Oregon TECH
Oregon Institute of Technology

Meeting of the
Oregon Tech Board of Trustees
Klamath Falls, OR
And virtually
via Microsoft Teams
Friday, June 2, 2023
1:45 pm – 5:30 pm

Board of Trustees Meeting Agenda

Theme: A Future of Possibilities

1. **Call to Order/Roll/Declaration of a Quorum** (1:45 pm) (5 min) *Chair John Davis*
2. **Consent Agenda** (1:50 pm) (5 min) *Chair Davis*
   - **2.1. Approval of the Minutes of the April 2023 meeting**
3. **Regular Board Reports**
   - **3.1. President's Report** (1:55 pm) (20 min) *President Nagi Naganathan*
   - **3.2. Foundation Report** (2:15 pm) (10 min) *Chair Alan Polaski (Remote)*
   - **3.3. ASOIT** (2:25 pm) (15 min) ASOIT *Presidents Sasha Rabich (KF) and Billy Kimmel (PM)*
   - **3.4. Faculty Senate** (2:40 pm) (15 min) *Senate President Terri Torres (Verbal)*
   - **3.5. Admin Council** (2:55 pm) (10 min) *Chair Becky Burkeen (Verbal)*
4. **Special Reports and Discussion Items**
   - **4.1. Athletic Report** (3:05) (15 min) *Athletic Director John VanDyke*
   - **4.2. Enrollment Management Report** (3:20) (20 min) *Provost Mott, Director Josephine Ness, & Director Joel McPherson*

Break (3:40 pm) (10 min)

5. **Board of Trustee Committee Reports**
   - **5.1. Academic Quality and Student Success Committee Report** (3:50 pm) (10 min) *AQSS Chair Jeremy Brown*
   - **5.2. Finance and Facilities Committee Report** (4:00 pm) (10 min) *F&F Chair Vince Jones*
   - **5.3. Executive Committee Report** (4:10 pm) (10 min) *Chair Davis*
6. **Action Items**
   - **6.1. New Program Approval: Masters in Natural Resources** (4:20 pm) (10 min) *Dean Dan Peterson & Department Chair Dr. Nate Bickford*
   - **6.2. New Program Approval: Masters in Biomedical Sciences** (4:30 pm) (10 min) *Dean Dan Peterson & Department Chair Dr. Nate Bickford*
   - **6.3. Approval of the FY24 Budget** (4:40 pm) (20 min) *VP John Harman*
7. **Public Comment** (5:00 pm) (15 min)
8. **Other Matters** (5:15) (15 min) *Chair Davis*
9. **Adjournment (5:30 pm)**

Oregon TECH
Oregon Institute of Technology

Meeting of the
Oregon Tech Board of Trustees
Full Board Meeting
CEET Board Room, Klamath Falls, OR
And virtually via Microsoft Teams
April 13, 2023
12:30 pm – 5:00pm

Board of Trustees
Theme: Accreditation and Assessment
DRAFT Minutes

Trustees Present:

John Davis, Chair	Kanth Gopalpur	Stefan Bird
Jeremy Brown	Vince Jones	Mason Wichmann
Phong Nguyen	Kelley Minty	Nagi Naganathan (*ex officio*)

Trustees Unable to Attend:

Celia Nunez	Mike Starr	Kathleen Hill
Fred Ziari	Jill Mason	Michele Vitali

University Staff and Faculty Present in person:
Abdy Afjeh, Vice Provost-Research & Academic Affairs
Nawaf Al Wahaibi, ASOIT
Dawn Bailey, Behavior Improvement Group (BIG) ABA Clinic Director & Professor
Nate Bickford – Natural Sciences Department Chair
Alicia Dillon, Associate Vice President – Controller of Business Affairs
Alan Polaski, President– Oregon Tech Foundation
Diana Escamilla, ASOIT
Ken Fincher, Vice President University Advancement & Interim Board Secretary
Erin Foley, Vice President of Student Affairs & Dean of Students
Lori Garrard, Executive Assistant to the VP of University Advancement
David Groff, General Counsel
John Harman, Vice President Finance & Administration
MariaLynn Kessler, Department Chair & Program Director of Applied Behavior Analysis
Billy Kimmel, President of ASOIT – Portland-Metro
Kimberly Koops, AVP Government Relations
Beverly McCreary, Assistant Vice Provost of Faculty Relations
Michelle Meyer, Director of Audit & Compliance-Business Affairs
Joanna Mott, Provost & VP of Academic Affairs
Josephine Ness, Director of Admissions
Adria Paschal, Senior Executive Assistant to the President
Dan Peterson, Dean – College of Health, Arts & Sciences
Sasha Rabich, President of ASOIT – Klamath Falls
Terri Torres, President of Faculty Senate & Professor

Bryan Wada, Information Technology Consultant 2
Joshua Wray, ASOIT

1. **Call to Order/Roll/Declaration of a Quorum** *Chair John Davis*
   Chair Davis called the meeting to order at 12:33 pm. The Board Secretary called roll, and a quorum was declared.

2. **Consent Agenda** *Chair John Davis*
   2.1 Approval of the Minutes of the January 26, 2023 meeting
   No changes or objections were made, and the minutes were adopted.

3. **Regular Board Reports**
   3.1 President's Report *President Nagi Naganathan*

President Naganathan's report included the following:

- Introduction of the meeting theme "assessment and accreditation" and how it applies to the university.
- Unique things happening at Oregon Tech and recognized several Achievements and accomplishments of faculty, staff, students, and the various units at Oregon Tech including the Oregon Tech Foundation.
- Status of the higher education funding challengesat the state level and the continued lobbying efforts including testifying at the legislature and tours on our campuses.
- Other legislative initiatives, including the need for funds for geothermal repairs and the 75th-anniversary resolution.
- Update on the hiring and separation data from the human resources department.
- Report on the progress with the 2022-23 institutional goals
- Highlights on selected upcoming events at Oregon Tech.

3.2 Foundation Report *Chair Alan Polaski*

- **Chair Polaski** shared Foundation events and goals, including details on Give a Hoot Day and the Presidential Gala.
- **Chair Polaski** advised that the Foundation has been working on a strategic plan which is nearing completion. It includes objectives and goals for a capital campaign. **Trustee Brown** asked about annual giving now and how it compares to during the pandemic. **Chair Polaski** shared that there has not been a drop off in giving, and the numbers have stayed stable. **Trustee Brown** discussed the importance of alumni giving and fundraisers working with the university to identify priorities.
- **Trustee Nguyen** shared his positive experience with the Foundation and their providing monetary assistance to his department. He stated that the access and ease of coordination with the Foundation needs to be better communicated with other faculty.

3.3 ASOIT *Presidents Sasha Rabich (KF) and Billy Kimmel (PM)*

- **ASOIT-KF President Sasha Rabich** spoke about the last term and student activities that ASOIT sponsored. ASOIT elections for the 2023-24 year took place, and the new officers will be shadowing the current officers this term as part of their training.
- **Rabich** talked about creating other pathways to keep students on campus if they are not accepted into a health program.
- **Rabich** advised that the number of faculty is not where students like them to be as there are shifting standards and availability. Students are concerned about opportunities to get their hands on education.
- **Trustee Brown** asked about the concerns students have in their programs. **Rabich** said students tend to focus on what is taken away, not positive changes.
- **Trustee Gopalpur** asked about other concerns. **Rabich** said that when new instructors are brought in, students are worried about the caliber of a first-year instructor and also class availability and how it impacts graduation.
- **ASOIT-PM President Billy Kimmel** recapped the winter term and events on the Portland Metro campus.
- **Kimmel** summarized the modality survey conducted with students on the Portland Metro campus indicating students' preference for in-person or hybrid-classes, with remote-instruction only classes being a distant third.
- **Kimmel** talked about the tuition recommendation committee and provided some suggestions to smooth the process for the students.
- **Kimmel** advised that ASOIT just went through the officer hiring process and is onboarding of new officers.
- He shared about upcoming events.

3.4 Faculty Senate *President Terri Torres*

- **President Terri Torres** talked about goals which include an excellent school for all of our students and serving the state of Oregon by providing programs that create employees the state needs. Another goal is creating a great place to work.
- **President Torres** discussed the faculty senate resolution presented to the Board of Trustees. She listed the requests for the resolutions.
- **President Torres** listed efforts by faculty to resolve faculty issues working in committees.
- **Trustee Brown** asked about the schedule for students so they know when they need to take classes and have a mapped-out curriculum. President Torres advised that this is a necessity for all concerned.
- **President Torres** asked how she can get results and discuss the resolution with the faculty senate. **Chair Davis** shared that the topic was discussed in detail in the executive committee.

3.5 Admin Council *Chair Rebecca Burkeen*

- **Rebecca Burkeen** shared about the structure of the admin council and committees and new initiatives, many supporting staff retention. **Burkeen** reviewed the roles of the members of the admin council and their duties.

4. Special Reports and Discussion Items

4.1 ABA Clinic *Dr. Dawn Bailey*

- A video was shared with the Board of an interview with Dr. Bailey on KOBI channel 5.
- **Dr. Bailey** provided background about the Big ABA Clinic. She advised that there is a high demand for services and practitioners. Dr. Bailey reported with the change in insurance mandates, ABA was determined to be a covered medical service, and the need has jumped since insurance coverage was approved.
- **Dr. Bailey** shared almost all students who have gone through the program have been certified and employed.

4.2 NWCCU Accreditation *Dr. Abdy Afjeh and Dr. Erin Foley*

- **Dr. Afjeh** explained the outline, process, and purpose of accreditation. Northwest Commission on Colleges and Universities accredits colleges and universities in the Northwest. The US Department of Education recognizes them as an accreditation agency. He explained the cycle and requirements.
- The NWCCU accreditation site visit is scheduled April 24-26. There will be five evaluators, and they will look at the required standards. They will assess student learning and achievement and institutional research dashboards. **Chair Davis** asked if we knew what the evaluators will do during the site visit. The evaluators determine the itinerary of interviews they wish to have, and we will facilitate their requests.
- **Trustee Brown** asked if we encourage faculty to dwell on the assessment results they receive and apply and/or improve their classes and programs? **Provost Mott** and **Dean Peterson** said that it is a conversation starter for an opportunity for growth and improvement in the classroom.

4.3 Enrollment Management Report *Provost Mott and Director Josephine Ness*

- **Provost Mott** recognized that the subject of two-year schedules has been brought up several times, and she clarified that there is a two-year schedule in place for every single program, and they have been in place for three years now so students can plan their scheduling. She encouraged the students to contact department chairs, if they have questions regarding scheduling.
- **Provost Mott** advised that enrollment is down in the spring term. Because of dual credit numbers , the overall enrollment is up by 10.6%, but the non-dual credit headcount is down about 8%. Dual credit student numbers can skew the numbers in student-to-faculty ratios. **Trustee Brown** asked if dual credit courses were only general education classes and if offering more "interesting" classes might be worthwhile to entice students to enroll at Oregon Tech full-time. **Chair Davis** requested staff prepare the pros/cons of dual credit courses.
- **Provost Mott** said that first-year students' housing deposits are the same as last year.
- **Provost Mott** advised that transfer students are down on both campuses.
- **Josephine Ness** advised that there has been an increase in applications and visits, but deposits are down. She reported that this is a nationwide trend. She shared the admissions

initiatives to bring deposit numbers up. They can use the collected data to focus on the students who need assistance completing the application process.

- Admissions have launched a direct admissions initiative. They are moving to a regional admissions counselor program with a counselor who will live in a focused regional area.
- Admissions are launching a new communications campaign to help students navigate their college search.
- **Trustee Brown** stated the Dept of Education recently communicated that they are reviewing the relationships that universities have with search firms, which could impact recruitment processes.
- **Trustee Brown** asked if there was a new market/area that Admissions is considering for recruitment. **Director Ness** advised research was conducted to determine locations. Some new areas they are considering are Salt Lake City, Utah, and having conversations to determine if the new markets could include consideration of international recruitment. **Trustee Brown** encouraged Admissions to start now and be ahead of the curve to get an advantage. **Provost Mott** advised that Oregon Tech has unique programs, such as the Allied Health programs, that could potentially recruit students from different areas.

(*Break*)

5. Board of Trustee Committee Reports

5.1 Academic Quality and Student Success Committee Report *AQSS Chair Jeremy Brown*

- **Trustee Brown** reviewed what was presented to the AQSS committee the day prior. He summarized presentations by Provost Mott, Dr. Foley, and Student Involvement and Belonging. He advised that accreditation and the pending review on the DPT program were discussed. Accreditation requires considerable effort, and there is worry if we are putting too much effort into the process and if accreditation is required for all programs.
- **Trustee Brown** talked about the ASOIT presentation and the survey conducted at the Portland Metro campus regarding course modality and shared the survey results.
- New academic programs were discussed, and some of them are coming up for approval.

5.2 Finance and Facilities Committee Report *F&F Chair Vince Jones*

- **Trustee Jones** reported on the Finance and Facilities Committee meeting. He stated that there was a report from FOAC and their concerns about operating funding for the university. There are concerns about the geothermal system and the need for funding.
- **Trustee Jones** advised that VP Harman presented the budget and advised that reserve funds would most likely not be needed due to having a good handle on expenses. **Trustee Jones** reported that VP Harman also presented on investments.
- Soderstrom Architects presented a facilities master plan, which should be completed in May.
- Mahlum Architects also presented a report on the student housing facility, and a site was identified. It is in the schematic design phase.
- Facilities Director Thom Director reported on the highlights of current projects.
- KernuttStokes provided the internal audit report.
- Two action items were reviewed, with recommendations to be presented to the entire Board for consideration and adoption.

5.3 Executive Committee Report *Chair John Davis*

- **Chair Davis** discussed the special meeting held on March 17, 2023, regarding recommendations for upcoming trustee board positions. He addressed each candidate and which needs they would fill on the Board. Five recommendations have been sent to the governor's office for consideration.
- **Chair Davis** stated that today's executive committee meeting had a government relations presentation and a discussion regarding the faculty senate resolution and the retention of faculty.
- **Chair Davis** discussed changes in scheduling AQSS and F&F committee meetings to be virtual only, followed by in-person Executive Committee and full board meetings.

6. Action Items

6.1 Academic Year 2023-24 Tuition and Fees Recommendation *VP John Harman*

- **VP Harman** summarized the guidelines that the Tuition Recommendation Committee followed. The question of preserving quality programs in the face of declining enrollment was discussed. He showed the increase in expenses and the decrease in proposed funding from the state. The burden has been placed on students/families to fund education. A factor always considered is whether Oregon Tech is competitive with comparable universities.
- The recommended increase was 5% by the committee and by ASOIT to President Naganathan. That is an increase of approximately $163 for a 15-hour term each term. After due consideration of the inputs received, President Naganathan recommended a 4.9% increase to the Board.
- **Trustee Jones** advised that the Finance and Facilities committee adopted the motion unanimously. He stated the main point discussed was using reserve funds to balance the budget.
- **Chair Davis** asked what the assumption from admissions this tuition increase was based on? **VP Harman** stated it was based on a flat, no increase in enrollment.
- **Trustee Brown** commented that we have not made any progress on international students, which is a missed opportunity. He advised we are not enabling our admissions counselors to be successful. There needs to be a strategy from admissions. We continue to recruit from areas where everyone else is recruiting, and we should be more competitive in other areas.
- **Provost Mott** said there have been increases in in-state students and does not feel data is showing that Oregon Tech is charging too much and has not affected in-state students.
- **Trustee Gopalpur** stated that until there is movement in state funding (revenue) or labor costs (expenses), we will be forced to discuss a tuition increase yearly.
- **Trustee Starr** stated that Oregon Tech needs to continue to market what makes Oregon Tech unique and that the ROI is so great.

Motion:

With the recommendation of the Finance and Facilities Committee, the President requests a Motion by the Board for approval of a 4.9% increase in Academic Year 2023-24 Tuition and Fees in accordance with the President's recommendation memo (Attachment A to the Board Agenda Item 4.2) and delegation of authority to the President or their designee, as available under policy and law, to make minor and technical adjustments to

these proposed rates as necessary to correct mathematical rounding, errors, inconsistencies, or omissions and execute the Board's directives.

Motion: Chair Davis

Second: Trustee Gopalpur

- **Trustee Wichmann** commented about the decrease in state funding and the decrease in enrollment. He shared how Oregon Tech will continue to need tuition increases to maintain in the future.

Roll Call vote: Trustee Davis aye, Bird aye, Brown aye, Gopalpur aye, Jones aye, Minty aye, Nguyen aye, Starr aye, Vitali aye, Wichmann aye.

The motion passes unanimously.

8. **Public Comment (moved to an earlier time)**
   - Jordan Spencer is a cybersecurity major and stated he has concerns about the retention of faculty. He asked for a comprehensive review of Dr. Naganathan's performance. He said he was sharing his perspective based on what he knew.

6.2 2022 Single Audit and FY 2023 Audit Planning *Jean Bushong CLA*

- **Jean Bushong** reviewed the single audit process and reported on the results. There were three findings, and they found that all action plans had been implemented to resolve the issues.

Motion:

Motion by the Board to accept the Oregon Tech FY 2022 Single Audit Report.

Motion: Trustee Minty

Second: Trustee Bird

Roll Call Vote: Chair Davis aye, Trustee Bird aye Brown aye, Trustee Gopalpur aye, Trustee Jones aye, Trustee Minty aye, Trustee Nguyen aye, Trustee Starr aye, Trustee Vitali aye, Trustee Wichmann aye.

7. **Additional Discussion**

7.1 Portland Metro Growth Plan Update *Drs. Afjeh and Kessler*

- **Dr. Maria Lynn Kessler** advised that a Portland Metro Growth task force consists of faculty, staff, students, and a representative from the Wilsonville Chamber. It is focused on how to make the campus more welcoming and vibrant to promote enrollment and growth. Their short term goal is a 2% growth on the Portland Metro campus.
  Dr. Kessler highlighted some of the work and activities in the action plan, including target marketing, a transfer ad campaign, and ASOIT survey takeaways.
- **Dr. Afjeh** talked about a new initiative that will assist students in forecasting their careers in different geographic areas. It is a tool to get information about career choices

and the likelihood of success in that career in a geographic area. It will assist Oregon Tech with recruitment.

- **President Naganathan** asked how the person who uses the tool will connect the dots to connect with Oregon Tech. **Dr. Afjeh** stated it is information for a potential student. **Dr. Kessler** said that it is a valuable tool for job placement and can be used with current students and something career services can use.
- **Trustee Brown** stated we need to define the Portland Metro campus and what it should be. The question is, are we trying to solve a problem and not know what the target is?
- **Trustee Brown** asked how significant the growth should be and does there need to be a more long-term vision?
- **Provost Mott** stated a challenge will be adding programming in PM as there is competition from other universities in the area. We need to distinguish ourselves from other universities in Portland.
- **President Naganathan** said we need to stop the leak, **as the first step**. The 2% goal is modest, but it is stabilizing.

9. Other Matters
None

10. Adjournment (5:44 pm)

Oregon TECH

ASOIT

Board of Trustees

June 2, 2023

Lobbying

TRU Day

Higher Ed Lobby Day

Advocacy for Academic Issues Portland-Metro Students

Town-Hall

January - Open forum with

Academic Affairs Leadership Panel

Course Modality Survey

February - PM Student-wide survey

Dinner and Dialogue

May 30 - Focus groups comprised of students, faculty, and staff to develop solutions

Advocacy for Academic Issues Portland-Metro Students

Town-Hall

Identified Barriers:

- Faculty members rarely seen on campus
- Dept. Chairs asked to visit PM campus once per term with advanced notice to students
- Classes advertised as in-person tend to shift entirely remote thus reducing access to peer-to-peer in-class collaboration
- Percentage of courses offered in-person to qualify as a PM academic program (international/veteran)

Advocacy for Academic Issues Portland-Metro Students

Course-Modality Survey

Identified Barriers:

- Evening courses cater towards part time students
- Access to recorded lectures
- Having in-person options
- Frequency of needing to come to campus

Follow-Up

Summaries

Shared with Academic Leadership
(Provosts, Deans, Department Chairs),
Faculty Senate, and PM Growth Task Force

Response

- ASOIT led the effort to scheduled meetings with Dept. Chairs to address career advising with faculty
- No acknowledgement of identified barriers
- No commitment to address barriers

Request

Fall Board Meeting

Request response to identified barriers presented by Academic Affairs Leadership at Fall Board meeting

QUESTIONS?

OFFICE OF THE PROVOST
Dr. Joanna Mott
3201 Campus Drive, Klamath Falls, OR 97601

Enrollment Report for the Board of Trustees, June 2, 2023

FALL 2023 Enrollment data (as of 05/22/23) comparison with same date last year

FRESHMEN

Klamath Falls and Portland Metro

	Completed Apps	Admits	Deposits
FY 22	4927	4145	537
FY 23	4798	4495	501
change	+2.69%	+8.44%	-6.70%

Deposits are below previous year but the gap has been closing steadily through the recruiting period - appears a trend for students to delay deposits this year.

Housing numbers are up:

	Total	New students	Returning Students
FY 22	770	340	430
FY 23	780	316	460
change	+1.3%	-7.1%	+7.0%

Josephine Ness, Director of Admissions and Joel McPherson, Director of Marketing current and new initiatives to maximize enrollment for fall 2023. (Oral presentation)

HIGHER EDUCATION COORDINATING COMMISSION

Proposal for a New Academic Program

Institution: Oregon Institute of Technology

College/School: College of Health, Arts, and Sciences

Department/Program Name: Natural Science

Degree and Program Title: MS Natural Resources

1. Program Description

a. Proposed Classification of Instructional Programs (CIP) number.

03.0101 Natural Resource/Conservation, General

b. Brief overview (1-2 paragraphs) of the proposed program, including its disciplinary foundations and connections; program objectives; programmatic focus; degree, certificate, minor, and concentrations offered.

Our world, locally and globally, faces unprecedented environmental challenges. In the Klamath basin alone, we are faced with managing millions of acres of private, state, and federal lands to reduce catastrophic wildfire risk, maintain biodiversity, and produce valuable natural resources. Furthermore, many federal and state natural resource agencies such as the US Forest Service have an aging workforce that is retiring and many agencies and offices have significant vacancies (Frost 2001). These agencies and others are now seeking to recruit and retain the next generation of natural resource management and environmental science practitioners while increasing age, gender, ethnic, and cultural diversity (Brown & Harris 1993, Schelhas 2002).

Here in the Klamath Basin, we face many of the biggest environmental and natural resource management challenges people are facing across the country and around the world. For example, issues of catastrophic wildfire in Oregon and California mirror those in Australia and Europe while environmental and sociopolitical issues of issues of drought and water resource use, access, and availability here are akin to those in Israel and South Africa. Environmental health and rural vs urban poverty are problems in nearly every corner of the world. We have a number of threatened and endangered species in the Klamath Basin. The conservation and management of endangered species is a global challenge all countries face, especially biodiverse tropical countries like Mexico, Indonesia, Madagascar, India and Brazil which have some of the greatest number of endangered species. The Klamath River will be the site of the largest dam removal project in the world, averting extinction of at least a dozen endangered species, and adapting to severe drought and up to 80% declines in winter snowpack. In China, dam construction and removal is central to many environmental concerns of water and energy development. Despite substantial management and policy efforts, our region is experiencing severely degraded air and water quality with significant environmental health impacts on our communities, concerns central to many of the 17 United National Sustainable Development Goals.

Our current undergraduate Environmental Science program prepares students to tackle these problems with applied science and communication skills. We work closely with a diversity of industry partners located in Klamath including the US Forest Service, US Fish and Wildlife Service, US Geological Survey, Oregon Department of Forestry, Bureau of Land Management, The Klamath Tribes, and many more. Our faculty and

our partners desperately need to increase our capacity to manage, research, and monitor our efforts to understand and solve the problems we face, from local to global. Our capacity would be greatly expanding through the creation of a Masters in Natural Resources program.

Through the Natural Sciences Department and the Environmental Sciences undergraduate program, this would create both a 3-plus-2 year program for current undergraduates in ENV and a standalone 2-year program for students coming in with a relevant undergraduate from another institution. The MS program would be particularly designed to service specific projects identified and funded by our industry partners. The MS program would:

- Increase recruit exceptional students through national searches,
- expand the research and teaching capacity of our faculty,
- draw academic acclaim to the university,
- recruit advanced personnel for local agency offices, and
- provide our industry partners valuable deliverables and expanding their capacity.

Development of the Natural Resources Masters would be done in close consultation with the Geomatics Department, Population Health Management program, and the Civil Engineering and Renewable Energy Engineering programs.

c. Course of study – proposed curriculum, including course numbers, titles, and credit hours.

CURRICULUM

Within the first 2-4 years following program launch, the graduate curriculum would primarily consist of courses offered as 400/500 level options. In addition to the required 500 level courses, graduate students (standalone MS and BMS 3+2) would be in 400/500 level classes alongside undergraduates and would have additional requirements from their undergraduate peers. While requirements would vary with course and instructor, additional graduate requirements would include:

- Additional or more complex project work
- Additional readings and assignments on more advanced topics
- Additional or more advanced data analysis, mapping, and/or communication
- Mentoring of undergraduates

We expect that the addition of an MS program will also increase enrollment in the BS program. As the entire ENV program grows within the first 2-4 years after implementation, so too will our capacity to offer exclusively graduate courses in a greater diversity of areas.

Completion of the MS-BMS degree consists of **47 credits**. Students must maintain a 3.0 graduate-level GPA with a final grade of "C" or better in all graduate courses.

- The **MS** consists of **23 credits of core classes** (including **10 credits of research/thesis work**) and **24 credits of elective courses**. Master's students will typically be occupied with either Teaching Assistantships or Research Assistantships, so the recommended course load is 6-9 credits per term for 6 terms (2 years).
- Students in the 3+2 BMS option would follow the normal BES curriculum map through their third year. In their fourth year, students will complete their senior year requirements which are comprised mostly of program-

specific upper division required and technical elective courses. The electives would be taken at the 500 level. They would also integrate the required 500 level core classes.

Required Core Classes (23 credit hours):

- BIO 511 Foundation in conservation, **3 credit hours** (Offered every Fall)
- BIO 501 Intro to Graduate Study, **3 credit hours** (Offered Fall term)
- BIO 535 Advanced Data Analysis, **4 credit hours** (Offered Winter term)
- BIO 510* Current Issues, 1 credit hour (Offered each term)
  * students must take Current Issues 3 different terms for a total of **3 credit hours**
- BIO 595 Graduate Research/Thesis (2 credits per term*)
  *students must take BIO 595 in 5 different terms, for a total of **10 credit hours**. Prerequisite: BIO 501.

Elective Coursework (24 credits)

In the 3+2 BMS track, students would take the following elective courses at the 400-level through year three and at the 500-level in year four and five. They would be required to take 24 of the 32 credits of elective coursework at the 500-level. See **Appendix A: Curriculum Map for 3+2 Natural Resources track**

BMS 3+2 CURRICULUM ("Senior" Year 4 of BS, Year 1 of the +2 BMS)															
	Fall					Winter					Spring				
Course	ENV 108	SPE 321	WRI Elec	Tech Elec	ENV 501	ENV 485	BIO 595	SOC/HUM Elective	Tech Elec	BIO 510	ENV 484	BIO 595	Tech Elec	Tech Elec	
Course Title	Mentorship & Team Building	Small Group and Team Com.	WRI 327, 328, 345, 350, or 410	Technical Elective (500)	Intro to Grad Studies	Ecoregional Management	Grad research/ Thesis	Social Sci/Hum elective	Technical Elective (500)	Current Issues	Sustainable Human Ecology	Grad research/ Thesis	Technical Elective (500)	Technical Elective (500)	Total Grad credits
Credits	1	3	3	4	3	3	2	3	4	1	4	2	4	4	24
Year 2 of +2															
Course	BIO 511	BIO 510	BIO 595	Tech Elec	Tech Elec	BIO 510	BIO 595	BIO 535			BIO 595				
Course Title	Foundations in Conservation	Current Issues	Grad research/ Thesis	Technical Elective (500)	Technical Elective (500)	Current Issues	Grad research/ Thesis	Advanced Data Analysis			Grad research/ Thesis				
Credits	3	1	2	4	4	1	2	4			2				23

Appendix B: Schedule of course offerings for ENV program, Fall 2023 through Spring 2025

Fall 2023		
Course Number	**Course Name**	**Campus**
BIO 255	Sophomore Research	Klamath Falls
BIO 355	Junior Research	Klamath Falls
BIO 455	Senior Research	Klamath Falls
BIO 307	Seminar: Ecology Elective	Klamath Falls
BIO 377	Wildlife Ecology	Klamath Falls
ENV 108	Mentorship & Team Building	Klamath Falls
ENV 111	Intro to Env Sciences	Klamath Falls
ENV 217	Intro to Natural Resource Management	Klamath Falls
ENV 355	Careers and Professions in Environmental Science	Klamath Falls

ENV 465	Ecological Restoration and Monitoring	Klamath Falls
ENV 495	Research in Environmental Sciences	Klamath Falls
GEOG 335	Soils	Klamath Falls
HED 240	Emergency Care and CPR	Klamath Falls
Winter 2024		
Course Number	**Course Name**	**Campus**
BIO 255	Sophomore Research	Klamath Falls
BIO 355	Junior Research	Klamath Falls
BIO 455	Senior Research	Klamath Falls
BIO 354	Environmental Health	Klamath Falls
BIO 446	Conservation Biology	Klamath Falls
CHE 315	Environmental Chemistry	Klamath Falls
ENV 224	Scientific Reasoning & Methodology	Klamath Falls
ENV 226	ENV Data Analysis	Klamath Falls
ENV 314	Environmental Policy and Management	Klamath Falls
ENV 4xx	Environmental Education	Klamath Falls
ENV 434	Advanced Data Analysis	Klamath Falls
ENV 495	Research in Environmental Sciences	Klamath Falls
PHED 163	Wilderness Navigation	Klamath falls
PHY 201	General Physics	Klamath Falls
Spring 2024		
Course Number	**Course Name**	**Campus**
BIO 2xx	Sophomore Research	Klamath Falls
BIO 3xx	Junior Research	Klamath Falls
BIO 4xx	Senior Research	Klamath Falls
BIO 386	Ornithology	Klamath Falls
BIO 369	Mammalogy	Klamath Falls
CHE 465	Fate/Transport of Pollutants	Klamath Falls
ENV 315	Water Resources	Klamath Falls
ENV 375	Forest Ecology & Mgmt	Klamath Falls
ENV 484	Sustainable Human Ecology	Klamath Falls
ENV 495	Research in Environmental Sciences	Klamath Falls
GEOG 105	Physical Geography	Klamath Falls
HED 240	Emergency Care and CPR	Klamath Falls
Summer 2024		
Course Number	**Course Name**	**Campus**
BIO 407	Ecology elective	Klamath Falls

Fall 2024		
Course Number	**Course Name**	**Campus**
BIO 255	Sophomore Research	Klamath Falls
BIO 355	Junior Research	Klamath Falls
BIO 455	Senior Research	Klamath Falls
ENV 355	Careers in Environmental Sciences	Klamath Falls
BIO 337	Aquatic Ecology	Klamath Falls
ENV 111	Intro to Env Sciences	Klamath Falls
ENV 214	Watershed Science and Tech	Klamath Falls
ENV 217	Intro to Natural Resource Management	Klamath Falls
ENV 3xx	Fire Ecology	Klamath Falls
ENV 355	Careers and Professions in Environmental Science	Klamath Falls
ENV 495	Research in Environmental Sciences	Klamath Falls
HED 240	Emergency Care and CPR	Klamath Falls
Winter 2025		
Course Number	**Course Name**	**Campus**
BIO 255	Sophomore Research	Klamath Falls
BIO 355	Junior Research	Klamath Falls
BIO 455	Senior Research	Klamath Falls
BIO 426	Evolutionary Biology	Klamath Falls
CHE 315	Environmental Chemistry	Klamath Falls
ENV 224	Scientific Reasoning & Methodology	Klamath Falls
ENV 226	Environmental Data Analysis	Klamath Falls
ENV 460	Risk Assessment and Wilderness First Aid	Klamath Falls
ENV 434	Advanced Data Analysis	Klamath Falls
ENV 485	Habitat Management	Klamath Falls
ENV 495	Research in Environmental Sciences	Klamath Falls
GEOG 313	Climatology and Atmospheric Science	Klamath Falls
HED 240	Emergency Care and CPR	Klamath Falls
PHY 201	General Physics	Klamath Falls
Spring 2025		
Course Number	**Course Name**	**Campus**
BIO 255	Sophomore Research	Klamath Falls
BIO 355	Junior Research	Klamath Falls
BIO 455	Senior Research	Klamath Falls
BIO 313	Botany and Plant taxonomy	Klamath Falls
BIO 367	Plant Ecology	Klamath Falls
BIO 428	Fisheries	Klamath Falls
CHE 465	Fate/Transport of Pollutants	Klamath Falls

ENV 226	Environmental Data Analysis	Klamath Falls
ENV 469	Treatment Wetlands	Klamath Falls
ENV 484	Sustainable Human Ecology	Klamath Falls
ENV 495	Research in Environmental Sciences	Klamath Falls
GEOG 105	Physical Geography	Klamath Falls
HED 240	Emergency Care and CPR	Klamath Falls
PHED 163	Wilderness Navigation	Klamath Falls

