RECORD OF ACADEMIC ACHIEVEMENT

The Evergreen State College - Olympia, Washington 98505

OFFICIAL TRANSCRIPT DOCUMENT

Straley, Zacharie T — A00425811

Last, First Middle — Student ID

CREDENTIALS CONFERRED:

Mycology Certificate — Awarded 14 Jun 2024

Bachelor of Arts and Bachelor of Science — Awarded 14 Jun 2024

EVERGREEN UNDERGRADUATE CREDIT:

Start	End	Credits	Title
01/2020	06/2020	32	**General Biology: Cells, Populations, and Ecosystems** *6 - General Biology: Ecology and Evolutionary Biology with Laboratory* *4 - General Biology: Animal Systems and Physiology with Laboratory* *6 - General Biology: Molecular and Cellular Biology* *4 - General Biology Plant Systems and Physiology* *3 - Pacific Northwest Natural History* *4 - Introductory Statistics* *5 - Scientific Communication*
06/2020	09/2020	8	**Experimental Photography** *8 - Alternative Process Photography*
06/2020	09/2020	4	**Spanish - First Year I** *4 - Spanish - First Year I*
09/2020	12/2020	16	**Chemistry Counts!** *8 - Introductory Chemistry with Microsoft Excel Skills Laboratory* *6 - Algebraic Thinking for Science* *2 - Enrichment Activities*
01/2021	06/2021	16	**General Chemistry** *16 - General Chemistry with Laboratory*
01/2021	03/2021	4	**Precalculus I** *4 - Precalculus I*
03/2021	06/2021	4	**Precalculus II** *4 - Precaclulus II*
06/2021	09/2021	8	**Field Ornithology** *4 - Ornithology* *4 - Avian Research Methods*
06/2021	09/2021	6	**Plant Biology** *4 - Plant Biology* *2 - Field Botany*
09/2021	03/2022	32	**Environmental Biology and Chemistry** **11 - Organic Chemistry I and II with Laboratory* **4 - Organic Chemistry: Instrumentation and Spectroscopy* **5 - Microbial Ecology with Laboratory* **4 - General Microbiology with Laboratory* **3 - Environmental Microbiology with Laboratory* **3 - Biogeochemistry and Bioremediation with Field Methods* **2 - Environmental Chemistry*

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EVERGREEN UNDERGRADUATE CREDIT:

Start	End	Credits	Title
03/2022	06/2022	16	**Developmental Biology** **5 - Cell Biology* **5 - Molecular Biology* **4 - Developmental Biology* **2 - Molecular and Developmental Biology Laboratory*
06/2022	09/2022	6	**Anatomy and Physiology II with Laboratory** *6 - Anatomy and Physiology II with Laboratory*
06/2022	09/2022	6	**Anatomy and Physiology: Foundations and Movement** *6 - Anatomy and Physiology 1 with Laboratory*
09/2022	03/2023	32	**The Fungal Kingdom** **8 - Fungal Biology and Ecology* **6 - Lichen Biology and Ecology* **6 - Lichen Taxonomy* **6 - Fungal Taxonomy* **2 - Research Seminar in Mycology* **4 - Independent Project: Fungal Natural Products Research*
04/2023	06/2023	16	**So You Want to be a Psychologist** *4 - Cognitive Psychology* *4 - Psychology: History of Psychology* *4 - Psychology: Research Ethics and Open Science* *4 - Careers in Psychology*
04/2023	06/2023	2	**Undergraduate Research with L.Calabria** **2 - Natural Product Chemistry*
06/2023	09/2023	8	**Statistics and Research Methods for Psychology and Other Social Sciences** *4 - Introductory Statistics (Descriptive and Inferential)* *4 - Psychology: Research Methodology*
06/2023	09/2023	5	**Neurobiology** **5 - Neuroscience*
09/2023	06/2024	21	**Psychology Capstone: Clinical and Counseling** *4 - Abnormal Psychology* *5 - Multicultural Psychology Competencies* *3 - Counseling Skills: Motivational Interviewing* *3 - Counseling Skills: Suicide Prevention, Cognitive Behavioral Therapy and Mindfulness Based Cognitive Therapy* *2 - Professional Writing* *2 - Social Science Writing* *2 - Psychological Law and Ethics*
09/2023	12/2023	8	**Fungi For Human Health and the Environment** *4 - Introductory Mycology (Certificate Sequence)* *4 - Fungal Food Justice (Certificate Sequence)*

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EVERGREEN UNDERGRADUATE CREDIT:

Start	End	Credits	Title
01/2024	03/2024	8	**Medicinal Fungi** **8 - Medicinal Fungi (Certificate Sequence)*
04/2024	06/2024	8	**Environmental Applications of Fungi** **8 - Environmental Applications of Fungi (Certificate Sequence)*

Cumulative

266 Total Undergraduate Credits Earned

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As I hoped in beginning my higher education, I gained a much deeper understanding of the world around me. I learned a great deal about the natural environment, such as methods for identifying and quantifying organisms in nature- fungi, plants, birds and microorganisms. I also gained familiarity with many intricate biological processes, and can now visualize chemical structures based solely on hearing an IUPAC chemical name.

I took environmental science/biology courses throughout my entire time at Evergreen, and then my junior and senior year I took a great deal of psychology, and learned all about the mind, clinical counseling strategies, various mental pathologies, and the importance of multiculturalism.

I have become more comfortable and confident with algebraic procedures, and generally speaking, math, than I would have ever thought possible. Not only precalculus classes, but microbiology too presented me with many opportunities to enhance my mathematical prowess.

Lab and field activities were priceless experiences in my time at Evergreen. Witnessing mitosis under a dissection microscope in real time, in the root of an onion, and then after fertilizing frog eggs, was a magical process to see.

I was challenged to do drawings in my lab and field notebooks, since art is not my usual forte, I had to rise to the occasion of drawing animals, plants, habitats, molecules & reactions, mushrooms, and biological signaling pathways to name a few.

Doing field work for Mycology and Ornithology gave me comfort with doing site descriptions and collecting data in the field. I have an abundance of experience in data collection and analysis in every biology course I've taken. I enjoy exploring, and taking site descriptions forces me to pay close attention to the specifics of what's around me.

Analysis and quantification of data from all of my biology courses has gotten me increasingly familiar with Excel and its functions. The spectrum of types of data I collected in the field go from observing mollusks to see how tree species in a habitat contributes to species variation, quantifying foraging behavior for birds and comparison of behavior to habitat differences, isolating and quantifying microorganism populations in soil, determining tree stand types effect on lichen populations, and also designing all aspects of a mushroom farm.

I also did a great amount of data collection and analysis in the lab, such as carrying out MPN and dilution series to examine water samples for the presence of microorganisms, quantifying bacterial and phage replication, doing organic chemistry synthesis, and used PCR techniques many times for isolating DNA and analyzing it, by putting the data into a BLAST to compare with other organisms after the PCR process.

The organic chemistry labs taught me significant background theory about each instrument used for chemistry labs, as well as sample preparation, operation, and analysis of the Spectra or data for each instrument I trained on. Some of the instruments for organic chemistry included FT-IR spectrophotometer, gas chromatograph, gas chromatograph mass spectrometer, and FT-NMR spectrometer. Setting up instrumentation for organic chemistry labs was another invaluable learning experience. I got to learn the names and see the functions of many essential parts of a chemistry laboratory, as well as learn how to properly clean everything and dispose of waste of various kinds/toxicities correctly.

I filled out and received a capstone grant for a research project started in the fungal kingdoms program that continued as an independent research project with 3 other teammates, where my team identified medicinal compounds in a species of mushroom no one had tested before.

Fungal kingdoms, as well as the mycology certification classes I took, were opportunities to collect not only data, but specimens from the field, then work through keys to be able to identify mushrooms or lichen species.

I learned a great deal about the medicinal properties of mushrooms, extraction and storage techniques, the latin names of many different types of plants and trees, as well as names and appearance of 60+ species of mushrooms and 40 species of lichen in the Pacific Northwest in those courses as well.

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My clinical psychology capstone program senior year taught me more practical knowledge than any other single course I took. I learned an immense amount about non-bias communication, active listening skills, different types of cognitive therapies, and had my eyes really opened to the realistic nature of the prevalence of racism in the world still.

I'm so passionate and curious about our world that I retained as much of the materials as possible. I am thrilled to be a student of science, I found my niche.

Straley, Zacharie T — A00425811
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April 2024 - June 2024: Environmental Applications of Fungi

8 Credits

DESCRIPTION:
Faculty: Lalita M. Calabria, Ph.D. and Aziz Turkoglu, Ph.D.

Environmental Applications of Fungi was an upper-division science program focused on cultivation of edible and medicinal mushrooms, as well as laboratory techniques for fungal isolation and identification. Lectures provided background on fungal biology and ecology, applications of mycorrhizal and endophytic fungi to restoration, agriculture and forest management, mycoremediation, fungal systematics and bioinformatics. In-person labs and workshops provided students with hands-on experience in the following methods: sterile technique and fungal isolation, cultivation of oyster and shitake mushrooms, production of grain spawn, inoculation of tree species with mycorrhizal fungi, truffle hunting and growing techniques; molecular and microscopic methods for identification of fungi. Students presented posters on a topic of their choice related to environmental applications of fungi using various reference books, peer-reviewed scientific papers and other resources.

This class is a part of a series of courses that comprise the Mycology Certificate sequence.

