Program Learning Outcome Assessment	
Learning Outcomes published in the most recent academic catalog.	<table><tr><td>Outcome 1</td><td>Develop problem solving, modeling and technological skills.</td></tr><tr><td>Outcome 2</td><td></td></tr><tr><td>Outcome 3</td><td></td></tr></table>
Target	80% of students earn grades of C- or better on course-embedded assessments. Each graduating cohort is in the 75th percentile in the ETS Major Field Test in Mathematics.
Data Source	WOU coursework; ETS
Means of Assessment	Course-embedded assessments in the form of final exams from the following courses: MTH 341 Linear Algebra, MTH 365 Probability, MTH 366 Statistics, MTH 358 Mathematical Modeling. Final exams from all students will be used. ETS Major Field Test in Mathematics. All graduates take the test.
Means of Scoring	Answer keys for the course-embedded assessment. Assessment done by course instructor. Mathematics is fortunate to be in a situation where essentially every question on every exam in these courses addresses one or more of the aspects of this outcome. Therefore, total scores will be reported. Comparative data provided each year by ETS.
Evidence Storage	Exams (scanned in pdf format) and accompanying scoring data maintained in a folder on the M-drive. ETS data also maintained on the M-drive.

Program Learning Outcome Assessment	
Learning Outcomes published in the most recent academic catalog.	Outcome 1 | Outcome 2 | Demonstrate the ability to make rigorous mathematical arguments and work with axiomatic systems. Outcome 3 |
Target	80% of students earn grades of C- or better on course-embedded assessments.
Data Source	WOU coursework.
Means of Assessment	Course-embedded assessments in the form of final exams from the following core courses: MTH 344 Group Theory, MTH 345 Ring Theory, MTH 311 & 312 Advanced Calculus I & II. Final exams from all students will be used. Senior Papers (from MTH 403 & 404, the mathematics capstone) Videos of Senior Presentations (also from MTH 403 & 404).
Means of Scoring	Answer keys for the course-embedded assessment. Assessment done by course instructor. Mathematics is fortunate to be in a situation where the majority of questions on every exam of these core courses address this outcome. Therefore, total scores will be reported. Senior project talks scored with a rubric by the instructor. Total scores reported. Senior papers scored with a rubric by the instructor. Total scores reported.

Evidence Storage	Exams and senior papers (scanned in pdf format) and accompanying scoring data maintained in a folder on the M-drive. Videos and accompanying scoring data maintained in a folder on the M-drive.

<table>
<tr><th colspan="2">Program Learning Outcome Assessment</th></tr>
<tr><td>Learning Outcomes published in the most recent academic catalog.</td><td>
<table>
<tr><td>Outcome 1</td><td></td></tr>
<tr><td>Outcome 2</td><td></td></tr>
<tr><td>Outcome 3</td><td>1. Effectively communicate, both in writing and orally, mathematical and logical arguments and concepts.</td></tr>
</table>
</td></tr>
<tr><td>Target</td><td>80% of students earn grades of C- or better on course-embedded assessments.</td></tr>
<tr><td>Data Source</td><td>WOU coursework.</td></tr>
<tr><td>Means of Assessment</td><td>Senior project talks scored with a rubric by the instructor. Total scores reported.

Senior papers scored with a rubric by the instructor. Total scores reported.</td></tr>
<tr><td>Means of Scoring</td><td>Senior papers (scanned in pdf format) and accompanying scoring data maintained in a folder on the M-drive.

Videos and accompanying scoring data maintained in a folder on the M-drive</td></tr>
</table>

Departmental Assessment Plan: Student Learning Outcomes
(Please submit, electronically, to division office.)

Program Information	
Academic Program (Major)	Mathematics service courses: 070, 095, 105 and 111
Degree	N/A
Department	Mathematics
Division	Natural Sciences and Mathematics
Academic Year	2011-2012
Departmental Contact Person	
Name	Laurie Burton / Avery Cotton
Title	Professor / 070, 095, 111 Course Coordinator
Department	Mathematics / Mathematics
E-Mail Address	burtonl@wou.edu / cottona@wou.edu
Extension	8-8345 / 8-9708
Program Mission Statement and Learning Outcomes	
Teaching of mathematics and the communication of mathematical ideas. Faculty members believe that both the assimilation of mathematical knowledge and the enhancement of one's capacity for mathematical reasoning are essential outcomes of a liberal arts education.	
Program Learning Outcome Assessment	

Learning Outcomes published in the most recent academic catalog.		
	Outcome 1	Develop problem solving, modeling and technological skills.
	Outcome 2	Demonstrate ability to make rigorous mathematical arguments, work with axiomatic systems, and precisely articulate (both in writing and orally) complicated and technical arguments (both mathematical and logical). N / A for service courses
	Outcome 3	Understand the distinction between applied and theoretical mathematics, the connection between the two fields, and the breadth of each field. N / A for service courses

Target	Outcome 1 For the B.S.: At the end of Math 111, students passing the course with a C- or better (70% or better), given a context and a set of data, should be able to apply problem solving skills to choose an appropriate model, develop a regression equation and make predictions using the model. At the end of Math 111, students passing the course with a C- or better (70% or better), will be able to use their graphing utility to graphically obtain local extrema for a quadratic function. For the B.A.: At the end of Math 105, students passing the course with a C- or better (70% or better), given a context and a set of data, should be able to apply problem solving skills to answer basic standard normal distribution questions.
Data Source	Outcome 1 For the B.S.: These problem solving and technological skills are assessed in every section via homework and / or exam questions. Our plan is to review Cotton's 111 final exam data for the Winter 2012 (42 students) and 2012- 2013 academic year as data is gathered. For the B.A.: These problem solving and technological skills are assessed via in class work, homework and exam questions. Our plan is to review Cotton's 105 data for fall 2012 (approximately 30 students).
Means of Assessment	Outcome 1 For the B.S.: Review of selected final exam and possibly homework questions. For the B.A.: Review of selected final exam and possibly homework questions.
Means of Scoring	Outcome 1 For the B.S.: Final exam questions are directly graded by 111 instructors. For the B.A.: Final exam questions are directly graded by 105 instructors.