Appendix C: Curriculum Map for 2 year thesis track

NEW CURRICULUM		
1st Year - Fall		
BIO 511	Foundation in conservation	3
BIO 501	Intro to Graduate Study	3
	Elective	3
	Elective	
	TOTAL:	9
1st Year - Winter		
ENV 535	Graduate Data Analysis	4
BIO 512	Current Issues	1
BIO 595	Graduate Research/Thesis	2
	TOTAL:	7
1st Year - Spring		
BIO 512	Current Issues	1
BIO 595	Graduate Research/Thesis	2
	Elective	3
	Elective	3
	TOTAL:	9
2nd Year - Fall		
BIO 512	Current Issues	1
BIO 595	Graduate Research/Thesis	2
	Elective	3
	Elective	3
	TOTAL:	9
2nd Year - Spring		
BIO 595	Graduate Research/Thesis	2
	Elective	3
	Elective	3

	TOTAL:	8
2nd Year - Spring		
BIO 595	Graduate Research/Thesis	2
	Elective	3
	TOTAL:	5
	DEGREE TOTAL:	**47**

, Appendix A: Curriculum Map for 3+2 Natural Resources track

BMS 3+2 CURRICULUM ("Senior" Year 4 of BS, Year 1 of the +2 BMS)															
	Fall					Winter					Spring				
Course	ENV 108	SPE 321	WRI Elec	Tech Elec	ENV 501	ENV 485	BIO 595	SOC/HUM Elective	Tech Elec	BIO 510	ENV 484	BIO 595	Tech Elec	Tech Elec	
Course Title	Mentorship & Team Building	Small Group and Team Com.	WRI 327, 328, 345, 350, or 410	Technical Elective (500)	Intro to Grad Studies	Ecoregional Management	Grad research/ Thesis	Social Sci/Hum elective	Technical Elective (500)	Current Issues	Sustainable Human Ecology	Grad research/ Thesis	Technical Elective (500)	Technical Elective (500)	Total Grad credits
Credits	1	3	3	4	3	3	2	3	4	1	4	2	4	4	24
Year 2 of +2															
Course	BIO 511	BIO 510	BIO 595	Tech Elec	Tech Elec	BIO 510	BIO 595	BIO 535			BIO 595				
Course Title	Foundations in Conservation	Current Issues	Grad research/ Thesis	Technical Elective (500)	Technical Elective (500)	Current Issues	Grad research/ Thesis	Advanced Data Analysis			Grad research/ Thesis				
Credits	3	1	2	4	4	1	2	4			2				23

Appendix B: Schedule of course offerings for ENV program, Fall 2023 through Spring 2025

Fall 2023		
Course Number	**Course Name**	**Campus**
BIO 255	Sophomore Research	Klamath Falls
BIO 355	Junior Research	Klamath Falls
BIO 455	Senior Research	Klamath Falls
BIO 307	Seminar: Ecology Elective	Klamath Falls
BIO 377	Wildlife Ecology	Klamath Falls
ENV 108	Mentorship & Team Building	Klamath Falls
ENV 111	Intro to Env Sciences	Klamath Falls
ENV 217	Intro to Natural Resource Management	Klamath Falls
ENV 355	Careers and Professions in Environmental Science	Klamath Falls
ENV 465	Ecological Restoration and Monitoring	Klamath Falls

ENV 495	Research in Environmental Sciences	Klamath Falls
GEOG 335	Soils	Klamath Falls
HED 240	Emergency Care and CPR	Klamath Falls
Winter 2024		
Course Number	**Course Name**	**Campus**
BIO 255	Sophomore Research	Klamath Falls
BIO 355	Junior Research	Klamath Falls
BIO 455	Senior Research	Klamath Falls
BIO 354	Environmental Health	Klamath Falls
BIO 446	Conservation Biology	Klamath Falls
CHE 315	Environmental Chemistry	Klamath Falls
ENV 224	Scientific Reasoning & Methodology	Klamath Falls
ENV 226	ENV Data Analysis	Klamath Falls
ENV 314	Environmental Policy and Management	Klamath Falls
ENV 4xx	Environmental Education	Klamath Falls
ENV 434	Advanced Data Analysis	Klamath Falls
ENV 495	Research in Environmental Sciences	Klamath Falls
PHED 163	Wilderness Navigation	Klamath falls
PHY 201	General Physics	Klamath Falls
Spring 2024		
Course Number	**Course Name**	**Campus**
BIO 2xx	Sophomore Research	Klamath Falls
BIO 3xx	Junior Research	Klamath Falls
BIO 4xx	Senior Research	Klamath Falls
BIO 386	Ornithology	Klamath Falls
BIO 369	Mammalogy	Klamath Falls
CHE 465	Fate/Transport of Pollutants	Klamath Falls
ENV 315	Water Resources	Klamath Falls
ENV 375	Forest Ecology & Mgmt	Klamath Falls
ENV 484	Sustainable Human Ecology	Klamath Falls
ENV 495	Research in Environmental Sciences	Klamath Falls
GEOG 105	Physical Geography	Klamath Falls
HED 240	Emergency Care and CPR	Klamath Falls
Summer 2024		
Course Number	**Course Name**	**Campus**
BIO 407	Ecology elective	Klamath Falls
Fall 2024		

Course Number	Course Name	Campus
BIO 255	Sophomore Research	Klamath Falls
BIO 355	Junior Research	Klamath Falls
BIO 455	Senior Research	Klamath Falls
ENV 355	Careers in Environmental Sciences	Klamath Falls
BIO 337	Aquatic Ecology	Klamath Falls
ENV 111	Intro to Env Sciences	Klamath Falls
ENV 214	Watershed Science and Tech	Klamath Falls
ENV 217	Intro to Natural Resource Management	Klamath Falls
ENV 3xx	Fire Ecology	Klamath Falls
ENV 355	Careers and Professions in Environmental Science	Klamath Falls
ENV 495	Research in Environmental Sciences	Klamath Falls
HED 240	Emergency Care and CPR	Klamath Falls
Winter 2025		
Course Number	**Course Name**	**Campus**
BIO 255	Sophomore Research	Klamath Falls
BIO 355	Junior Research	Klamath Falls
BIO 455	Senior Research	Klamath Falls
BIO 426	Evolutionary Biology	Klamath Falls
CHE 315	Environmental Chemistry	Klamath Falls
ENV 224	Scientific Reasoning & Methodology	Klamath Falls
ENV 226	Environmental Data Analysis	Klamath Falls
ENV 460	Risk Assessment and Wilderness First Aid	Klamath Falls
ENV 434	Advanced Data Analysis	Klamath Falls
ENV 485	Habitat Management	Klamath Falls
ENV 495	Research in Environmental Sciences	Klamath Falls
GEOG 313	Climatology and Atmospheric Science	Klamath Falls
HED 240	Emergency Care and CPR	Klamath Falls
PHY 201	General Physics	Klamath Falls
Spring 2025		
Course Number	**Course Name**	**Campus**
BIO 255	Sophomore Research	Klamath Falls
BIO 355	Junior Research	Klamath Falls
BIO 455	Senior Research	Klamath Falls
BIO 313	Botany and Plant taxonomy	Klamath Falls
BIO 367	Plant Ecology	Klamath Falls
BIO 428	Fisheries	Klamath Falls
CHE 465	Fate/Transport of Pollutants	Klamath Falls
ENV 226	Environmental Data Analysis	Klamath Falls

ENV 469	Treatment Wetlands	Klamath Falls
ENV 484	Sustainable Human Ecology	Klamath Falls
ENV 495	Research in Environmental Sciences	Klamath Falls
GEOG 105	Physical Geography	Klamath Falls
HED 240	Emergency Care and CPR	Klamath Falls
PHED 163	Wilderness Navigation	Klamath Falls

Appendix C: Curriculum Map for 2 year thesis track

NEW CURRICULUM		
1st Year - Fall		
BIO 511	Foundation in conservation	3
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	Elective	3
	Elective	
	TOTAL:	9
1st Year - Winter		
ENV 535	Graduate Data Analysis	4
BIO 512	Current Issues	1
BIO 595	Graduate Research/Thesis	2
	TOTAL:	7
1st Year - Spring		
BIO 512	Current Issues	1
BIO 595	Graduate Research/Thesis	2
	Elective	3
	Elective	3
	TOTAL:	9
2nd Year - Fall		
BIO 512	Current Issues	1
BIO 595	Graduate Research/Thesis	2
	Elective	3
	Elective	3
	TOTAL:	9
2nd Year - Spring		
BIO 595	Graduate Research/Thesis	2
	Elective	3
	Elective	3

	TOTAL:	8
2nd Year - Spring		
BIO 595	Graduate Research/Thesis	2
	Elective	3
	TOTAL:	5
	DEGREE TOTAL:	**47**

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In the stand-alone MS track, students would take the following courses at the 500-level. They would be required to take at least 80% of their elective coursework at the 500-level, allowing students to take courses relevant to their studies not offered at the 500-level (e.g. courses in GIS, GEOL, CE, CHEM).

Elective coursework that is currently in the course catalogue at the 400-level and we could offer immediately with current staff cross-listed as 400/500-level courses include:

- BIO 426/526 - Evolutionary Biology Credit Hours: 3
- BIO 446/546 - Conservation Biology Credit Hours: 3
- CHEM 465/565 – Fate & Transport of Pollutants
- CE 489/589 - Treatment Wetlands Credit Hours: 3
- ENV 465/565 - Ecological Resto. & Monitoring Credit Hours: 4
- ENV 469/569 - Treatment Wetlands Credit Hours: 3
- ENV 495/595 - Research in Env. Sciences Credit Hours: 4
- ENV 485/585 – Ecoregional Management
- ENV 484/584 – Sustainable Human Ecology
- BIO/ENV 407/507 – Seminars in Biology and Environmental Science
- ENV 434/534 – Advanced Data Analysis
- GIS 426/526 - Geospatial Vector Analysis II Credit Hours: 4
- GIS 432/532 - Customizing the GIS Envirn II Credit Hours: 4
- GIS 446/546 - GIS Database Development Credit Hours: 2
- GME 425/525 - Remote Sensing Credit Hours: 4

Core coursework that is currently in the course catalogue at the 300-level that we would change to the 400-level so they could be cross-listed as 400/500-level courses include:

BIO 337 - Aquatic Ecology Credit Hours: 4
BIO 367 - Plant Ecology Credit Hours: 4
BIO 377 - Wildlife Ecology Credit Hours: 4
BIO 386 - Ornithology Credit Hours: 4

A few additional courses could be created in the fields of expertise of our PhD level faculty, for example *mammalogy, fisheries management, ichthyology, and entomology*.

Additionally, students would take units of ENV 597 research and ENV599 thesis – Thesis under their primary adviser while they were writing and defending their thesis.

Students lacking prerequisites for graduate courses will be required to fill those deficiencies. Deficiency credits will not be counted toward the total 47 credit requirements for the program.

We have a planned schedule for when the core and elective courses currently listed in the course catalogue will be offered in Error! Reference source not found..

GRADUATE THESIS

All MS students would be required to complete an original project-based research thesis. Students would develop and submit a proposal in their first term for approval by their adviser and committee approved by their adviser and graduate committee (see section below). The thesis would include at least five terms of thesis credit for project design, execution, and presentation. The completed written thesis would require review and approval by the student's graduate committee and one external reviewer. All MS theses would be made available online through the OIT Library Services. Peer-reviewed publication submission would be highly encouraged and under the discretion and mentorship of the primary graduate adviser.

d. Manner in which the program will be delivered, including program location (if offered outside of the main campus), course scheduling, and the use of technology (for both on-campus and off-campus delivery).

   All classes and courses will be offered on Klamath Falls Campus.

e. Adequacy and quality of faculty delivering the program.

   The faculty at Klamath Falls campus teaching in the Natural Sciences have the required credentials and experience to teach the suggested curriculum. Current faculty include:

   - Dr. Jherime L. Kellermann, PhD
   - Dr. Nate Bickford, Phd
   - Professor Kerry Farris, MS
   - Professor Christy Van Rooyen, MS
   - Dr. Ross Wagstaff, PhD

   Environmental Chemist position, PhD (position currently being filled; as of 01/19/2023, candidate has been selected and recommended to Dean by search committee)

   See **Appendix D. Natural Resources** Faculty CV
   s.

f. Adequacy of faculty resources – full-time, part-time, adjunct.

   The Natural Sciences program has 19 full time faculty. 1 part time faculty and a few adjuncts. Although the full-time faculty will be the primary individuals teaching the curriculum in this degree.

g. Other staff.

   We have office manager and plans to hire lab manager in 2023

h. Adequacy of facilities, library, and other resources.

We have facilities that are already being successfully used for the BS program, which mainly consists of access to the primary peer-reviewed scientific literature. We feel these are adequate facilities and resources through the OIT library and inter-library loan system for the MS program as well.

i. Anticipated start date.
We would like to have soft start of the program in Fall 2023 but a full recruitment year in Fall 2024.

2. Relationship to Mission and Goals

Manner in which the proposed program supports the institution's mission, signature areas of focus, and strategic priorities.

The Environmental Science (BES) program mission closely aligns with the Oregon Tech mission: Oregon Institute of Technology (Oregon Tech), Oregon's public polytechnic university, offers innovative, professionally focused undergraduate and graduate degree programs in the areas of engineering, health, business, technology, and applied arts and sciences. To foster student and graduate success, the university provides a hands-on, project-based learning environment and emphasizes innovation, scholarship, and applied research. With a commitment to diversity and leadership development, Oregon Tech offers statewide educational opportunities and technical expertise to meet current and emerging needs of Oregonians as well as other national and international constituents. The curriculum is a multidisciplinary integration of ecology, biology, chemistry, & natural resources; data analysis & statistics; geographic information systems (GIS); and other physical, natural and social sciences. Emphasis in our program is placed on active experiential learning through engagement in real-world, real-time problems in collaboration with local and regional agency partners. The program offers numerous, diverse opportunities for students to engage is applied research, and resource management projects with the support of faculty and professionals. Further, BES faculty and students engage with professional communities through publications and conference presentations. These research and scholarly activities are in direct alignment with Pillars II & III of Oregon Tech's strategic plan which state:

Pillar II COMMITMENT TO INNOVATION: Oregon Tech strives to be entrepreneurial and on the leading edge of student engagement, innovative teaching, and collaborative research.

Pillar III COMMITMENT TO COMMUNITY: Oregon Tech is an active member of the communities that it serves. Students, faculty, and staff are encouraged to contribute to their physical, professional, scholarly, and social communities via leadership and active participation through their academic and professional expertise.

Our faculty and students currently work with a diversity of community partners. Currently (2023) our faculty have funded research projects that involve undergraduates working with the US Fish and Wildlife Service on bird conservation and management, the EPA and DEQ on air quality and environmental health, the Bureau of Land Management on stream restoration and bird conservation, the US Forest Service on stream and wetland conservation and bird management, US FWS and NGOs on bee conservation, and Oregon Department of Forestry and the City Parks Department on forest and fire management in Moore Park. Past projects and collaborations have involved the Bureau of Reclamation, US Geological Survey, Oregon Department of Fish and Game, and US Fish and Game. We are also working to develop a strong relationship with the Klamath Tribes. We have current Tribal member students doing research with the tribes on fisheries and aquatic restoration and we have several Tribal members that are alumni of the program working at the US Fish and Wildlife, Department of Forestry and the Klamath Tribes Department of Natural Resources. We regularly engage tribal members and staff in our classes. For example, the Klamath Tribal Chairman Don Gentry has met with our students for field courses/labs and Alex Gonyaw, Senior Fisheries Biologist for the Tribes has given guest lectures and lead field labs for a number of courses for the past 5 years. Our students have worked with the Tribal Forest and Fire management staff to study forest and fire ecology on lands managed by the Tribes in the Chiloquin area, including the use of monitoring technology in cooperation with Chiloquin High School students.

Like our BS program, the Masters program will help students cultivate a deep experiential appreciation for the interdisciplinary character of natural resource problems.

Expanding capacity
The Masters program will increase our ability to achieve our mission and meet the goals of our strategic plan. Masters students and their required graduate projects will extend and expand the capacity of both our faculty and our agency partners to address the significant environmental and natural resource challenges we face in the Klamath Basin, the Pacific Northwest, nationally, and globally. We will create and design individual graduate projects and their products to address the needs of our partners and resource stakeholders. Graduate students will be expected to show leadership and initiative on their projects while providing critical support, value, and resources for our partners. Ultimately, our Masters program will provide desperately needed human resources

in the region to address critical and growing environmental and natural resource problems including air and water quality, extreme fire risk, conservation of fisheries and wildlife species, and environmental health, and sustainability.

Collaboration with other programs
CE & REE: Currently, students at Oregon Tech can pursue Dual degrees in Environmental Science and either Civil Engineering or Renewable Energy Engineering. Both CE and REE now offer Masters programs at the Klamath Falls campus. Our Masters program will provide opportunity for students interested in the nexus of these disciplines to acquire a Masters in Natural Resources that integrates elements of these disciplines as well through partnerships and collaborations among our faculty and partners that are already well established through our dual undergraduate programs.

GIS: The Environmental Sciences and GIS programs have always been closely aligned and overlapping in their learning outcomes, curricula, real-world applications, student interest, and industry partners. The ENV curriculum requires at least three terms of GIS coursework and many ENV students complete a minor in GIS. The Geomatics department is also considering developing a graduate program. Development of a Masters in Natural Resources should be in close consultation with the Geomatics Department to ensure synergy and reduce redundancy of future programs.

PPHM: The Population Health Management program also has significant overlap in learning objectives such as environmental health. We will also include the PPHM program in planning and development to increase opportunities for all programs.

State Universities: Faculty at Oregon Tech already have significant collaboration with Oregon State University. Dr. Jhermine Kellerman has collaborated with Dr. Daniel Leavell of OSU Extension. With this program we can build even more significant opportunities for collaboration on research at sites in the Klamath region. Dr. Nate Bickford Also communicated with Dr. Mark Needham (OSU) on potential collaboration results from the graduate program. **See attached letter in Appendix**.

Dr. Nate Bickford has also spoken to Dr. Karen Mager of Southern Oregon University about opportunities to collaborate in the classroom and in research. The graduate program will help facilitate many possible opportunities to work together.

See attached letter of support in Appendix

a. Manner in which the proposed program contributes to institutional and statewide goals for student access and diversity, quality learning, research, knowledge creation and innovation, and economic and cultural support of Oregon and its communities.

The proposed Program located in Klamath Falls will facilitate student experiences in underserved, rural regions of the state.

We are working to develop collaborations with Klamath tribes and with the development of their environmental research and policies, we think we can find some strong common ground to build programs together.

Students attracted to this program are likely from OIT's biology/science programs and will serve to help establish services in rural and underserved areas of the state.

In addition to providing a rigorous curriculum, and conducting regular assessment of learning outcomes, the program will admit students who have the necessary characteristics to succeed in this field. In order to ensure that students will have the necessary preparation for success, applicants must meet the program admissions requirements as determined by OIT. The program will have a rigorous curriculum, standards for admissions, accreditation standards, and ongoing program assessments.

Per Oregon Tech policy, to be considered for admission to this graduate program, an applicant must have a baccalaureate degree from a regionally accredited college or university, as well as a scholastic record that evidences the ability to perform satisfactory graduate work.

Specifically, all MS-BMS students must:

- be in good academic standing currently or at the last college or university attended
- have attained a grade point average of at least 3.0 on a 4.0 scale for the last 90 term (60 term) units attempted
- have attained a grade point average of at least 3.0 on a 4.0 scale for the last 47 term hours in the major

Students pursuing the standalone MS program:

- completed a four-year college course of study and hold an acceptable baccalaureate degree from an institution accredited by a regional accrediting association

b. Manner in which the program meets regional or statewide needs and enhances the state's capacity to:

i. improve educational attainment in the region and state;
ii. respond effectively to social, economic, and environmental challenges and opportunities; and
iii. address civic and cultural demands of citizenship.

- The OIT program will be the only Natural Resource Masters program east of the Cascades with a focus on rural, eastern arid land systems of the Cascade Mountains, Great Basin, Sage-steppe, juniper woodland, and high desert ecoregions.
- We are embedded within and surrounded by small, rural natural resource-based communities that face a wide range of challenges which confront much of the American west including increasing drought & water scarcity, increasing risk of and catastrophic wildfire, endangered species management, development & land use change, climate change.
- Although Klamath Falls is a relatively small town, it is home to the headquarters and offices of many major federal, state, and non-governmental natural resource management agencies and organizations including:
    - US Forest Service
    - Bureau of Land Management
    - US Fish & Wildlife
    - US Geological Survey

- Bureau of Reclamation
- National Park Service
- OR Dept of Forestry
- OR Dept of Fish & Game
- Klamath Tribes
- The Nature Conservancy
- Trout Unlimited

- We will have a graduate program focused on specific applied graduate projects designed to serve specific agency partners and local/regional needs
- Our university and Master program will be well placed to address significant social, economic, and environmental challenges and opportunities in the region including
    - Klamath River Dam Removal – the largest dam removal project in the world – beginning in 2023
    - Water quality and availability issues
    - Wildlife conservation and endangered species management
    - Air quality and environmental health
    - Wildland fire and forest resources management
    - Civic engagement in the management of public resources

3. Accreditation

a. Accrediting body or professional society that has established standards in the area in which the program lies, if applicable.

NA

b. Ability of the program to meet professional accreditation standards. If the program does not or cannot meet those standards, the proposal should identify the area(s) in which it is deficient and indicate steps needed to qualify the program for accreditation and date by which it would be expected to be fully accredited.

The department does not fell like this is a concern based on our accreditation of the BS

c. If the proposed program is a graduate program in which the institution offers an undergraduate program, proposal should identify whether or not the undergraduate program is accredited and, if not, what would be required to qualify it for accreditation.

The BS program is accredited.

d. If accreditation is a goal, the proposal should identify the steps being taken to achieve accreditation. If the program is not seeking accreditation, the proposal should indicate why it is not.
We do not have specialized accreditation.

4. Need

a. Anticipated fall term headcount and FTE enrollment over each of the next five years. The numbers in the table below represent a roughly 2:1 ratio of 3+2 BMS to Standalone MS students. We recognize that this ratio could

vary from year to year depending on the qualifications and interests of the undergraduates in any given year, faculty research and funding.

1st Year (2023)	2nd Year (2024)	3rd Year (2025)	4th Year (2026)	5th Year (2027)	10th Year (2033)
10 enrolled	5 incoming 15 enrolled 10 graduating	13 incoming 18 enrolled 5 graduating	5 incoming 18 enrolled 13 graduating	16 incoming 21 enrolled 5 graduating	8 incoming 24 enrolled 16 graduating

b. Expected degrees/certificates produced over the next five years.

51 thesis MS degree in Natural Resources

c. Characteristics of students to be served (resident/nonresident/international; traditional/ nontraditional; full-time/part-time, etc.).

The program design allows for students to be served from any of the listed characteristics.

d. Evidence of market demand.

Anticipated market & demographics

Our Masters program will attract and target two primary markets and demographics.

- *Young people deeply concerned about critical environmental problems in rural regions:* Environmental issues are a central concern in the Northwest, the U.S. and globally, particularly for contemporary young people, sometimes called Generation Z (or Zed). The Climate Crisis, environmental pollution and health, biodiversity loss, catastrophic wildfires, destruction of the world's rainforests, and environmental justice are all critical concerns of students in and entering universities. This is our market, people, especially young students coming out of high school, who feel compelled to help discover and contribute to solutions to the world's pressing environmental problems at the graduate level. We expect to continue to attract students, for both our graduate and undergraduate programs that are interested in tackling global environmental problems at the local scale in rural communities that have challenges and problems unique to the history and circumstances of rural, in contrast to urban, America.

  Specifically, our marketing will target:

  - Students graduating from our own undergraduate program, or the dual majors with CE and REE, who are eligible to pursue a Masters through the 3+2 option.
    - We believe that the 3+2 Masters option could be very attractive to:
      a. students at 2-year community colleges considering a bachelors degree as well as
      b. students at other 4-year institutions that are considering transfer
  - Students graduating with other undergraduate degrees (not Environmental Science) from Oregon Tech but are interested in a graduate degree that integrates issues of natural resources and environmental science with their undergraduate discipline. These may be students from biology-health science, civil or renewable energy engineering, or social science programs such as population health management or applied psychology.

- Students graduating from regional undergraduate programs seeking to study natural resource and environmental problems in rural regions of Oregon, the Northwest, and beyond through adequately funded partner-driven projects.

- *Career professionals seeking advancement in their sector:* Both within and outside Klamath Falls, there are a large number of people already working in the field of natural resources and environment. Typically, people working in this sector already have an undergraduate degree, although this degree may have been attained some time ago, be in a general field such as biology, or in an unrelated discipline. Attaining a graduate degree represents a way to qualify for more advanced positions and/or higher pay grades within their job series. For individuals with undergraduate degrees more unrelated to environmental fields, they may wish to also take a number of undergraduate courses as well such as wildlife ecology, botany, environmental chemistry, or physics to help meet the qualifications of federal and state job series.

- *Agency research needs:* The professors in the Environmental Science have spoken with US Forest service, US Geologic Service, US Fish and Wildlife Service, Bureau of Land Management, and Oregon Department of Fish and Game about the graduate program and potential projects. There was overwhelming excitement about the opportunities to work and fund local graduate student on project. All of the agencies have district offices in Klamath Falls. The agency partners are very confident in creating opportunities since they have more project than manpower.

- From University of Oregon

  "For the 2018-2019 graduate class, the department received 162 applications for 5 positions. We initially made offers to 7 applicants, or around 4% of those who applied."

  This information indicates that there is a number of possible students that are interested in Graduate Programs but have not successfully found a program. We are lacking more recent data but we do not feel the pattern has changed.

- The Texas A&M Natural Resource Job Board is an industry standard to recruit students. Between November 1st and December 7th there were posting for 6 graduate positions in the Northwest out of 103 total requests during that same time period for the rest of the country. Clearly there is a need for more graduate study opportunities in the Northwest.
  Recruiting graduate students for funded position is as simple as advertising in a graduate student board such Texas A&M job board. At Colorado State University Pueblo – a similar school to Oregon Tech a graduate position would attract 30 – 50 qualified applicants.

- The job outlook for Natural Science manager is a 6% increase which is the average increase for job market in the United States (https://www.bls.gov/ooh/management/natural-sciences-managers.htm).

- We performed a survey of environmental students to identify their interest in the Master's Program. Although we did not have large number of respondents, we do feel the patterns would stay the same for a larger number of students. We also feel the comments below indicate the overall feeling of the students.

  "Klamath Falls is a region with diverse and complex natural resources opportunities and topics. The addition of a masters program will draw in more prospective students and further elevate OIT as a premiere polytechnic university. I know I would pursue a masters in natural science here"

  "As a senior I don't think it will impact me a lot. I do think that the freshman or sophomore's would definitely benefit from a masters program. A Masters program could bring in more students and money for the natural science department."

  "It will add opportunities for enhanced education that will set us up better in the future."

"Oregon tech on it's own has very few graduate programs compared to competition, so the more the merrier. In perspective to natural science, many jobs require some sort of graduate degree so implementing a program here would be very beneficial."

"I think it would be awesome!"

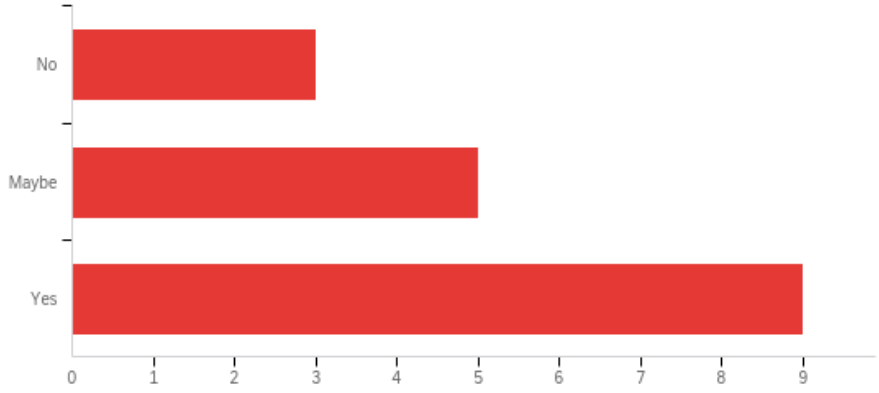
"I would consider adding a Masters if it is implemented."

"A Masters Program would be beneficial for OIT students in the ENV program. This program could provide more educational opportunities for students to learn about more specific topics at a higher level."

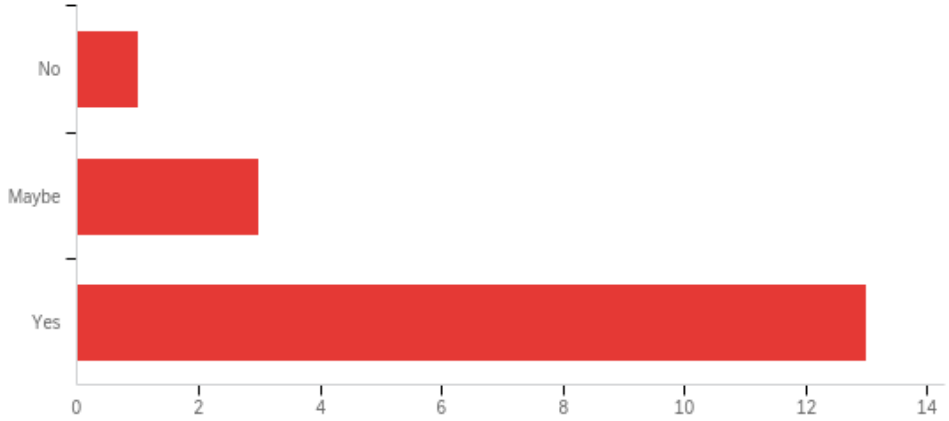
"I think a masters program would help increase the research that we do and encourage more people to join the program since there is more room of individuals to grow"

Some of the questions asked of the students indicate that the majority of the students are both interested and excited about the graduate program and many are interested in applying to the program.

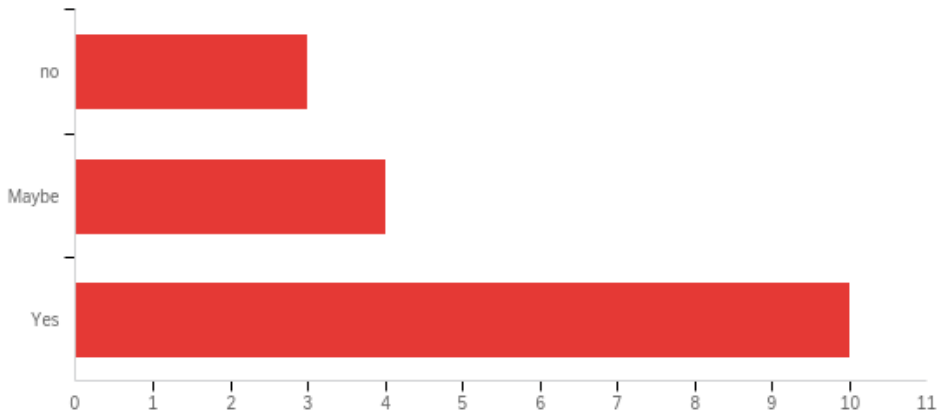
Have you thought about a Masters degree?



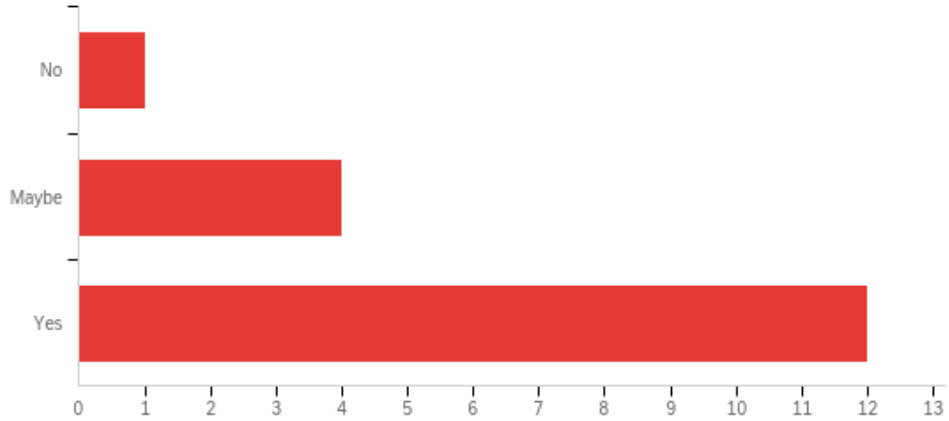
Do you think that adding a Masters program in Natural Resources at Oregon Tech would enhance your educational experience?



Would you be interested in a Masters Program?



Are you interested in research and developing a research project?



e. If the program's location is shared with another similar Oregon public university program, the proposal should provide externally validated evidence of need (e.g., surveys, focus groups, documented requests, occupational/employment statistics and forecasts).

NA

f. Estimate the prospects for success of program graduates (employment or graduate school) and consideration of licensure, if appropriate. What are the expected career paths for students in this program?

There is extremely high demand for students with graduate degrees in natural resources and environmental sciences from a wide range of federal, state, private, and non-governmental organizations. Any organization or company that manages, uses or impacts natural resources or the environment needs personnel with multidisciplinary science background in the environmental fields. In particular, highly trained individuals are in extremely high demand by federal and state agencies that manage natural resources in our rural regions, such as the US Forest Service, Bureau of Land Management, US Fish & Wildlife, and Oregon Departments of Forestry and Fish and Wildlife.

Federal and state natural resource agencies pay strong salaries with good benefits. Students with graduate degrees can qualify for intermediate to upper level pay grades, especially in conjunction with prior experience. For example, many of our undergraduate students work for the federal government (e.g. US Forest Service, US

Fish & Wildlife, National Park Service) during summer break and after graduation our students. These positions are within the federal Office of Personnel Management, 400 Occupational Series – Biological Sciences (Office of Personnel Management), which includes common job series such as Natural Resources Management and Biological Sciences, Biological Science Technician Series, Ecology Series, Forestry Series, and Wildlife Biology Series, most of which have educational requirements.