EVALUATION:
Written by: Lalita M. Calabria, Ph.D. and Aziz Turkoglu, Ph.D.

Zacharie's participation in program activities was good. His performance on the exams reflected a very good understanding of the topics covered. Zacharie's learning reflections indicated a great ability to synthesize learning, from a variety of sources, into a cohesive framework. Zacharie's lab reports indicated developing skills and techniques for the identification and cultivation of fungi. Zacharie's poster on increasing nature connectedness through fungi showed excellent library research and media literacy skills. The poster content was engaging and effective at communicating the connection between the natural and social sciences.

SUGGESTED COURSE EQUIVALENCIES (in quarter hours) TOTAL: 8

*8 - Environmental Applications of Fungi (Certificate Sequence)

* indicates upper-division science credit

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January 2024 - March 2024: Medicinal Fungi

8 Credits

DESCRIPTION:
Faculty: Aziz Turkoglu, Ph.D. and Lalita M. Calabria, Ph.D.

Medicinal Fungi was an upper-division science program that provided students' with an overview of medicinal fungi with an emphasis on PNW species. Lectures provided background on the biology, chemistry, medicinal properties, cultivation, taxonomy, and ecology of medicinal fungi. Students conducted library research to produce 10 medicinal mushroom monographs outlining the chemical and biological properties of each species and prepared team presentations about a medicinal mushroom of their choice. In-person labs provided students with hands-on experience in the following methods: sterile technique and fungal isolation, preparation of medicinal mushroom extracts, bioassays for examining the antibacterial activity of fungi and microscopic methods for identification of mushrooms. This class is a part of a series of courses that comprise the Mycology Certificate sequence.

EVALUATION:
Written by: Aziz Turkoglu, Ph.D. and Lalita M. Calabria, Ph.D.

Zacharie's participation in program activities was excellent. Zacharie's learning reflections demonstrated an adequate ability to describe and evaluate his understanding of the topics covered, while his performance on the exams was excellent. Zacharie's medicinal mushroom presentation on Liberty Cap Mushroom showed a detailed understanding of research in scientific literature and excellent presentation skills. Zacharie's medicinal mushroom monographs were of excellent quality and reflected their growing knowledge of taxonomy ecology and distribution, morphology, bioactivities, and medicinal uses for each species. Zacharie's lab reports indicated great attention to detail and strong observation skills.

SUGGESTED COURSE EQUIVALENCIES (in quarter hours) TOTAL: 8

*8 - Medicinal Fungi (Certificate Sequence)

* indicates upper-division science credit

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September 2023 - December 2023: Fungi For Human Health and the Environment

8 Credits

DESCRIPTION:
Faculty: Lalita Calabria, PhD and Prita Lal, PhD

In this interdisciplinary program (which was taught in a hybrid-remote mode), students learned the fundamentals of fungal biology, ecology and diversity through weekly lectures and readings grounded in the text *21st Century Guidebook to the Fungi* (Moore, Robson &Trinci). Labs and self-guided field study of mushrooms served as a foundation for learning to identify common species and to develop fluency in mushroom morphology terminology. Students documented their study of mushrooms using *iNaturalist*, an online community science tool, and a mushroom identification notebook. A final exam tested students' ability to sight identify local mushrooms from memory using scientific and common names. Students also had hands-on opportunities to learn the basics of mushroom cultivation and textile-dyeing with mushroom pigments.

Students further explored connections between fungi, humans, society, and the environment with an emphasis on the intersections of fungi and food justice; topics included traditional ecological knowledge systems as well as the history, political economy, and equity issues within the fungal food system. The text *The Mushroom at the End of the World: On the Possibility of Life in Capitalist Ruins* by Anna Tsing served as a primary seminar reading through the quarter. Bi-weekly food justice workshops focused on topics such as ethics in psilocybin research, social movements for "fungal" justice, and the struggles of mushroom laborers. Assignments included discussion board posts that synthesized the recorded lectures with the readings, films, and other materials. Students also completed a final poster project, where they chose a topic that integrated their studies of the physical and social sciences. This class is a part of a series of courses that comprise the Mycology Certificate sequence.

EVALUATION:
Written by: Prita Lal, PhD

Zacharie came into this program with a strong foundation in mycology. Zacharie's answers on weekly study questions and performance on the bi-weekly quizzes indicated an excellent understanding of fungal biology and ecology. Zacharie's team fungal ecology presentation on mycoheterotrophy demonstrated a good understanding of research in the scientific literature and good presentation skills. Zacharie's mushroom identification notebook reflected an excellent understanding of field collection methods, morphological terminology and using dichotomous keys and field guides to identify an unknown mushroom species. On the final sight identification exam, Zacharie demonstrated an excellent ability to identify more than 30 local mushrooms species using scientific and common names. Zacharie was very engaged with our class *iNaturalist* project and made good use of this community science tool to practice field observation and identification skills. Overall, Zacharie made significant progress in understanding mushroom biology and diversity of the PNW.

For the food justice credits, Zacharie persevered and did solid work. Zacharie attended most of our synchronous classes prepared to listen and engage in discussion. Zacharie often participated in our synchronous and asynchronous discussions, which contributed greatly to our collective learning. Zacharie's discussion board posts demonstrated an insightful analysis of the program materials and did a sound job substantiating their analysis with evidence from our readings and videos. Zacharie's final poster project "spirit medicine" did an excellent job discussing the potential of psychedelic research and the necessity of centering Indigenous knowledge by using compelling visuals and narratives.

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SUGGESTED COURSE EQUIVALENCIES (in quarter hours) TOTAL: 8

4 - Introductory Mycology (Certificate Sequence)
4 - Fungal Food Justice (Certificate Sequence)

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September 2023 - June 2024: Psychology Capstone: Clinical/Counseling

21 Credits

DESCRIPTION:
Faculty: Mukti Khanna, Ph.D.

Psychology Capstone: Clinical and Counseling was an upper division of junior and senior undergraduates. Twelve credits in psychology were prerequisites. During the program, students studied abnormal psychology, multicultural psychology, APA social science writing, psychology law and ethics and counseling skills in motivational interviewing, cognitive behavioral therapy, mindfulness based cognitive behavioral therapy and suicide prevention, cultural competency, psychological ethics and law. The program offered the opportunity to participate in a two-quarter internship during the program in local human service agencies. Students also completed work on resumes and the academic statement as a part of professional development. Student work included integrative papers, working APA peer reviewed literature and writing an APA paper, counseling labs, progress notes, theoretical assessments, case study analysis group theoretical presentations, online curriculum, applied professional ethics, and social science writing.

The program work helped students achieve competency with both American Psychological Association (APA) undergraduate psychology learning goals and many Washington State Behavioral Health Specialist meta competencies. APA learning goals included developing knowledge in the field of psychology, critical thinking in psychology, awareness of sociocultural and diversity issues, and application of psychology in an internship setting. Washington State Behavioral Health Specialist meta competencies addressed in the program included of understanding the evidence base of brief intervention in theory and practice, recognizing the impact of health disparities, practicing cultural humility and interprofessional communication, development of whole health care and stay well plan, understanding federal and state laws and ethics in psychology practice, utilizing supervision and engaging in ongoing reflective practice, and integrations of professional identity within a healthcare team. Students completed reflective writings on their experiences. Students read diverse psychology texts and case studies, throughout the program, to engage in learning across significant differences, collaborative learning, interdisciplinary study from a biopsychosocial cultural framework, and linking theory with practice. This evaluation is based on student achievement of program learning goals, assignment and internship completion and participation.

EVALUATION:
Written by: Mukti Khanna, Ph.D.

Zacharie Straley demonstrated progressive learning in the Psychology Capstone program. His participation was effected by extenuating circumstances. Zacharie helped create a cohesive and engaged learning community. Zacharie continued to develop very good applied and theoretical awareness of sociocultural and diversity issues throughout the program, in both academic and applied work.

Zacharie demonstrated a good knowledge of multicultural psychology through integrative writing and case analysis. Zacharie demonstrated a very variable knowledge base of psychology in abnormal psychology and applied counseling skills through online learning platforms. He demonstrated a good knowledge of psychological ethics through online learning and oral case analysis. Zacharie has also demonstrated working competencies in applied micro-counseling skills through descriptive progress notes and very good competency through practical skills assessments in applied micro-counseling skills, suicide prevention, cognitive behavioral therapy and mindfulness based cognitive therapy. Zacharie continued to develop social science writing skills, to include, becoming competent with APA style writing

in social science integrative writing throughout the program and in working with Academic Writer. Zacharie choose not to be in an internship during the program and instead completed a literature review paper and PowerPoint presentation on "Psychedelic Assisted Therapy: Limitations, Current Status and Future." Zacharie has a strong interest in this clinical treatment paradigm. His work on this project demonstrated a strong conceptual understanding and the ability to synthesize and evaluate peer reviewed literature in this growing field. Importantly, he demonstrated potential to be a leading voice in addressing issues of cultural competency and cultural appropriation in this field. He is continuing to work on refining APA style writing citations and formatting.

The good work, overall, that Zacharie was able to complete in the program is preparatory for future studies in psychology, human services and cultural studies.