Evidence Storage	Outcome 1 For the B.S.: Scoring data stored in shared department drive and included in report to department and division chairs. For the B.A.: Scoring data stored in shared department drive and included in report to department and division chairs.

Departmental Assessment Plan: Student Learning Outcomes
(Please submit, electronically, to division office.)

Program Information	
Academic Program (Major)	Mathematics education service curriculum and Mathematics education math focus curriculum
Degree	part of the BA/BS degree in Education
Department	Mathematics
Division	Natural Sciences and Mathematics
Academic Year	2012-2013
Departmental Contact Person	
Name	Cheryl Beaver
Title	Department Chair / Associate Professor
Department	Mathematics
E-Mail Address	beavec@wou.edu
Extension	88404
Program Mission Statement and Learning Outcomes	
The Mathematics Department at Western Oregon University is committed to the teaching of mathematics and the communication of mathematical ideas. Faculty members believe that both the assimilation of mathematical knowledge and the enhancement of one's capacity for mathematical reasoning are essential outcomes of a liberal arts education.	

Program Learning Outcome Assessment	
Learning Outcomes published in the most recent academic catalog.(*The learning outcomes for the education portion of the mathematics curriculum is found on the math department webpage under "extended learning outcomes for pre-service and in-service K-8 teachers"* *http://www.wou.edu/las/natsci_math/math/missiongoals.php)*	<table><tr><td>Outcome 1</td><td>1. Problem Solving and Problem Writing Skills - the ability to create and understand complicated situations, which are applications of K-8 mathematical topics and to apply learned skills and techniques to resolve them.</td></tr><tr><td>Outcome 2</td><td></td></tr><tr><td>Outcome 3</td><td></td></tr></table>
Target	. 80% of students earn scores that meet expectations or above (C- or above equivalent on each assessment activity)
Data Source	WOU course work (exam scores) – the data will be collected during the term
Means of Assessment	Course-embedded assessment: MTH 396 is a problem solving course. There is a mid-term and final exam devoted to testing problem solving. All students in the education program are required to take this course after the MTH 211-212-213 sequence. Their ability to solve problems is also a reflection on how well they learned the basic material in MTH 211-212-213. The assessment for this learning outcome will be scores on these two problem solving exams in MTH 396.
Means of Scoring	The exams will be scored by the instructor of the course. The scores will be recorded in aggregate for each section of the course as percentages in one of three categories: exceeds expectations (A-B range); meets expectations (B- to C- range); or below expectations (D-F range)
Evidence Storage	Exams and scores for each section will be scanned and saved electronically on the mathematics department drive.

<table>
<tr><th colspan="2">Program Learning Outcome Assessment</th></tr>
<tr><td>Learning Outcomes published in the most recent academic catalog.</td><td>
<table>
<tr><td>Outcome 1</td><td></td></tr>
<tr><td>Outcome 2</td><td>Ability to Model Problems - the ability to translate various real-world scenarios into mathematical models that can be explored by hands-on models, paper-and-pencil methods and technological applications where appropriate.</td></tr>
<tr><td>Outcome 3</td><td></td></tr>
</table>
</td></tr>
<tr><td>Target</td><td>80% of students earn scores that meet expectations or above (C- or above equivalent on each assessment activity)</td></tr>
<tr><td>Data Source</td><td>WOU course work and exam scores – the data will be collected during the term</td></tr>
<tr><td>Means of Assessment</td><td>Course-embedded instruction – various problems on final exams or in class projects (such as the geometer’s sketch pad). Our plan is to review material in select courses and choose items for assessment during the next year.</td></tr>
<tr><td>Means of Scoring</td><td>The scoring will be done by the instructor. The scores for each activity will be recorded in aggregate for each section of the course as percentages in one of three categories: exceeds expectations (A-B range); meets expectations (B- to C- range); or below expectations (D-F range)</td></tr>
<tr><td>Evidence Storage</td><td>Copies of assessments items and scores will be saved electronically on the mathematics department drive.</td></tr>
</table>

Program Learning Outcome Assessment	
Learning Outcomes published in the most recent academic catalog.	Outcome 1
	Outcome 2
	Outcome 3: Communication Skills - Ability to precisely articulate (both in writing and orally) K - 8 mathematical topics in a way that is clear and understandable to elementary and middle school students.
Target	80% of students earn scores that meet expectations or above (C- or above equivalent on each assessment activity)
Data Source	WOU course work – the data will be collected during the term
Means of Assessment	Scores on lesson plan development activities in the upper division mathematics education courses (MTH 393,394,398,492,494,495). These activities require students to develop mathematics topics for elementary and middle level students. Scores on MTH 396 mentoring activity (pass/fail). This activity requires students to communicate using written letters with actual elementary grade students.
Means of Scoring	The scoring will be done by the instructor. The scores for each the lesson plan activity will be recorded in aggregate for each section of the course as percentages in one of three categories: exceeds expectations (A-B range); meets expectations (B- to C- range); or below expectations (D-F range). The scores for the mentoring activity will be recorded as percentages earning a pass or fail.

Evidence Storage	The instructions for the lesson plan activity and the scores for the lesson plan and mentoring activity will be stored electronically in the mathematics drive.