Individuals with a Masters degree and some prior work experience in natural resources and environmental science can expect to start a federal job in the 400 series at the General Schedule (GS) level of 5, 7, or 9. These positions, as of 2020 have annual salaries in Oregon of $45,000 - $71,000 depending on position, location, and experience (Office of Personnel Management). Depending on experience and location, students with a Masters degree appropriate experience could qualify for positions at least at the GS-11 level, with 2019 salaries ranging from at least $66,000 - $86,000 and possibly the GS12-13 level ranging from $79,000 - $122,750.

It is extremely important to note that most of our current undergraduate students are from rural regions and wish to remain and work in rural regions, often in eastern Oregon, California, and Washington. The salaries stated above for positions in the federal 400 Biological series as well as for similar state agency job series provides a high standard of living in rural areas where the cost of living is relatively low compared to urban areas. For example, the average cost/value of a home in Klamath Falls is $177,000, while in Portland, OR it is $416,000, in Seattle it is $714,000, and in San Francisco, CA is $1.3 million! Furthermore, many individuals with undergraduate and advanced degrees in natural resources and environmental sciences work as, or for independent contractors regularly earning $100-200 per hour.

These economic metrics highlight the fact that students attaining a graduate degree in NR at OIT can 1) achieve very comfortable salaries by any standard, 2) particularly in the rural areas where many jobs are located which have significantly lower costs of living which regions where many tech industry jobs are based.

5. Outcomes and Quality Assessment

a. Expected learning outcomes of the program.

1. Advanced conceptual and applied knowledge of conservation, ecology, and management of natural resources.
2. Management and completion of an original research project including study design, hypothesis testing, data analysis, manuscript writing, and public communication and outreach
3. Active professional engagement in a graduate-level community of peers, faculty, industry partners, and the public.
4. Ability to effectively appraise and constructively critique scientific work and writing.
5. Mentoring of undergraduates in the natural sciences.

b. Methods by which the learning outcomes will be assessed and used to improve curriculum and instruction.

We will use techniques already developed to assess Programmatic Student Learning Objectives (PSLOs) in our BS of Environmental Science. This includes the analysis of academic works such as papers, presentations, exams, and lab exercises specifically developed to assess specific PSLOs. Additionally, we will use peer-review and publication of manuscript submissions to assess Number 2 above. We will also survey industry partners who work closely with our graduates as project mentors and collaborators on the professionalism, effectiveness, and skills of graduate students they engage with.

c. Nature and level of research and/or scholarly work expected of program faculty; indicators of success in those areas.

Faculty will be expected to engage with the MS of Natural Resources program in at least one or more of four main areas:

1. Developing masters-level research projects in collaboration with partnering agencies and organizations to meet identified needs in management, conservation, planning, and research and to be published in peer-reviewed literature;
2. Develop masters projects that fit within ongoing research programs of the faculty member and to be published with peer-reviewed literature;
3. Provide graduate-level instruction in the form of courses, seminars, and trainings;
4. Serve on graduate thesis committees, providing mentorship and review of required graduate products

6. Program Integration and Collaboration

a. Closely related programs in this or other Oregon colleges and universities.

Oregon State University

- MS in Fisheries & Wildlife Administration
- MS in Wildlife Science
- MS in Natural Resources
- MS in Forest Ecosystems & Society
- MS in Environmental Sciences

University of Oregon

- MS in Environmental Studies

Southern Oregon University

- MS in Environmental Education

Portland State University

- MS in Environmental Science and Management

Western Washington University

- MS in Environmental Science

Cal-Poly Humboldt

- MS in Environmental Systems
- MS in Natural Resources

b. Ways in which the program complements other similar programs in other Oregon institutions and other related programs at this institution. Proposal should identify the potential for collaboration.

As we mentioned above, this will be the only Masters in Natural Resources east of the Cascade Mountains. The rural, arid lands ecosystems of our region are unique, with biogeographic and socioeconomic factors quite different from the more populated and mesic systems west of the Cascades. We have significant need and demand for graduate level research in our region that can meet the management and research needs of our faculty and partner agencies and organizations who lack capacity. We already collaborate with other universities in the state. For example, Dr. Jherime Kellermann has collaborated with Oregon State University, both the main and Cascades campuses, over the past ten years on research projects on sensitive species conservation, wildfire ecology, and climate change scenario planning. In the past we have collaborated with OSU-Cascades, Southern Oregon University, College of the Siskiyous, and Western Washington University.

The development of the MS in Natural Resources will facilitate added and advanced collaboration with other programs at Oregon Tech, including the MS in Civil Engineering (we already have a Dual major in CE and Environmental Science), the MS in Renewable Energy Engineering (we have a Dual Major in REE and ENV), the Geomatics program and the developing GIS Service Center, the Population Health Management Program, the proposed MS in Medical Science program, and the Data Science Program. With this program we can build even more significant opportunities for collaboration on research at sites in the Klamath region. Dr. Nate Bickford also communicated with Dr. Mark Needham (OSU) on potential collaboration results from the graduate program. Dr. Nate Bickford has also spoken to Dr. Karen Mager of Southern Oregon University about opportunities to collaborate in the classroom and in research. The graduate program will help facilitate many possible opportunities to work together.

c. If applicable, proposal should state why this program may not be collaborating with existing similar programs.

d. Potential impacts on other programs.
We expect minimal impact on programs at other institutions due to the unique location and programmatic offerings of Oregon Tech and the MS in Natural Resources. Students interested in Oregon Tech are typically seeking out our small school with low teacher to student ratios as well as our rural setting in the upper Klamath Basin and the Great Basin bioregion including the outstanding outdoor opportunities, low cost of living, and high quality of life.

7. External Review

If the proposed program is a graduate level program, follow the guidelines provided in *External Review of New Graduate Level Academic Programs* in addition to completing all of the above information.

See attached Appendix F. External review report and reviewers CV

Appendix A: Curriculum Map for 3+2 Natural Resources track

BMS 3+2 CURRICULUM ("Senior" Year 4 of BS, Year 1 of the +2 BMS)															
	Fall					Winter					Spring				
Course	ENV 108	SPE 321	WRI Elec	Tech Elec	ENV 501	ENV 485	BIO 595	SOC/HUM Elective	Tech Elec	BIO 510	ENV 484	BIO 595	Tech Elec	Tech Elec	
Course Title	Mentorship & Team Building	Small Group and Team Com.	WRI 327, 328, 345, 350, or 410	Technical Elective (500)	Intro to Grad Studies	Ecoregional Management	Grad research/ Thesis	Social Sci/Hum elective	Technical Elective (500)	Current Issues	Sustainable Human Ecology	Grad research/ Thesis	Technical Elective (500)	Technical Elective (500)	Total Grad credits
Credits	1	3	3	4	3	3	2	3	4	1	4	2	4	4	24
Year 2 of +2															
Course	BIO 511	BIO 510	BIO 595	Tech Elec	Tech Elec	BIO 510	BIO 595	BIO 535			BIO 595				
Course Title	Foundations in Conservation	Current Issues	Grad research/ Thesis	Technical Elective (500)	Technical Elective (500)	Current Issues	Grad research/ Thesis	Advanced Data Analysis			Grad research/ Thesis				
Credits	3	1	2	4	4	1	2	4			2				23

Appendix B: Schedule of course offerings for ENV program, Fall 2023 through Spring 2025

Fall 2023		
Course Number	**Course Name**	**Campus**
BIO 255	Sophomore Research	Klamath Falls
BIO 355	Junior Research	Klamath Falls
BIO 455	Senior Research	Klamath Falls
BIO 307	Seminar: Ecology Elective	Klamath Falls
BIO 377	Wildlife Ecology	Klamath Falls
ENV 108	Mentorship & Team Building	Klamath Falls
ENV 111	Intro to Env Sciences	Klamath Falls
ENV 217	Intro to Natural Resource Management	Klamath Falls
ENV 355	Careers and Professions in Environmental Science	Klamath Falls
ENV 465	Ecological Restoration and Monitoring	Klamath Falls
ENV 495	Research in Environmental Sciences	Klamath Falls
GEOG 335	Soils	Klamath Falls
HED 240	Emergency Care and CPR	Klamath Falls
Winter 2024		
Course Number	**Course Name**	**Campus**
BIO 255	Sophomore Research	Klamath Falls
BIO 355	Junior Research	Klamath Falls
BIO 455	Senior Research	Klamath Falls
BIO 354	Environmental Health	Klamath Falls
BIO 446	Conservation Biology	Klamath Falls
CHE 315	Environmental Chemistry	Klamath Falls
ENV 224	Scientific Reasoning & Methodology	Klamath Falls

ENV 226	ENV Data Analysis	Klamath Falls
ENV 314	Environmental Policy and Management	Klamath Falls
ENV 4xx	Environmental Education	Klamath Falls
ENV 434	Advanced Data Analysis	Klamath Falls
ENV 495	Research in Environmental Sciences	Klamath Falls
PHED 163	Wilderness Navigation	Klamath falls
PHY 201	General Physics	Klamath Falls
Spring 2024		
Course Number	**Course Name**	**Campus**
BIO 2xx	Sophomore Research	Klamath Falls
BIO 3xx	Junior Research	Klamath Falls
BIO 4xx	Senior Research	Klamath Falls
BIO 386	Ornithology	Klamath Falls
BIO 369	Mammalogy	Klamath Falls
CHE 465	Fate/Transport of Pollutants	Klamath Falls
ENV 315	Water Resources	Klamath Falls
ENV 375	Forest Ecology & Mgmt	Klamath Falls
ENV 484	Sustainable Human Ecology	Klamath Falls
ENV 495	Research in Environmental Sciences	Klamath Falls
GEOG 105	Physical Geography	Klamath Falls
HED 240	Emergency Care and CPR	Klamath Falls
Summer 2024		
Course Number	**Course Name**	**Campus**
BIO 407	Ecology elective	Klamath Falls
Fall 2024		
Course Number	**Course Name**	**Campus**
BIO 255	Sophomore Research	Klamath Falls
BIO 355	Junior Research	Klamath Falls
BIO 455	Senior Research	Klamath Falls
ENV 355	Careers in Environmental Sciences	Klamath Falls
BIO 337	Aquatic Ecology	Klamath Falls
ENV 111	Intro to Env Sciences	Klamath Falls
ENV 214	Watershed Science and Tech	Klamath Falls
ENV 217	Intro to Natural Resource Management	Klamath Falls
ENV 3xx	Fire Ecology	Klamath Falls
ENV 355	Careers and Professions in Environmental Science	Klamath Falls
ENV 495	Research in Environmental Sciences	Klamath Falls
HED 240	Emergency Care and CPR	Klamath Falls

Winter 2025		
Course Number	**Course Name**	**Campus**
BIO 255	Sophomore Research	Klamath Falls
BIO 355	Junior Research	Klamath Falls
BIO 455	Senior Research	Klamath Falls
BIO 426	Evolutionary Biology	Klamath Falls
CHE 315	Environmental Chemistry	Klamath Falls
ENV 224	Scientific Reasoning & Methodology	Klamath Falls
ENV 226	Environmental Data Analysis	Klamath Falls
ENV 460	Risk Assessment and Wilderness First Aid	Klamath Falls
ENV 434	Advanced Data Analysis	Klamath Falls
ENV 485	Habitat Management	Klamath Falls
ENV 495	Research in Environmental Sciences	Klamath Falls
GEOG 313	Climatology and Atmospheric Science	Klamath Falls
HED 240	Emergency Care and CPR	Klamath Falls
PHY 201	General Physics	Klamath Falls
Spring 2025		
Course Number	**Course Name**	**Campus**
BIO 255	Sophomore Research	Klamath Falls
BIO 355	Junior Research	Klamath Falls
BIO 455	Senior Research	Klamath Falls
BIO 313	Botany and Plant taxonomy	Klamath Falls
BIO 367	Plant Ecology	Klamath Falls
BIO 428	Fisheries	Klamath Falls
CHE 465	Fate/Transport of Pollutants	Klamath Falls
ENV 226	Environmental Data Analysis	Klamath Falls
ENV 469	Treatment Wetlands	Klamath Falls
ENV 484	Sustainable Human Ecology	Klamath Falls
ENV 495	Research in Environmental Sciences	Klamath Falls
GEOG 105	Physical Geography	Klamath Falls
HED 240	Emergency Care and CPR	Klamath Falls
PHED 163	Wilderness Navigation	Klamath Falls

Appendix C: Curriculum Map for 2 year thesis track

NEW CURRICULUM		
1st Year - Fall		
BIO 511	Foundation in conservation	3
BIO 501	Intro to Graduate Study	3
	Elective	3

	Elective	
	TOTAL:	9
1st Year - Winter		
ENV 535	Graduate Data Analysis	4
BIO 512	Current Issues	1
BIO 595	Graduate Research/Thesis	2
	TOTAL:	7
1st Year - Spring		
BIO 512	Current Issues	1
BIO 595	Graduate Research/Thesis	2
	Elective	3
	Elective	3
	TOTAL:	9
2nd Year - Fall		
BIO 512	Current Issues	1
BIO 595	Graduate Research/Thesis	2
	Elective	3
	Elective	3
	TOTAL:	9
2nd Year - Spring		
BIO 595	Graduate Research/Thesis	2
	Elective	3
	Elective	3
	TOTAL:	8
2nd Year - Spring		
BIO 595	Graduate Research/Thesis	2
	Elective	3
	TOTAL:	5
	DEGREE TOTAL:	**47**

Appendix D. Natural Resources Faculty CV

Jherime L. Kellermann, PhD

1001 Loma Linda Dr., Klamath Falls, OR 97601

jlkellermann@gmail.com

Cell: 707-599-0777

EDUCATION

PhD 2013. University of Arizona, Tucson, AZ

- **Major:** Wildlife Conservation & Management, **Minor**: Renewable Natural Resources
- **Dissertation**: Spatiotemporal and phenological patterns of bird migration and the influence of climate and disturbance in the Madrean Sky Island Archipelago and American southwest.
- **Adviser**: Dr. Charles van Riper III

MS 2007. Humboldt State University, Arcata, CA

- **Major**: Wildlife
- **Thesis**: Ecological and Economic services provided by birds on Jamaican Blue Mountain coffee farms.
- **Adviser:** Dr. Matthew D. Johnson

BA 1998. Pennsylvania State University, University Park, PA

- **Multiple Major Program**: Anthropology & Psychology

TEACHING POSITIONS

Fall 2022 – To date: ***Professor,* Oregon Tech,** Natural Sciences Dept., Klamath Falls, OR.
Fall 2017 – Spring 2022: ***Associate Professor***, **Oregon Tech**, Natural Sciences Dept., Klamath Falls, OR.
Fall 2013 – Spring 2017: ***Assistant Professor***, **Oregon Tech**, Natural Sciences Dept., Klamath Falls, OR
New courses I have created and taught as **Lead Instructor** since Fall 2013

- Mentorship & Team Building (ENV108)
- Intro to Natural Resource Management (ENV217)
- Fire Ecology (ENV/BIO307)
- Coffee: Ecology & History (BIO307)
- Environmental Health (BIO354)
- Wildlife Ecology (BIO377)
- Ornithology (BIO386)
- Crater Lake Ecology (BIO307)
- Natural Resource Management & Environmental Health (BIO407)
- Conservation Biology (BIO446)

Pre-existing courses I have significantly re-designed/re-created and taught as **Lead Instructor** since Fall 2013

- Principles of Biology I (BIO211)
- Principles of Biology II (BIO212)
- Scientific Reasoning & Methodology (ENV224)
- Careers in Environmental Science (ENV275)
- Developmental Biology (BIO352)
- Methods in Environmental Science (ENV365)
- Evolutionary Biology (BIO426)
- Sustainable Human Ecology (BIO484)

Other academic positions and duties

- **Advising Coordinator** for Environmental Sciences program from 2017-to date

- **Assessment Coordinator** for the Environmental Sciences Program 2017-2019
- Academic advising of program majors (including those in the dual Environmental Science-Civil Engineering and –Renewable Energy Engineering degrees)
- Advising of independent student research projects
- Academic service on a range of academic committees including Sustainability Committee (2016-2021), Health & Wellness Committee (2018-to date), search committees

Fall 2017 – Spring 2021: ***Environmental Sciences Program Director***, **Oregon Tech**, Natural Sciences Dept.

- Organize and lead strategic planning for the program
- Oversee program and curriculum development and changes
- Develop and maintain partnerships with regional, state, and national organizations, agencies, and individuals
- Develop opportunities for student research, internships, and jobs
- Organize and lead program faculty meetings
- Identify and support the teaching and research needs of our faculty
- Management of a program fund held by the Oregon Tech Foundation
- Lead and organize outreach and student recruitment including "influencer" events, high school and community college visits, on-campus events, materials development, and social media development
- Coordinate with upper administration (chair, dean, provost) to manage the program

2009-2011***: Graduate Teaching Associate,*** **University of Arizona**, Ecology & Evolutionary Biology Dept., Tucson, AZ

- ***Fall 2011 - Lead-Teaching Associate*** - Ecology (ECOL302),
  - Supervise a team of six graduate student TAs for the course
  - Coordination of field materials and vans, examinations and grading
  - Teaching of weekly labs
  - Periodic lectures (150+ students)
- Spring 2011 - Intro Ecology & Evolutionary Biology (ECOL182L) – **Lab Instructor**
- Fall 2009 – 2011 Ecology (ECOL302) – **Lab Instructor**

2005-2007: ***Graduate Teaching Assistant***, **Humboldt State University**, Wildlife Dept., Arcata, CA

- Ornithology (WDLF 365)
- Wildlife Management & Research Techniques (WDLF 311)
- Advanced Ornithology (WDLF465)

Fall 2006: ***Tutor*** – Ecology of Wildlife Populations (WDLF 478), **Humboldt State University**, Learning Center
Fall 1999: ***Naturalist***, **Ferry Beach Ecology School,** Saco, ME

RESEARCH POSITIONS

08/19/2013 – 09/16/2017: ***Science Coordinator*** (0.5 FTE), **Crater Lake National Park – Science and Learning Center**, Crater Lake National Park

- Attract and promote research by academic scientists and students within Crater Lake National Park to further the natural resource needs of the park
- Assist natural resource staff in identifying and securing funding for park projects and monitoring
- Development of an annual competitive student research assistantship program
- Supervision of an annual student intern and independent research project
- Presentation of projects at annual conferences
- Lead annual summer course for university students at the park, including a group research project

02/04/2013 – 08/30/2013**:** ***Wildlife Ecologist***, **USA National Phenology Network**, University of Arizona, Tucson

- Provide expertise on the development of monitoring protocols for wildlife species, especially birds

- Data analysis, report writing, conference presentations, organization of workshops for natural resource and research professionals
- Promote and Coordinate with other organizations, agencies, and researchers to implement USA-NPN protocols
- Support graduate students utilizing USA-NPN protocols and data across the country

01/11/2012 – 12/20/2012: ***Graduate Research Associate***, **USA National Phenology Network**, & School of Natural Resources & Environment, **University of Arizona**, Tucson, AZ

- Provide expertise on the development of monitoring protocols for wildlife species, especially birds
- Data analysis, report writing, conference presentations, organization of workshops for natural resource and research professionals
- Coordinate with other organizations, agencies, and researchers to implement USA-NPN protocols

08/2008 – 06/2011: ***Graduate Research Associate***, School of Natural Resources & Environment, **University of Arizona**, Tucson, AZ. Supervisor: Dr. Charles van Riper III

- Survey migratory bird populations during spring migration throughout the Madrean Archipelago of southeast Arizona.
- Supervise a team of 4-5 technicians
- Data management, analysis and report writing
- Management of other avian research project data, field work, technicians, and graduate students

05/2009 – 05/2010: ***STEP Biologist***, **US Forest Service**, Coronado National Forest, Hereford, AZ, 40hrs/wk

- Assess impacts of vegetation thinning projects on bird communities throughout the Huachuca Mountain range of southeast Arizona.

02/2008 - 05/2008: ***Biologist***, **US Fish & Wildlife Service**, Humboldt Bay National Wildlife Refuge, CA, 40hrs/wk, GS-5

- Lead Aleutian Cackling Goose project, conducting band recovery/resight surveys, mapping and report writing
- Monitoring of Black Brandt population on Humboldt Bay
- Refuge mapping

05/2007 - 08/2007: ***Biologist***, **Bureau of Reclamation**, lower Colorado River, AZ and CA, 40hrs/wk, GS-7

- Surveys of the lower Colorado River for 8 species of birds of conservation concern using spot mapping method

05/2004 – 07/2008: ***Biological Contractor***, **Klamath Bird Observatory**, Ashland, OR

- Conduct avian point count surveys throughout southern Oregon and Northern California

08/2003 - 11/2003: ***Biologist*** – Abaco Parrot Project, **North Carolina State University,** Abaco, Bahamas 40hrs/wk

- Tracking movements, dispersal, and habitat use by Abaco parrots using VHF telemetry

05/2002 - 07/2004: ***Crew leader***, **USFS Pacific Southwest Research Station**, Redwood Sciences Laboratory, Arcata, CA, 40hrs/wk, GS-5

- Operation of MAPS stations in NW California following standardized protocols
- Capture and banding of small owls
- Lead American Dipper project on Smith River watershed
- Total capture & processing across projects of more than 1,000 birds across more than 50 species

02/2002 - 04/2002: ***Biological Technician***, **Institute for Wildlife Studies,** San Clemente Island, CA 40hrs/wk.

- Capture, banding, and monitoring (resight) of endangered San Clemente Sage Sparrows

01/2001 - 08/2001: ***Assistant Project Coordinator*** – Puaiohi Recovery Project, **USGS Pacific Islands Ecosystem Research Center** & **University of Hawaii,** HI, 40hrs/wk

- Banding of critically endangered Puaiohi adults and nestlings

- Fitting of VHF transmitters to captured Puaiohi
- Tracking and data analysis of telemetry data
- Analysis of survival, population estimates, and habitat use

02/2000 - 08/2000: ***Biological Technician***, **US Forest Service,** Gila National Forest, Silver City, NM, 40hrs/wk, GS-5
- Survey for Mexican Spotted Owls

05/1999 - 08/1999: ***Biological Technician***, **Institute for Bird Populations,** Fremont National Forest, OR, 40hrs/wk
- Operation of MAPS stations following standardized protocols
- Capture and processing of more than 3,000 birds from more than 75 species

01/1999 - 05/1999: ***Biological Technician*** – Puaiohi Recovery Project, **USGS Pacific Islands Ecosystem Research Center**, HI, 40hrs/wk
- Banding of critically endangered Puaiohi adults and nestlings
- Fitting of UHF transmitters to captured Puaiohi
- Tracking and data analysis of telemetry data
- Lethal control of exotic predators (cats, rats)

07/1998 - 11/1998: ***Aviculture Intern***, **The Peregrine Fund,** Keauhou Bird Conservation Center, HI, 40hrs/wk
- Handling and care of multiple species of critically endangered Hawaiian birds including the ‘Alalā, Puaiohi, and Nene.
- Lethal control of exotic predator on the KBCC property

06/1996 - 08/1996: ***Volunteer Technician***, **Foundación Jatún Satcha,** Bilsa Biosphere Reserve, Ecuador, 40hrs/wk
- Collect and prepare plant specimens for the Missouri Botanical Gardens (see http://www.mobot.org/MOBOT/research/ecuador/pacific/checklist.shtml for list of type specimens)
- Reforestation including maintaining tree seedling beds, transplanting, and outplanting

PUBLICATIONS

*Represents undergraduate co-author, **represents graduate student co-author

PUBLISHED

Kellermann, J. L. *2021*. The knowledge of rails and waterthrush: Observer value and information content in Oregon’s rare bird populations. *Oregon Birds* 47(2), 107-110

Albert, S.K., J.D. Wolfe, **J.L. Kellermann**, T.W. Sherry, B.J.M. Stutchbury, N.J. Bayly, & A. Ruíz-Sánchez. 2020. Habitat ecology of Nearctic-Neotropic migrant landbirds on the wintering grounds. The Condor https://doi.org/10.1093/condor/duaa055

Kellermann, J.L. 2020. Migratory birds need wildfire, but beware too much of a good thing. Vermillion Flycatcher 65: 14-15. https://tucsonaudubon.org/wp-content/uploads/2021/02/VF-Fall2020-WEB.pdf

Kellermann J.L., Rodhouse TJ, Nesmith JC, Chung-MacCoubrey A. 2019. Setting the stage for climate change scenario planning: Whitebark pine and American pika in the Sierra Nevada, Klamath, and Upper Columbia Basin Inventory and Monitoring Networks. Natural Resource Report. NPS/KLMN/NRR—2019/1960. National Park Service. Fort Collins, Colorado PDF

O'Leary**, D., **J.L. Kellermann**, & C. Wayne. 2018. Snowmelt, spring phenology, and extended growing season in Crater Lake National Park. International Journal of Biometeorology. DOI 10.1007/s00484-017-1449-3

Gerst, K.L., **J.L. Kellermann**, C.A.F. Enquist, A.H. Rosemartin, E.G. Denny. 2015. Estimating the onset of spring from a a complex phenology database: Tradeoffs across geographic scales. International Journal of Biometeorology DOI 10.1007/s00484-015-1036-4

Kellermann, J.L. and C. van Riper III. 2015. Detecting mismatches of bird migration stopover and tree phenology in response to changing climate. *Oecologia*. DOI 10.1007/s00442-015-3293-7

Wood E. M. & **J.L. Kellermann.** Eds. 2015. Phenological synchrony of North American bird migration with seasonal resources in a changing climate. *Studies in Avian Biology* CRC Press, London.

Kellermann, J.L., C.A.F. Enquist, A. Rosemartin, D.L. Humple, N.E. Seavy, R. L. Cormier, and L. Barnett. 2015. A bird's eye view of the USA National Phenology Network: An off-the-shelf monitoring program. *Studies in Avian Biology* CRC Press, London p 47-60.

Kellermann, J.L. and C. van Riper III. 2015. Phenological synchrony of bird migration with tree flowering at desert riparian stopover sites. *Studies in Avian Biology* CRC Press, London p 133-144.

Enquist, C.A.F., **J.L. Kellermann**, K.L. Gerst, & A. Miller-Rushing. 2014. Phenology for resource management: connecting science to practice. *International Journal of Biometeorology* DOI: 10.1007/s00484-013-0772-6

Rosemartin, A.H., T.M. Crimmins, C.A.F. Enquist, K.L. Gerst, **J.L. Kellermann**, E.E. Posthumus, J. Weltzin, E.G. Denny, P. Guertin & L. Marsh. 2013. Organizing Phenological Data Resources to Inform Natural Resource Conservation. *Biological Conservation* DOI: 10.1016/j.biocon.2013.07.003

Kellermann, J.L., T.M. Crimmins, E.G. Denny, C.A.F. Enquist, K.L. Gerst, A.H. Rosemartin, and J.F. Weltzin. 2013. Nature's Notebook: 2012 State of the Data. USA-NPN Technical Series 2013-001 USGS IP-046270.

Kellermann, J.L., T.M. Crimmins, E.G. Denny, C.A.F. Enquist, R.L. Marsh, A.H. Rosemartin, J.F. Weltzin. 2012. Nature's Notebook: 2011 Data & Participant Summary. USA-NPN Technical Series 2012-001. USGS IP-038693.

Johnson, M. D., **J. L.**, **Kellermann** & A. M. Stercho. 2010. Pest reduction services by birds in shade and sun coffee in Jamaica. *Animal Conservation* 13: 140-147.

Johnson, M. D., N. J. Levy*, **J. L. Kellermann**, & D. E. Robinson. 2009. Effects of shade and bird exclusion on arthropods and leaf damage on coffee farms in Jamaica's Blue Mountains. *Agroforestry Systems* 76: 139-148.

Kellermann, J. L., M.D. Johnson, A.M. Stercho, & S. Hackett. 2008. Ecological and economic services of birds on Jamaican Blue mountain coffee farms. *Conservation Biology* 22: 177-1185.

Kellermann, J.L. & M.D. Johnson. 2006. Coffee-Friendly Birds: Can birds reduce pests in coffee? *Biocontrol News & Information* 27: 53N.

Tweed, E.J., J.T. Foster, B.L. Woodworth, W.B. Monahan, **J. L**. **Kellermann**, & A. Lieberman. 2006. Breeding biology and success of a reintroduced population of the Critically endangered Puaiohi. *The Auk* 123: 753-763.

Tweed, E.J., J.T. Foster, B.L. Woodworth, P. Oesterle, C. Kuehler, A. Lieberman, T.A. Powers, K. Whitaker, W.B. Monahan, **J.L. Kellermann**, & T. Telfer. 2003. Survival, dispersal, and home-range establishment of reintroduced captive-bred Puaiohi, Myadestes palmeri. *Biological Conservation* 111: 1-9.

CONFERENCE PRESENTATIONS (1st author)

Kellermann, J.L., D. O'Leary**, C. Wayne. 2017. Snowmelt, phenology, and growing season length in Crater Lake National Park. Northwest Scientific Association Annual Meeting, Ashland, OR.

Kellermann, J.L., T.J. Rodhouse, J.C.B. Nesmith, & A. Chung-MacCoubrey. 2016. Initiating climate change scenario planning for whitebark pine and American pika. 7th Mountain Climate Conference, Leavenworth, WA.

Kellermann, J.L., J. Lajoie*, S. Mohren, & A. Robatcek*. 2014. Black-backed woodpecker occupancy and Mountain Pine Beetle disturbance at multiple scales: Crater Lake National Park, Oregon. American Ornithologist's Union, Cooper Ornithological Society, Society of Canadian Ornithologists 2014 Joint Meeting, Estes Park, Colorado.

Kellermann, J.L., K.L. Gerst, & C.A.F. Enquist. 2013. When is the onset of a phenophase? Calculating phenological metrics from status monitoring data in the National Phenology Database. 98th Annual meeting of the Ecological Society of America, Minneapolis, MN.

Kellermann, J. L. and E. M. Wood (Symposium organizers) 2012. Tracking migratory stopover phenology: Climate change and the phenological synchrony of North American bird migration with seasonal resources. 5th North American Ornithological Conference, Vancouver, B.C., Canada. http://www.naoc-v2012.com/files/Kellermann.pdf

Kellermann, J.L. & C. van Riper III. 2012. Phenological synchrony, habitat breadth, and responses to climatic variation of bird migration in the Madrean Archipelago & American southwest. 5th North American Ornithological Conference, Vancouver, B.C., Canada.

Kellermann, J.L., D. Falk, & C. van Riper III. 2011. Migratory stopover habitat and landscape fire mosaics in Arizona's Madrean Archipelago. 36th Annual Conference of Western Field Ornithologists, Sierra Vista, AZ, USA.

Kellermann, J.L. & C. van Riper III. 2010. (Invited) Spring migration phenology and plasticity of habitat use by Neotropical migratory birds across an elevational gradient within the Madrean Archipelago, AZ, USA 25th International Ornithological Congress, Campos do Jordao, Brazil.

Kellermann, J.L. & C. van Riper III. 2010. Temporal and spatial patterns of spring migration and plant phenology across large elevational gradients in the arid southwestern United States. COS/AOU/SCO 2010 Joint Meeting, San Diego, CA.

Kellermann, J.L. & M.D. Johnson. 2009. Avian Diversity across tropical agroecosystems of Jamaica. 79th Meeting of Cooper Ornithological Society. Tucson , AZ.

Kellermann, J. L., M.D. Johnson, A.M. Stercho, S. Hackett, & D. W. Robinson. 2008. (Invited) Pest Control as an incentive for Bird Conservation in coffee Plantations. 4th International Partners in Flight Conference, McAllen, TX.

Kellermann, J. L. 2008. (Invited) Potential effects of late season hunting on Aleutian Cackling Goose distribution around Humboldt Bay. Humboldt Bay Symposium, Eureka, CA.

Kellermann, J.L., M.D. Johnson, & A.M. Stercho. 2007. Ecological services of birds on Jamaican coffee farms: An economic incentive for habitat conservation. The Wildlife Society, Western Section, Annual Conference, Monterrey, CA, USA.

Kellermann, J.L., M.D. Johnson, & A.M. Stercho. 2006. Neotropical insectivorous birds as pest control of the coffee berry-borer Hypothenemus hampeii on Jamaican Blue Mountain coffee farms. IV North American Ornithological Conference, Veracruz, Mexico.

CONFERENCE PRESENTATIONS (co- author)

Gunning, A.* & J.L. Kellermann. 2017. Black-backed Woodpecker and Wood-boring Beetle Associations with post-fire burn severity following the National Creek Fire. Northwest Scientific Association Annual Meeting, Ashland, OR.

Rubenstein, M. & J. L. Kellermann. 2016. Phenological Overlap & Asynchrony in Migratory Birds as a Consequence of Climate Change. 6th North American Ornithological Conference, Washington D.C., USA.

Crimmins, T. M., J. Kellermann, and J. F. Weltzin. 2012. A bird's eye view of the USA National Phenology Network: Expanding the scale of phenological research in avian ecology. 5th North American Ornithological Conference, Vancouver, B.C., Canada.

Crimmins, T. M., J. F. Weltzin, and J. Kellermann. 2012. Anomalous Warm Spring of 2010 Advances Deciduous Forest Leaf-out: Application of the Nature's Notebook Dataset and Visualization Analysis Tool. 97th Annual meeting of the Ecological Society of America, Portland, OR.

Johnson, M.D., B. Campos, J. Kellermann, S. Railsback, & V. Jirinec. 2010. Pest control services in coffee farms as a tool for bird and habitat conservation. 25th International Ornithological Congress, Campos do Jordao, Brazil.