SUGGESTED COURSE EQUIVALENCIES (in quarter hours) TOTAL: 21

4 - Abnormal Psychology
5 - Multicultural Psychology Competencies
3 - Counseling Skills: Motivational Interviewing
3 - Counseling Skills: Suicide Prevention, Cognitive Behavioral Therapy and Mindfulness Based Cognitive Therapy
2 - Professional Writing
2 - Social Science Writing
2 - Psychological Law and Ethics

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June 2023 - September 2023: Neurobiology

5 Credits

DESCRIPTION:
Faculty: Nancy C. Murray, Ph.D.

This neuroscience course covered cellular neurophysiology, membrane potential, action potentials, synaptic transmission, somatosensory and motor systems, olfaction, audition, vision, molecular biology of channels and receptors (focus on voltage-dependent channels and neurotransmitter receptors), learning and memory, and developmental neurobiology. Students used the text, The Mind's Machine: Foundations of Brain and Behavior, 4th ed., by Watson and Breedlove. Students were evaluated on the basis of weekly quizzes and weekly problem sets. Each week, students watched asynchronous lectures and participated in a synchronous Zoom session.

EVALUATION:
Written by: Nancy C. Murray, Ph.D.

Zacharie was a very conscientious student who was always prepared for class. He regularly asked questions during Zoom sessions to clarify his understanding and was an active participant in group discussions. The seriousness with which he approached learning was evident in all of the work he produced. He has developed a deep foundation and understanding of all the material presented. Zacharie's performance on the weekly quizzes (average 98%) was an indicator of his knowledge. Zacharie demonstrated a strong ability to address scientific questions in a logical manner and synthesize information about neurobiological processes. In addition, he possessed an inquisitive mind that he used well in solving homework problems. He consistently watched all the asynchronous lectures and actively participated in all synchronous Zoom sessions. His work clearly shows that he grasped all the concepts covered at a deep level and has earned full upper-division science credit.

SUGGESTED COURSE EQUIVALENCIES (in quarter hours) TOTAL: 5

*5 - Neuroscience

* indicates upper-division science credit

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June 2023 - September 2023: Statistics and Research Methods for Psychology and Other Social Sciences

8 Credits

DESCRIPTION:
Faculty: Carrie M. Margolin, Ph.D.

This evaluation is based on a 5-week, intensive summer session of statistics that covered the basics of descriptive statistics (graphing techniques, measures of central tendency and variability, standard scores, percentiles and percentile ranks, regression, correlation), elementary probability theory, and inferential statistics (sampling distributions, hypothesis testing, z-tests, t-tests, chi-square). The textbook was *Fundamental Statistics for Behavioral Sciences (8th Ed.)* by Robert B. McCall. There were four examinations on statistics.

Research methodology was the second component of the course. The course covered experimental designs (independent groups and repeated measures designs). We covered the use of variables and controls, factorial designs, validity, and ethical considerations of research. There was one examination on experimental methodology.

EVALUATION:
Written by: Carrie M. Margolin, Ph.D.

Zacharie Straley was enrolled in *Statistics and Research Methods for Psychology and other Social Sciences* during Summer 2023. Zacharie did good work throughout and earned full credit.

Zacharie was a hard worker in this program and always came to class prepared. Zacharie was clearly engaged in the work. Zacharie's exam performance was steady throughout the course, showing facility with the calculations and knowledge of the concepts of statistics. Zacharie's research methodology exam was also nicely done. Zacharie has a good command of the material in statistics and research methodology. Overall, Zacharie is prepared for advanced study in statistics and research methodology, should Zacharie choose to do so.

SUGGESTED COURSE EQUIVALENCIES (in quarter hours) TOTAL: 8

4 - Introductory Statistics (Descriptive and Inferential)
4 - Psychology: Research Methodology

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April 2023 - June 2023: Undergraduate Research with L.Calabria

2 Credits

DESCRIPTION:
Faculty: Lalita Calabria, Ph.D.

For this undergraduate research experience, the student worked as part of a research team to confirm the presence of a class of biologically active cyathane diterpenes (erinacines) in *Hericium abietis* mycelium. These compounds are well-known from the mycelium of a related species, *H. erinacius*. However, it was previously unknown if *H. abietus* also contained these compounds. To confirm the presence of erinacines, the student performed culturing, extraction, purification, and LC-MS analysis of the *H. abietis* crude extracts to test for erinacines in collaboration with an independent analytical chemistry lab. The student verified the identity of *Hericium* strains using DNA sequence data and by comparison with online DNA databases. Finally, the student summarized their research finding in the form of a research paper and presentation at the end of the quarter. Overall, the student spent approximately 40 hours in the lab performing culturing work, prepping fungal extracts, performing DNA extractions, PCR, and sequence alignments. The student also read a few dozen papers on fungal natural products. Finally, the student successfully wrote and obtained a capstone grant to fund their research..

EVALUATION:
Written by: Lalita Calabria, Ph.D.

Zacharie came into this undergraduate research experience with a strong foundation in mycology. Zacharie demonstrated good project management skills and made significant strides in understanding fungal natural products research. Zacharie was a committed member of the research team who worked collaboratively and independently to successfully complete research tasks. Zacharie's preparation and learning habits were strong. Zacharie made good use of time and project resources.

Zacharie gained proficiency in DNA extractions and PCR. Zacharie also further developed skills in natural products chemistry including extraction and purification of fungal extracts. Zacharie practiced techniques such as liquid culturing, lyophilization, and fraction partitioning. Zacharie also gained some experience with interpretation of LC-MS data. Even when there were technical challenges and unanticipated outcomes, Zacharie took these challenges in stride and kept a positive attitude throughout. This is a valuable skill given the unknowns inherent to any experimental research project.

At the end of the quarter, Zacharie submitted a well-written summary of their research methods and preliminary results and presented their findings to our research group. The final presentation was excellent. The LC-MS results from this experiment were both novel and relevant to the mushroom nutraceutical industry. With more time, these results could be written up and published to a peer-reviewed publication.

SUGGESTED COURSE EQUIVALENCIES (in quarter hours) TOTAL: 2

*2 - Natural Product Chemistry

* indicates upper-division science credit

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April 2023 - June 2023: So You Want to be a Psychologist

16 Credits

DESCRIPTION:
Faculty: Nathalie Yuen, Ph.D.

This one-quarter program considered psychology as both an academic discipline and as a career. The program led students through entry work as part of the Psychology, Health, and Community path of study. The major topics of study were history and systems of psychology, social science research ethics, open science, career explorations in psychology, and a concentration in one of its subdisciplines: cognitive, developmental, or social psychology, or biopsychology.

Readings included *A History of Psychology in Ten Questions* by Michael Hyland, *The 7 Deadly Sins of Psychology* by Chris Chambers, selections from *50 Great Myths of Popular Psychology: Shattering Widespread Misconceptions about Human Behavior* by Scott O. Lilienfeld, Steven Jay Lynn, John Ruscio, and Barry L. Beverstein, and empirical studies from peer-reviewed journals. Students completed the online Collaborative Institutional Training Initiative (CITI Program) training on the ethics of human research. Weekly activities included readings, written assignments, lectures, workshops, and discussions. Each week students also wrote a reflection on and assessment of their learning.

Students joined one of four discipline groups within psychology: cognitive, developmental, or social psychology, or biopsychology. Students worked collaboratively and read a recent textbook from their discipline. In addition, they demonstrated their learning via a comprehensive final examination on their chosen discipline field or by documenting their work.

Students also shared their learning across disciplines by participating in jigsaw groups focused on a topic of interest in psychology. Jigsaw groups were composed of members from each of the four discipline groups and these members chose a topic. Students expanded their library research skills, in particular the use of PsycInfo. Students found empirical studies from peer-reviewed journals and wrote an annotated bibliography on these articles from within their disciplines.

Students investigated theories and practices of psychologists to enhance their understanding of counseling, social services, and the science of psychology. Students explored careers in psychology and the academic preparations necessary for these career choices. We learned the typical activities of psychologists who work in academia, schools, counseling/clinical settings, social work agencies, and applied research settings. Invited speakers provided career perspectives from a number of fields including: research, clinical psychology, school psychology, counseling, and social work.

Students attended the 103rd Annual Convention of the Western Psychological Association (WPA), April 26-30, 2023, Riverside, California. The WPA conference allowed students to discover the range of activities and topics that psychology offers, and to learn about cutting-edge research in all areas of psychology. The conference activities included invited lectures, papers, symposiums, and poster sessions of current research by professionals. Students who did not travel to the WPA conference did library research on the current writings and online presence of a psychologist in their chosen discipline, as well as observing the use of #PsychologyWeek on social media.

EVALUATION:
Written by: Nathalie Yuen, Ph.D.

Zacharie Straley had a very successful quarter in So You Want to be a Psychologist. Zacharie completed all of the work and the overall quality was excellent. Zacharie demonstrated excellent engagement with

the program materials and finished this program with a solid foundation for intermediate-level work in the social sciences.

Zacharie completed all of the written assignments. These assignments included thoughtful reflections on the readings. Zacharie did very good work on the history and systems quizzes. Zacharie also completed the Collaborative Institutional Training Initiative (CITI Program) Social & Behavioral Research - Basic/ Refresher certification training on the ethics of human subjects research.

Zacharie studied cognitive psychology, collaborating with a small group of students. This group was very dynamic and cohesive. Zacharie read *Cognitive Psychology* by Mehgan Andrade and Neil Walker as the textbook in this discipline area. To demonstrate learning in the discipline, Zacharie completed a series of quizzes. The performance on the quizzes confirmed that Zacharie had achieved a very good understanding of cognitive psychology. At the end of the quarter, Zacharie created a poster on synesthesia for the program's own virtual conference. The poster included an clear explanation of synesthesia.