Johnson, M.D., Campos**, B.R., Jirinec*, V., Kellermann, J.L., & Railsback, S.F. 2010. Spatial ecology of ecosystem services provided by birds. COS/AOU/SCO 2010 Joint Meeting, San Diego, CA.

Johnson, M.D., Kellermann, J.L., A.M. Stercho, R. Fowler, & D. Robinson. 2006. Can shade trees and birds help Jamaican coffee farmers with insect pests? 20th Annual meeting Society for Conservation Biology, San Jose, CA, USA.

Monahan W., J. L. Kellermann, E. J. Tweed, & B. L. Woodworth. 2003. Habitat shortage vs. life history feature incompatibility: Quantitative assessment of factors limiting numbers of a critically endangered Hawaiian solitaire. 5th Bay Area Conservation Biology Symposium.

Monahan W.B., J. L. Kellermann, E. J. Tweed, & B. L. Woodworth. 2002. Population consequences of life history features in an endemic and critically endangered Hawaiian Solitaire. 23rd International Ornithological Congress, Beijing, China.

Tweed, E.J., W.B. Monahan, J. Foster, J.L. Kellermann, & B.L. Woodworth. 2001. Behavior of a reintroduced population of captive-bred critically endangered Puaiohi. Society for Conservation Biology Conference, Hilo, HI.

GRANTS, AWARDS & FUNDING

- 2023-2027 Federal Appropriations funding- Research for Northern Waterthrush and impacts of snowpack on the Deschutes National Forest – PI ($200,000)
- 2021-2024 Cooperative Agreement - PI – Cascade-Siskiyou National Monument, *BLM* ($13,295 for 2021-22)

- 2021 Western Yellow Rail migration with solar PTT tags - PI – *OIT* ($13,500)
- 2021 Ground-based remote sensing of vegetation phenology - PI – *OIT* ($2,500)
- 2020 Ore-Cal RC&D Pathways to Workforce Initiative, National Association of Resource Conservation and Development Councils (NARCD&C) Youth Development Grant – Co-PI with George Jennings, ORE-CAL RC&D executive director ($8,000)
- 2018-2019 Beaver Restoration Assessment Tool (BRAT) for identifying stream restoration sites in the upper Klamath Basin, *Klamath Watershed Partnership* – PI ($17,000)
- 2017 Snowmelt timing, phenology, and growing season length in conifer forests of Crater Lake National Park, *George Melendez Wright Foundation* - PI (Graduate student salary & housing for summer season 2017)
- 2015 Climate Change Scenario Planning for American Pika and Whitebark Pine*, National Park Service Inventory & Monitoring* - PI ($17,000) -
- 2013 Bird use and water management, Klamath Important Bird Area, *Klamath Basin Audubon Society* - Co-PI ($12,000)
- 2012-2013 Outstanding Dissertation Award, SNRE, University of Arizona
- 2011 Coordination and analysis of bird data – Saguaro National Park BioBlitz, *National Geographic* - PI ($2,000)
- 2010 Bird Migration in Tumacacori National Historic Park, Desert Southwest Cooperative Ecosystems Study Unit grant – PI ($15,000)
- 2010 University of Arizona, Graduate and Professional Student Council Travel Grant ($500)
- 2010 International Ornithological Congress Travel Grant ($500)
- 2010 Avian migration in the Madrian Archipelago, Grants for Conservation Biology Research, T&E Inc., NM - PI ($2,000)
- 2009 Bird Migration in Tumacacori National Historic Park, Desert Southwest Cooperative Ecosystems Study Unit grant – PI ($15,000)
- 2007 James Koplin Award, Humboldt State University, CA
- 2006 Ecosystem services by birds in Jamaican Coffee farms, Conservation Trust, *National Geographic Society*, Co-investigator. ($22,000)
- 2006 Ecosystem services by migratory birds on Jamaican Coffee Farms, USFWS Neotropical Migratory Bird grant, Investigator - Investigator ($32,000)
- 2005 Ecosystem services by birds in Jamaican Coffee farms, Frank M. Chapman Award, American Museum of Natural History, NY ($2,000)
- 2005 Ecosystem services by birds in Jamaican Coffee farms, Mewaldt-King Award, Cooper Ornithological Society, KS ($1,000)
- 2001 Attendance of the 23rd International Ornithological Conference, Beijing China, Dan Moriarty Award, Kilauea National Wildlife Refuge, HI ($2,000)

Service (recent)

- Board Member – *Lake County Resource Initiative* (www.lcri.org) Fall 2019-today
- Board Member – *Klamath Basin Audubon Society* – 2014-2016

Nate A. Bickford, PhD, Male
2707 Franklin Ave Pueblo, Colorado 81003
Phone: (208) 301-8120
E-mail: nate.bickford@csupueblo.edu

Academic Preparation

2004-2006 NSF Polar Post-Doctoral Work
University of Alaska Fairbanks
Research: Movement patterns of fish in the Bering Sea and Gulf of Alaska

2000-2004 PhD, Environmental Science (emphasis in biology and chemistry)
Arkansas State University
Research: "Linkages between Hydrology and Essential Fish Habitat: Spring River, Arkansas"

1997-2000 M.S., Biology
Appalachian State University
Research: "Survey of Gastrointestinal Helminths in Small Mammals in Watauga County, NC and Changes in Parasite Populations Due to Changes in Host Species and Changes in the Season"

1993-1997 B.S., Biology
Lenoir-Rhyne University
Research: "The Caloric Content of Wild and Captive Bears Diet and the Difference in Calories Used by Captive Bears and Wild Bears"

Leadership
2019 AlumniTies State Department Program March– Develop leadership and Collaboration for Urban Renewal
2018 – Present Chair Conservation Committee North American Falconers Association
2016 – 2019 LEAP Research Group Leader
2016 – 2019 Board of Nebraska Academy of Sciences
2009 – 2015 Board of Montana Academy of Sciences
2008 – 2015 Director of Undergraduate Research Program, University of Great Falls
2005 – 2007 Lab Manager ICP-MS Lab University of Alaska
2000 – 2004 Graduate Student Lab Manager University of Arkansas
2004 – present Served on Multiple Department and University of Comities
2004 – present 9 Graduate students since 2004
2004 – present 48 Undergraduate student researchers

Skills
Ecology:

Bird Trapping
Bird Population estimation
Fish Age and Growth
Fish Community Assessment
Essential Habitat Identification
Aquatic Habitat Assessment
Wildlife Surveys
Management Reports
Habitat Restoration
Bird Population Surveying
Bird Trapping
Waterfowl Population Assessment
Upland Game Surveying
Quality Deer Population Management
Predator Control
Conservation Planning
Chemistry:
EPA Good Laboratory Practices
EPA standard methods 6020 and 200.8
Chain of Custody
APHA sample collection methods
Computer:
Microsoft Office (Word, Excel, PowerPoint, Access, PhotoDraw)
Sigma Plot
R Studio
GIS
Minitab
SPSS

Modeling
Huso Mortality Model
Bird Mortality Analysis
Analytical Expertise
Laser Ablation Inductively Coupled Plasma – Mass Spectrometry (LA-ICP-MS)
Inductively Coupled Plasma – Mass Spectrometry (ICP-MS)
Ion Chromatography
UV-vis spectrophotometry
Atomic Absorption Spectrometer

Language
English – Native Language
Finnish – Beginner
Spanish – Beginner

Academic Professional Experience
2019–present Director of Wildlife Program, College of Science and Mathematics, Department of Biology, Colorado State University Pueblo

2016-present Affiliated Faculty University of Nebraska Medical Center, Center for Global Health and Development

2015-2019 Associate Professor College of Natural and Social Science – Biology Department University of Nebraska Kearney

2012-2015 Online Faculty General Education Department
Henley-Putnam University

2013 Tenure, University of Great Falls
2011-2015 Associate Tenured Faculty and Director of the Science Undergraduate Research Experience (SURE)
Division of Science and Humanities
University of Great Falls

2008-2011 Assistant Faculty and Director of the Science Undergraduate Research Experience (SURE) Division of Science and Humanities – University of Great Falls

2008-present Bird Survey specialist: sub-contractor for environmental consulting firms

2008-2015 Assistant Coach University of Great Falls Women's soccer team

2005 – 2009 Research Faculty: ESTES Department in the College of Natural Sciences and Mathematics – University of Alaska Fairbanks

2005 – 2007 Laboratory Manager: Inductively Coupled Plasma-Mass Spectrometer (ICP-MS) located in the Advanced Instrumentation Laboratory in the College of Natural Sciences and Mathematics – University of Alaska Fairbanks

2004 – 2006 NSF Polar Regions Post Doctoral program Post-Doc: Identifying movement patterns and stock identification in fish from the Bering Sea and Gulf of Alaska.

2004 Water Rock Life Lab (ASU) Post Doc: CRUI: Environmental Life History of Freshwater Fish using Otolith Microchemistry

2003 – 2004 Water Rock Life Lab (ASU) Project Manager: CRUI: Environmental Life History of Freshwater Fish using Otolith Microchemistry

2001 – 2004 Environmental Sciences Program (ASU) Graduate Assistant:

2000 – 2001 Environmental Health, ASU Environmental Health Assistant:

1997 – 2000 Appalachian State University Laboratory Assistant:
Classes taught –

1998 Grandfather Mountain Habitat Zoo Research Assistant:

1996 Lenoir-Rhyne College Laboratory Assistant
Classes taught-
Undergraduate laboratory assistant for general biology

1994 Oak Ridge National Laboratory

1990 – 1992 Rookery Bay Research Laboratory Research Assistant

Professional Experience
2001- present Southern Ecological Services Environmental Consultant:
• Bird Identification and surveys
• Survey for potential wind sites
• Fish Community assessment
• Habitat assessments
• Wildlife surveys and enhancements
• Management reports
• Bird survey and trapping
• Waterfowl assessment and habitat enhancement
• Upland game survey and habitat enhancement
• Quality deer management
• Predator control

Grant and Contract Funding
Solar Faculty Research Fund (2019) Wildlife Movement and use of Solar Facilities. $10,500 PI
United States Department ALLUMNITIES funding (2019) Modern agriculture in our cities: a

workshop to develop the agricultural, leadership, and business skills to be successful. $10,000 PI
United States Department ALLUMNITIES funding (2019) Modernizing management and leadership: Workshops to develop agile capabilities in a modern economy $10,000 CO-PI
Nebraska University System Collaborative Research Initiative (2018) Capturing Archaeal Biochemistry to Build Bigger Botanical Biomass $149,065 CO-PI
Nebraska University System Collaborative Research Initiative (2018) Aquaponics: An innovative approach to teach health. $149,000 CO-PI
NASA-EPSCoR (2017) – Behavioral changes of animals during Solar Eclipse using telemetry. $10,000 CO-PI
Nebraska University System Collaborative Research Initiative (2017) The impacts of habitat loss and fragmentation on human-wildlife conflict in an agriculturally dominated system. CO-PI. $150,000.
Nebraska University System Collaborative Research Initiative (2017) Gathering the expertise needed to understand human-wildlife conflicts in fragmented prairie landscape. CO-PI. $20,000.
Rural Futures Institute (RFI) (2017) – Teaching Health, Exercise, Technology, & Aquaponics (THETA) Day Camps to Grow Future Health Professionals from McCook Middle School Students. $20,000 CO-PI
Nebraska's Coordinating Commission for Postsecondary Education (2017) – Helping Rural Middle School Science Teachers Create Classroom Aquaponic systems enhancing soft skills and career readiness. $59,766. Co-PI
Hollman Intern Program Proposal: Roadkill App. Hollman Intern Program, (2017), $7,000 Co -PI
Nebraska Research Initiatives Equipment (2017) – Ion Chromatograph for Water analysis. $60,949 PI
Nebraska Space Grant Fellowship (2016) – Graduate Student Fellowships $12,000 – PI
NASA-EPSCoR (2016) – Identification of Climate Change Effects in a National Forest and Possible Remediation Using a Top Tier Predator: Goshawk Nesting Habitat Loss and Possible Effects on Goshawk Abundance. $15,000 PI
University of Nebraska RSC grant (2016) – Aquaponics: Human Health and Wellbeing $20,000 CO-PI
Nebraska food for Health Initiative (2016) – Drones and Agriculture, methods for precise agricultural application. – Planning and Proposal Generating grant. $20,000 CO-PI
Nebraska food for Health Initiative (2016) – Solving for Pattern: Promoting Health through Localizing Food Systems Topic Areas to be Explored. – Planning and Proposal Generating grant. $20,000 CO-PI
University of Nebraska RSC grant (2015) – Goshawk management effects on behavior $20,000 PI
National Science Foundation (2015) – S-Stem Success Initiative. $500,000 Co PI
Montana EPSCOR (2014) –Upper class curriculum enhancement. $47.000 PI.
Montana EPSCOR (2014) –Goshawk as a Biological Indicator for Forest Change. $50.000 PI. In Review
Montana Farmers Union (2014) – Aquaponics development. ($10,000) PI
Wisconsin Fisheries (2012) – Goby otolith aging study. $10,000 PI.
Montana Fish Wildlife and Parks (2010) –Sampling Equipment and Boat. $30,000 PI.

Charlotte Martin Foundation (2010) – Goshawk Genetics and Prey Densities in the Lewis and Clark National Forest. $10,000 PI.
Montana EPSCOR (2009 – 2010) –Biology curriculum enhancement. $44.524 PI.
Montana EPSCOR (2009 – 2010) – General Biology lab enhancement. $15.824 PI.
Sitka salmon age study (2008-2010) – Age and Stock delineation of sockeye salmon. $29,000 PI.
Exxon Valdez Oil Spill Trustee Council (2006-2008) – Pacific Herring study – Herring Restoration in PWS: Identifying Natal and Nursery Habitats. $335,000. PI
Exxon Valdez Oil Spill Trustee Council (2006-2009) – Pacific Herring study – Using otolith chemistry to discriminate Pacific herring stocks in AK. $394,000 Co-PI
Exxon Valdez Oil Spill Trustee Council (2006-2008) – Pacific Herring study – Identification of essential habitat of Pacific herring (Clupea pallasii) in Sitka Sound. $154,000 Co-PI
Kenai River Sport fishing Association – (2006-2007) Stock and sub-stock delineation of chinook, coho and sockeye salmon in select Kenai River drainages. $80,533. PI
Sitka salmon age study (2005-2007) – Age and Stock delineation of sockeye salmon. $19,000 PI.
North Pacific Research Board (2005-2008) – Identifying life history characteristics of squid in the Bering Sea. $198,886 PI
Artic Yukon Kuskokwim –Sustainable Salmon Initiative (2005-2007) – Factors Affecting Juvenile AYK Chum Salmon Growth and Condition $1,955,486 C0- PI.
Sea Grant (2005-2007) – Mentoring Undergraduates in Fisheries Techniques $10,000 PI
Exxon Valdez Oil Spill Trustee Council (2005-2007) – Pacific Herring study – Using otolith chemical analysis to determine larval drift of Prince William Sound Pacific herring (Clupea pallasii). $52,000 PI
Oil Spill Recovery Institute (2005-2007) – Pacific Herring in Prince William Sound – Identifying past habitat use and essential habitat of Pacific herring (Clupea pallasii).-$33,000 C0- PI
Sitka herring and salmon study (2005-2007) – Stock delineation and natal homing in herring and sockeye salmon. $30,000 C0- PI.
NSF Polar Programs Post Doctoral Fellowship (2004-2006) – “Identifying movement patterns and stock identification in fish from the Bering Sea and Gulf of Alaska.” $140,000. PI
Arkansas Water Resources (2003-2004) – “Otoliths and Environmental Life History of Freshwater Fish”, $20,000. Co- PI
NSF DBI 0328832 (2003-2007) “CRUI: Assessing Environmental Life Histories of Freshwater Fish: Applications of Otolith Microchemistry”. $698,626. Project Manager (2003-2004).
Arkansas Environmental Federation – 2000 Environmental safety and leadership scholarship. $1,000.
Appalachian State University – 1998 Graduate Student Research Grant, $2,000. PI
Association of Southeastern Biologists – 1998 Student Research Grant, $100. PI
North Carolina Natural Gardens – 1998 Student Research Grant, $1,000. PI
Appalachian State University – 1998 Grants in Aid of Research. $400. PI
Appalachian State University – 1997 Grants in Aid of Research. $500. PI

Awards
2019 People's Choice Award Best Project, Stronger American Cities – Entrepreneurial Ecosystems. Alumni Ties State Department.
2017-2018 Fulbright Specialist Program for Finland, University of Nebraska Kearney
2014 Research and Creativity Award, University of Great Falls
2013 TEDx Presentation, Connecting Fragmented Habitats: A Grass Roots Adventure
2011 Science Mentor of the Year, Montana Academy of Science
2010 Faculty Special Achievement Award, University of Great Falls
2004 National Science Foundation Post Doc Fellow

Teaching Experience – I have taught in person and online classes in the following subjects
Ecology – University of Nebraska Kearney (BIOL 307)
Wildlife Conservation – University of Nebraska Kearney (BIOL 330)
Aquatic Trophic Ecology – University of Nebraska Kearney (BIOL 883)
Conservation Biology – University of Nebraska Kearney (BIOL 834)
Taking Action in Science – University of Nebraska Kearney (BIOL 830p)
Range and Wildlife Management – University of Nebraska Kearney (BIOL 405)
Tour of the Arctic – University of Nebraska Kearney (BIOL 856)
Climate Change – University of Nebraska Kearney (BIOL 830)
Scientific Communication – University of Nebraska Kearney (BIOL 375)
Conservation of Birds and Mammals – University of Nebraska Kearney (BIOL 869)
General Biology – University of Nebraska Kearney (BIOL 105L)
Survival in the wilderness – University of Great Falls (ILC 350)
General Biology – University of Great Falls (BIO 151)
General Biology – University of Great Falls (BIO 152)
Conservation Ecology – University of Greats Falls (BIO 420)
Form and Function – University of Great Falls (ILC 130)
Environmental Ecology – University of Great Falls (BIO 115)
Ecology – University of Greats Falls (BIO 200)
Freshman Science Seminar – University of Great Falls (BIO 190)
Aquatic Ecology – University of Great Falls (BIO 320)
Ornithology – University of Great Falls (BIO 315)
Sophomore Science Seminar – University of Great Falls (BIO 290)
Zoology – University of Great Falls (BIO 211)
Meteorology and Oceanography – University of Great Falls (GSC 230)
Mammalogy – University of Great Falls (BIO 305)
Fisheries Techniques – University of Alaska Fairbanks (FISH 497)
Environmental Geology Lecture – Arkansas state University (GEO 1003)
Ind. Study in Stream ecology (Team Taught) – Arkansas state University (ESCI 7133)
General Chemistry Laboratory – Arkansas state University (CHEM 1011)
Introductory Biology Lecture – Arkansas state University (BIO 1110)

Online Teaching Experience
Aquatic Trophic Ecology – University of Nebraska Kearney (BIOL 883)
Conservation Biology – University of Nebraska Kearney (BIOL 834)
Taking Action in Science – University of Nebraska Kearney (BIOL 830p)
Tour of the Arctic – University of Nebraska Kearney (BIOL 856)
Climate Change – University of Nebraska Kearney (BIOL 830)
Scientific Communication – University of Nebraska Kearney (BIOL 375)
Conservation of Birds and Mammals – University of Nebraska Kearney (BIOL 869)
Environmental Science – Henley Putnam University (Bio 119)

Editor
2011 – Present Journal of Ecosystem & Ecography – Open Access – OMICS Publishing Group

Recent Reviews
2015– Hogan et. al. Reconstructing larval performance and habitat use in a diadromous fish using otolith increments, trace elements and oxygen isotopes. Limnology and Oceanography Methods.
2016 – Cain et. al. Ecology book
2016 – Tzadik et.al. Chemical archives in fishes beyond otoliths: A review on the use of other body parts as chronological recorders of microchemical constituents for expanding interpretations of environmental, ecological, and life-history changes. Limnology and Oceanography Methods.
2018 – Genaro A. G. and Yesica M-M. Food Waste Index and Corporate Social Responsibility Regarding Food Loss and Waste in some Mexican Food Companies. Sustainability
2018 – Qi Chen, Weiteng Shen and Bing Yu Assessing the Vulnerability of Marine Fisheries in China: Towards an Inter-provincial Perspective. Sustainability

Publications
Conference Proceedings
Bickford, S., Krans, J.K., and Bickford, N 2015 Impacts from Large Corporate Development on Indigenous Communities in Arctic: Specific Focus on Social Justice and Sustainability for the Swedish Sami. International Business Information Management Conference (26th IBIMA)
Bickford, N., Hannigan, R., and Bogdevich, O. 2003. Otolith Microchemistry of Freshwater Fish: Stock Discrimination of Brown Trout and Walleye. Proceedings of the Sixth International Symposium and Exhibition on Environmental Contamination in Central and Eastern Europe and the Commonwealth of Independent States. Prague, Czech Republic.
Bickford, N.A., and Hannigan, R.E. 2003. End-Member Mixing Analysis: Application To The Spring River, AR. Proceedings of the Arkansas Water Resources Center Annual Conference, April 2003. 54-61.

Journal Articles Submitted
Ritson R, Bickford N, Wuellner M, Fuda RK, Miller TA, Boulanger JR, Beasley JC, Brzorad JN, Fisher R, Orben RA, Kauffman M, Barber M, Kays R, Stuber MJ, Watson JL, Ranglack DH. Obscured Sun,

Obscure Behavior: Exploring the Effects of a Solar Eclipse on Animal Movement. Prepared for Movement Ecology.
Ringenberg, J, Bice, M., Hollman, A., Meyer, D., Ball, J. Wiedenman, E.*, Bickford, S., & Bickford, N. Aquaponics: An innovative teaching model for Middle School Science Education. Middle School Journal. In Review
Schlater, S., Ringenberg, J., Bickford, N., and Ranglack, D. White-tailed Jackrabbits: a Review and Call for Research. Journal of Wildlife Management. In Review.
Ramos, A., Trinidad, N., Bickford, S., Bickford, N., Torquati, T., Mushi, M. 2018. A manuscript titled Engaging residents in planning a community garden: A strategy for enhancing relevant messaging and participation (PCHP-WIP-0009-2018). Progress in Community Health Partnerships: Research, Education, and Action. IN REVIEW
Bickford, S.H., Bickford, N., Bice, M., Hollman, A., Ramos, A.K., and Torquati, J. (2018) If there is a will there is a way: assessment of success variables for community gardens in rural areas in Arctic and non-Arctic regions. Polar Geography. Under review. Submitted 08 Feb 2018. IN REVIEW
Adams, B, Bickford, N, Albrecht, M, Ranglack, D, and Bickford N. (2018) Cost Benefit Analysis of Medium and Micro Sized Aquaponics System. Aquaculture. IN REVIEW
Wright, M., Ranglack, D, and Bickford, N. (2018) A Comparison of Prey Availability at Active and Inactive Northern Goshawk Nest Areas in a Dry Forest Landscape. Raptor Research. IN REVIEW
Wright, M., Jackson, J., Tornberg, R., Higa, E., Clayton, A., McCartney, S., Ranglack, D.H., and Bickford, N. (2018) Habitat Suitability Modeling and Ecological Forecasting of Northern Goshawk Nesting Habitat. Raptor Research. IN REVIEW

Journal Articles
Hoyer, R., Bomske, C., and Bickford N. Dwarf Populations of Rubber Boas (Charina Bottae) in Southern California. Southwestern Naturalist In Press
Anderson, H., and Bickford, N. Stream Assessment on the Impact of Agricultural Activity in the Dry River, VA. Virginia Journal of Science In press
Ramos, A., Trinidad, N., Bickford, S., Bickford, N., Torquati, T., Mushi, M. 2018. A manuscript titled Engaging residents in planning a community garden: A strategy for enhancing relevant messaging and participation (PCHP-WIP-0009-2018). Progress in Community Health Partnerships: Research, Education, and Action. In Press
Wright, M., Tornberg, R., and Bickford, N. (2019) Comparison of Nest Defense Behaviors of Goshawks (Accipiter gentilis) from Finland and North America. Animals 10(62).
Ritson R, Bickford N, Ranglack DH. (2019). Comparing Social Media Observations of Animals During a Solar Eclipse to Published Research. Animals 9(59):1-12. doi:10.3390/ani9020059
Bomske, C and Bickford, N. (2019) The Effects of Vegetation Variety on Overwintering Anuran Diversity in Permanent Florida Ponds. Southeastern Naturalis 18
Adams, B., Boyer, T., Albrecht, M., Ranglack, D. H., & Bickford, N. (2019). Micro-system aquaponics: testing designs for increased productivity. Journal of Applied Aquaculture, 1-12.
Hollman, A., Bice, M., Ball, J., Bickford, N., Shafer, A. & Bickford, S. (2018). A comparison of scholarly productivity among current professors who obtained terminal degrees. American Journal of

Distance Education, 32(4), In Press August 8, 2018.
Bice, M., Ball, J., Bickford, N., Bickford, S., Hollman, A., Coughlin, A., Dinkel, D., Meyer, R., & Ranglack, D. (2018) Community Gardens: Interactions between communities, schools, and impact on students. The Health Educator 50(1).
Helms, B., Bickford, N., Tubbs, N., and Feminella, J. (2017) Feeding, growth, and trophic position of redbreast sunfish (Lepomis auritus) in watersheds of differing land cover in the lower Piedmont, USA. Urban Ecosystems.
Mailey, S., Shafer, A., and Bickford N. (2017) Pain Tolerance and Pain Threshold According to Indoor versus Outdoor Sport Participation and Sex. Jacobs Journal of Physiotherapy and Exercise, 3(1).
Bickford, N., Smith, L., Bickford, S., Bice, M.R., Ranglack, D.,H., (2017) Evaluating the Role of CSR and SLO in Ecotourism: Collaboration for Economic and Environmental Sustainability of Arctic Resources. Resources, 6(2), 21.
Bice, M.R., Hollman, A., Bickford, S., Bickford, N., Ball, J., Wiedenman, E.M., Brown, G., Dinkel, D., & Adkins, M. (2017). Kinesiology in 360 Degrees. International Journal of Kinesiology in Higher Education, 1(1), 9-17.
Bickford, S., Krans, J.K., and Bickford, N 2016. Social and Environmental Impacts of Development on Rural Traditional Arctic Communities: Focus on Northern Sweden and the Sami. Journal of EU Research and Business Vol 2016 1:11.
Hogan, J., McIntyre, P., Blum, M., Gilliam, J., and Bickford, N. 2014 Consequences of Alternative Dispersal Strategies in a Putatively Amphidromous Fish. Ecology 95(9):2397-2408.
Collins, S., Bickford, N., McIntyre, P., Coulon, A., Ulseth, A., Taphorn, D., and Flecker, A. 2013 Population Structure of a Neotropical Migratory Fish: Contrasting Perspectives from Genetics and Otolith Microchemistry. Transaction of American Fisheries 142.5 (2013): 1192-1201.
Beaulaurier, J. N. Bickford, J.L. Gregg, C.A. Grady, A. Gannam, J.R. Winton, P.K. Hershberger. 2012. Susceptibility of Pacific herring Clupea pallasii to Viral Hemorrhagic Septicemia (VHS) is Influenced by Diet. Journal for Aquatic Animal Health 24.1 (2012): 43-48.
Brown, R., Bickford, N., and Severin, K. 2007. Probing Upstream Migrations of Anadromous Coregonid Fish (Family: Salmonidae; Subfamily: Coregoninae) in the Yukon River Drainage. Transactions of American Fisheries Society. Transaction of American Fisheries 136: 678-690
Bickford, N., and Hannigan, R. 2006. Stock identification of Walleye (Sander vitreum) using otolith chemistry in the Eleven Point River, AR North American Journal of Fisheries Management. 25: 1542-1549.
Bouldin, J., Bickford, N., Stroud, B., and Guha, G. 2004. Tailwater recovery systems for irrigation – benefit/cost analysis and water resource conservation technique in Northeast Arkansas. Journal of the Arkansas Academy of Sciences 58: 23-31
Sako, A., O'Reilly, C.M., Hannigan, R., Bickford, N., and Johnson, R.L. 2004. Stock identification of two clupeid species, Stolothrissa tanganicae and Limnothrissa miodon in Lake Tanganyika using otolith microchemistry. Geochemistry: Exploration, Environment, Analysis. 5: 91-97.
Hannigan, R.E. and Bickford, N.A. 2003. Hydrochemical Variations In A Spring-Fed River, Spring River Arkansas. Environmental Geoscience 10 (4): 167-188.
Bickford, N.A. and Hannigan, R.E. 2003. Trace element chemistry of fish tissues: Uptake routes in

genus Moxostoma. Environmental Geoscience 11(2): 226-236.
Christian, A.D., Bouldin, J., Bickford, N., McCord, S.B., Sako, A., and Ferris, J. 2003. Winter and spring water quality of Big Creek watershed, Craighead County, AR: Nutrients, habitat, and macroinvertebrates. Journal of the Arkansas Academy of Sciences 57: 27 -36

Peer Reviewed Final Report
Woody, H. and Bickford, N. 2009. Identifying Essential Habitat (Source vs. Sink Habitat) for Pacific Herring (Clupea pallasi) in Sitka Sound Using Otolith Microchemistry Restoration Project 080834. Exxon Valdez Oil Spill Restoration Project Final Report.
Bickford, N. 2007. Using otolith chemical analysis to determine larval drift of Prince William Sound Pacific herring (Clupea pallasii) Restoration Project 060782. Exxon Valdez Oil Spill Restoration Project Final Report

Invited Workshops
APECS-U Arctic Science Communication Workshop – The Association of Polar Early Career Scientists (APECS) and UArctic jointly organised a science communication workshop in connection with the U Arctic Congress 2018 in Oulu, Finland. The workshop included both introductory lectures and also hands-on practical parts. In addition to the workshop day, the participants received a task to use the skills gained during the workshop during the UArctic Congress (incl. conducting interviews).

Invited Symposiums
Bickford, N. Elevator Talk: Developing the Ability to Make Connection for Future Collaboration and Funding. The Wildlife Society Annual Meeting, Reno. Symposium: Communication: The Key to Effective Natural Resource Programs. 2019
Bickford, N. Cost Benefit Analysis: A tool to help farmers prioritize wildlife improvements. The Wildlife Society Annual Meeting, Reno. Symposium: Natural Resource Conservation in Agricultural Landscapes: Challenges and opportunities. 2019

Invited Presentations
Bickford, N. and Bickford, S. Transdisciplinary Research and How to Integrate Innovation into University Systems. Lenoir Rhyne University 2019
Menke, Kelsey, Marc Albrecht, and Nate Bickford. 2019. Tilapia feeding preference using commercial fish food, ethanol distiller's grain, and lab-made food. University of Arizona Controlled Environment Agriculture Center.
Willmore, Cody, Marc Albrecht and Nate Bickford. 2019. Aquaponic systems: a comparative assessment of commercial and reclaimed crop production systems. University of Arizona Controlled Environment Agriculture Center.
Bickford, N. Falconry and Upland game. Nebraska Habitat Meeting. February 2018
Schlater, S., Ranglack, D., Bickford N. How are Red-tailed Hawks influenced by highly fragmented, agricultural landscapes? North American Falconry Association Annual Meeting Nov 2017.

Ringenberg, J., Ranglack, D., Bice M., Bickford N. Rabbits in Nebraska and Possible Movement Troubles. North American Falconry Association Annual Meeting Nov 2017.

Presentations at Scientific Meetings

Reinson, M., Bickford, N., Burger, P., and Ranglack, D. Habitat Selection of White-Tailed Deer during Agricultural Growing and Non-Growing Season. The Wildlife Society Annual Meeting, Reno 2019

Riston, R., Bickford, N., Ranglack, D. Variations in American Bison Resource Selection across Their Former Range. The Wildlife Society Annual Meeting, Reno 2019

Barnes, Jackson, Albrecht, Marc, and Bickford, Nate. Aquaponics Comparison Study Using Commercial Feed and Homemade Plant Based Feed. Nebraska Research Days 2019

Laub, Emily, Reichart, Letty, and Bickford, Nate Molecular Identification of Sex of Northern Goshawk (accipiter gentilis) Feathers Collected Across Multiple Goshawk Populations in Finland. Nebraska Research Days 2019

Ritson R, Bickford N, Ranglack DH. Seasonal space use patterns of Plains bison (Bison bison) across multiple ecological gradients and management regimes in the American West. Nebraska Chapter of The Wildlife Society Annual Meeting. York, NE. Feb 2019.

Schlater, S. M., Ranglack, D. H., Shreading, A., Domenech, R., Bickford, N. Differences in breeding and nonbreeding red-tailed hawk home range size throughout the breeding season. Oral Presentation. Nebraska Chapter: The Wildlife Society, York, NE. Feb 2019.

Ringenberg, J., Bickford, N., Ranglack, D. The impact of fragmented landscapes on the spatial distribution and dispersal of eastern cottontail rabbits (Sylvilagus floridanus). 25th Annual Meeting of the Wildlife Society, Cleveland, OH, October 7 – 12, 2018.

Reinson, M.C., Bickford N., and Ranglack D.H. “Evaluating the usage, design, and effectiveness of roadway underpasses as wildlife crossings in Nebraska” presented at the Annual Meeting of the Central Mountains and Great Plains Section of The Wildlife Society (CMPS), 28 February 2018 – 2 March 2018, Kearney, NE.

Reinson, M.C., Bickford N., and Ranglack D.H. “Impacts of habitat fragmentation on white-tailed deer (Odocoileus virginianus) in south central Nebraska”, presented at the International Deer Biology Congress (IDBC), 5-10 August 2018, Estes Park, CO.