Zacharie also shared this learning in cognitive psychology across disciplines by participating in a jigsaw group. The group discussed trauma as its main topic and Zacharie completed an annotated bibliography that focused on this topic from the perspective of cognitive psychology. Zacharie submitted all drafts of the annotated bibliography, each an improvement from the previous. In the final annotated bibliography, Zacharie included very good summaries of and reflections on ten empirical studies from peer-reviewed journals. Zacharie demonstrated an excellent understanding of American Psychological Association (APA) style formatting for references. For the jigsaw group presentation, the group members were knowledgeable, well-rehearsed, and gave an excellent talk.

Zacharie attended the 103rd Western Psychological Association (WPA) annual conference in Riverside, California, gaining valuable preprofessional experience. Zacharie attended many conference activities; the summary of this experience demonstrated excellent engagement at the conference. It is evident that Zacharie gained much from attending the conference.

Overall, Zacharie completed excellent work in this program. Zacharie made significant progress, especially in developing strong collaborative skills. It was a pleasure having Zacharie as part of the learning community.

SUGGESTED COURSE EQUIVALENCIES (in quarter hours) TOTAL: 16

4 - Cognitive Psychology
4 - Psychology: History of Psychology
4 - Psychology: Research Ethics and Open Science
4 - Careers in Psychology

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September 2022 - March 2023: The Fungal Kingdom

32 Credits

DESCRIPTION:
Faculty: Lalita Calabria, Ph.D. and Paul Przybylowicz, Ph.D.

The Fungal Kingdom was a two-quarter, junior/senior program focused on the taxonomy, physiology and ecology of fungi, with an emphasis on Pacific Northwest fungi and lichens. There were both 16- and 12-credit options available in both quarters. The major learning objectives were to: 1) develop a detailed understanding of the biology, ecology, and taxonomy of lichens and fungi; 2) become proficient using field and lab methods for mushroom and lichen collection and identification, including dichotomous keys, molecular systematics, and chemical testing; 3) demonstrate the ability to recognize the common fungi and lichen species of the PNW; and 4) to develop scientific literacy, critical thinking and research skills, as well as science communication skills. Students' understanding was assessed through weekly study questions, several quarter-long projects, seminars, participation and two exams in the fall and biweekly quizzes in the winter. Each major component of the program is described below.

The text for fungal biology and physiology was *21st Century Guidebook to the Fungi,* 2nd Edition by Moore, Robson and Trinci, along with selected scientific research papers. Lichen lectures were supported by readings from *Lichens of North America* by Brodo, Sharnoff and Sharnoff, a series of essays titled *Ways of Enlichenment* by Goward and a selection of peer-reviewed literature. Topics covered during fall quarter included: lichen biodiversity, evolution and reproduction, fungal diversity and classification, molecular systematics, cell biology, spore production and discharge, genetics, human uses of fungi, and bioinformatics. During winter quarter, the focus was fungal and lichen ecology. Topics covered included: ecophysiology of lichens and fungi, environmental monitoring using lichens, lichen conservation and the ecology of various groups of fungi—pathogens, decay, mycorrhizae, and endophytes.

In fall quarter, field collection and identification skills were a significant focus. Students used dichotomous keys to identify unknown mushroom and lichen specimens and developed fluency in identification terminology. Every student compiled both a lichen and mushroom Identification Notebook which included 12 specimens with detailed descriptions, key characters and photos for each specimen and drawing of key features for several specimens. Field identification skills were further developed using *iNaturalist*, an online citizen science tool to document biodiversity. Weekly observations for both mushrooms and lichens were required. Each student completed a reflective summary of the collective results from the quarter. A sight identification exam tested students' ability to identify local mushrooms and lichens from memory using scientific names.

Weekly research seminars focused on current topics in mycology. Topics covered included bioremediation, radiotrophic fungi and medicinal uses of fungi. Students summarized peer-reviewed articles to inform critical discussions to develop informed perspectives.

During the winter, students further expanded their lichen identification skills through a plot-based forest survey. Students worked in teams to identify all lichens collected and then analyzed class data and presented their results. In addition to macrolichen surveys, students participated in two workshops, one focusing on *Usnea* species and a second on crustose lichen ID.

Students learned molecular and bioinformatic approaches for identifying fungi, including how to extract DNA from both environmental isolates and tissue samples, perform PCR amplification, clean and compare sequence data with sequences in online DNA databases, create a multiple sequence alignment with DNA data, construct a phylogenetic tree and interpret the relationships between different fungal

taxa. Other fungal identification skills covered included culturing and sterile technique, along with compound microscope slide preparation and observation of microscopic fungi.

During winter quarter, 16-credit students completed either an independent research project or a literature review on a particular mycology topic. This work culminated in a written report or paper, along with a public presentation.

EVALUATION:
Written by: Paul Przybylowicz, Ph.D. and Lalita Calabria, Ph.D.

Zacharie Straley met all the major learning objectives for this program. Zacharie attended most of the program meetings and submitted most of the program work. Zacharie contributed enthusiastically to our learning community, especially in the field and with his research project. Overall, the quality of Zacharie's work was very good and demonstrated a high level of engagement with the program.

Zacharie made significant progress in fungal and lichen biology, ecology and taxonomy. Zacharie completed all weekly study questions, which indicated a very good understanding of the material. Zacharie's performance on the quizzes and exams indicated a fair understanding of fungal biology, with a very good comprehension of the lichen topics in fall. In winter Zacharie's quizzes indicated a good understanding of fungal topics, with a very good comprehension of the lichen topics.

In the taxonomy portion of the program, Zacharie worked hard in the lab and field to increase his ability to identify mushrooms and lichens. Zacharie's mushroom identification notebook was satisfactory. His descriptions demonstrated an excellent use of technical terms. Both the collection and notebook needed additional attention to the details. Zacharie's lichen identification notebook was good and included descriptions and photographs that highlighted the distinguishing features for each specimen. Overall, Zacharie showed solid skills with using dichotomous keys to identify an unknown species. On the final sight identification exam, Zacharie demonstrated an excellent ability to identify 44 common mushrooms and lichen species using scientific names.

Zacharie contributed regularly to the class *iNaturalist* project through weekly observations, comments and detailed notes. It was clear that Zacharie used this online community science tool to deepen their understanding of the natural history of the PNW.

Zacharie completed all the seminar response posts which were generally excellent. Zacharie asked good questions and contributed his thoughts in a supportive manner. As a result, Zacharie deepened his skills in interpreting primary scientific papers and science media sources from a critical perspective.

Zacharie contributed to all aspects of the lichen plot research including field sampling, macrolichen identification, data entry and organization. Zacharie's team did an excellent job of accurately identifying all lichens in their plots. Their summary and analysis of the class data was very good and included a well-defined research question with a graph/table illustrating their results.

Zacharie demonstrated a solid understanding of fungal identification using molecular tools through participation in fungal DNA isolation and PCR labs. With the resulting DNA sequences, Zacharie successfully identified their fungal species and constructed an accurate phylogenetic tree representing eight different classes of fungi. Zacharie was an engaged participant in fungal diversity and endophyte isolation labs and showed a solid grasp of the microscopy, culturing and sterile technique skills covered. Zacharie completed all the Excel mushroom farm models. His final model demonstrated a very good understanding of both the modeling and the cultivation process.

Straley, Zacharie T — A00425811
Last, First Middle — Student ID

For their research project, Zacharie's team investigated biologically active cyathane diterpenoid production (i.e. erinacines) in Lion's mane mushroom, *Hericium abietis*. Their project involved culturing, extracting and fractionating cyathane diterpenoids from *H. abeitis.* They did a great job working collaboratively to refine their research question, develop methods and implement their project. Overall, their paper and final presentation were both very good and highlighted a solid understanding of the biology and medicinal chemistry of fungi, as well as growing skill with researching the scientific literature and technical writing.

Overall, Zacharie worked hard and made significant progress. He is well prepared for more advanced work in mycology.

SUGGESTED COURSE EQUIVALENCIES (in quarter hours) TOTAL: 32

*8 - Fungal Biology and Ecology
*6 - Lichen Biology and Ecology
*6 - Lichen Taxonomy
*6 - Fungal Taxonomy
*2 - Research Seminar in Mycology
*4 - Independent Project: Fungal Natural Products Research

* indicates upper-division science credit

Straley, Zacharie T — A00425811
Last, First Middle — Student ID

June 2022 - September 2022: Anatomy and Physiology: Foundations and Movement

6 Credits

DESCRIPTION:
Faculty: Amanda Kugel, D.C.

Anatomy and Physiology I with Laboratory was designed to assist students in developing foundational knowledge and understanding of the structures and physiologic processes in the human body, while also learning to communicate properly using anatomical terminology. Topics covered during the first session included a review of cellular structure and the fluid mosaic model, a detailed discussion of the four primary tissues types, as well as exploration of the integumentary, muscular, skeletal and nervous systems. The course used the text "Anatomy and Physiology, 2e" by Open Stax licensed under CC BY 4.0. The course also used the Visible Body Web Suite for three-dimensional human anatomy and organ systems.

Students were expected to locate and identify pertinent tissues and organs of each body system, describe physiologic processes within individual systems, and the contribution of each system to the overall homeostasis of the human body. Anatomical position and terminology were integrated throughout the course to give students the necessary tools for communicating effectively with others in health-related fields.