Reinson, M.C., Bickford N., and Ranglack D.H. “A comparison of wildlife tracking technologies: where are we going?”, presented at The Wildlife Society 25th Annual Conference (TWS), 7-11 October 2018, Cleveland, OH.

Schlater, S. M., Bickford, N., Ranglack, D. H. Time-of-day effects reassessed with roadside raptor surveys and red-tailed hawk (Buteo jamaicensis) GPS transmitter data. Raptor Research Foundation Conference Kruger National Park, South Africa. Nov 2018

Schlater, S. M., Bickford, N., Ranglack, D. H. Raptor Mortality along an Interstate Highway in the Great Plains, North America. Raptor Research Foundation Conference Kruger National Park, South Africa. Nov 2018.

Schlater, S. M., Bickford, N., Ranglack, D. H., Domenech, R., Shreading, A. Changes in the home range size of breeding and nonbreeding red-tailed hawks (Buteo jamaicensis) throughout the breeding season. Raptor Research Foundation Conference Kruger National Park, South Africa. Nov

2018
Schlater, S.M., Bickford, N., Ranglack D.H. Carcass persistence and searcher efficiency trials reveal the number of raptor mortalities along Interstate 80 in central Nebraska. Poster Presentation: The Wildlife Society, Cleveland, Ohio. Oct 2018.
Bickford, N., Schlater, S., Domenech, R., Shreading, A., Ranglack, D. H. Migration corridors and stop over locations for red-tailed hawks. Raptor Research Foundation Conference Kruger National Park, South Africa. Nov 2018
Bickford, N., Ritson, R., and Ranglack, D. H. Wildlife Behavior Changes During a Solar Eclipse. The Wildlife Society Cleveland, OH. Oct 2018
Bickford, N. North American Falconers Association Commitment to Research and Conservation. Raptor Research Foundation Conference Kruger National Park, South Africa. Nov 2018
Bickford, N, Bice, M., Ringenberg, J., Hollman, A., Meyer, D., Ball, J. Wiedenman, E., & Bickford, S. Aquaponics: An innovative teaching model for science education. U Arctic Congress Helsinki Finland September 2018
Bickford, N., and Wright, M. Goshawk as a bioindicator species for climate change in the boreal forest. U Arctic Congress Helsinki Finland September 2018
Bickford, N., Adams, B., Willmore, C., and Albrecht, M. Compare and Contract Aquaponic Systems: Can reclaimed material be used to create an economically viable food production system. U Arctic Congress Helsinki Finland September 2018
Unvert, K., Ringenberg, J., Ball, J., Dinkel, D., Bickford, N., Hollman, A., Meyer, R., Bice, M. Aquaponics Growing Systems: An Innovative Approach to Health Consciousness and Science in Elementary Education. Early Childhood Conference: Promoting Wellbeing for Children and Families. October 2018.
Ritson, R., Bickford, N., Smith, L., Bickford, S., Bice, M., and Ranglack, D. Evaluating the role of CSR and SLO in Ecotourism Plains Safaris: A conference on tourism and conservation in the Great Plains April 2018
Ritson, R., Bickford, N., and Ranglack, D. Does Wildlife Behavior Change in Response to a Solar Eclipse? The Nebraska Academy of Sciences Annual Meeting April 2018
Bickford, N. and Wright, M. Goshawk as a bioindicator species for climate change in the boreal forest. U Arctic Congress Helsinki Finland September 2018
Bickford, N and Ranglack, D.H, (2018) Life History Plasticity Creates Long-Term Options for Species Survival. The wildlife Society Central Mountains and Plains Section meeting. Kearney, Nebraska, February 28- March 2, 2018.
Ringenberg, J., Bickford, N., and Ranglack, D. (2018) Lagomorph management in a fragmented world: the need to incorporate meta-population dynamics. 51st Annual Meeting of the Nebraska Chapter of The Wildlife Society, Kearney, Nebraska, February 28- March 2, 2018.
Reinson, M. C., N. Bickford, and D. H. Ranglack. (2018) Evaluating the usage, design, and effectiveness of roadway underpasses as wildlife crossings in Nebraska. Poster Presentation. 51st Annual Meeting of the Nebraska Chapter of The Wildlife Society. Kearney, Nebraska. 1 March 2018.
Schlater, S. M., N. Bickford, and D. H. Ranglack. (2018) Cellular GPS transmitter provide insight on fluctuating home range size of breeding and nonbreeding red-tailed hawks (Buteo jamaicensis).

Poster Presentation. 51st Annual Meeting of the Nebraska Chapter of The Wildlife Society. Kearney, Nebraska. 1 March 2018.
Ritson, R, Bickford, N and Ranglack, D.H, (2018) Spatial Requirements of Plains Bison (Bison bison) in the American West March Central Mountains and Plains Section of the Wildlife Society meeting. Kearney, Nebraska, February 28- March 2, 2018.
Adkins, M., Bice, M., Brown, G., Bickford, N., Hollman, (2018) A Farm to Fresh! A multidisciplinary approach to teach Health and Physical Activity. Central District Society of Health and Physical Educators of America Conference. Sioux Falls, South Dakota (January 27-29, 2018).
Unvert, K., Ringenberg, Meyer, D., Bickford, N., Hollman, A., Bickford, S., Bice, M. (2018) Aquaponics: An innovative approach to teaching Health. National Conference for Undergraduate Research.
Rowles, G., Bickford N., and Wuellner, M. Walleye and White bass in Management from a Rivers cape perspective on the North Platte River. Nebraska Chapter AFS Rivers and Streams Technical Committee
Bice, M., Ball, J., Wiedenman, E., Bickford, N., Bickford, S., Hollman, A., & Meyer, D. Aquaponics: An assessment of physical activity, nutrition, and health consciousness. Society of Health and Physical Educators (SHAPE) America 2018 National Conference Nashville, Tennessee, March 20-24, 2018
Bice, M, Bickford, N., Meyer, D., Hollman, A., Bickford, S., & Ringenberg, J. Aquaponics: An innovative model to teach science and technology. University of Nebraska at Kearney – Community Early Childhood Conference. Kearney, Nebraska September 2017
Bickford, S., Waples, C., Hollman, A. K., Bice, M. R., Brachle, B. J., Heikkinen-Moilanen, R.-L., Bickford, N. A. (2017) The Multiple Faces of CSR: an international comparison of a multidisciplinary view of CSR best practices based on stakeholder engagement and collective values. Academy of International Business. (July 2-5, 2017)
Hollman, A., Torquati, J., Bickford, N., Bickford, S. & Bice, M. (June 8 – 12, 2017). Growing food and knowledge in the Arctic: combining biological processes with the Internet of Things. Conference presentation. International Congress of Arctic Social Science (ICASS) IX, Umeå, Sweden.
Bickford, N., Bickford, S., Lanteigne, M., Bice, M., Ranglack, D. & Hollman, A. (June 8 – 12, 2017). The Village: Using high-tech for international multidisciplinary education of Indigenous sustainability. Conference presentation. International Congress of Arctic Social Science (ICASS) IX, Umeå, Sweden.
Bickford, S., Hollman, A., Torquati, J., Ramos, A., Bice, M., Bickford, N. (June 8 – 12, 2017). Assessing local food production and accessibility for community gardens in rural areas: Arctic and beyond. Conference presentation. International Congress of Arctic Social Science (ICASS) IX, Umeå, Sweden.
Bickford, S., Heikkinen-Moilanen, R., Lanteigne, M., Waples, C., Hollman, A., Bice, M., Brachle, B. & Bickford, N. (June 8 – 12, 2017). A multidisciplinary assessment of community level corporate social responsibility in rural communities: Arctic and non-Arctic. Conference presentation. International Congress of Arctic Social Science (ICASS) IX, Umeå, Sweden.
Bickford, S., Hollman, A., Waples, C., Bice, M., Brachle, B., and Bickford, N. (2017) Assessment of rural community level CSR via a Quintuple Helix Model. University of Tampere Finland; Research

Seminar on Responsible Business (March 15-16, 2017)
Boyer, T, Adams, B., Ranglack, D., and Bickford, N. Aquaponics Productivity: Heated VS. Room Temperature Water. Nebraska Academy of Science April 2017.
Sanchez, J, Adams, B., Ranglack, D., and Bickford, N. A Comparative Study between Polyculture of Brussel Sprouts and Sweet Peppers and a Monoculture of Sweet Peppers in an Aquaponics system. Nebraska Academy of Science April 2017.
Wright, M and Bickford, N. Goshawk prey availability in the Lewis and Clark National Forest. Midwest Fish and Wildlife Conference, Lincoln, Nebraska 2017.
Wright, M., Jackson, J., Murphy, V., Higa, E., McCartney, S., Clayton, A., Nelson, R., Bolten, J., and Bickford, N. Quantifying northern goshawk (Accipiter gentilis) habitat in the Lewis and Clark National Forest, Montana. Idaho Chapter of the Wildlife Society and the American Fisheries Society Meeting, Boise, Idaho, 2017.
Boyer, T, Adams, B, and Bickford, N. Aquaponics Productivity: Heated vs. Non-heated Water in an Aquaponics System. Nebraska Academy of the Sciences, Lincoln, Nebraska 2017.
Jazmin, S, Adams, B., and Bickford, N. A Comparative Study between Polyculture of Brussels Sprouts and Sweet Peppers with Monocultures in an Aquaponics System. Nebraska Academy of the Sciences, Lincoln, Nebraska 2017.
Adams, B and Bickford N. Murphy's law and Aquaponics. Midwest fish and wildlife, Lincoln Nebraska 2017.
Adams, B and Bickford N. Aquaponics. Nebraska Academy of the Sciences, Lincoln, Nebraska 2017.
Wright, M, Burger, P, Combs, J., and Bickford N. Using GIS for habitat comparisons: a case study with northern goshawks. Nebraska Academy of the Sciences, Lincoln, Nebraska 2017.
Wright, M., Tornberg, R., Hill, E., and Bickford N. The Loss of Aggression in Northern Goshawk: Comparisons from Finland and North America, Department of Biology, University of Nebraska at Kearney, NE 68849
Wright, M and Bickford N. Quantifying northern goshawk (Accipiter gentilis) habitat in the Lewis and Clark National Forest, Montana. Nebraska Academy of the Sciences, Lincoln, Nebraska 2016.
Bickford et.al. Sustainable Food for Health: a comprehensive study assessing food security and benefits for wellbeing. Rural Initiative 2015
Bickford, N. Connecting Fragmented Habitats a Grassroots Adventure. TEDx Great Falls MT 2014
Leonard, M. and Bickford, N. Walleye Larval Drift and Dams. Montana Academy of Science. April 2014
Kemp, D and Bickford, N. White Tailed Jack Rabbit population dynamics in short grass Prairie. Montana Academy of Science. April 2014
Jones S, and Bickford N. Water effect on decomposition rates. Montana Academy of Science. April 2014
Jackson, J, Bickford, N., and Murphy, V. Analysis of Northern Goshawk Nest Site and Nesting Habitat on the Lewis and Clark National Forest. Montana Academy of Science. April 2012
Ward, R. and Bickford, N. Investigating how native species are affected by road obliteration in the Lewis and Clark National Forest. Montana Academy of Science. April 2012
Hill, J., Bickford, N., and Gibbons, J. Landscape Alterations on a Military Base: The Effects on Bird

Diversity. Montana Academy of Science. April 2012
Pezel, A., Bickford, N., and Lund D. Using feather genetics to determine the relatedness between goshawks in the Lewis and Clark National Forest. Montana Academy of Science. April 2012
Weber, J., Bickford, N., and Lund, D. Identifying walleye populations in the Missouri River in central Montana. Montana Academy of Science. April 2012
Bossert-Lomeli, H., Bickford, N., Vansickle, S. The Effects of Logging Roads in Aquatic Systems, Montana Academy of Science. April 2012
Fenger, E, Bickford, N, and VanSickle. Effects of Road and Culvert Removal on Macroinvertebrates and Total Suspended Solids in Headwater Streams. Montana Academy of Science. April 2011
Beaulaurier J, Bickford, and Hershberger. Can Commercially made Feed have Pathogens? Montana Academy of Science. April 2011
Hill, J., Bickford J., and Gibbons, J. Land Use Effects on Bird Diversity. Montana Academy of Science. April 2011
Fenger, E, Bickford, N, and VanSickle, S. Effects of Road and Culvert Removal on Macroinvertebrates and Total Suspended Solids in Headwater Streams. Murdock Foundation. Oct 2010
Beaulaurier J, Bickford, N., and Hershberger. Can Commercially made Feed have Pathogens? Murdock Foundation. Oct 2010
Fenger, Erin, Bickford, N, and VanSickle. Effects of Road and Culvert Removal on Total Suspended Solids in Headwater Streams. Montana Academy of Science. April 2010
Morris Daniel and Bickford N. Bird Population Densities of Cheatgrass Influenced Prairie Habitat. Montana Academy of Science. April 2010
Beaulaurier Josh, Bickford, and Hershberger. Can Commercially made Feed have Pathogens? Montana Academy of Science. April 2010
Morris Daniel and Bickford N. Bird Population Densities of Cheatgrass Influenced Prairie Habitat. Montana Space Grant. April 2010
Collins, S. M., Bickford, N., McIntyre, .P, Coulon, A., Ulseth, A., and Flecker, A. Genetic and microchemical analysis of population structure in a migratory Neotropical fish. North American Benthological Society National Meeting, May 2008.
Hannigan, R.E, and Bickford, N., Nutrient Chemistry of Chukchi Sea Sediments. Geologic Society of America, 2008.
Bickford, N., Fish habitat and Otolith Chemistry. Alaska Marine Science Symposium. January 2007.
Keyse, M., Bickford, N., and Norcross, B. Patterns in life and environmental histories of Myoxocephalus scorpius in the Chukchi Sea. Alaska Marine Science Symposium. January 2007.
Drobny, P., Bickford, N., and Norcross, B. Squid Overload: Berryteuthis magister in the Bering Sea. Alaska Marine Science Symposium. January 2007.
Helms, B., Bickford, N., and Feminella, J. Does increasing urbanization affect the feeding ecology and growth of redbreast sunfish? American Fisheries Society. September 2006.
Bickford, N., Where do fish go, let's ask them: or at least their otolith. North American Benthological Society National Meeting, May 2006.
Kelly, S., Bickford, N., and Norcross, B. Otolith chemical tags identify past habitat use of larval and

juvenile Prince William Sound Pacific Herring. North American Benthological Society National Meeting, May 2006.
Drobny, S., Bickford, N., and Norcross, B. Identifying life history characteristics of squid in the Bering Sea. North American Benthological Society National Meeting, May 2006.
Schumann, K., Bickford, N., Norcross, B., and Spangler, R. Identifying eulachon populations to spawning locations using otolith chemistry. North American Benthological Society National Meeting, May 2006.
Jones, M., Haas, G., and Bickford, N. Movement of Coho salmon on the Yakutat Foreland revealed from otolith chemistry. North American Benthological Society National Meeting, May 2006.
Hamilton, B., Bickford, N., and Hannigan, R. Elemental chemistry of endolymph and otolith: passive recorder or active writer? Geological Society of America National Meeting, November 2004.
Bouldin, J.L., N.A. Bickford, B. Stroud and G. Guha. Irrigation options for best management practices – benefit/cost analysis, resource conservation, and ecological benefits. MidSouth Regional Society of Environmental Toxicology and Chemistry Society annual meeting. Oxford, MS. 2004.
Bouldin, J.L., N.A. Bickford, B. Stroud and G. Guha. Tailwater recovery systems for irrigation – benefit/cost analysis and water resource conservation technique in Northeast Arkansas. Arkansas Geographical Society spring meeting. Jonesboro, AR. 2004.
Bouldin, J.L., N.A. Bickford, B. Stroud and G. Guha. Tailwater recovery systems for irrigation as water resource conservation technique in Northeast Arkansas. Arkansas Academy of Science 88th Annual meeting. Jonesboro, AR. 2004
McDaniel, B., Bickford, N.A. and Hannigan, R.E. Age and growth patterns of fish from thr Spring River, AR. Arkansas Academy of Sciences. 2004
Hamilton, B., Bickford, N.A. and Hannigan, R.E. Elemental variations of endolymph and otolith composition in Moxostoma erythrurum. Arkansas Academy of Sciences. 2004
Clarke, D., Bickford, N.A. and Hannigan, R.E. Analysis of dissolved organic carbon in an interconnected ditch system in the delta agricultural zone, AR. Arkansas Academy of Sciences. 2004
Walls, J., Bickford, N.A. and Hannigan, R.E. Age and growth analysis of centrachid species in the Spring River, AR. Arkansas Academy of Sciences. 2004
Horton, M. Bickford, N.A. and Hannigan, R.E. Uptake and storage of metals by crayfish Arkansas Academy of Sciences. 2004
Howard, R., Bickford, N.A. and Hannigan, R.E. Age and growth analysis of Cyprinid, Ictalurid, Fundulid, Cottid, and Percid species in the Spring River, AR. Arkansas Academy of Sciences. 2004
Young, S., Bickford, N.A. and Hannigan, R.E. Age and growth patterns of large mouth bass, small mouth bass, and spotted bass from the Spring River, AR. Arkansas Academy of Sciences. 2004
Bickford, N.A. and Hannigan, R.E. A Multi-Disciplinary Approach to Locating Essential Fish Habitat in Freshwater Systems. North American Benthological Society National Meeting, May 2004.
Hannigan, R.E., Bickford, N.A., Bogdevich, O.P. “Assessing Essential Fish Habitat In Freshwater Environments using Otolith Microchemistry”. Sixth International Symposium and Exhibition on Environmental Contamination in Central and Eastern Europe. Prague, Czech Republic. 2003.

Hannigan, R. and Bickford, N. “Assessing Essential Fish Habitat in Freshwater Environments using Otolith Microchemistry” Gordon Research Conference, Catchment Hydrology. Colby-Sawyer College, New Hampshire. 2003.
Hannigan, R., Farris, J.L., and Bickford, N. “Chemical Weathering and The Biotic Ligand Model”. Arkansas Water Resources Conference. Fayetteville AR. 2003
Hannigan, R.E and Bickford, N.A. Linkages between bioavailability and equilibrium kinetics in a freshwater system and the effects on fish. Southcentral-Southeast sectional meeting of the Geological Society of America. Memphis TN. 2003.
Bickford, N.A. and Hannigan, R.E. Can fish hear the chemistry of the water? North American Benthological Society National Meeting, May 2003.
Bickford, N.A., Hamilton, B., and Hannigan, R.E. Assessing essential fish habitat in freshwater environments using chemical fingerprinting, Spring River AR. North American Benthological Society National Meeting, May 2002.
Investigation of nitrate pollution and the effects on fish community in the Spring River, AR. Association of Southeastern Biologist, April 2002.
Bickford, N.A. and Hannigan, R.E. Major and trace element hydrochemistry in a spring-fed river (Spring River, Arkansas). American Geophysical Union Fall Meeting. December 2001.
Bickford, N.A. and Hannigan, R.E. Investigation of nitrate pollution in the Spring River, AR: Preliminary results of a spatial-temporal study. Geological Society National Meeting, November 2001.
Bickford, N. and Hannigan, R. Investigation of nitrate pollution in the Spring River, Arkansas: Preliminary results of a spatial-temporal study. Mid-South Society of Environmental Toxicology and Chemistry, Jonesboro, AR, May, 2001.
Bickford, N.A. and Henson R. Characteristics of small mammals that help or inhibit parasite infection. Association of Southeastern Biologist, Chattanooga, TN, March 2000.
Bickford, N.A. and Henson R. Survey of Gastrointestinal Helminths in Small Mammals In Watauga County, NC and Changes in Parasite Populations Due to Changes in Host Species and Changes in the Season. Association of Southeastern Biologist, Wilmington, NC, March 1999.
Bickford N.A. 1996-1997. Ecological Essays. Monthly article in Lenoir-Rhynean Newspaper.

Service
2015 – present Nebraska Academy of Sciences
2015 – present Graduate Research Committee
2015 – present Wildlife Committee
2010 – 2015 Chair of the Last Lecture Series – University of Great Falls
2010 – 2015 Montana Academy of Science – University of Great Falls
2010 – 2015 Electric City Soccer Board, Montana
2009 – 2012 Curriculum Committee – University of Great Falls
2003 – 2004 Arkansas State University – President of Association of Graduate Scientist and President Graduate Student Advisory Council
2003 Geological Society of America – Convener, Special Session SE/SC Joint meeting of the Geol.

Soc. Am. “Water Rock Life: Interactions Between Hydrology and Biology”
2001 – 2004 Arkansas State University – Member of Graduate Council
1999 – 2000 Appalachian State University – President of Biology Graduate Student Association
1998 – 1999 Appalachian – Vice President of Biology Graduate Student Association

Memberships in Professional Societies
Nebraska Academy of Sciences (member since 2016)
Association of Southeastern Biologist (member since1997)
North American Benthological Society (member since 1998)
Geological Society of America (member since 2000)
American Geophysical Union (member since 2000)
American Chemical Society (member since 2003)
North American Fisheries Society (member since 2003)

Kerry L Farris

Environmental Sciences Program
Department of Natural Sciences
OREGON TECH

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Skills & Objectives

I am a broadly trained ecologist specializing in wildlife-habitat relationships, silvicultural and fire management techniques, and quantitative analysis. I have experience both teaching and mentoring undergraduate and graduate students in biology and ecology. My objective is to draw from my applied professional experiences to teach courses integrating theory and application.

Education

University of Idaho / M.S. Natural Resources
1997-2000 MOSCOW, IDAHO

Thesis: Micro-habitat selection of *Picoides* woodpeckers in relation to ponderosa pine decomposition

University of Idaho / B.S. Wildlife Resources
1995-1996 MOSCOW, IDAHO

Magna Cum Laude
Outstanding Senior - Department of Fish and Wildlife

Humboldt State University / B.S. Wildlife Management (*transfer*)
1988-1991 ARCATA, CALIFORNIA

Experience

Oregon Tech AIRE Center / Environmental Research Scientist
2020 - Present, KLAMATH FALLS, OREGON

- Worked to establish Oregon Tech's Center for *Advancing Interdisciplinary Research on the Environment and Health* (AIRE) by providing project leadership and management related to the quantitative analysis of air quality and hospitalization data, conducted and published research generated by the team, trained and managed other researchers and staff, and participated in long-range research planning.

Oregon Tech / Faculty Instructor
2017 - Present, KLAMATH FALLS, OREGON

- *Research in Environmental Sciences* (ENV 495) – directed students in the development of research projects designed to assist the City of Klamath Falls Parks Division in the proactive management of vegetation in Moore Park.
- *Advanced Environmental Data Analysis* (ENV 434) – created newly offered course examining the modern statistical approaches used to address the special needs of ecological data sets
- *Forest Ecology and Management* (ENV 375) – created newly offered course focused on western coniferous forests and their management challenges
- *Plant Ecology* (BIO 367) – developed an upper division course examining the fundamentals of terrestrial ecology with an emphasis on vascular plant communities
- *Principles of Biology* (BIO 211 & 212) – instructed both lecture and laboratory sections

Oregon Tech / Adjunct Instructor

2016-17 KLAMATH FALLS, OREGON

- Principles of Biology (BIO 211 & 212) – instructed laboratory sections
- Sustainable Human Ecology (ENV 484) – led weekly discussion sessions

Wildlife Conservation Society / Associate Conservation Scientist

2000 - 2009, NORTH AMERICA PROGRAM, BOZEMAN, MONTANA

- Collaborated with public resource agencies and private organizations to conduct interdisciplinary research focusing on ecological forest management, with a particular emphasis on prescribed fire. Notable projects (see publications) include: wildlife discipline leader for a nation-wide project investigating the effects of prescribed fire and silvicultural treatments for forest restoration; principal investigator for research quantifying the relationship between bark foraging birds, bark beetles, and fungi in the process of tree decay
- Hired, trained and supervised 15 to 20 undergraduate students per year to conduct field work and data analysis for various research projects; assisted multiple graduate students with thesis research related to Wildlife Conservation Society research projects, and served as a core thesis committee member.
- Developed research objectives and experimental design; conducted meta-analyses for large, national level conservation datasets; wrote customized code to implement a variety of statistical analysis techniques including univariate and multivariate statistics, generalized linear modeling, mixed and random effects modeling, logistic regression, and ordination
- Conducted outreach and technology transfer to disseminate research results to the general public and land managers, including lectures at universities. Authored scientific papers and presented at professional society conferences.

University of Idaho / Graduate Teaching and Research Assistant

1997 - 2000, DEPT OF FISH & WILDLIFE RESOURCES and DEPT OF BIOLOGICAL SCIENCES

- Served as lead laboratory instructor for three courses: wildlife ecology, wildlife techniques, and ornithology. Developed and graded lab exercises, quizzes, and exams covering: (1) identification, anatomy, aging and sexing of both avian and mammalian specimens in both laboratory and field settings; (2) habitat ecology, population estimation, and basic field-data collection techniques; organized and led field trips; prepared and presented substitute classroom lectures
- Conducted original research investigating the synergistic ecology of tree decomposition, woodpecker foraging, and bark beetle phenology

Humboldt State University Foundation / Research Crew Leader

1996 & 1997, ARCATA, CALIFORNIA

Served as crew leader on research projects investigating the response bird and mammal communities to experimental silvicultural and prescribed burning treatments

Turnstone Ecological Research / Research Assistant

1995 & 1996, MOSCOW, IDAHO

Conducted point-count and vegetation surveys in support of research on avian-habitat

relationships as part of the Partners in Flight/Northern Region Landbird Monitoring Program

USDA Forest Service Intermountain Research Station / Research Assistant

1994, MISSOULA, MONTANA

Used the Breeding Bird Research Database (BBIRD) protocol to locate and monitor nests, conducted point counts and vegetation surveys in support research investigating the effects of forest fragmentation on breeding bird communities in cedar-hemlock forests of northern Idaho

USDA Forest Service / Biological Technician

1990-1993, TAHOE NF, ELDORADO NF, and LAKE TAHOE BASIN MANAGEMENT UNIT

Conducted surveys for threatened, endangered and sensitive species including: willow flycatcher, peregrine falcon, bald eagle, northern goshawk, California spotted owl, pine martin, fisher, and Sierra Nevada red fox using nocturnal and diurnal surveys techniques such as taped playbacks, mimic calls, track plates, bait stations, and remote cameras

Humboldt State University / Biological Technician

1988-1992, CAMPUS GAME PENS

Cared for a variety of wildlife species kept on campus for research purposes (e.g., mule deer, Pacific fisher, Sierra Nevada red fox, gray fox, kit fox, coyote and Canada goose). Physically and chemically immobilized animals in support of teaching and research.

Peer-Reviewed Publications

(Google Scholar)

Kyle A. Chapman, Adelaide E. Clark, **Kerry L. Farris**, and Sarah Fitzpatrick. 2023. Fires, Respiratory Hospitalizations, and Capacity Issues. Pp. 210-221 *in* Fleishman, E., editor. 2023. Sixth Oregon Climate Assessment. Oregon Climate Change Research Institute, Oregon State University, Corvallis, Oregon. https://blogs.oregonstate.edu/occri/oregon-climate-assessments

McIver, James D., Scott L. Stephens, James K. Agee, Jamie Barbour, Ralph E.J. Boerner, Carl B. Edminster, Karen L. Erickson, **Kerry L. Farris**, Christopher J. Fettig, Carl E. Fiedler, Sally Haase, Stephen C. Hart, Jon E. Keeley, Eric E. Knapp, John F. Lehmkuhl, Jason J. Moghaddas, William Otrosina, Kenneth W. Outcalt, Dylan W. Schwilk, Carl N. Skinner, Thomas A. Waldrop, C. Phillip Weatherspoon, Daniel A. Yaussy, Andrew Youngblood, Steve Zack. 2013. Ecological effects of alternative fuel-reduction treatments: highlights of the National Fire and Fire Surrogate study (FFS). International Journal of Wildland Fire 22(1):63-82.

Farris, Kerry L., Steve Zack, Andy J. Amacher, Jennifer C. Pierson. 2010. Microhabitat selection of bark-foraging birds in response to fire and fire surrogate treatments. Forest Science 56(1):100-111.

Farris, Kerry L., Sarah J. Converse, Steve Zack, Andy J. Amacher, Thomas Contreras, William Gaines, Donald Miles, Douglas Robinson, Ghislain Rompre, Katie Sieving, and Jenny Woolf. 2010. Short-term effects of fire and fire surrogate treatments on avian nest survival: a national-scale analysis. Open Environmental Sciences 4:53-62

Farris, Kerry L. and Steve Zack. 2008. A comparison of post-burn woodpecker foraging use of white fir (Abies concolor) and Jeffrey pine (Pinus jeffreyi). In: Narog, M.G., technical coordinator. Proceedings of the 2002 Fire Conference on Managing fire and fuels in the remaining wildlands and open spaces of the southwestern United States. December 2-5,

2002, San Diego, CA. Gen. Tech. Rep. PSW-189, Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture.

Converse, Sarah J., Gary C. White, Kerry L. Farris, and Steve Zack. 2006. Small mammal responses to forest fuel reduction: national scale results from the fire and fire surrogate project. Ecological Applications 16(5):1717-1729.

Farris, Kerry L. and Steve Zack. 2005. Woodpecker-snag interactions: an overview of current knowledge in ponderosa pine systems. Pp.183-195 In: Ritchie, M.W., D.A. Maguire and A. Youngblood, technical coordinators. Proceedings of the Symposium on ponderosa pine: Issues, trends and management. 2004 October 18-21; Klamath Falls, OR. General Technical Report PSW-GTR-198. Albany CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture. 281 pp.

Farris, Kerry L., Martin J. Huss, and Steve Zack. 2004. The role of foraging woodpeckers in the decomposition of ponderosa pine snags. The Condor 106(1):50-59.

Farris, Kerry L, Edward O. Garton, Patricia J. Heglund, Steve Zack, and Patrick J. Shea. 2002. Woodpecker foraging and the successional decay of ponderosa pine. Pp. 237-246 in W.F. Laudenslayer, P.J. Shea, B.E. Valentine, P.C Weatherspoon, T.E. Lisle (tech coord). Proceedings of the symposium on the ecology and management of dead wood in western forests. Gen. Tech. Rep. PSW-GTR-181. Albany, CA. Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture, 949 pp.

Farris, K.L. 2000. The foraging ecology of Picoides woodpeckers in relation to ponderosa pine decay dynamics. MS Thesis. Department of Fish and Wildlife Resources, University of Idaho, Moscow, Idaho. 63pp.

SELECTED EXAMPLES OF RESEARCH IN THE NEWS

Oregon Public Broadcasting (OPB). 2022. "Million-dollar federal grant boosts efforts to monitor air quality and improve health outcomes in wildfire-prone Southern Oregon". Interview on Think Out Loud Radio Program. 4 August 2022. https://www.opb.org/article/2022/08/04/million-dollar-federal-grant-boosts-efforts-to-monitor-air-quality-and-improve-health-outcomes-in-wildfire-prone-southern-oregon/

Herald and News. 2022. "Oregon Tech awarded a $1M federal grant for air quality research; faculty to create a new research center". 29 July 2022. https://www.heraldandnews.com/klamath/oregon-tech-awarded-a-1m-federal-grant-for-air-quality-research-faculty-to-create-a/article_d7d9f9a5-d0a5-5229-8227-082b8fcb1653.html

Canadian Broadcasting Corporation (CBC). 2004. "Woodpeckers and Fungus". Radio Interview on Quirks and Quarks Radio Program. 13 March 2004.

Society of American Foresters. 2004. "Woodpeckers Play a Vital Role in Creating Quality Snags". The Forestry Source. April 2004.

Birder's World Magazine. 2004. "Snag Starters". Birding Briefs. June 2004.

Science Daily. 2004. "Woodpeckers Carry Fungus in Beaks That Promotes Tree Decay". Science Daily Online. 12 Feb. 2004.

Environmental News Service. 2004. "Fungus in Woodpeckers' Beaks Crucial to Forest Processes". ENS Daily Headlines. 11 Feb. 2004. Canadian Broadcasting Corporation (CBC). 2004. "Woodpeckers and Fungus". Radio Interview on Quirks and Quarks Radio Program. 13 March 2004.

Society of American Foresters. 2004. "Woodpeckers Play a Vital Role in Creating Quality Snags". The Forestry Source. April 2004. Birder's World Magazine. 2004. "Snag Starters". Birding Briefs. June 2004.

Science Daily. 2004. "Woodpeckers Carry Fungus in Beaks That Promotes Tree Decay". Science Daily Online. 12 Feb. 2004.

Environmental News Service. 2004. "Fungus in Woodpeckers' Beaks Crucial to Forest Processes". ENS Daily Headlines. 11 Feb. 2004.

Selected Presentations

INVITED PAPERS

Chapman, Kyle, Kerry Farris, and Adelaide Clark. 2022. Drought, wildfires, air quality, and respiratory hospitalizations in Southern Oregon. Pacific Northwest Drought and Public Health Workshop. Portland, OR 19-20 October 2022.

Clark, Adelaide, Kyle Chapman, **Kerry Farris**, and Sarah Fitzpatrick. 2021. Helping hospitals predict capacity issues: using state agency data to examine the relationship between PM2.5 and respiratory hospitalizations in southern Oregon. AGU Fall Meeting 2021, New Orleans, LA, 13-17 December 2021, id. SY13B-05.

Zack, Steve and **Kerry L. Farris**. 2007. Managing for Wildlife with Prescribed Fire in Eastside Pine Habitats. Society of American Foresters and Oregon State University Department of Forestry: The Art and Science of Multiaged Forest Management. 5-6 June 2007. Klamath Falls, Oregon.

Farris, Kerry L., Sarah J. Converse, Steve Zack, Andy J. Amacher, Thomas Contreras, William Gaines, Donald Miles, Douglas Robinson, Ghislain Rompre, Katie Sieving, and Jenny Woolf. 2006. The effects of fire and fire surrogate (FFS) treatments on avian nest survival. The Association for Fire Ecology: 3rd International Fire Ecology and Management Congress. 13-17 November 2006. San Diego, California.

Converse, Sarah J., Gary C. White, **Kerry L. Farris**, and Steve Zack. 2006. Small mammal responses to forest fuel reduction: national scale results from the fire and fire surrogate project. The Association for Fire Ecology: 3rd International Fire Ecology and Management Congress. 13-17 November 2006. San Diego, California.

Farris, Kerry L. and Steve Zack. 2004. Woodpecker snag interactions: an overview of current knowledge in ponderosa pine systems. USDA Forest Service, Pacific Southwest Research Station and Oregon State University Outreach Education: Ponderosa Pine – Management, Issues, Trends. 21-23 October 2004. Klamath Falls, Oregon.

Farris, Kerry L. 2003. An overview of desert cavity nesting species: implications for management plans. California Partners in Flight: Desert Bird Conservation Planning. 6-7 November 2003. Yuma, Arizona.

Farris, Kerry L., Martin J. Huss, and Steve Zack. 2002. Complexities of snag decay in ponderosa pine: how foraging woodpeckers may influence decay patterns and subsequent nest-site quality. American Ornithologist Union (AOU): 3rd North American Ornithological Conference – Special Symposium: The Ecology of Cavity-Nesters: Keystone Processes. 24-28 September 2002. New Orleans, Louisiana.

CONTRIBUTED PAPERS

Zack, Steve, **Kerry L. Farris**, and T. Luke George. 2005. Bird responses to thinning and prescribed fire in ponderosa pine. Partners in Flight – California Chapter, Oregon/Washington Chapter: Tools for Bird Conservation in Conifer Forests. 7-8 April

2005. Ashland, Oregon.

Farris, Kerry L. and Steve Zack. 2002. A comparison of post-burn woodpecker foraging use between white-fir (Abies concolor) and yellow pine (Pinus jeffreyi and P. ponderosa). The Association for Fire Ecology: Managing Fire and Fuels in the Remaining Wildlands and Open Spaces of the Southwestern United States. 2-5 December 2002. San Diego, California.

Zack, Steve and **Kerry L. Farris.** 2002. Wildlife responses to alternative fire management treatments: the national fire and fire surrogate approach. USDA Forest Service: Rocky Mountain Research Station: Fire, Fuel Treatments, and Ecological Restoration. 16-18 April 2002. Fort Collins, Colorado.

Farris, Kerry L., Steve Zack, Edward O. Garton, William F. Laudenslayer, and Patricia J. Heglund. 2001. Woodpeckers and snag decay in North American forests: foraging patterns of three sympatric Picoides woodpeckers in relation to the initial decay of ponderosa pine (Pinus ponderosa). Woodpeckers Working Group of the German Ornithologists Society: International Symposium on Woodpecker Ecology. 23-25 March 2001. Berchtesgaden, Germany.

Hughes, Kerry L., Edward O. Garton, Patricia J. Heglund, and Steve Zack. 2000. The role of foraging woodpeckers in the decay of ponderosa pine. Cooper Ornithological Society: 70th Annual Meeting. 25-29 April 2000. Riverside, California.

Hughes, Kerry L., Edward O. Garton, Patricia J. Heglund, Steve Zack, and Patrick J. Shea. 1999. The dynamic relationship of woodpecker habitat selection and the successional decay of ponderosa pine. The Wildlife Society – Western Section: Symposium on the Ecology and Management of Dead Wood in Western Forests. 2-4 November 1999. Reno, Nevada.

Hughes, Kerry L., Edward O. Garton, Patricia J. Heglund, Steve Zack, and William F. Laudenslayer. 1999. Woodpecker foraging selection in relation to tree decay characteristics. Cooper Ornithological Society: 69th Annual Meeting, 29 March – 3 April 1999. Portland, Oregon.

Specialized Skills & Experience

Project Management, Instruction, and Data Analysis

- Experimental/study design for inventory and monitoring of various taxa
- Proposal writing and manuscript preparation
- Coordination and management of dispersed field crews and senior scientists
- Classroom, laboratory, and field instruction in both academic and field settings
- Data management in EXCEL and ACCESS
- Statistical analysis using: R, SAS, DISTANCE, SPSS, S-PLUS, PC-ORD
- Budget management

Field Techniques

- Avian point counts using distance sampling
- Nest searching and monitoring techniques
- Mist netting and fungal sampling of birds
- Spot-mapping avian territory use
- Surveys for sensitive, threatened, and/or endangered species including: Spotted Owl, Northern Goshawk, Willow Flycatcher, Pine Martin, Sierra Nevada Red Fox
- Live trapping of small mammals
- Use of track plates and remote cameras
- Acoustic bat sampling

Specialized

- **Excellence in Teaching Workshop.** Commission on College Teaching, Oregon

Training

Institute of Technology. September 2018.

- **Statistical Design and Analysis of Biological Monitoring Programs for Conservation Management.** Samantha Strindberg PhD, Fernanda Marques PhD, and Tim O'Brien PhD. Department of Landscape Ecology and Science Exploration, Wildlife Conservation Society, Bronx, New York. 20 June – 1 July 2005.
- **Analysis of Ecological Communities using PC-ORD.** Jeri Peck. Department of Forest Resources, University of Minnesota. 16-17 March 2005.
- **GIS for Wildlife Conservation.** Eric Sanderson PhD and Gosia Bryja. Department of Landscape Ecology and Geographic Analysis, Living Landscapes Program, Wildlife Conservation Society, Bronx, New York. 4-15 October 2004.
- **Advanced Techniques and Recent Developments in Distance Sampling.** Steven Buckland PhD and Len Thomas PhD. Center for Research into Ecological and Environmental Modeling, University of St. Andrews, Scotland. 15-17 September 2003.
- **Introduction to Distance Sampling.** Steven Buckland PhD and Len Thomas PhD. Center for Research into Ecological and Environmental Modeling, University of St. Andrews, Scotland. 10-12 September 2003.
- **Metapopulation Ecology of Animals and Plants: Inventory, Monitoring, and Viability Analysis.** Edward O. Garton PhD, Department of Fish and Wildlife Resources, University of Idaho. 3-7 January 2000.

Grants & Awards

- **Research Grant:** Establishing a Vegetation Monitoring Network for Moore Park: A Partnership Between Oregon Tech and the Klamath Falls Parks Division. Principal Investigator. June 2022. $10,000. Provost Office, Oregon Tech.
- **Research Grant:** Health effects of smoke from wild and human-related fires. Co-Principal Investigator with Kyle Chapman and Adelaide Clark. June 2022. $1,000,000. United States Health Resources and Services Administration.
- **Nomination:** Oregon Tech Foundation Excellence in Teaching Award 2020
- **Research Grant:** Effects of altering stand-structure on wildfire severity and effects in the Blacks Mtn. Experimental Forest, Cascade Range, California. Co-Principal Investigator with M. Ritchie, W. Oliver, C. Skinner, S. Zack, G. Nakamura. Fiscal Years 2003, 2004, 2005. $171,000. Joint Fire Sciences Program.
- **Research Grant:** Woodpeckers and the process of snag decay in the management of wildlife of western coniferous forests. Co-principal investigator with S. Zack. Fiscal Years 2001 & 2002. $20,000. The Walt Disney Wildlife Conservation Fund.
- **Research Grant:** Micro-habitat selection of Picoides woodpeckers in relation to ponderosa pine decomposition on Blacks Mountain Experimental Forest. Principal Investigator. Jan-Dec 1999. $10,000. USDA Forest Service: Pacific Southwest Research Station.
- **Honorary Membership:** Cooper Ornithological Society 1999
- **Student Travel Award:** Cooper Ornithological Society 1999
- **Outstanding Senior Award:** Department of Fish and Wildlife Resources, University of Idaho, Academic Year 1995-1996
- **Marvin Klemme Centennial Scholarship:** College of Natural Resources, University of Idaho, Spring 1995
- **Safari Club International Scholarship:** American Wilderness Leadership School, Jackson, Wyoming, Summer 1986

Professional Service & Membership

- **Klamath Lake Forest Health Partnership (KLFHP)** – member of a science committee engaged in research and management of forest related projects on public lands throughout southern Oregon.
- **Peer Reviewer:** Journal of Wildlife Management, Journal of Fire Ecology, Forest Ecology and Management, Restoration Ecology, Journal of Field Ornithology, and Northwest Science

Christy VanRooyen

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EDUCATION

Master of Science in Environmental Education

Southern Oregon University – Ashland, OR December 2017
Phi Kappa Phi honorary society

Bachelor of Science in Applied Environmental Sciences

Oregon Institute of Technology – Klamath Falls, OR June 2001
Magna Cum Laude
Alpha Chi honorary society

PROFESSIONAL POSITIONS

Environmental Sciences Program Director. Oregon Institute of Technology. 2021-Current

- Strategic planning and curriculum development to support programmatic, departmental, academic and university wide objectives and outcomes.
- Maintenance and development of the dual CE-ENV and REE-ENV programs through communication with their program directors and department chairs.
- Leading faculty program meetings (scheduled by department chair) including setting of the agenda, meeting management, and follow-up on action items.
- Coordinate programmatic recruitment and retention efforts in close collaboration with departmental efforts.
- Develop and maintain partnerships with local, regional, and national agencies and organizations that can provide educational, professional, and research opportunities for students and faculty.
- Planning and execution of the annual ENV Student Research Symposium.
- Assessment coordinator – Facilitate PSLO and ISLO Data Collection. Write the annual assessment report for the ENV program.

Assistant Professor, Natural Science Department. Oregon Institute of Technology. 2018-Current

- Teach a variety of courses within the Natural Science department including chemistry, biology, nutrition, and environmental sciences. See teaching experience for a comprehensive list.
- Apply innovative pedagogy to promote student success and retention.
- Chemistry Advanced Credit Placement Liaison - Work with high school teachers from around the state to offer CHE 101/104 and CHE 2xx credit to high school students.
- Serve on multiple departmental and institutional committees: Academic Master Plan Committee, Assessment Executive Committee, Online Learning Advisory Committee, Sustainability Committee, and search committees.

- Primary or secondary academic advisor to 14 students.
- Advisor for the student Bee Keeping Club.

Co-Coordinator, Fall in the Field. Southern Oregon University Environmental Education. 2016-2017.

- Worked in close collaboration with 15 other graduate students to create and execute standards aligned curriculum for residential and day program outdoor school.
- Over 1,500 k-12 students participated in Fall in the Field over the course of eight weeks of programming.
- Communicated with a wide range of stakeholders including teachers, administrators, nonprofits, government agencies, and businesses.
- Co-authored an Ashland Food Co-op grant which provided a locally sourced "Food for Thought" meal with a lesson on the environmental costs associated with food purchasing. $1,200 was awarded.
- Risk Management Committee Chair.
- For more info, go to http://fallinthefield.sou.edu/

Intern. Bee Girl Organization. 2016-2017.

- Developed a graduate thesis around a multi-year pollinator monitoring project at an Oregon Department of Transportation wetland remediation site in White City, OR. See research for more details.
- Analyzed data related to ongoing research projects.
- Created maps using ArcGIS for public land and virus monitoring projects.
- Promoted bee conservation at various educational, fundraising, and tabling events.
- Helped with honey extraction and processing from Bee Girl managed hives.
- Co-authored a Coquille Tribal Community Fund grant for Kids and Bees programming. Funding pending.
- For more info, go to https://www.beegirl.org/

Sustainability Coordinator. Oregon Institute of Technology. 2005.

- Sustainability Committee Chair.
- Wrote a report detailing environmental sustainability efforts on campus and focus areas for improvement.
- Offered sustainability seminars for faculty, staff, and students advising ways to reduce individual carbon footprints.

Instructor, Natural Science Department. Oregon Institute of Technology. 2002 – 2007.

- Taught a variety of introductory courses within the Natural Science department including chemistry, biology, and environmental sciences. See teaching experience for comprehensive course list.

Senior Geographic Information Systems (GIS) Analyst. Oregon Institute of Technology. 2001-2002.

- Consulting work doing cartography and data analysis on the following topics: Oregon mortality rates and disease outbreak, websites for economic development groups, stream restoration projects, trail locations, animal habitat, and watershed health

OIT: CHE 101 – Introduction to General Chemistry. VanRooyen, C. Editor. 2021. Open-Source chemistry text available online via Libretext created by remixing other available OERs and writing original content. View here: http://bit.ly/OTCHE101

Comparison of Hymenoptera Abundance at Three Vernal Pool Sites in White City, Oregon in Varying Stages of Disturbance. 2017. VanRooyen, C. Graduate Thesis for Southern Oregon University.

Native Bees at Oregon Tech. Edenhofer, K. * & VanRooyen, C. Poster Presentation at the Annual Meeting of the Oregon Chapter of the Wildlife Society Conference. Abstract submitted December 2022 with presentation scheduled for February 2023.

Apis Mellifera Floral Resource Use in the Oregon Tech Apiary. Steiber, M.*, Trier, F. *, Torres, T., & VanRooyen, C. Poster Presentation at the Annual Meeting of the Oregon Chapter of the Wildlife Society Conference. Abstract submitted December 2022 with presentation scheduled for February 2023.

Improved Teaching: A Symptom of COVID 19. VanRooyen, C. Biennial Conference on Chemical Education – American Chemical Society. In this talk I shared about the variety of tools I use to engage students online in my introductory chemistry course including: a phone friendly open textbook, virtual escape rooms, flexible policies, reading quizzes, games, CHEM 101, and coffee hours. Data on student's interactions with the tools correlated to student success will be included. August 2022.

Faculty Panel on Open Educational Resources in Promotion and Tenure. VanRooyen, C. - panel facilitator. Open Oregon's Open Education Week virtual symposium. March 2022.

Bee School. VanRooyen, C. & Corzatte, L. Klamath Basin Beekeepers Association. Co-taught an introductory beekeeping class. March 2022.

Importance of Pollinators. VanRooyen, C. & Torres, T. Klamath Tree League community educational event. October 2021.

Lessons Learned from Spring of 2020. Panel presentation at the Commission on College Teaching Conference at Oregon Tech on successes and failures of moving to all remote teaching due to COVID. September 2020.

Promoting Engagement with OERs. VanRooyen, C. Oregon Virtual Statewide Open Educational Resources Symposium. Shared tips for getting to students to engage with OERs in STEM courses. May 2021.

6 Tips for Improving Heart Health. VanRooyen, C. Owl about Health Oregon Tech Alumni Event. Virtual Presentation shared via the alumni association on various social media platforms. February 2021.

Native Bee Walk. VanRooyen, C. An interpretive hike starting from the Oregon Tech Apiary and finishing at the native plant garden on campus to discuss bees and to teach pollinator sampling methods. This event was open to the Klamath Falls community. May 2020 & May 2019.

Integrating OERs in the Classroom. VanRooyen, C. & Clark, A. Presentation during open education week discussing how we have used our original OER in introductory chemistry which was shared at Oregon Tech and through the Oregon Open Ed. website. This talk was also accepted to be presented at the Biennial Conference on Chemical Education which was cancelled in 2020 due to COVID. March 2020.

The Honey Bee. VanRooyen, C. & Kenyon, E.* Sustainapalooza presentation given at the Klamath County Library about honeybees and their role in food production in the United States. May 2019.

Plight of Our Pollinators. VanRooyen, C. Public presentation on pollinator decline given to the Klamath Basin Bee Keeping Association. February 2019

Geospatial Analysis of Apis Mellifera Colonies VanRooyen, C. & Bennett, J.* Western Apicultural Society Conference. Poster presentation examining how GIS can be used for pollinator research. July 2019.

PolliNation Podcast OSU Extension Service. I participated in the recording of this episode of the podcast on pollinator science. July 2018.
You can access the episode here: http://blogs.oregonstate.edu/pollinationpodcast/2018/07/30/sam-droege/

The Buzz on Bees. VanRooyen C. Interpretive Talk at U.S. Forest Service Diamond Lake Campground. July 2017.

An Introduction to Process Oriented Guided Inquiry Learning (POGIL). Parrett, L., VanRooyen, C., & Klopf, E. Oregon Institute of Technology Commission on College Teaching Pre-convocation Workshop. September 2016.

Beginning a transition towards active-learning classrooms: Oregon Tech's story. Anthony, S., Lund, T., & VanRooyen, C. 70th Northwest Regional Meeting of the American Chemical Society, Pocatello, ID. June 2015.

Flipping the Classroom in CHE 101. VanRooyen, C. Oregon Institute of Technology Commission on College Teaching Tech Talk. February 2015.

Prescription for Increasing Student Interest in GOB Chemistry I and Prescription for Increasing Student Interest in GOB Chemistry II. VanRooyen, C. & Swisher, R. Biennial Conference on Chemical Education (BCCE). August 2014.

Fractal Analysis Watershed Project. VanRooyen, C., Ritter, J., Hansen, M., & Emmen, B. Klamath Basin Fish and Water Management Symposium. Humbolt State University, Arcata, CA. May 2001.

*Indicates Oregon Tech student name

GRANT AWARDS

Oregon Tech Foundation Innovation Grant 2022-2023. "Phenological Study of Apis mellifera Pollen Collection with Shifting Climate and Fire Regimes". The purpose of this project is to identify important floral resources for bees, particularly during fire season, and to correlate hive data with particulate matter to better understand how air quality during fire season affects bees. We currently have three students involved in this work. $11,000

Oregon Open Education Grant. 2019-2021. Collaborative project with Dr. Addie Clark to produce an OER and ancillary resources for introductory chemistry CHE 101. Dr. Clark is mainly responsible for the ancillary products and I have developed the online textbook for the class using other available OER materials and original content. $6,000

Oregon Tech OER Grant. 2019. Internal grant for switching to an open education resource in human nutrition BIO 205. Award $500

Provost's Summer Creativity Grant. 2018. Funds from this grant were used to establish the Oregon Tech Apiary with two live honey bee colonies. As a result of this grant a student bee keeping club was established at Oregon Tech. The apiary provides educational opportunities to talk about pollinator decline. Award $3,500.

Coquille Tribal Community Fund grant. 2017. Grant written for the Bee Girl Organization's Kids and Bees program. Award $2,000

Ashland Food Co-op grant. 2016. Grant provided funding for Southern Oregon University's Fall in the Field *Food for Thought* lesson. Award $1,20

ONGOING RESEARCH =

Oregon Bee Atlas Project. Sample contributor to this collaborative project, which is being coordinated through Oregon State University and the Oregon Department of Agriculture.

Entomological Collection. I am working with a group of research students to curate an entomological reference collection of bees at Oregon Tech. Students are learning pan trapping, areal netting, specimen pinning, and labeling techniques as part of this work.

Hive Monitoring. I consulted on a project for CSET juniors 2021 who developed a hive monitoring system to track internal temperature and hive weight. These students developed a working prototype which successfully collected hive temperature and humidity data. Data could be downloaded via wifi to a laptop. Students presented their work at the Oregon Tech Student Project Symposium in May of 2021. This project enabled us to secure funding for a more robust hive monitoring system which we installed in February of 2022. Data from these monitors will be used for ongoing projects in the ENV 495 Bee Research class.

Pollen Collection in the Oregon Tech Apiary. Research students working in the Oregon Tech apiary collected pollen last year to contribute to an international study conducted by BeeODiversity. The purpose of this project was to determine which floral resources bees were visiting and to identify environmental contaminates using pollen brought back to the hives. In addition to this study, students conducted their own analysis of the pollen using color as an indicator of floral species. This work will be ongoing in 2023.

Halictidae Phenological Trends. Continued monitoring of phenological trends of floral resources and pollinators with shifting climate and fire regimes in the Klamath Basin. Baseline data was established in 2022 using hive monitors, pan trapping, floral surveys, pollen collection, and time lapse photography.

PROFESSIONAL MEMBERSHIPS & PUBLIC SERVICE

Oregon State Beekeepers Association – South Central Oregon Representative Executive Board Member. OSBA is a group of committed beekeepers who manage colonies, provide educational opportunities, lobby for government support of pollinator protection and research, and contribute to bee research. Through this association, I have been able to connect student beekeepers at Oregon Tech to state and national research initiatives. 2020-current.

Klamath Basin Bee Keeping Association – board secretary. Local chapter of beekeepers, which spans membership across southeast Oregon and northeast California. This organization is dedicated to the well-being of honeybees and to the fields of bee keeping, apiculture, research and education. My involvement with the board allows me to keep up to date with the most current initiatives related to pollinators and to ensure that Oregon Tech plays a role in pollinator conservation. KBBA has kindly adopted the Oregon Tech Beekeeping Club as a sister organization which has allowed OIT students to participate and even present at KBBA meetings. 2019 -current.

Oregon Educational Resources Steering Committee. This committee, which reports to HECC, is advising institutions on how to meet the statewide standards for providing open source materials for students and organizes educational events for both higher ed. and K-12 professionals about using or creating open educational resources. Grant funds to support the creation of Open Educational Resources are channeled through this committee. On this board, I served on the Open Education Week subcommittee who was responsible for the planning and implementation of Open Ed. Week. 2019 – 2022.

Western Apicultural Society – 2019-current. Member

American Chemical Society. 2022-current. Member.

COLLEGIATE SERVICE

Online Learning and Advisory Council - This committee makes recommendations to the Provost regarding online learning policies and guidelines. 2021 – current.

Sustainability Committee. The mission of the Sustainability Committee -Our mission is to "serve as the coordinating body for the University's activities relating to sustainability. The committee will address methods to imbue the theme of sustainability throughout Oregon Tech in meaningful and visible ways." Notable accomplishments of the committee during my time of service include planning and delivering a variety of Earth Week events, proving volunteers for National Bike to Work Day stations, and facilitating the instillation of water bottle refill stations in every building. 2019-present.

Academic Master Plan Steering Committee -We developed an academic master plan for Oregon Tech that aligned with the University's Strategic Plan. As the chair of the Charge 3 Subcommittee, I facilitated the creation of the section focused on increasing enrollment, retention, and four-year graduation rates. 2022.

Executive Assessment Committee - Our team has created a variety of trainings and guides to help departments more effectively use assessment data for evaluating programmatic and institutional success. I have scored program assessment reports and provided individual feedback for the reports I assessed. I have offered training to various departments on campus about reporting data on institutional and programmatic learning outcomes and using equity dashboards. At convocation, I led a session on reporting requirements in preparation for Northwest's accreditation visit. 2022-current.

Oregon Tech Foundation Faculty Employee Giving Ambassador - Help to raise funds from staff and faculty for the Oregon Tech foundation and participate planning and execution of recognition events throughout the year. 2019-2022.

Chemistry Lab Move. In preparation for the renovation of Boivin Hall, chemistry faculty coordinated the movement of chemicals and equipment to temporary locations. I was specifically responsible for sorting, packing, and moving the CHE 104 labs from BH to the DOW building. As part of this process, I had to organize a temporary chemical prep space in what was formally a biology storage room. I hosted an event for local middle and high school teachers, where they could look through our older/outdated chemistry/science equipment and take supplies for their schools. Twelve teachers from seven different schools benefited from our donations. (2021).

Search Committee member for the following faculty and staff positions:

- Environmental Chemistry Assistant Professor, 2022 (ongoing). Committee Chair.
- Chemistry Visiting Instructor, 2022. (filled).
- Chemistry Assistant Professor, 2022. (1 of three positions filled)
- Natural Science Department Chair, 2022 (filled).
- Assistant Professor of Chemistry, 2021 (filled).
- Chemistry Visiting Instructor 2021 (filled).
- Assistant Professor of Chemistry, 2021 (failed).
- Foundation Annual Giving Manager. 2021 (filled)
- Educational Partnerships and Outreach Assistant Director, 2021 (filled).

BES Assessment Coordinator – I work to continually improve the Environmental Science assessment processes. I am responsible for writing our annual report and coordinate the collection of both institutional and programmatic assessment data in our program. 2018-current.

Dual Credit Faculty Liason for CHE 101/104 and CHE 201/204 - Coordinate with high school teachers to offer college level chemistry courses for Oregon Tech credit at their schools. In the last few years, I have partnered with 11 different teachers from across Oregon to offer college credit to hundreds of high school students.

Planning Committee for the Natural Science Department Retreat – I helped the department secure a discounted rate for our venue at Siskiyou Field Institute and did the meal planning and some cooking for the event which allowed us to host the retreat at a minimal cost to the university. 2018.

Admissions Recruitment Events – I have represented the Environmental Science Program at numerous Oregon Tech admissions events, including college preview days, Tech Treks, and New Wings. From leading guided walks in the arboretum to rolling beeswax candles, I always try to incorporate an activity for our visitors to make their experience memorable. 2018-current.

Girls Got STEM - residential summer camp for teenage women. Developed curriculum and was a primary instructor for land navigation and outdoor survival courses. 2018.

ABET Accreditation -Natural Science Department representative for CHE 101/104 as a support course in the accreditation process. This included meeting with ABET evaluators and preparing course materials for inspection. 2015 & 2019.
Scholarship Reader – I have long participated as a an evaluator of student scholarship applications. 2015-current.

TEACHING EXPERIENCE

Primary instructor for the following classes offered at Oregon Institute of Technology:

BIO 205 Nutrition. A study of the relationships of food and nutrition to health. An overview of the basic nutrition principles including the nutrients and how they function in the body, nutrient requirements, diet planning and energy balance. Current topics and controversies are examined.

BIO 211 Laboratory. Principles of modern biology emphasizing form and function of multicellular plants, major invertebrate phyla, and general vertebrate morphology and physiology.

BIO 212 Laboratory. Principles of modern biology emphasizing evolution, ecology, population genetics, and behavior of organisms.

BIO 225 Riparian Assessment. Introduced topics such as Greenline assessment protocol, proper functioning condition, repeat photography, macroinvertebrate collections, stream survey, flow/discharge calculations, and field sketches.

CHE 101 Introduction to General Chemistry. A brief presentation of introductory chemical concepts including atomic structure, the chemical equation, the behavior of gases, the chemistry of solution and acid-base chemistry. First term in GOB chemistry series.

CHE 104 Laboratory. Lab accompanying introductory general chemistry.

CHE 102 Introduction to Organic Chemistry. The role of organic chemistry in life and industrial processes is discussed. Second term in GOB chemistry series.

CHE 105 Laboratory. Lab accompanying introductory organic chemistry.

CHE 201/221 Laboratory. Lab accompanying general chemistry I.

CHE 202/222 Laboratory. Lab accompanying general chemistry II.

ENV 108 Mentorship and Team Building. We develop a strong sense of community, trust, inclusion, and belonging within the Environmental Science program among

all students and faculty. We introduce student mentorship opportunities and engage in team building exercises and environmental exploration during a weekend camping trip. Course is required every Fall. Can be taken multiple times for credit. No prerequisites.

ENV 117 Stream Water Chemistry. Chemical analysis of water quality parameters including temperature, turbidity, pH, dissolved oxygen, nitrates, and phosphates.

ENV 307 Water Resources. This course will provide an overview of the science & policy related to managing freshwater resources in the Western United States. Fundamentals of hydrologic processes, riparian assessment, stream surveying techniques, water sampling methods, watershed delineation, adjudication processes, the environmental impacts of water use, and riverine restoration practices will be included

ENV 407 Ecological restoration and monitoring. Co-taught with Dr. Michael Hughes. One week intensive field study assessing the stream restoration work on North Creek and Elder Creek in Lake County, OR.

ENV 226 Environmental Data Analysis I. Introduction to compilation, manipulation, and analysis of datasets common to environmental analysis. Includes measures of central tendency and spread; characterizing data distribution; linear regression; exceedance probability and cumulative frequency functions; understanding time series; and basic principles of graphical data displays.

ENV 355 Careers and Professionalism in Environmental Sciences. Practical seminar focusing on career opportunities in environmental sciences, professional standards, culture, ethics, and skills to enhance communication and collegiality. Assists students with workforce transition, including job search, preparation of resume packages and portfolios, interviewing tips, and job-offer negotiation.

ENV 420 Extern in Environmental Science. Students work in applied settings related to their career interest under the supervision of a professional mentor.

ENV 495 Bee Research. Supports student-initiated research projects in environmental sciences. Topic and scope must be reviewed and accepted by a faculty advisor. Registration by instructor consent. Counts as technical elective credit. May be repeated for up to nine total credits.

ENV 496 Senior Project. Advisor for a student project, *Waste Stream Audit at Oregon Tech*, examining waste disposal trends at Oregon Tech and ways to reduce, reuse, and recycle.

GEOG 105 Physical Geography. Comprehensive introduction to physical geography, including maps and representation of the earth's surface, the climate system and weather phenomena, plate tectonics, landform evolution and interpretation, and human-landscape interactions.

Appendix E. Letters of Support

HIGHER EDUCATION COORDINATING COMMISSION

Proposal for a New Academic Program

Institution: Oregon Institute of Technology

College/School: College of Health, Arts, and Sciences

Department/Program Name: Natural Sciences

Degree and Program Title: MS in Biomedical Sciences

1. Program Description

a. Proposed Classification of Instructional Programs (CIP) number: **26.0102**

b. Brief overview (1-2 paragraphs) of the proposed program, including its disciplinary foundations and connections; program objectives; programmatic focus; degree, certificate, minor, and concentrations offered.

The Natural Sciences department at Oregon Tech seeks to create a Master's of Science in Biomedical Sciences (MS-BMS) degree program to complement the existing Bachelor of Science in Biology-Health Sciences (BS-BHS) undergraduate program, which is tailored to prepare students for entry into professional graduate programs in the health sciences. We envision two tracks: a course-based, non-thesis track, as well as a thesis-based track integrating laboratory research experience. Each track would consist of 45 graduate-level credits; the non-thesis track could be completed in as few as three 15-credit quarters, while the thesis-based track would typically require two years to complete. With minimal additional investments, we can leverage the department's existing faculty and resources to provide valuable additional opportunities for our existing BS-BHS students, as well as for incoming post-baccalaureate students with degrees from other institutions.

Firstly, a 1-year coursework-based master's degree track would allow our department to offer an intensive set of biomedically-oriented courses to incoming post-baccalaureate students from other institutions, as well as to students from other Oregon Tech programs. These students may be looking to return to school after a period of employment or looking for "gap year" preparation for application to professional schools. As noted below, we are already well situated to offer numerous graduate-level courses with our existing faculty and infrastructure in this model.

Secondly, a 2-year thesis-based master's degree track integrating laboratory research experience would significantly expand the opportunities for our existing BS-BHS students (via a "3+2" model), as well as attracting external post-baccalaureate students (via a standalone 2-year program). Though our existing BS-BHS students have an excellent track record in admission to graduate professional health programs of their choice, our department has less history in offering laboratory research experiences to students to prepare them for application to MS or PhD graduate school programs or post-baccalaureate employment in the biomedical sciences.

These two tracks will both benefit from the existing faculty and facilities that already serve our Biology-Health Sciences program, which is tailored to prepare students for entry into careers in the health sciences disciplines and careers. The master's program focus and objectives include (1) promoting a deep and integrated understanding of the biological sciences and their implication to the advancement of health and biomedical science, (2) strengthening critical analysis and reasoning skills and the application of these skills in a manner relevant to the biomedical sciences, (3) generating and effectively communicating scientific knowledge relevant to the biomedical sciences, (4) developing a commitment to life-long learning and career pursuits within the discipline, (5) fostering a commitment to health equity, and (6) demonstrating the ability to competently conduct ethical reasoning in the discipline.

c. Course of study – proposed curriculum, including course numbers, titles, credit hours.

Curriculum

The MS-BMS degree requires the completion of 45 graduate-level (listed at 500+) credits in both the thesis and non-thesis tracks. (To provide some flexibility, up to 12 credits of the 45 will be accepted at the 400 level.) Students must maintain a 3.0 graduate-level GPA with a final grade of "C" or better in all graduate courses.

- The **thesis-based BMS** degree track consists of **21 credits of core classes** (including **10 credits of research/thesis work**) and **24 credits of elective courses**. Thesis-based master's students will typically be occupied with either Teaching Assistantships or Research Assistantships, so the recommended course load is 6-9 credits per quarter for 6 quarters (2 years).
- The **non-thesis BMS** degree track consists of **8 credits of required core classes**, and **37 credits of elective courses**. This course of study could be completed in as few as 3 quarters by enrolling in 15 credits per quarter.

Thesis Option

For students interested in biological research, private sector jobs, and professional schools where research experience is valued. The thesis option requires successful completion of the core classes, thesis research credits, and an approved thesis, as well as elective coursework. Thesis option students are required to defend their research results before a thesis defense committee.

3+2 graduate program

A unique feature of this program is its 3+2 option for Oregon Tech students. This plan allows a student to simultaneously receive a BS and an MS degree in five years. With this plan, students are moved quickly toward expanding their academic and scientific horizons based on the student's abilities and personal motivation. Students in the 3+2 plan are expected to successfully complete the requirements for both the BS and MS degrees by the end of their fifth year in college.

Non-Thesis Option

This option will be attractive to a broad range of career professionals, including science teachers requiring graduate coursework and individuals with positions in which an MS in Biomedical Sciences will qualify them for promotion. It is also attractive to existing Biology-Health Sciences The Biomedical Sciences MS non-thesis option requires completion of the core classes, a capstone, and elective

coursework, and may be completed in a single academic year. The program of study for each student must be approved by a graduate committee and the Program Director.