Hybrid laboratory activities included a virtual compound light microscope through University of Delaware, virtual tissue/organ slides available at the Histology Guide website, and the 3D software platform Visible Body to accomplish identification for major bones, skeletal muscles and actions, and nervous system and special sense structures. Students utilized the interactive 3D brain model available at BrainFacts.org for their virtual dissection of the human brain external and internal gross features. Students had the opportunity to attend some laboratories in person to work with human skeleton and disarticulated bones, perform BIOPAC muscle contraction physiology simulations, elicit reflexes, and dissect mammalian brain and eye specimens.

Students were evaluated through multiple modalities. Dynamic quiz modules within the Canvas learning management system included standardized questioning and short-answer essays for each body system. Laboratory reports were submitted for each major topic to show the student’s ability to identify structures and explain physiologic processes. Online exams were conducted for the final laboratory practical to identify skeletal and muscular system components.

EVALUATION:
Written by: Amanda Kugel, D.C.

Throughout the quarter Zacharie turned in consistently very good to excellent quality work, diligently submitting all required assignments. Zacharie's high quality performance in organ identification and physiology was evident through participation in both virtual and in-person laboratory activities, the associated lab reports, as well as the final assessment quizzes for each body system. Zacharie wrote short answer essays that were concise, yet contained adequately detailed explanations to demonstrate their advanced comprehension of the physiology for each body system covered this session. Zacharie enthusiastically participated in the class community by attending all weekly Zoom meetings, and respectfully engaged with peers while performing dissections and BIOPAC muscle physiology simulations during in person laboratories. Through frequent conversations with Zacharie, it was evident he can think outside the box, piecing together foundational knowledge with personal experiences and evidence-based research to form comprehensive solutions to musculoskeletal based pathophysiologic conditions. Based upon participation and work submitted over the course, Zacharie is unquestionably prepared to succeed in subsequent health related courses.

Straley, Zacharie T — A00425811

Last, First Middle — Student ID

SUGGESTED COURSE EQUIVALENCIES (in quarter hours) TOTAL: 6

6 - Anatomy and Physiology 1 with Laboratory

Straley, Zacharie T — A00425811
Last, First Middle — Student ID

June 2022 - September 2022: Anatomy and Physiology II with Laboratory

6 Credits

DESCRIPTION:
Faculty: Amanda Kugel, D.C.

Anatomy and Physiology II with Laboratory was designed to complete student knowledge of human body systems related to transport and exchange, including cardiovascular components, the respiratory, digestive, lymphatic, urinary and reproductive systems. The course used the text "Anatomy and Physiology, 2e" by OpenStax licensed under CC BY 4.0

Students were expected to locate and identify pertinent tissues, organs, and describe physiologic processes of individual systems that contributed to overall homeostasis. Laboratory was completed through a combination of virtual work with online histology slides at Histology Guide.org, anatomy software through Visible Body Web Suite, and on-campus hands-on laboratories including dissection of animal hearts and fetal pigs, blood typing with Eldon cards, blood pressure measurement skills, and respiratory physiology with Biopac simulation.

Students were evaluated through multiple modalities. Online exams conducted within the Canvas learning management system included standardized questioning and short-answer essays for each body system. Laboratory reports were submitted to assess the student's ability to locate organs and explain physiologic processes.

EVALUATION:
Written by: Amanda Kugel, D.C.

Zacharie submitted all work, consistently demonstrating excellent comprehension of physiology and organ identification for topics this quarter as assessed through online lab reports and final assessment quizzes for each body system. Zacharie regularly contributed to discussions with meaningful questions and statements, showing an ability to think outside of the box while integrating factual knowledge with current topics in health, as well as relating it to past experiences. Skills in blood pressure measurement, blood type analysis, spirometry, heart anatomy and digestive organ identification were expertly demonstrated during in-person laboratory activities and dissections. Zacharie communicated professionally and respectfully with their instructor and peers during every encounter, attending synchronous meetings online and in the laboratory regularly. Zacharie was an asset in the laboratory, assisting peers with a calm, cooperative approach. Based upon participation and work submitted over the course, Zacharie is unquestionably prepared to succeed in future health related courses.

SUGGESTED COURSE EQUIVALENCIES (in quarter hours) TOTAL: 6

6 - Anatomy and Physiology II with Laboratory

Straley, Zacharie T — A00425811
Last, First Middle — Student ID

March 2022 - June 2022: Developmental Biology

16 Credits

DESCRIPTION:
Faculty: Nancy C. Murray, Ph.D.

Developmental Biology was a one-quarter, interdisciplinary science program that interwove upper-division cell, molecular and developmental biology. In addition to the content, learning goals included the development of analytical and critical thinking and quantitative reasoning skills. Weekly activities included lectures, labs, and workshops. Students were required to actively contribute to the learning community and were evaluated on the bases of their performances on weekly quizzes, midterm and final exams, homework, workshops, and labs.

Molecular Cell Biology: The study of molecular and cellular biology was posited around the concept that the cell is the fundamental unit of life. Through this lens, students studied prokaryotic and eukaryotic cell structure, chromosomal organization of coding and non-coding regions, DNA mutations and repair mechanisms, protein structure and function, molecular genetic mechanisms (eukaryotic transcription and translation), biomembrane structure, membrane transport, protein trafficking, cell cycle regulation, post-transcriptional control mechanisms, molecular genetic techniques bioinformatics, and signal transduction pathways. The textbook used was *The Cell: A Molecular Approach,* by Cooper, 8th edition.

Developmental Biology: Developmental biology is the study of becoming, of change, and of the many cellular and molecular mechanisms accounting for those changes during an animal's life. Eukaryotic model organisms (yeast, *Drosophila melanogaster*, and *Xenopus laevis)* were used. Using the text, *Principles of Development,* by Wolpert, et al., 6th edition, students studied the following topics: fertilization, *Drosophila* and amphibian axis formation, neurulation, patterning of the central nervous system and brain growth, neural crest cells and axonal specificity, limb development, metamorphosis and, regeneration.

Laboratory

In the lab, students carried out experiments using *Xenopus laevis* to study axis formation and learned *in-vitro* fertilization methods. In addition, students acquired bench skills in data collection and analysis, aseptic technique, DNA isolation, polymerase chain reaction (PCR), restriction digest, CRISPR, and bioinformatics. Students were required to maintain a laboratory notebook documenting their work and analyses of their experimental results.

EVALUATION:
Written by: Nancy C. Murray, Ph.D.

Zacharie accomplished his academic goals through hard work, perseverance, and dedication. His participation in class, workshop, and laboratory was active and welcome, and he demonstrated a strong desire to understand the content. He learned a great deal this quarter. What follows is an evaluation of his work.

Overall, Zacharie was very conscientious and had a tenacious work ethic. He sought to understand the material at a deep level and when he had questions, he sought out help from faculty and peers. Zacharie's effort was reflected in his strong scores on the weekly quizzes, midterms, and final exams and through detailed and complete answers to homework problems. His performance on these assessments demonstrated a solid ability to address scientific questions in a logical manner and to synthesize complex information about biological processes. In the lab, Zacharie showed himself to be a careful and deliberate worker. His work at the lab bench indicated a strong ability to apply theoretical concepts learned in

lectures to the lab setting. He maintained a very good lab notebook that was organized, detailed, and easy to follow.

Zacharie earned full, upper-division science credit for his efforts.

SUGGESTED COURSE EQUIVALENCIES (in quarter hours) TOTAL: 16

*5 - Cell Biology
*5 - Molecular Biology
*4 - Developmental Biology
*2 - Molecular and Developmental Biology Laboratory

* indicates upper-division science credit

Straley, Zacharie T — A00425811
Last, First Middle — Student ID

September 2021 - March 2022: Environmental Biology and Chemistry

32 Credits

DESCRIPTION:
Faculty: Andrew D. Brabban, Ph.D. and Paula Schofield, Ph.D.

Environmental Biology and Chemistry was an interdisciplinary science program that used topics and theoretical concepts within microbiology and organic chemistry to study the natural world and human interaction with it, including anthropogenic pollution. It included upper division organic chemistry, environmental and general microbiology, environmental chemistry, and chemical instrumentation. Although each subject is listed separately, the material was delivered in an integrated manner, approaching many concepts from both biological and chemical perspectives. Each week, students spent 9 hours in lecture and small group problem solving sessions, 7 hours in the laboratory and doing some fieldwork, and 2 hours in seminar discussions. Students were evaluated on the basis of weekly homework assignments, seminar assignments, field and laboratory reports, in-person class activities, and performance on weekly on-line quizzes and regular in-person examinations. Some students elected to take components of this full time program.