Thesis Track Core Classes

BIO 501 – Intro to Graduate Study (3 credits)
BIO 534 – Advanced Data Analysis (3 credits)
BIO 509 – Intro to Biomedical Sciences (2 credits)
BIO 510 – Current Issues in Biomedical Sciences (1 credit per term*)

- *students must take BIO 510 in 3 different quarters, for a total of 3 credit hours

BIO 595 – Graduate Research/Thesis (2 credits per term*)

- *students must take BIO 595 in 5 different quarters, for a total of 10 credit hours. Prerequisite: BIO 501.

Non-Thesis Track Core Classes

BIO 509 – Intro to Biomedical Sciences (2 credits)
BIO 510 – Current Issues in Biomedical Sciences (1 credit per term*)

- students must take BIO 510 in 3 different quarters, for a total of 3 credits

BIO 596 – Capstone (3 credits)

Elective Classes

Existing Oregon Tech graduate courses

STAT 505: Biostatistics I (3 credits)
STAT 510: Epidemiology I (3 credits)
WRI 521: Writing at the Grad Level (3 credits)
WRI 510: Grant Proposal Writing (3 credits)
ALH 510: The Science of Evidence-Based Medicine (3 credits)
ALH 515: Scientific Writing and Healthcare Leadership Literature Review (3 credits)
ALH 545: Pertinent Ethical and Legal Considerations for Healthcare Leaders (3 credits)
ALH 565: Population Health Issues for Healthcare Professionals (3 credits)
ALH 585: Financial Considerations and Political Strategies for Healthcare Leaders (3 credits)

Existing Natural Sciences courses

A number of existing Natural Sciences courses will be crosslisted at the graduate level:
BIO 507 - Drug Development (1 credit)
BIO 522 - Intro to Neuroscience (3 credits)
BIO 526 - Evolutionary Biology (3 credits)
BIO 527 – Special topics in neuroscience (1 credit)
BIO 534 – Advanced Data Analysis (3 credits)
BIO 536 - Immunology (4 credits)
BIO 538 - Exercise Physiology (3 credits)
BIO 541 - Genetic Engineering & Therapy (1 credit)
BIO 542 - Cell Biology (4 credits)
BIO 544 - Biological Physics (3 credits)

BIO 545 - Virology (3 credits)
BIO 546 - Pathophysiology I (3 credits)
BIO 547 - Pathophysiology II (3 credits)
BIO 552 - Developmental Biology (3 credits)
BIO 554 - Environmental Health (3 credits)
BIO 561 - Human Cadaver Dissection I-III (1 credit per term; available multiple terms)
BIO 567 - Biomedical Devices (3 credits)
BIO 597 - Biomedical Internship (1-5 credits)
CHE 505 - Nanoscience & Nanotech (4 credits)
CHE 535 - Bioorganic Chemistry (4 credits)
CHE 550 - Biochemistry I (4 credits)
CHE 551 - Biochemistry II (4 credits)
CHE 552 - Biochemistry III (4 credits)
CHE 565 - Fate and Transport of Pollutants (4 credits)

Future additional electives

As the MS-BMS program grows, so too will our capacity to offer exclusively graduate courses in a greater diversity of areas. We expect that the addition of an MS program will also increase enrollment in the BS program, eventually leading to potential for more departmental faculty. In conjunction with this, the introduction of masters-level Teaching Assistants will free up faculty from teaching lower-level laboratory sections and enable them to offer upper-division electives in their specialty.

Graduate Thesis

MS-BMS students in the thesis track would be required to complete an original research project under the supervision of a faculty advisor. This thesis-based track would include a total of at least 5 terms of enrollment in BIO595: Graduate Research/Thesis. Students would develop and submit a research plan in their first term for approval by their adviser and graduate committee. Research will be performed beginning in their first or second term. The completed written thesis would require review and approval by the student's graduate committee and one external reviewer. All MS theses would be made available online through the OIT Library Services. Peer-reviewed publication submission would be highly encouraged and under the discretion and mentorship of the primary graduate adviser.

A thesis-track student's graduate committee would be comprised of the primary adviser, at least one additional Natural Sciences faculty, and an external member from beyond the department. The graduate committee should be determined in the first term of the MS degree. An MS committee agreement will be signed by all members, the student, and university administration. The committee will be responsible for approving the student's proposal, reviewing and approving the final MS thesis, and attending and approving the Public Defense. The committee will also provide technical and academic support during the student's degree to facilitate their success and that of the project.

d. Manner in which the program will be delivered, including program location (if offered outside of the main campus), course scheduling, and the use of technology (for both on-campus and off-campus delivery).

   All classes and courses will be offered on Klamath Falls Campus.

e. Adequacy and quality of faculty delivering the program.

The faculty at Klamath Falls campus teaching in the Natural Sciences have the required credentials and experience to teach the suggested curriculum and lead students in research projects. Below is a brief overview of the primary faculty members who will teach in the program; their CVs are attached.

- Rachel Edwards, PhD in Biomedical Engineering
- Kamal Gandhi, PhD in Microbiology
- Hui-Yun Li, PhD in Neuroscience
- Travis Lund, PhD in Biochemistry
- Ken Usher, PhD in Chemistry
- Jesse Kinder, PhD in Physics
- Yuehai Yang, PhD in Physics
- Nate Bickford, PhD in Environmental Sciences
- Jherime Kellermann, PhD in Wildlife Conservation & Management

In addition, 4 newly-hired faculty members with PhDs and expertise in biology and biologically-oriented chemistry will be joining the Natural Sciences Department in Fall 2023. In addition to their ability to teach graduate-level electives in the proposed MS program in their areas of expertise, several have been provided both the release time and significant startup funding in order to purchase the necessary equipment and work to establish rigorous research projects; this is in addition to the existing research projects led by current faculty (see also section 5c, below). As a result of these factors, our new and existing faculty members are well equipped to provide significant research and course support to MS students in both the non-thesis and thesis tracks.

f. Adequacy of faculty resources – full-time, part-time, adjunct.

The Natural Sciences program currently has 19 full time faculty, 1 part time faculty and a few adjuncts. The full-time faculty will be the primary individuals teaching the curriculum

g. Other staff.

We have an office manager and plans to hire a lab manager in 2023

h. Adequacy of facilities, library, and other resources.

We have facilities and resources that are already being successfully used for the BS programs, and which are more than adequate for the proposed MS program.

i. Anticipated start date.
We anticipate our program will begin in Fall 2024, with recruitment occurring throughout 2024.

2. Relationship to Mission and Goals

a. Manner in which the proposed program supports the institution's mission, signature areas of focus, and strategic priorities.

The Biomedical Sciences MS Program advances the missions of OIT by providing rigorous, high quality applied degree program in sciences, with a focus on the application of theory to practice, and offer statewide educational opportunities to meet emerging needs.

OIT Mission
Oregon Institute of Technology, an Oregon public university, offers innovative and rigorous applied degree programs in the areas of engineering, engineering technologies, health technologies, management, and the arts and sciences. To foster student and graduate success, the university provides an intimate, hands-on learning environment, focusing on application of theory to practice. OIT offers statewide educational opportunities for the emerging needs of Oregonians and provides information and technical expertise to state, national and international constituents.

b. Manner in which the proposed program contributes to institutional and statewide goals for student access and diversity, quality learning, research, knowledge creation and innovation, and economic and cultural support of Oregon and its communities.

The proposed Program located in Klamath Falls will facilitate student experiences in underserved, rural regions of the state.

Many students attracted to this program will be from the local region and/or from OIT's biology/science programs and will serve to help establish services in rural and underserved areas of the state. Many of the thesis projects will be focused on the region and will inherently add information that will help us understand the region. Also, many of the student in the degree will head to medical school and there will be percentage that will return to the area.

In addition to providing a rigorous curriculum, and conducting regular assessment of learning outcomes, the program will admit students who have the necessary characteristics to succeed in this field. In order to ensure that students will have the necessary preparation for success, applicants must meet the program admissions requirements as determined by OIT. The program will have a rigorous curriculum, standards for admissions, accreditation standards, and ongoing program assessments.

Per Oregon Tech policy, to be considered for admission to this graduate program, an applicant must have a baccalaureate degree from a regionally accredited college or university, as well as a scholastic record that evidences the ability to perform satisfactory graduate work. Specifically, a student must have:

- completed a four-year college course of study and hold an acceptable baccalaureate degree from an institution accredited by a regional accrediting association
- been in good academic standing at the last college or university attended
- attained a grade point average of at least 3.0 on a 4.0 scale for the last 90 term (60 semester) units attempted
- attained a grade point average of at least 3.0 on a 4.0 scale for the last 45 term hours in the major
- met the professional, personal, scholastic, and other standards for graduate study

Specific Admission Requirements for 3+2
In the 3+2 thesis-based option, students are simultaneously awarded both the BS and MS degrees in five years, thus shortening the normal time to receive both degrees from six years to five years. They must apply and be admitted into the MS program by the Spring term of their junior year (preferred) or by the start of the Fall term of the senior year and meet the course requirements

listed below. Students applying to the 3+2 plan must have a minimum 3.0 overall GPA and a minimum 3.25 GPA in their science coursework.

The application file for admission to the 3+2 plan must include:

1. A completed MS application form;
2. An Oregon Tech transcript;
3. Two letters of recommendation from faculty;
4. A statement of research interests; and
5. Satisfactory scores in 300 and 400 level classes

c. Manner in which the program meets regional or statewide needs and enhances the state's capacity to:

   i. improve educational attainment in the region and state;
   ii. respond effectively to social, economic, and environmental challenges and opportunities; and
   iii. address civic and cultural demands of citizenship.

This program will be the among the only MS programs in the Pacific Northwest to focus on the biomedical sciences. Its rural setting provides a unique opportunity for Oregon residents interested in pursuing biomedical careers while living and working in a non-urban environment. It will thus be well positioned to address the current and upcoming need for medical professionals in the workforce, drawing from traditional undergraduates as well as nontraditional students interested in pursuing a career in biomedicine. The small size of the program will enable it to respond to shifting socioeconomic challenges and opportunities as needed, while the curriculum will be tailored to produce well-rounded medical professionals able to address civic and cultural issues.

3. Accreditation

a. Accrediting body or professional society that has established standards in the area in which the program lies, if applicable.

   N/A

b. Ability of the program to meet professional accreditation standards. If the program does not or cannot meet those standards, the proposal should identify the area(s) in which it is deficient and indicate steps needed to qualify the program for accreditation and date by which it would be expected to be fully accredited.

   N/A

c. If the proposed program is a graduate program in which the institution offers an undergraduate program, proposal should identify whether or not the undergraduate program is accredited and, if not, what would be required to qualify it for accreditation.

   The BS program is accredited.

d. If accreditation is a goal, the proposal should identify steps being taken to achieve accreditation. If the program is not seeking accreditation, the proposal should indicate why it is not.
   NA

4. Need

a. Anticipated approximate fall term headcount and enrollment over each of the next five years are included in the table below. Separate estimates are provided for the 1-year non-thesis track ("NTT") and the 2-year thesis track ("TT") MS students, with a final section tallying the overall MS student enrollment and graduate counts.

	1st Year (AY '24-25)	2nd Year (AY '25-26)	3rd Year (AY '26-'27)	4th Year (AY '27-28)	5th Year (AY '28-29)	5-year cumulative total
New incoming NTT students	5 new NTT	5 new NTT	5 new NTT	5 new NTT	5 new NTT	
Total enrolled NTT students	5 NTT enrolled	5 NTT enrolled	5 NTT enrolled	5 NTT enrolled	5 NTT enrolled	
Graduating NTT students	5 NTT graduates	5 NTT graduates	5 NTT graduates	5 NTT graduates	5 NTT graduates	25 total NTT graduates
New incoming TT students	5 new TT	10 new TT	10 new TT	10 new TT	10 new TT	
Total enrolled TT students	5 TT enrolled	15 TT enrolled	20 TT enrolled	20 TT enrolled	20 TT enrolled	
Graduating TT students	0 TT graduates	5 TT graduates	10 TT graduates	10 TT graduates	10 TT graduates	35 total TT graduates
Total enrolled (NTT+TT) MS students	10 MS enrolled	20 MS enrolled	25 MS enrolled	25 MS enrolled	25 MS enrolled	
Total graduating (NTT+TT) MS students	5 MS graduates	10 MS graduates	15 MS graduates	15 MS graduates	15 MS graduates	60 total MS graduates

b. Expected degrees/certificates produced over the next five years.

35 non thesis MS degree in Biomedical Sciences

20 thesis MS degree in Biomedical Sciences

c. Characteristics of students to be served (resident/nonresident/international; traditional/ nontraditional; full-time/part-time, etc.).

The program design allows for students to be served from any of the listed characteristics.

d. Evidence of market demand.

Although master's degrees in biology abound, particularly at PhD-granting institutions, there are very few master's degrees with a biomedical science focus in the Pacific Northwest. In Oregon, OHSU offers a two-year non-master's Graduate Program in Biomedical Sciences (PBMS). In addition, OSU offers thesis and non-thesis options of a master's degree in Comparative Health Services (Biomedical Sciences option) via their College of Veterinary Medicine. Our one-year course-based non-thesis MS track will provide an opportunity not currently available in Oregon, enabling students to enhance their foundational biomedical science knowledge base before beginning professional programs. Programs such as these are proliferating rapidly in recent years, and surveys of our recent graduates demonstrate significant interest in both thesis and non-thesis MS degrees offered at our rural setting. (Survey results attached.) Notably, the average growth in the medical fields supported by this program is 15% (much faster than the average growth of 6%). (BLS.gov). There is an obvious need for individuals in the various fields supported by our proposed program.

e. If the program's location is shared with another similar Oregon public university program, the proposal should provide externally validated evidence of need (e.g., surveys, focus groups, documented requests, occupational/employment statistics and forecasts).

NA

f. Estimate the prospects for success of program graduates (employment or graduate school) and consideration of licensure, if appropriate. What are the expected career paths for students in this program?

A likely career path for many of our graduates is to pursue professional or graduate school. We anticipate many students will use our program to enhance their preparedness for medical, osteopathic, dental, pharmaceutical, and related professional programs. The non-thesis option will be attractive to a broad range of career professionals, including science teachers requiring graduate coursework and individuals with positions in health care or biotechnology in which an MS in Biomedical Sciences will qualify them for promotion. Students on the thesis track will also be prepared to enter the workforce in hands-on roles in the fields of biotechnology, pharmacy, research or clinical laboratories, and related fields. The proposed MS program will build on the success of our undergraduate Biology-Health Sciences program; approximately 100% of our graduates from this program are either employed or seeking an advanced degree within six months of graduation. Our graduates who decide to apply to graduate programs are accepted at very high rates, and our alumni in graduate school often report that they are better prepared than their peers from other universities, and they often become leaders within their graduate programs and are highly successful in their professional careers. We anticipate the BMS-MS numbers to continue this trend. If we continue to do well our student will also do well.

5. Outcomes and Quality Assessment

a. Expected learning outcomes of the program.

1. Promote a deep and integrated understanding of the biological sciences and their implication to the advancement of health and biomedical science.
2. Strengthen critical analysis and reasoning skills and the application of these skills to the design and execution of scientific inquiry relevant to specific biomedical disciplines.

3. Generate and effectively communicate scientific knowledge relevant to specific biomedical disciplines.
4. Develop a commitment to life-long learning and career pursuits within health and biomedical science disciplines.
5. Foster a commitment to health equity.
6. Students will demonstrate ability to evaluate pertinent values to ethical dilemmas using multiple ethical frameworks.

b. Methods by which the learning outcomes will be assessed and used to improve curriculum and instruction.

Typical programmatic assessment will be performed, including tracking of post-graduation student success, surveys of current and former students, assessment by industry experts, analysis of retention patterns, and related efforts.

c. Nature and level of research and/or scholarly work expected of program faculty; indicators of success in those areas.

Beyond the existing high expectation for scholarship that our department has long operated under, we have recently been gradually increasing our expectations for faculty surrounding our scholarly expectations and scientific research efforts. In support of this, new and existing faculty are being provided significant resources in their efforts to engage student in productive research projects. This support is being provided financially, for the purchase of supplies and equipment; significant support has also been provided logistically, in the form of assignment of new research spaces, provision of teaching release time in exchange for mentoring student researchers, and related efforts. In addition, several new tenure-track faculty with expertise in biology and biology-oriented chemistry are joining our department in the Fall of 2023, and they have been provided significant startup funding and release time in order to purchase the necessary equipment and supplies to establish rigorous research projects, in addition to those research projects led by existing faculty. These projects are already published and presented at both regional and national levels in their respective fields, and we only anticipate an increase in this research output and prominence as a result of the efforts described above. In all, the increased expectation for scholarship among our departmental faculty, as well as the availability of new thesis-based graduate students to dedicate significant time over many months/years to ongoing research projects, will lead to a synergistic enhancement of research efforts in our department.

6. Program Integration and Collaboration

a. Closely related programs in this or other Oregon colleges and universities.

Although master's degrees in biology abound, particularly at PhD-granting institutions, there are very few master's degrees with a biomedical science focus in the Pacific Northwest. In Oregon, OHSU offers a two-year non-master's Graduate Program in Biomedical Sciences (PBMS). In addition, OSU offers thesis and non-thesis options of a master's degree in Comparative Health Services (Biomedical Sciences option) via their College of Veterinary Medicine.

b. Ways in which the program complements other similar programs in other Oregon institutions and other related programs at this institution. Proposal should identify the potential for collaboration.

The Biomedical Sciences MS program is designed to build on, while also augmenting and improving, the existing Biology-Health Sciences BS program, including its faculty, upper division electives, and facilities (such as the cadaver and research labs). The proposed program will exist in two forms: a research-based thesis track, and a course-based non-thesis track. Each will provide opportunities for existing Oregon Tech undergraduates as well as for new post-baccalaureate applicants. The addition of MS-level research opportunities will benefit from the participation of talented undergraduate research students. In addition, the one-year course-based non-thesis track will provide an opportunity not currently available in Oregon, enabling students to enhance their foundational biomedical science knowledge base before beginning professional programs, science teachers requiring graduate coursework and individuals with positions in which an MS in Biomedical Sciences will qualify them for promotion.

Our faculty are actively engaged in research with undergraduates and with addition of graduate student who will facilitate this research, it will create system where the whole is greater than the parts. This means more can be achieved together.

c. If applicable, proposal should state why this program may not be collaborating with existing similar programs.
NA

d. Potential impacts on other programs.
There is no on campus competition for this type of student and we do not expect any negative impacts.

7. External Review

If the proposed program is a graduate level program, follow the guidelines provided in *External Review of New Graduate Level Academic Programs* in addition to completing all of the above information.

The provost and Natural Sciences will invite respected panel of colleagues to review the graduate program.

HECC Document
The external review process for a proposed new graduate level degree program may include a site visit by a panel composed of three highly qualified individuals in the specific field/discipline of the proposed program. Although scholars and professionals from Oregon may be included, the majority of the panel members must be selected from peer institutions outside the state.

Institutions may consider virtual or hybrid reviews in place of on-site reviews under the following guidelines:
(1) If the proposed program is an online program;
(2) If the proposed program has minimal special facilities associated with it;
(3) If the proposed program has the need for an expedited timeline for needed approval; or
(**4) If the proposed program is closely related to an existing program (i.e., not a completely new area for the proposing institution).**

1 At the request of an institution and by agreement with the Statewide Provosts Council, the review requirement may be modified or waived if the proposed degree program is closely related to an institution's authorized existing program; for example, adding a Master of Engineering in Civil Engineering where the Master of Science in Civil Engineering is already in place.
2
Site Visit
Invitations to serve on the external review panel and to act as chair are extended by the institution. The institution will provide panel members with (1) the full written program proposal, (2) participating faculty vitae, (3) the projected budget, (4) other supporting or contextual materials, as needed, and (5) a site visit schedule and itinerary (if applicable), including all arrangements.

Report and Institution's Response
On the basis of its visit, review of materials, and panel members' expertise, the panel will make a written report for which guidelines are provided. The external review report and any institutional responses will be included in the program proposal submitted for Statewide

Provosts Council consideration.
External Review Panel Responsibility
The panel is responsible for preparing the final report in a timely manner. The report will be based primarily on the full panel's evaluation of the written program proposal and the information gathered during the site visit, and will address areas set forth in these guidelines. Once completed, the chair will send the report to the institution provost or graduate dean; a copy will be provided to the academic unit that developed the program proposal.

Report Guidelines
The panel is asked to assess the program within the present and projected future contexts, addressing program elements, faculty, need, and resources.
1. Program
a. The program objectives and requirements; the mechanisms for program administration and assessment.

b. The program's alignment with the institution's mission and strategic objectives.

c. The depth and breadth of coverage in terms of faculty availability and expertise, regular course offerings and directed study, and access to and use of support resources within and external to the institution.

d. The relationship of this program to undergraduate and other graduate programs at the institution and other institutions in the state, if appropriate. Consider collaborative arrangements, partnerships, interdisciplinary programs, service functions, joint research projects, support programs, etc.

e. The justification in terms of state needs, demand, access, and cost effectiveness (if this program represents duplication within the state).

f. The probable impact of the program on the department or academic unit, as well as its effect on current programs.

g. The program's major strengths and weaknesses.

2. Faculty

a. The quality of the faculty in terms of training, experience, research, scholarly contributions, ability to generate external support, stature in the field, and qualifications to serve as graduate faculty.

b. The faculty in terms of size, qualifications for area(s) of specialization offered, and the student body served. Include analysis of program sustainability in light of such factors as upcoming retirements, etc.

c. Areas of faculty strength and weakness.

d. Faculty workload, including availability for student advising, research oversight, mentoring, and teaching effectiveness.

e. The credentials, involvement of, and reliance upon support faculty from other departments within the institutions, from other institutions, and/or adjunct faculty.

3. Need

a. The evidence of sufficient demand and/or relevant employment opportunities for graduates of this program.

b. The overall need for the program within the institution, state and/or region, and nation.

4. Resources

a. The adequacy of library, computer, laboratory, and other research facilities and equipment; offices; classrooms; support services for the program; and, if relevant, the program's utilization of resources outside the institution (e.g., field sites, laboratories, museums, libraries, and cooperative arrangements with other institutions).

b. The proposed budget and any need for new resources to operate the program effectively. Where appropriate, review resources available to support graduate students (e.g., fellowships and other scholarships, teaching and research assistantships).

c. In terms of national standards, the institution's commitment to the program as demonstrated by the number of faculty relative to workload and student numbers, support for faculty by nonacademic personnel (e.g., support, staff, technicians), financial support for students, and funds for faculty research and professional activities (e.g., conferences, visiting lectures).

d. Institution leaders' commitment to this program in the long term.

e. The institution's ability to sustain the program in the foreseeable future along with its current and future projected commitments.

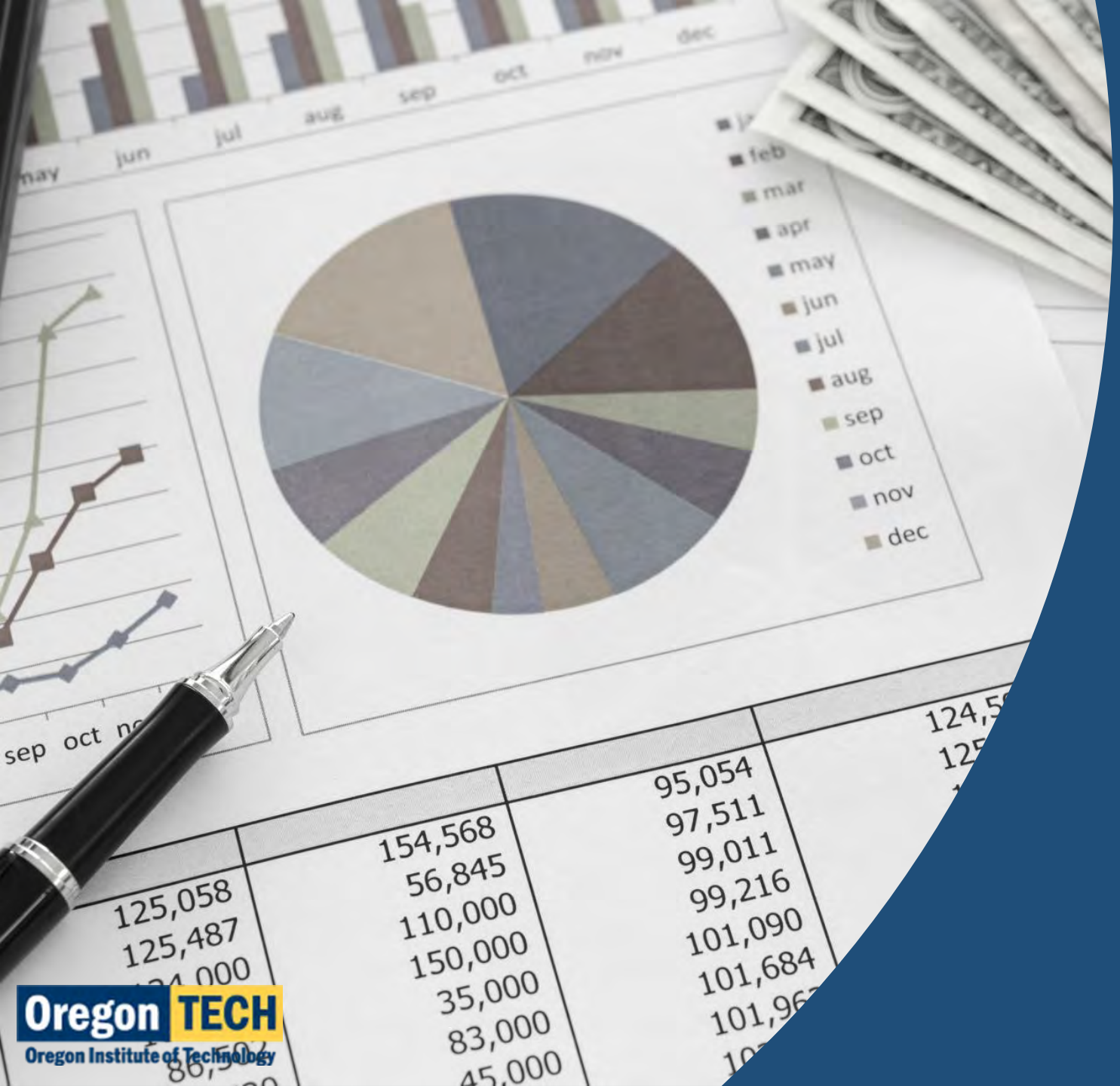
Report to Finance & Facilities Committee

(also Sitting as the Audit Committee)

Oregon Tech Board of Trustees

May 31, 2023

John A. Harman, MBA, CGMA, CMPE| VP Finance & Administration



Finance & Facilities Committee* Reports

*Also serving as the Audit Committee

Oregon TECH
Oregon Institute of Technology

Finance, Facilities & Audit Agenda Items

- **3. Finance, Facilities and Audit: Update**
  - 3.1- Fiscal Operations Advisory Council (FOAC) Report
  - 3.2- Quarterly Finance, Facilities and Audit Report
    - 3.2.1- FY 2022-23 YTD April Management Report
    - 3.2.2- Q-3 Financial Dashboard
    - 3.2.3- Q-3 Investment Report
    - 3.2.4- Q-4 Capital Projects Report
    - 3.2.5- Q-4 Internal Auditor Report- *Kernutt Stokes*
- **4. Action Items**
  - 4.1- Recommend Approval of FY 2023-24 Budget

FY 2022-23 Budget Performance YTD February

Forecast based on YTD April figures is trending cautiously positive

Tuition revenue is down related to 5.9% enrollment shortfall (excludes ACP students)

Spending is below budget for labor and non-labor categories

Required transfers-in may be less than budgeted based on spending patterns

FY 2022-23 budget was balanced using:

$3.0M COVID Funds & $1.5M Reserve Funds

Must continue to be strategic in managing our resources

Oregon TECH
Oregon Institute of Technology

General Fund Monthly Report

FY 2022-23 April (in thousands)

	YTD Comparison		FY 2022-23 Budget & Forecast					
	FY 2021-22 April Actuals	FY 2022-23 April Actuals	FY 2021-22 Year End Actuals	FY 2022-23 Board Adopted Budget (BAB)	FY 2022-23 Adjusted Budget	FY 2022-23 Forecast	Forecast to Budget Variance	Notes
Revenue								
State Allocations	$37,407	$33,744	$37,407	$32,385	$32,385	$33,744	$1,360	(1)
Tuition & Fees	37,522	37,168	38,190	39,832	39,973	37,708	(2,124)	(2)
Remissions	(5,711)	(6,554)	(5,837)	(5,546)	(5,546)	(6,649)	(1,103)	
Other	1,863	2,646	2,259	2,302	2,156	3,000	698	
Total Revenue	**$71,081**	**$67,003**	**$72,019**	**$68,972**	**$68,967**	**$67,803**	**($1,169)**	
Expenses								
Administrative Staff Salary	$6,807	$7,063	$8,204	$9,700	$9,636	$8,518	($1,182)	
Faculty Salary	10,291	10,559	12,783	14,227	14,291	$13,182	(1,046)	
Adjunct and Admin/Faculty Other Pay	2,583	2,393	3,726	3,457	3,457	$3,562	105	
Classified	4,854	5,106	5,838	6,321	6,323	$5,998	(324)	
Student	590	690	755	1,063	1,055	$842	(221)	
GTA	60	82	74	121	121	$120	(1)	
OPE	14,319	14,486	17,207	19,252	19,252	17,268	(1,983)	
Total Labor Expense	**$39,505**	**$40,380**	**$48,588**	**$54,142**	**$54,136**	**$49,490**	**($4,651)**	(3)
Service & Supplies	$9,807	$11,832	$12,762	$21,463	$21,632	$14,230	($7,233)	(4)
Internal Sales	(1,063)	(1,064)	(1,272)	(1,356)	(1,356)	(1,306)	49	
Debt Service	404	1,420	631	1,189	1,189	1,952	763	(5)
Capital	704	227	153	185	231	350	165	
Utilities	1,274	1,380	1,820	1,335	1,335	1,669	334	
Transfers In	-	-	-	-	-	-	-	
Transfers Out	1,421	1,433	1,433	1,462	1,433	1,433	(29)	
Total Direct Expense	**$12,547**	**$15,230**	**$15,527**	**$24,279**	**$24,465**	**$18,328**	**($5,951)**	
Total All Expense	**$52,051**	**$55,609**	**$64,115**	**$78,421**	**$78,601**	**$67,819**	**($10,602)**	
Net from Operations before Other Resources (Uses)	**$19,030**	**$11,394**	**$7,904**	**($9,449)**	**($9,633)**	**($16)**		(6)
Other Resources (Uses)								
Transfers In	$73	$36	$78	$8,000	$8,000	$48		
Transfer Out	(0)	(340)	(6,059)	(51)	(140)	(340)		
Use of Reserve	-	-	-	1,500	1,500	-		
Total Other Resources (Uses)	**$73**	**($304)**	**($5,981)**	**$9,449**	**$9,360**	**($292)**		(7)
Total from Operations and Other Resources (Uses)	**$19,102**	**$11,090**	**$1,923**	**($0)**	**($273)**	**($308)**		(8)
Beginning Fund Balance	$15,235	$17,218	$15,235	$17,218	$17,218	$17,218		
Fund Balance Adjustment	-	-	60	(1,500)	(1,500)	-		
Ending Fund Balance	**$34,337**	**$28,308**	**$17,218**	**$15,718**	**$15,445**	**$16,910**		
Fund Balance as % Operating Revenues	N/A	N/A	23.9%	22.79%	22.4%	24.9%		
Ending Cash Balance	$36,121	$30,359	$18,536					

FY 2022-23 YTD April Management Report

Oregon TECH
Oregon Institute of Technology

Notes:

(1) **FY 2022-23 State Allocations Forecast**- State allocation increased by $1.3M following HECC October 2022 formula corrections and data reconciliation.

(2) **FY 2022-23 Tuition Forecast-** Reflects impact of unexpected 5.9% enrollment decline (excludes ACP). Flat enrollment was budgeted for FY 2022-23.

(3) **FY 2022-23 Labor Expense Forecast**- Reflects budgeted positions remaining unfilled along with benefits and other payroll expenditures being less than expected.

(4) **FY 2022-23 Forecast** - $5M in reduced spending is anticipated from a slower pace of expenditures related to Applied Computing and Rural Health Initiatives. Unexpended Special Item Funds for this initiative were rolled forward from FY 2021-22 and budgeted as a transfer-in for FY 2022-23 as intended from state allocation.

(5) **FY 2022-23 YTD Actuals** - Debt service is higher than prior year due to front-loaded savings from May 2021 state bond refinancing for improved interest rates.

(6) **FY 2022-23 Net from Operations before Transfers In and Out Forecast-** Because of reduced spending, the net loss at yearend is forecasted to be less than budgeted.

(7) **FY 2022-23 Forecast for Use of Non-operating Funds** - Net transfers-in from non-operating resources is expected to be less due to pace of spending in Applied Computing and Rural Health Initiatives and savings in other areas.

(8) **FY 2022-23 Yearend Forecast** - Trending close to breakeven before budgeted transfers-in.