Organic Chemistry I and II with Laboratory: In fall quarter, students studied the relationship between the structure and behavior of organic molecules. Specific concepts included chemical bonding, acid-base properties of organic molecules, stereochemistry, nomenclature, electron delocalization and resonance. The chemistry of alkanes, alkenes, and alkynes were examined in detail, and the fundamental mechanism of electrophilic addition was emphasized. The laboratory work introduced common techniques in synthetic organic chemistry, including reflux, extraction, recrystallization, steam and simple distillation. Analytical techniques included thin layer chromatography, melting point analysis, gas chromatography, GC-MS, and infrared spectroscopy. In winter quarter, the chemistry of alkyl halides, carboxylic acids and their derivatives, benzene and its derivatives, aldehydes and ketones, as well as free radical reactions were covered. Emphasis was placed on the mechanisms of nucleophilic substitution and elimination, electrophilic aromatic substitution, nucleophilic acyl substitution, and nucleophilic addition. Thermodynamics and kinetics were highly emphasized as fundamental and guiding principles within each topic. For the winter lab work, in addition to a Grignard synthesis and a green chemistry synthesis of adipic acid, students conducted a 5-week interdisciplinary project to characterize microorganisms in soil via phospholipid fatty acid (PLFA) analysis. Students took soil samples from the Evergreen State College Campus, extracted the phospholipids from the membranes of microorganisms, chemically derivatized them to fatty acid methyl esters (FAMEs), then used GC-MS analysis to identify biomarkers and profile microbial communities. The textbook used was *Organic Chemistry* by Paula Yurkanis Bruice (8th Ed.).

Organic Chemistry: Instrumentation and Spectroscopy: Students gained significant hands-on training through individual and group workshops on the following instruments: FT-IR spectrophotometer, Gas Chromatograph, Gas Chromatograph-Mass Spectrometer, and FT-NMR spectrometer. In addition to learning significant background theory, students learned sample preparation, operation, and analysis of spectra/data for each instrument, and used this knowledge to analyze products from synthetic labs. Students also applied these skills to elucidate the structures of a series of unknown compounds through workshops and homework assignments. In addition, students used a tailored GC-MS method for the separation and analysis of fatty acid methyl ester (FAME) biomarkers to study microbial communities in soil.

General and Environmental Microbiology with Laboratory: This component of the program began by examining the broad variety of microorganisms so far identified, ways of growing microorganisms and measuring growth, the biochemistry of these species and their varying cellular structure. It then progressed to examining the roles microorganisms play in the environment and the broad diversity of

ecosystems they occupy. Specifically, we examined microbial metabolism and biogeochemical cycling at a biochemical level, examining the many modes of aerobic and anaerobic catabolism, such as chemolithotrophy. The laboratory component was structured to teach the basic techniques of microbiology required to safely and precisely manipulate microorganisms, such as aseptic technique, making media and growing cultures. Students learned to work quantitatively with organisms carrying out MPN and dilution series to examine water samples, bacterial and phage replication. Students also used quantitative methods to examine cellular processes such as electron transport, using biochemical assays such as the Hill Reaction. The textbook used was Madigan, M., Martinko, J., Bender, K.S., Buckley, G.H., Sattley, W.M., and Stahl, D.A. *Brock's Biology of Microorganisms* 15/e. New Jersey: Pearson: Benjamin Cummings, 2017.

Microbial Ecology and Bioremediation with Laboratory and Field Methods: Students gained an understanding of the relationships between, and the role of, microorganisms in natural and polluted environments. Course material examined microbial metabolism and biogeochemical cycling, water pollution, toxicology, wastewater treatment, methods of measuring microbial numbers and microbial activity, abiotic and biotic interactions within microbial communities, and bioremediation. Remediation of both organic and inorganic chemicals using active/passive, *in situ/ex situ*, chemical/biological processes including the design and use of wetlands was covered. Lab and field work focused on developing both quantitative and qualitative methods of measuring microbial growth and pollution including DO and BOD_5 assays, MPN, viable and total cell count methods, culture enrichment, soil analysis and genetic methods such as PCR detection of microorganisms in water samples. The textbook used was Madigan, M., Martinko, J., Bender, K.S., Buckley, G.H., Sattley, W.M., and Stahl, D.A. *Brock's Biology of Microorganisms* 15/e. New Jersey: Pearson: Benjamin Cummings, 2017.

Environmental Chemistry: Each week students read primary literature and other texts, and completed detailed homework assignments on each reading. Topics covered included green chemistry, energy use in the USA, biofuels from algae, contaminants of emerging concern, environmental hydrocarbon degradation, and the anthropogenic carbon cycle. Readings were mostly taken from primary literature: *Journal of the American Chemical Society, Bioresource Technology, Chemosphere, Environmental Pollution*; and also other texts: *US Energy Information Administration (EIA) Annual Outlook 2021; epa.gov*.

EVALUATION:
Written by: Andrew D. Brabban, Ph.D. and Paula Schofield, Ph.D.

Zacharie entered this program to learn advanced concepts, as well as lab and field techniques within biology and chemistry to prepare for a future career in environmental science.

Coursework:
In the organic chemistry component of the program, Zacharie submitted all assigned work and completed all online and in-person quizzes and exams. His work and understanding of the material really improved over the course of the two quarters, ending on a strong final exam. Overall, Zacharie demonstrated a very good grasp of the fundamentals of organic chemistry, specifically, nomenclature, structure-property relationships, stereochemistry, and thermodynamic principles governing molecular structure and reactions. In addition, he showed a very good understanding of organic reactions, mechanisms, and multi-step synthetic sequences. As a result, Zacharie was successful in applying his knowledge to solve applied synthetic and mechanistic problems.

Zacharie has demonstrated a fair understanding of both general and environmental microbiology. In the examination Zacharie was able to solve the set qualitative and quantitative problems, including growth, cell quantification and cell morphology and structure. In the environmental component, Zacharie showed a fair understanding of the environmental processes examined in the program, and solved most of the

quantitative redox and thermodynamic problems as they relate to the environment. In microbial ecology and bioremediation, Zacharie's performance on examinations improved markedly over the last few weeks; his final examination showed an excellent understanding of the theory covered and the ability to apply both quantitative and qualitative methods to measure microbial numbers and activity in the environment. Zacharie was also able to apply his biogeochemical knowledge to assess polluted sites, and then design the appropriate remediation processes. Zacharie completed all of the online quizzes and homework through both quarters and they were always good and sometimes very good.

Zacharie came to seminar discussions well prepared, completing detailed assignments on the readings. His work showed he had a solid understanding of the topics and had thoroughly read the texts. In addition, Zacharie was an engaged member of seminar discussions, contributing well to the dialogue.

Laboratory and Field Work:
Zacharie successfully worked with a variety of lab partners, and overall he learned the basic laboratory bench skills and techniques in organic chemistry and microbiology.

Zacharie worked very well with his group members on all aspects of the interdisciplinary field assessment and lab projects. These included an in-depth study (discharge, dissolved oxygen, conductivity, pH, temperature) of McLane Creek, a rural salmon spawning creek that drains into Eld Inlet of Puget Sound; a BOD5 study of the college campus natural waters; and the examination of ground water flow in reference to petrochemical pollution. Zacharie's data collection was efficient and thorough, and overall, his group's project reports were organized, included detailed site descriptions, the appropriate calculations, tables, and figures. Overall, the two larger group reports on McLane Creek and BOD5 were good and in parts very good. Zacharie also contributed significantly to the 5-week group project on the characterization of soil microbial communities via phospholipid fatty acid/FAME analysis. Zacharie's group successfully obtained and characterized numerous FAMEs as microbial biomarkers. Following feedback on a draft report, Zacharie's group submitted a fairly good final extensive lab report of this work. It lacked detail and clarity in some sections; however, it contained very good site descriptions and data presentations.

Chemical Instrumentation and Spectroscopy:
Zacharie learned the theory and practical application of chemical instrumentation typically used in organic chemistry. Specifically, he learned how to prepare samples, operate, and analyze data from the FT-IR, GC, and GC-MS instruments, and he used these to analyze products from organic syntheses. In addition, Zacharie and his project group successfully used a tailored GC-MS method for the separation and analysis of FAME biomarkers to study microbial communities in soil.

Zacharie learned the theory of FT-NMR and successfully analyzed spectra, as evidenced by homework and quiz scores. He also took two hands-on FT-NMR instrumentation training workshops.

SUGGESTED COURSE EQUIVALENCIES (in quarter hours) TOTAL: 32

*11 - Organic Chemistry I and II with Laboratory
*4 - Organic Chemistry: Instrumentation and Spectroscopy
*5 - Microbial Ecology with Laboratory
*4 - General Microbiology with Laboratory
*3 - Environmental Microbiology with Laboratory
*3 - Biogeochemistry and Bioremediation with Field Methods
*2 - Environmental Chemistry

* indicates upper-division science credit

Straley, Zacharie T — A00425811
Last, First Middle — Student ID

June 2021 - September 2021: Plant Biology

6 Credits

DESCRIPTION:
Faculty: Lalita Calabria, Ph.D.

In this course, students studied the Kingdom Plantae using Evert and Eichhorn's *Raven Biology of Plants*. Students attended weekly lectures and interactive group workshops that covered plant anatomy, cellular biology, physiology, plant systematics, and evolution and diversity, primarily on the phylum and class level. Labs were taught remotely due to COVID-19, utilizing fresh plant material collected locally for studying plant anatomy and reproduction features. Students demonstrated their comprehension of the material through weekly study question assignments, lab notebook entries, and weekly exams. Students also studied native plant identification and made weekly field observations in a class *iNaturalist* project, an online citizen science tool for documenting biodiversity. Students learned the Latin names for 25 common Pacific Northwest plants. At the end of the quarter, their knowledge was tested with an online practical exam.

EVALUATION:
Written by: Lalita Calabria, Ph.D.

Zacharie developed an excellent understanding of the plant biology material covered in lectures and labs based on weekly exams. Zacharie was actively engaged in all program activities and completed all homework assignments. Zacharie's laboratory entries served as an excellent record of thinking and observations in the lab and included well-labeled and accurate drawings of specimens studied.

Zacharie completed all entries into our class *iNaturalist* project, which included high quality photographs and detailed descriptions of vegetation and floral characteristics, as well as notation of phenological phases. Overall, it was clear that Zacharie utilized this online citizen science tool to deepen their understanding of natural history of the PNW. Zacharie's work on the final sight identification exam indicated an excellent ability to identify common Pacific Northwest plants without keys. In conclusion, Zacharie was a hard-working, engaged student and it was a pleasure having them in the program.

SUGGESTED COURSE EQUIVALENCIES (in quarter hours) TOTAL: 6

4 - Plant Biology
2 - Field Botany

Straley, Zacharie T — A00425811
Last, First Middle — Student ID

June 2021 - September 2021: Field Ornithology

8 Credits

DESCRIPTION:
Faculty: Alison Styring and Daniel Froehlich

Field Ornithology was an 8-credit program focused on birds as a unique group of terrestrial vertebrates and as the focus of conservation-oriented research, restoration, and monitoring. This program was intended to foster the development of foundational knowledge of avian biology as well as strong bird identification and natural history skills. This was a hybrid program with online components that included electronic documents covering weekly readings, lectures, and assignments, video lectures and tutorials, and quizzes. We met in-person once a week to learn specific field methods that are widely used in field studies. Weekly web-meetings were designed to support learning of textbook material and field identification and to undertake analytical approaches to understanding the field data we would collect during in-person field workshops.

Students learned about key elements of avian biology important to understanding the evolution and ecology of birds. Avian biology topics drew from readings from two current textbooks: *The Handbook of Bird Biology* (3rd edition, Lovette and Fitzpatrick) and *Ornithology* (4th edition, Gill and Prum). Topics included: avian evolution, taxonomy, and patterns of diversity; the biology of bird vocalizations and avian communication; the anatomical systems of birds and how they are adapted for flight; feathers and avian molt ecology; and avian life histories and population biology. Textbook learning was supplemented with readings focused on the concept of integrity including: data integrity, procedural integrity and institutional integrity within the scientific community as a whole societal endeavor. This was linked with the concepts of reputation, diversity, equity, and inclusion. Learning in this area of the program was assessed via weekly quizzes.

Students also worked to learn and improve their avian identification skills in the field. The emphasis was on learning common species of local birds and observing/documenting their distinguishing traits. Students demonstrated their learning via weekly submissions of eBird checklists (ebird.org) as well as individual observations of species via an iNaturalist project (iNaturalist.org).

Students gained experience with commonly used field methods via five assignments. Each assignment introduced students to a field method via readings, videos, and in-person instruction. The methods included: (1) monitoring species presence using autonomous field recorders, (2) point counts (with distance sampling) and associated habitat surveys, (3) observation and quantification of foraging behavior, (3) bird banding, and (4) study of birds using indirect observation (signs of presence such as prints, scat, and pellets). Each field method was linked to an assignment that provided them with the opportunity to enter their data into spreadsheets, analyze their data, and interpret their findings.

Students synthesized their learning via a final project in which demonstrated the links between the various components of the program and provided the student with the opportunity to showcase their skills and learning. Students wanting to delve further into avian biology and field research undertook an optional upper division science credit project in which they designed a study from question to field design to analysis and scientific report-writing. The research project provided students the opportunity to gain more experience in an area of their interest and practice skills and field methods, analysis, and scientific communication.

EVALUATION:
Written by: Alison Styring and Daniel Froehlich

Straley, Zacharie T — A00425811

Last, First Middle — Student ID

Zacharie Straley demonstrated effective learning in this program. Zacharie's learning and understanding of avian biology was excellent as assessed by weekly quizzes. Zacharie also provided thoughtful insight and commentary on the larger issues of science, society, birding, and inclusion.

For the field identification component of the program, Zacharie demonstrated an ability to master the technological and online components while thoroughly completing the assignments. Zacharie's submissions showed excellent growth in the ability to find, document and identify new species from week to week, demonstrating effective use of field guides and online resources for support and to incorporate advice from prior submissions.

Zacharie's work in the field methods component of the program was good with a growing attention to detail as demonstrated in documentation of field notes and acoustic recordings. Zacharie also submitted spreadsheets, graphs, and written interpretations that were well-organized and demonstrated a good foundation in avian research methods.

Zacharie's final project looked at birds in urban and more rural settings. The work took a narrative and reflective approach and included field observations and reflective insights as well as peer-reviewed research and scientific literature. The final presentation was very interesting and thought-provoking, and represented a creative approach to synthesizing the different elements of the program.

It was a pleasure working with Zacharie.

SUGGESTED COURSE EQUIVALENCIES (in quarter hours) TOTAL: 8

4 - Ornithology
4 - Avian Research Methods

Straley, Zacharie T — A00425811
Last, First Middle — Student ID

March 2021 - June 2021: Precalculus II

4 Credits

DESCRIPTION:
Faculty: Vauhn Foster-Grahler, MS, M.Ed.

Pre-calculus II was a problem-solving-based overview of functions that model change. The course continued to prepare students for calculus and more advanced study in mathematics and science. The course included an in-depth study of, sinusoidal functions, right and non-right triangle trigonometry, polynomial, and rational functions, and polar coordinates and curves. In addition vectors and parametric curves were introduced. Students learned collaboratively, and approached problems using multiple representations (algebraically, numerically, graphically, and verbally). The text was *Functions Modeling Change: A Preparation for Calculus, 5th Ed. Connally,* Hughes-Hallett, Gleason, et al. T.J. Wiley. Chapters 7, 8, 11, and 12. Due to the on-going Covid-19 pandemic, all classes were held remotely and included three hours of synchronous instruction each week.

In addition to the content, students were assessed and self-assessed on the following process outcomes:

1. Used correct mathematical notation

2. Used appropriate mathematical procedures correctly

3. Developed and/or correctly interpreted mathematical models

4. Used technology appropriately to investigate and solve problems

5. Linked algebraic, graphic, verbal, and numeric representations and solutions

6. Demonstrated an understanding of functions

7. Used logical and correct critical reasoning

8. Communicated mathematics for the clarity of the receiver

EVALUATION:
Written by: Vauhn Foster-Grahler, MS, M.Ed.

Zacharie was an active and positive participant in our synchronous Zoom sessions and in breakout rooms. Zacharie's written assessments consistently demonstrated near-proficient to proficient performance for each of the process outcomes above for the entire course content. Zacharie has a good aptitude in math and is well prepared for calculus. Zacharie is encouraged to continue studying math and was a pleasure to have in class.

SUGGESTED COURSE EQUIVALENCIES (in quarter hours) TOTAL: 4

4 - Precaclulus II

Straley, Zacharie T — A00425811
Last, First Middle — Student ID

January 2021 - March 2021: Precalculus I

4 Credits

DESCRIPTION:
Faculty: Vauhn Foster-Grahler, M.S., M.Ed.

This was a problem-solving-based overview of functions that model change that was taught remotely due to the COVID-19 pandemic. Classes were held twice weekly via Zoom. Students participated in group work during our virtual class meetings, and submitted weekly problem sets and took resource-limited exams. We studied functions and functional notation, linear, exponential and logarithmic functions and their applications in depth and represented them and worked with them algebraically, numerically, graphically, and verbally. There was an emphasis on context-based problem solving and collaborative learning. The text was *Functions Modeling Change*: *A Preparation for Calculus, 5th Ed.* Connally, Hughes-Hallett, Gleason, et al. Chapters 1 - 6 and parts of chapter 10. Due to the COVID-19 pandemic, all class sessions were held via Zoom. In addition to the content of the course, the students were assessed and self-assessed on the following eight outcomes for each content area.

1. Used correct mathematical notation
2. Used appropriate mathematical procedures
3. Developed and correctly interpreted mathematical models.
4. Used technology appropriately to investigate and solve problems
5. Linked algebraic, graphic, verbal, and numeric representations and solutions
6. Demonstrated an understanding of functions
7. Used logical and correct critical reasoning
8. Communicated mathematics for the clarity of the receiver

EVALUATION:
Written by: Vauhn Foster-Grahler, M.S., M.Ed.

Zacharie had regular attendance at our synchronous Zoom sessions and was an active and positive participant in group work and in the class. Zacharie's submitted problem sets and assessments demonstrated satisfactory to proficient performance for each of the outcomes above for the entire course content. Zacharie produced an exceptional final exam. Zacharie is very well prepared to take precalculus II and is encouraged to do so. Zacharie was a pleasure to have in class.

SUGGESTED COURSE EQUIVALENCIES (in quarter hours) TOTAL: 4

4 - Precalculus I

Straley, Zacharie T — A00425811
Last, First Middle — Student ID

January 2021 - June 2021: General Chemistry

16 Credits

DESCRIPTION:
Faculty: Robin J. Bond, Ph.D.

This program covered basic principles of general chemistry including atomic structure, principles of bonding, molecular geometry, stoichiometry, aqueous solutions, thermochemistry, gases, intermolecular forces, colligative properties, kinetics, equilibrium, acids and bases, buffers, solubility, thermodynamics, and electrochemistry. Students read from the textbook (McMurray and Fay, 2nd ed.), watched video lectures, and answered reading questions before class. Students' mastery of learning objectives was assessed via did homework problems and weekly quizzes. Students also participated laboratory experiences such as hydrolysis, thermochemistry, and gravimetric analysis, kinetics, intermolecular forces, and solubility.