FY 2022-23 YTD April Revenue and Labor Expenses

General Fund Monthly Report

FY 2022-23 April (in thousands)

	YTD Comparison		FY 2022-23 Budget & Forecast					
	FY 2021-22 April Actuals	FY 2022-23 April Actuals	FY 2021-22 Year End Actuals	FY 2022-23 Board Adopted Budget (BAB)	FY 2022-23 Adjusted Budget	FY 2022-23 Forecast	Forecast to Budget Variance	Notes
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Total Revenue	**$71,081**	**$67,003**	**$72,019**	**$68,972**	**$68,967**	**$67,803**	**($1,169)**	
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Total Labor Expense	**$39,505**	**$40,380**	**$48,588**	**$54,142**	**$54,136**	**$49,490**	**($4,651)**	(3)

YTD April Direct Expenditures and Net from Operations

General Fund Monthly Report

FY 2022-23 April (in thousands)

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	FY 2021-22 April Actuals	FY 2022-23 April Actuals	FY 2021-22 Year End Actuals	FY 2022-23 Board Adopted Budget (BAB)	FY 2022-23 Adjusted Budget	FY 2022-23 Forecast	Forecast to Budget Variance	Notes
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Utilities	1,274	1,380	1,820	1,335	1,335	1,669	334	
Transfers In	-	-	-	-	-	-	-	
Transfers Out	1,421	1,433	1,433	1,462	1,433	1,433	(29)	
Total Direct Expense	**$12,547**	**$15,230**	**$15,527**	**$24,279**	**$24,465**	**$18,328**	**($5,951)**	
Total All Expense	**$52,051**	**$55,609**	**$64,115**	**$78,421**	**$78,601**	**$67,819**	**($10,602)**	
Net from Operations before Other Resources (Uses)	**$19,030**	**$11,394**	**$7,904**	**($9,449)**	**($9,633)**	**($16)**		(6)
Other Resources (Uses)								
Transfers In	$73	$36	$78	$8,000	$8,000	$48		
Transfer Out	(0)	(340)	(6,059)	(51)	(140)	(340)		
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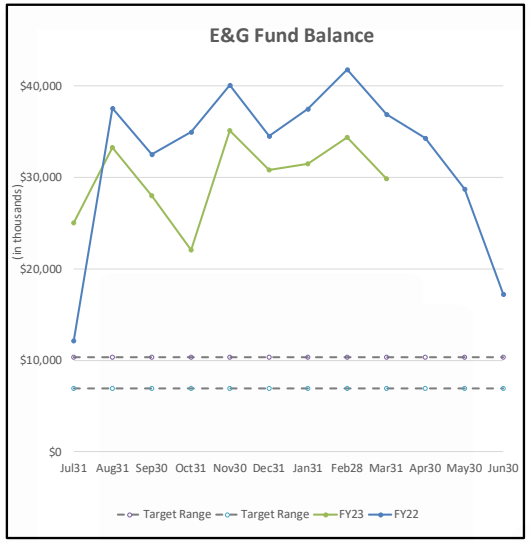
Total Other Resources (Uses)	**$73**	**($304)**	**($5,981)**	**$9,449**	**$9,360**	**($292)**		(7)
Total from Operations and Other Resources (Uses)	**$19,102**	**$11,090**	**$1,923**	**($0)**	**($273)**	**($308)**		(8)

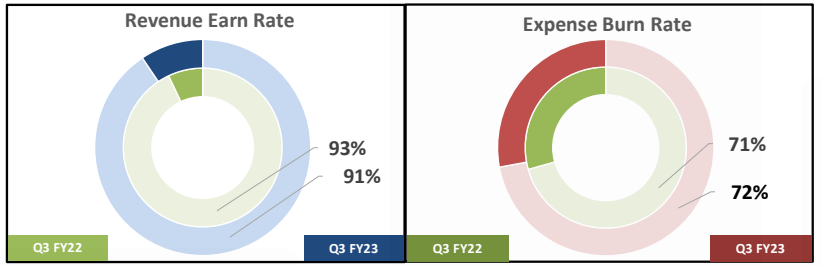
Q-3 Financial Dashboard

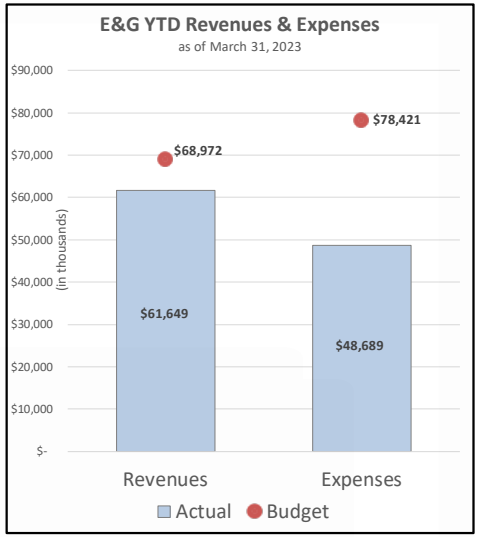


Oregon TECH

Quarterly Financial Dashboard

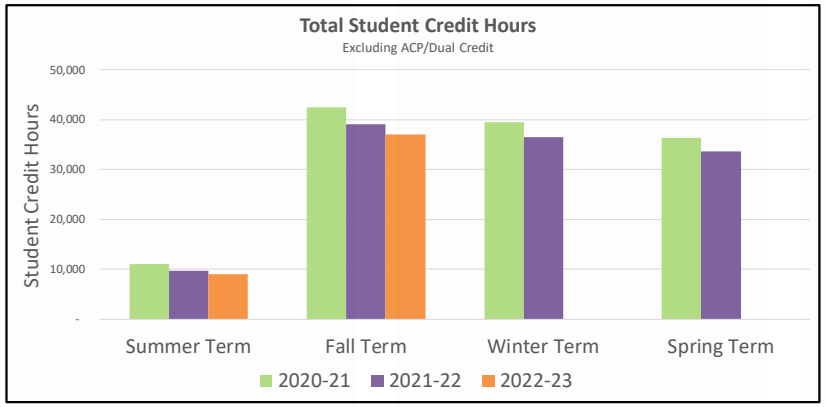
As of March 31, 2023



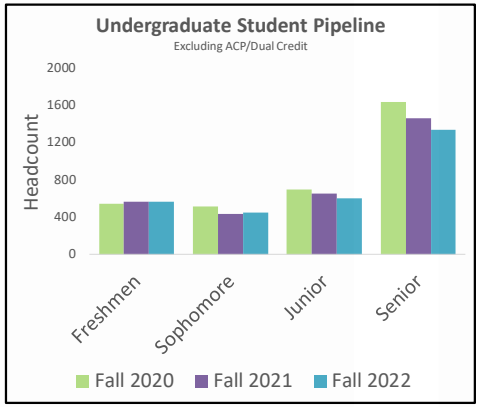


Key Financial Indicators		
E&G Fund Balance:	$29,874	As of March 31, 2023
Debt Burden Ratio:	3.34%	As of June 30, 2022
Quasi Endowment:	$6,397	As of Dec 31, 2022
Foundation Assets:	$37,960	As of June 30, 2022

Student Tuition		
Undergraduate Tuition		
	2022-23	2021-22
Resident:	$10,002	$9,572
Non-Resident:	$31,837	$30,466
WUE:	$15,003	$14,357
Online:	$13,230	$12,645
Differential:	37% Premium	37% Premium
Graduate Tuition		
	2022-23	2021-22
Resident:	$18,404	$17,612
Non-Resident:	$30,896	$29,565
Online (MS-AH):	$15,048	$14,400
Online (MS-ET):	$21,888	$20,952
Differential:	37% Premium	37% Premium



Degree Completions					
		2021-22	2020-21	2018-19	3 Year Δ
Undergraduate	Resident:	528	522	493	7.1%
	Non-Resident:	236	244	239	-1.3%
Graduate	Resident:	25	30	13	92.3%
	Non-Resident:	16	12	14	14.3%



Notes:
(1) Student tuition rates are shown at 15 credits per term for undergraduates and 12 credits per term for graduates.

Investment Report: Q-3 FY 2022-23

Public University Fund
(Prepared by the Public University Fund Administrator)

- Oregon Tech's operating assets are invested in the Public University Fund (PUF). As of March 31, 2023, Oregon Tech had $41.2 million on deposit in the PUF. The PUF increased 1.9% for the quarter and 1.4% fiscal year-to-date. The PUF's three-year and five-year average returns were 0.4% and 1.9%, respectively.
- The Oregon Short-Term Fund returned 0.9% for the quarter, underperforming its benchmark by 20 basis points. The Core Bond Fund increased 2.7% for the quarter, outperforming its benchmark by 40 basis points. The PUF investment yield was 1.0% for the quarter and 2.4% fiscal year-to-date.
- The Oregon State Treasury investment officers maintain a conservative positioning in the Core Bond Fund given the investment team's view of a looming recession in the U.S. The portfolio's allocation to corporate credit remains underweight compared to its benchmark (27.7% versus 30.5%). The investment team continues to seek opportunities to extend duration (average portfolio maturity) ahead of any significant risk-off events.

Oregon Tech Quasi-Endowment Fund

- The Oregon Tech Quasi-Endowment assets increased 2.7% for the quarter and 1.2% fiscal year-to-date. The Oregon Intermediate-Term Pool outperformed its benchmark by 40 basis points for the quarter and 50 basis points fiscal year-to-date. The Endowment assets were valued at $6.6 million, as of March 31,2023.

Investment Performance to Benchmark Q-3 FY 2022-23

Oregon Tech
Investment Summary
as of March 31, 2023
(Net of Fees)

	Quarter Ended 3/31/2023	Current Fiscal YTD	Prior Fiscal YTD	3 Yr Avg	5 Yr Avg	10 Yr Avg	Market Value	Actual Asset Allocation	Policy Allocation Target
OIT Operating Assets Invested in Public University Fund									
Oregon Short - Term Fund	0.9%	1.9%	0.5%	1.2%	1.7%	1.3%	$ 14,731,946	35.8%	[1]
Benchmark - 91 day T-Bill	1.1%	2.4%	0.1%	0.9%	1.4%	0.9%			
PUF Core Bond Fund	2.7%	1.3%	-4.5%	-0.4%	1.9%	N/A	26,426,026	64.2%	[1]
Benchmark - Bloomberg Barclays Intermediate U.S. Gov't./Credit Index[2]	2.3%	0.7%	-5.0%	-1.5%	1.4%	1.4%			
Public University Fund Total Return	1.9%	1.4%	-1.7%	0.4%	1.9%	N/A	$ 41,157,972	100.0%	
Public University Fund Investment Yield[3]	1.0%	2.4%	0.9%	2.2%	2.4%	N/A			
OIT Endowment Assets									
Oregon Intermediate-Term Pool	2.7%	1.2%	-4.5%	-0.2%	N/A	N/A	$ 6,568,981	100.0%	
Benchmark - Bloomberg Barclays Intermediate U.S. Gov't./Credit Index[4]	2.3%	0.7%	-5.0%	-1.7%	1.1%	1.1%			

[1] The Public University Fund (PUF) policy guidelines define investment allocation targets based upon total participant dollars committed. Core balances in excess of liquidity requirements for the participants are available for investment in the Core Bond Fund. Maximum core investment allocations are determined based upon anticipated average cash balances for all participants during the fiscal year.

[2] 100% Bloomberg Barclays Intermediate U.S. Gov't./Credit Index as of February 1, 2021. From April 1, 2017 to January 31, 2021, the benchmark was 75% Bloomberg Barclay's Aggregate 3-5 Years Index, 25% Bloomberg Barclay's Aggregate 5-7 Years Index.

[3] The reported investment yield for the quarter and fiscal year-to-date represent earned yields for the period and are not annualized rates.

[4] 100% Bloomberg Barclays Intermediate U.S. Gov't./Credit Index as of January 1, 2021. From June 1, 2015 to December 31, 2020 the benchmark was Bloomberg Barclays 3-5 Year U.S. Aggregate Index.

Note: Outlined returns underperfomed their benchmark.

Finance and Facilities Committee/Audit Committee Action Items

Recommendation for Approval of Fiscal Year Year 2023- 24 Budget

(Action item)

FY 2023-24 Budget Development Calendar

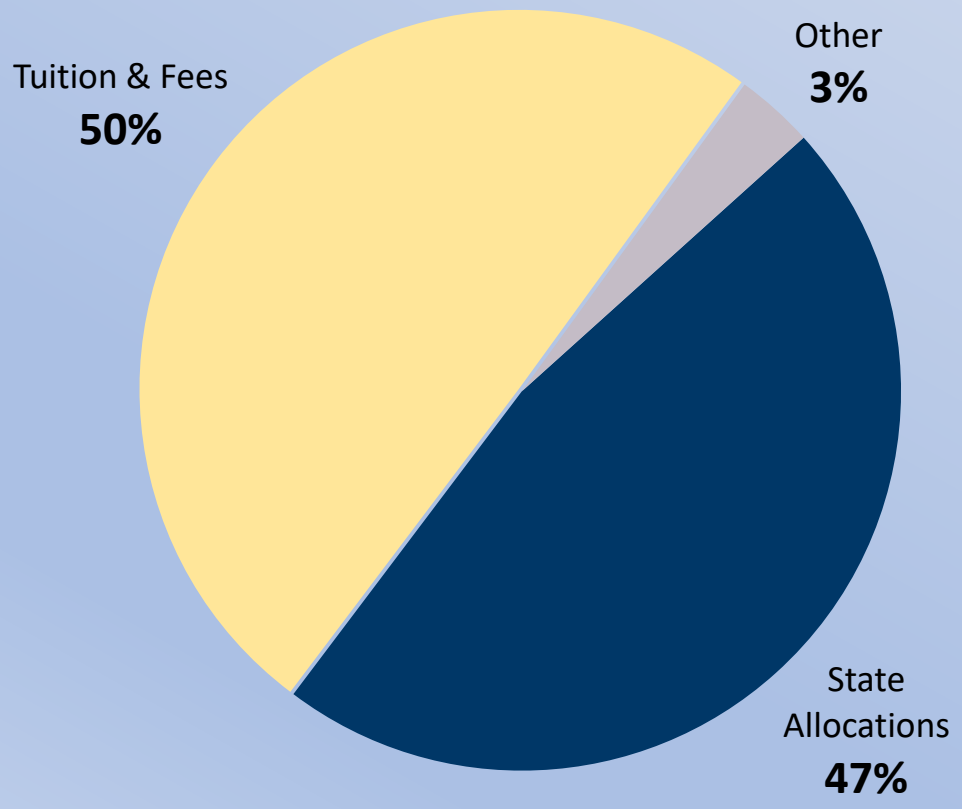
FY 2023-24 Budget Development Calendar		
December	2022	Budget template build starts
January	2023	Budget build begins
January	2023	First Tuition Recommendation Committee meeting
January	2023	Senior Leadership determines reduction/investment strategy
January	2023	Template preparation complete
January	2023	2023 Legislative long session begins
February	2023	Budget Office distributes budget templates
February	2023	Second and third Tuition Recommendation Committee meetings
March	2023	Targets available to departments
April	2023	Budgets due to Budget Office
April	2023	Budget Office reviews templates
April	2023	Board meeting - Academic Year 2023-24 Tuition & Fees
May	2023	FOAC reviews and recommends to President
May	2023	Senior Leadership reviews budget
June	2023	Board meeting - budget review/approval
June	2023	Board Approved Budget loaded to finance system

FY 2023-24 Budget Development

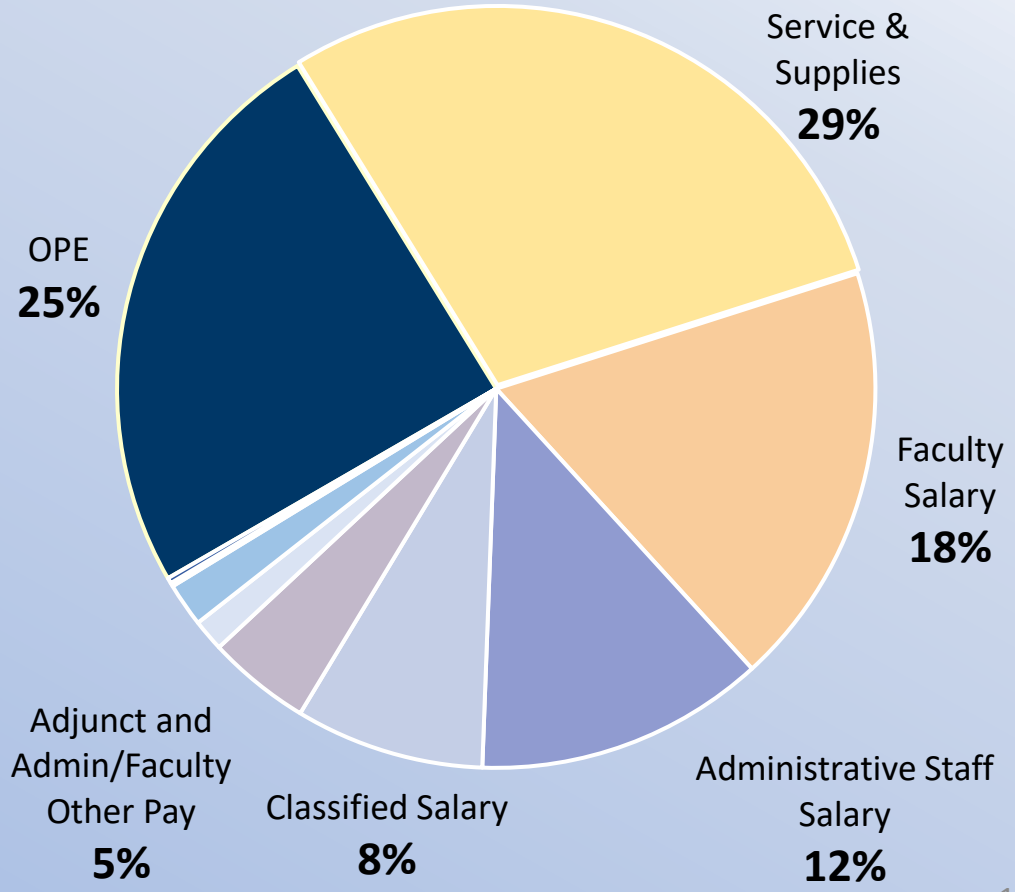
- Primary Sources of State Funding
  - Public University Support Fund (PUSF)
    - Funds the Student Success and Completion Model (SSCM)
  - Engineering and Technology Sustaining Fund (ETSF)
  - Oregon Renewable Energy Center (OREC)
- Other Types of Funds- Investment earnings, grant cost recovery, clinical revenues, etc.
- Student Tuition and Fees
- Funds not in Operating Budget
  - Capital Improvement and Renewal Funding (CIR)
  - Bonded capital construction funds

Major Components of E&G Budget

Budgeted Revenue

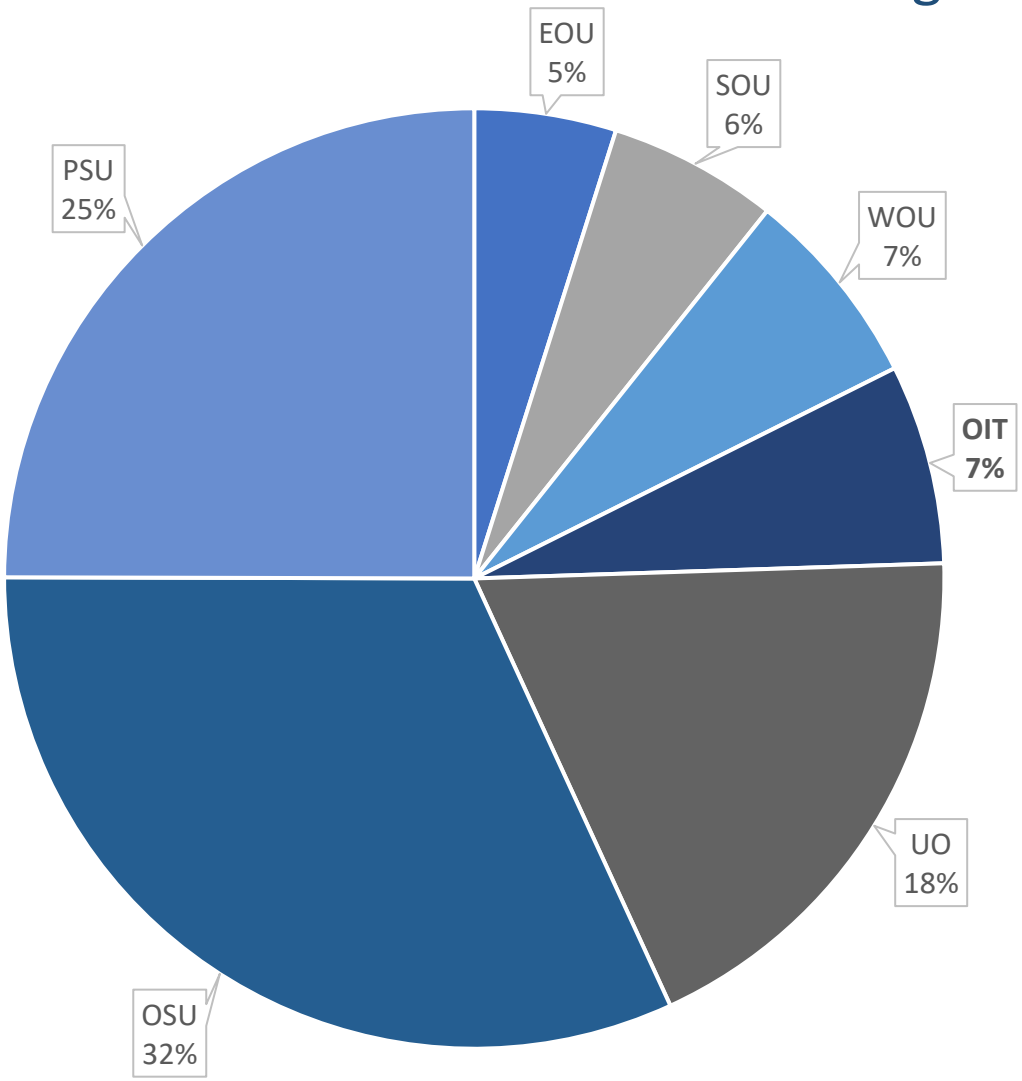


Budgeted Expenses



Public University Support Fund FY 2022-23 Distribution

FY 2022-23 Distribution of PUSF Funding



FY 2023-24 Budget Development

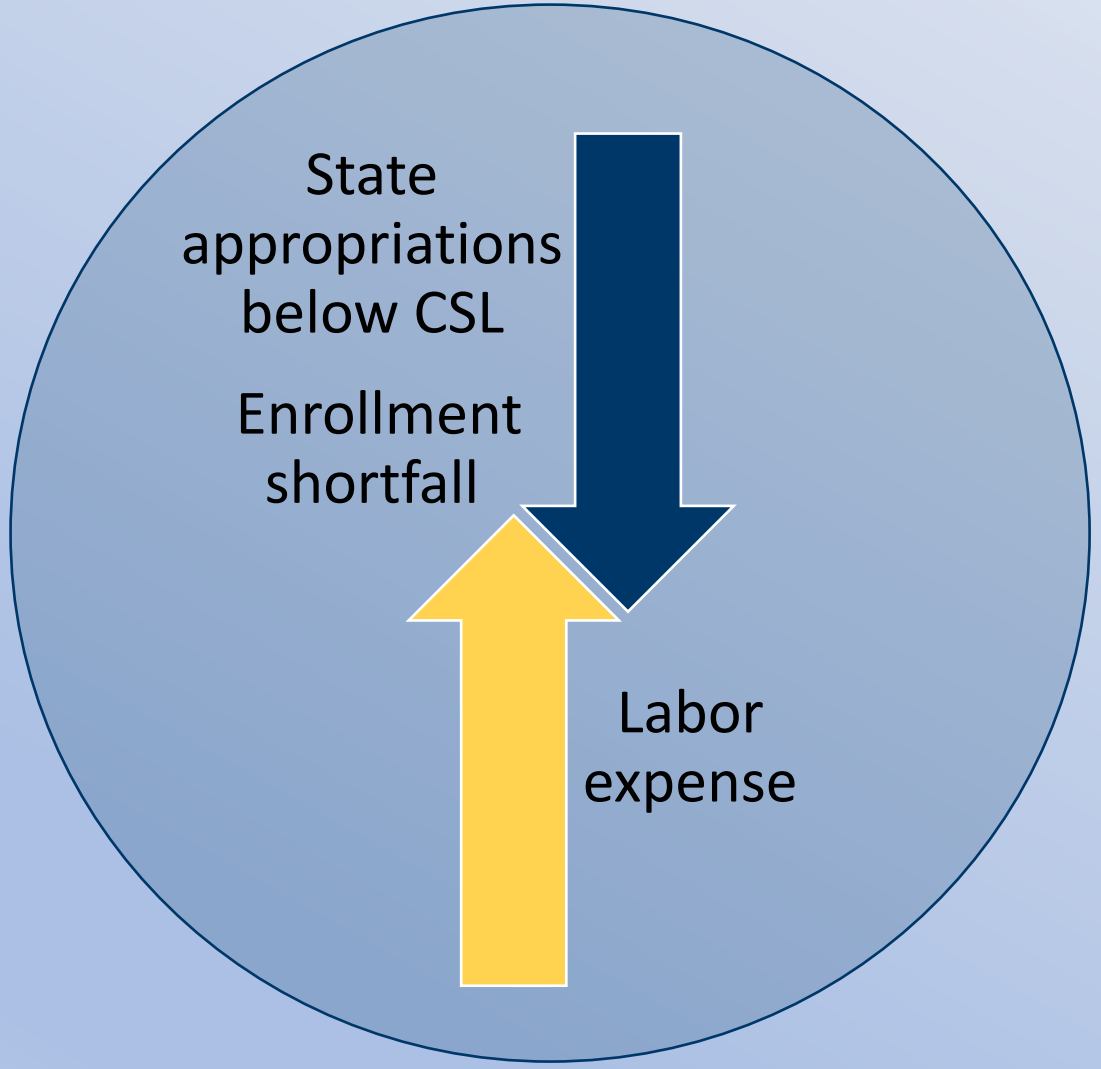
Budgeting Challenges

- Reliance on forecasting and assumptions
- Early enrollment projections drive tuition estimates
- FY 2022-23 enrollment was down 15.7% compared to two years ago (excluding ACP/dual credit students)
- State appropriations are based on GRB because final legislative biennium budget is not known
- HECC formula funding is subject to October true-up
- Uncontrollable PEBB and PERS benefits costs
- Organized labor contract commitments
- Challenge is to preserve quality of programs and student experience, despite changing environmental dynamics

Strategic Budget Investments

- AVP for Strategic Enrollment Management and Retention- enhanced focus and more tailored approach to recruiting students
- Assistant Admissions Director- personalized engagement and follow-up for students in pipeline
- Director of Career Services- for student success
- Assistant Director of Environmental Health and Safety- support campus training and compliance
- Salary pools for faculty and staff adjustments
- Dean for Online and global programs
- AIRE (Advanced Interdisciplinary Research on Environment) and math lab

FY 2023-24 Core Challenge



FY 2023-24 Budget Development

- Incremental Budget Model was utilized, as in prior years
- FY 2023-24 budget targets were based on prior year revised budget and adjusted for:
  - CY 2023 salary increases
  - Contract labor agreement obligations
  - Estimated benefits and medical insurance increases
- Pools were budgeted for:
  - Estimated AAUP CY 2024 increases and OPE
  - Contingent unclassified staff salary increases and estimated OPE
- Estimated salary recapture was also budgeted as in the past
- Important Strategic Investments were estimated and included
- Fiscal Operations Advisory Council (FOAC) reviewed FY 2023-24 Budget and supports advancing for approval

FY 2023-24 Budget by Division

FY 2023-24 Oregon Tech Regular General Fund Budget by Division									
Division	FY 2022-23 Perm. Budget	FY 2023-24 Faculty Increases	FY 2023-24 Admin. Increases	FY 2023-24 Classified Increases	FY 2023-24 OPE Increases	Other Adjustments[1]	FY 2023-24 Budget Reductions	FY 2023-24 Budget	Variance to FY 2022-23 Budget
President	$ 2,355,278	$ -	$ 9,788	$ -	$ 9,204	$ 100,000	$ (46,273)	$ 2,427,997	3.1%
Academic Affairs	40,110,588	145,471	27,445	61,269	192,968	-	(790,061)	39,747,680	-0.9%
Student Affairs	4,518,244	-	6,323	3,519	7,971	(1,098,774)	(66,991)	3,370,292	-25.4%
Enrollment Management	5,906,003	-	14,346	16,541	22,294	75,948	(117,622)	5,917,510	0.2%
Finance and Administration	14,976,489	-	29,744	125,243	74,384	1,022,826	(316,289)	15,912,397	6.2%
University Advancement	2,102,992	-	8,751	15,295	12,870	-	(41,706)	2,098,202	-0.2%
Institutional General	3,002,784	-	-	-	-	-	-	3,002,784	0.0%
Total	$ 72,972,378	$ 145,471	$ 96,397	$ 221,867	$ 319,691	$ 100,000	$ (1,378,942)	$ 72,476,862	-0.7%

[1] Resilience, Emergency Management and Safety and Campus Safety are moving from Student Affairs to Finance and Administration; Peer Consulting Coordinator is moving from Student Affairs to SEM in FY 2023-24

FY 2023-24 General Fund Budget

Footnotes

(1) Public University Support Fund (PUSF) budgeted at 4% increase (Governor's Recommended Budget). other state appropriations budgeted at a 5.4% increase (Joint Committee on Ways and Means Co-Chair Budget).

(2) Tuition revenue assumes a 0% enrollment increase over FY 2022-23 actual and a 4.9% tuition increase

(3) Salary recapture budget increased to limit budgeted dependence on reserve and expense reductions. Budgeted amount is within the range of savings realized over the past three fiscal years.

(4) Contingency fund is 1.5% of new state allocation.

(5) January 2023 faculty increases are already in FY 2023-24 budget.

(6) Special state appropriation received in full in FY 2021-22 and transferred back in for FY 2022-23.

FY 2023-24 General Fund Budget

	FY 2022-23	FY 2023-24	Variance FY 2022-23 to FY 2023-24	
Revenues				
State Allocation	$ 32,384,602	$ 33,819,717	4%	(1)
Tuition and Fees (less special general funds)	39,290,381	38,807,036	-1%	(2)
Remissions	(5,346,310)	(5,805,377)	9%	
New Targeted Remissions	(200,000)	-	-100%	
Other Revenues (less special general funds)	994,813	1,275,771	28%	
Special General Fund Revenues	1,848,613	1,926,987	4%	
Total Revenues	**$ 68,972,099**	**$ 70,024,134**	**2%**	
Expenses				
Permanent Budget	$ 72,621,634	$ 72,476,862	0%	
Salary Recapture	(2,500,000)	(3,500,000)	40%	(3)
Special General Fund Expenses	1,848,613	1,926,987	4%	
Contingency Reserve	432,923	517,603	20%	(4)
Administrative Salary Pool (effective January 2024)	103,948	114,343	10%	
Faculty Salary Pool (effective January 2024)	279,981	273,337	-2%	(5)
Applied Computing and Rural Health Initiatives	5,000,000	-	-100%	(6)
Total Budgeted Expenses	**$ 77,787,099**	**$ 71,809,132**	**-8%**	

FY 2023-24 General Fund Budget (continued)

FY 2023-24 General Fund Budget

	FY 2022-23	FY 2023-24	Variance FY 2022-23 to FY 2023-24
Strategic Investments			
Facilities Master Plan	$ 100,000	$ -	
Administrative Staff Pay Equity Study	100,000	-	
Faculty Pay Equity Study	150,000	-	
Business Continuity/Disaster Recovery Study	150,000	-	
Polytechnic Cost Study	185,000	-	
Math Learning Lab	-	40,000	
Bridge Funding for AIRE Lab	-	100,000	
AVP Strategic Enrollment Management and Retention	-	263,366	
Assistant Director of Admissions Operations	-	104,195	
Director of Career Services	-	159,559	
AVP Student Affairs and Dean of Students	-	187,241	
Associate Director of Environmental Health and Safety	-	131,877	
Associate Dean of Health, Arts, and Sciences	-	228,764	
Total Strategic Investments	**$ 685,000**	**$ 1,215,002**	**77%**
Total Expenses	**$ 78,472,099**	**$ 73,024,134**	**-7%**
Net from Operations Before Other Resources (Uses)	**$ (9,500,000)**	**$ (3,000,000)**	
Other Resources (Uses)			
Transfer In - Applied Computing and Rural Health Funds	$ 5,000,000	$ -	
Transfer In - COVID Relief Funds (HEERF)	3,000,000	-	
Use of Reserve	1,500,000	3,000,000	
Total from Operations and Other Resources (Uses)	**$ -**	**$ -**	

FY 2023-24 Non-E&G Funds Budget

FY 2023-24 Non E&G Funds Budget			
	Auxiliary	**Designated**	**Service**
Revenues			
Academic Affairs (HAS only)	$ 500,000	$ -	$ -
Student Affairs	9,987,517	-	-
Finance & Administration	2,996,050	4,430	187,000
OMIC	941,525	-	-
Total Revenues	**$ 14,425,092**	**$ 4,430**	**$ 187,000**
Expenses			
Academic Affairs (HAS only)	$ 500,000	$ -	$ -
Student Affairs	9,987,517	-	-
Finance & Administration	2,673,586	4,000	187,000
OMIC	941,525	-	-
Total Expenses	**$ 14,102,628**	**$ 4,000**	**$ 187,000**
Net	**$ 322,464**	**$ 430**	**$ -**

Recommendation for Approval of the Fiscal Year 2023-24 Budget

(Action item)

Board Action Item 7.2: FY 2023-24 Oregon Tech All Funds Budget

Motion:

After review of the proposed FY 2023-24 All-Funds Budget and related documents, and with the recommendation of the Finance and Facilities Committee, **staff requests a Motion by the Board for approval of the Fiscal Year 2023-24 Oregon Tech All-Funds Budget**.

Oregon TECH
Oregon Institute of Technology

Questions?