EVALUATION:
Written by: Robin J. Bond, Ph.D.

Zacharie's work in this program was generally excellent. Zacharie submitted all of the reading question sets in a timely fashion. Zacharie submitted all 33 homework sets, which demonstrated excellent understanding of the material. Zacharie's performance on quizzes showed excellent comprehension. Zacharie's lab reports showed evidence of strong analytical thinking. Overall, Zacharie showed mastery of all of the learning objectives for the course.

SUGGESTED COURSE EQUIVALENCIES (in quarter hours) TOTAL: 16

16 - General Chemistry with Laboratory

Straley, Zacharie T — A00425811
Last, First Middle — Student ID

September 2020 - December 2020: Chemistry Counts!

16 Credits

DESCRIPTION:
Faculty: Dharshi Bopegedera, Ph.D. and Vauhn Foster-Grahler, MS., M.Ed.

The Chemistry Counts! program explored topics in introductory chemistry and algebraic thinking for science using a context-based problem-solving approach. Students also learned to use spreadsheet software for graphing. Although students were held responsible for their individual work, collaborative learning was emphasized in all parts of the program.

The **Introductory Chemistry** component covered classification and properties of matter, the periodic table, IUPAC nomenclature, modern atomic theory, introduction to quantum mechanical model, atomic and molecular weights, the mole concept, balancing chemical equations, reaction stoichiometry, molarity, Lewis structures, VSEPR model, and acid-base reactions. Students worked in small teams in weekly workshops designed to develop problem solving and quantitative reasoning skills. Students were given weekly homework assignments and three exams to assess their learning. Text: *Chemistry: Atoms First* (2^{nd} Ed.), by Flowers, Theopold, Langley, Neth, and Robinson, OpenStax (Rice University, TX).

The **Microsoft Excel skills laboratory** focused on learning how to use this software package, especially for graphing and data analysis. Linear (including linear regression), exponential, and pi graphs were the main focus. Students' ability to use this software effectively was assessed via weekly assignments and a final exam.

Students engaged with eight different hands-on chemistry activities while learning remotely from home. These activities were mailed to students at the beginning of the quarter and were used to engage them with various chemistry concepts they learned. The activities explored interaction of light with matter, chemical bonding, acid-base chemistry, introduction to thermochemical concepts, and building a home-made spectroscope.

The **Algebraic Thinking for Science** portion of Chemistry Counts! introduced students to concepts and algebra of functions, as well as linear, quadratic, exponential, and logarithmic functions and their applications. In addition, students learned scientific notation, proportional reasoning, and unit conversions. Students worked with these topics algebraically, graphically, numerically, and verbally. Context-based problem solving and collaborative learning were emphasized. Text: *Algebraic Thinking for Science*. Vauhn Foster Grahler and Megan Olson-Enger. 2020. In addition to the content, students were assessed and self-assessed on the following eight outcomes.

1. Used correct mathematical notation.

2. Used appropriate mathematical procedures.

3. Developed and/or correctly interpreted mathematical models.

4. Used technology appropriately to investigate and solve problems.

5. Linked algebraic, graphic, verbal, and numeric representations and solutions.

6. Demonstrated an understanding of functions.

7. Used logical and correct critical reasoning.

8. Communicated mathematics for the clarity of the receiver.

First-Year students' academic skill development was supported by their participation in **Foundations of College Success**, a module of instruction and community-building activities where students were introduced to college support services and practices, wellness strategies, study techniques, and metacognitive strategies to foster both personal and academic growth.

Sophomore-senior students participated in **Enrichment Activities** that explored topics on global climate change. Students read and discussed the first four chapters from "Human-caused Global Warming and Climate Change: Understanding the Science" by John Gibbonsin class. Topics explored included: fossil fuels, greenhouse gases and their relationship to global warming, historical perspectives on global warming, evidence for global warming, the measurements of warming and their reliability, and aspects of climate denialism. Students wrote short papers each week in response to their readings and discussions. These papers were evaluated for their scientific content and writing skills. Students were then directed to read "A Global Transition to Clean Energy: Challenges and Opportunities" (American Chemical Society Discovery Report). Each student was assigned a chapter to study from this reading and prepared two PowerPoint slides to share the information they learned. Students used their slides as visual aids for a 10-minute oral presentations to their peers. Towards the end of the quarter, students read "The Dangers of Ocean Acidification" by Scott Doney (Scientific American, 2006, *294*(3), pp58-65). Each student took one section of this article and led a seminar discussion of their section.

EVALUATION:
Written by: Dr. Dharshi Bopegedera and Vauhn Foster-Grahler, MS., M.Ed.

Introductory Chemistry: Zacharie completed all the homework assignments on time and they were consistently very good. He completed all of the hands-on chemistry activities while learning remotely from home, demonstrating interest in applying the chemistry concepts learned in class. Zacharie was well engaged during lecture sessions, worked well in small teams with fellow students during breakout sessions, and engaged well with them to solve chemistry problems. Both of his mid-term exams and the final exam were good, demonstrating a good grasp of the concepts covered. Zacharie is ready for further studies in chemistry.

Zacharie participated in all of the **Microsoft Excel laboratory** sessions and completed all the weekly assignments. Some of them were very good while others were about average. His final exam indicated an average grasp of the skills taught this quarter.

Algebraic Thinking for Science: Zacharie had regular attendance at our synchronous Zoom classes and completed 6 of 7 problem sets and 3 of 3 exams. Zacharie's final exam was exceptional. Zacharie's submitted written problem sets and assessments demonstrated satisfactory performance for each of the process outcomes including use of correct mathematical notation and procedures; development and/or interpretation of mathematical models; use of technology; use of multiple representations to solve and model problems; understanding of functions; use of logical and correct critical reasoning; and effective communication of mathematics for the entire course content. Zacharie was a fully engaged member of our learning community and was prepared and encouraged to take Precalculus I. Zacharie was a pleasure to have in class.

Enrichment Activities: Zacharie attended all class meetings and participated actively in seminar discussions making good contributions to the conversations. He wrote most of the response papers to these discussions (some were submitted late) demonstrating a good understanding of the readings. He prepared two very good slides on the topic of Renewable Methane and provided an engaging oral presentation to the class using PowerPoint as an aid.

Straley, Zacharie T — A00425811

Last, First Middle — Student ID

SUGGESTED COURSE EQUIVALENCIES (in quarter hours) TOTAL: 16

8 - Introductory Chemistry with Microsoft Excel Skills Laboratory
6 - Algebraic Thinking for Science
2 - Enrichment Activities

Straley, Zacharie T — A00425811
Last, First Middle — Student ID

June 2020 - September 2020: Spanish - First Year I

4 Credits

DESCRIPTION:
Faculty: Ethan Rogol

In this course, students acquire the skills to understand and express themselves through written and oral language about the following: greetings, introductions, expressions of courtesy, academic life, days of the week, schedules, family, identifying and describing people, professions and occupations, leisure activities, sports, asking for and giving directions within a city or campus, travel and vacation arrangements and activities, months and seasons of the year and weather. Students acquire the following grammatical structures: use of the verbs hay and *gustar*, conjugation of verbs in the present tense including stem-changing verbs, *ser* and *estar*, noun/adjective agreement, subject/verb agreement, and various idiomatic expressions related to the topics studied.

EVALUATION:
Written by: Ethan Rogol

This quarter was partial review for Zacharie. But it was of great benefit to him. He has mastered the material covered and his listening and speaking abilities grew a great deal. He is a methodically studious learner who applied himself and did exceptionally well on the quizzes administered. His written work was outstanding and in class he asked excellent clarifying questions, demonstrating his engagement and desire to truly understand. Zacharie did superb work this quarter and I have high hopes for his further development in the future.

SUGGESTED COURSE EQUIVALENCIES (in quarter hours) TOTAL: 4

4 - Spanish - First Year I

Straley, Zacharie T — A00425811
Last, First Middle — Student ID

June 2020 - September 2020: Experimental Photography

8 Credits

DESCRIPTION:
Faculty: Carolyn Chema

Experimental Photography ran in summer 2020 as an intensive 3-week course with an optional 2-week extension for students to develop their final projects. Course content was delivered remotely to ensure safety during the novel coronavirus pandemic, COVID-19, that was raging around the world during summer 2020. Demonstrations were delivered asynchronously as pre-recorded videos through the class hosting site, Canvas, while lectures happened over Zoom with PDFs of their contents made available to be accessed asynchronously. Students uploaded their artwork to receive feedback from one another and the instructor virtually using a shared, private, class Instagram account and Slack channel. Synchronous critiques provided real-time discussion of student project development.

The course introduced students to a variety of alternative photographic processes including: lumen, clichè verre, collage, assemblage, montage, and cyanotype. Each process was situated in its own historical context along with contemporary manifestations of the techniques. Students then were asked to engage with the processes, bend them to their own artistic interest, and experiment with the boundaries of their potential outcomes. Students produced photographic work along with work that pushes at the boundaries of what might be considered photographic. Students engaged in oral and written critique regarding the works produced for class assignments and participated in demonstrations, independent field-work, online critiques and discussions regarding photographic projects.

EVALUATION:
Written by: Carolyn Chema

Zacharie showed tremendous artistic growth over the course of just five short weeks! In the beginning of the class, they stated that they had not taken an art class and felt inexperienced with the art-making process. Despite a lack of formal training, the early works in lumen and clichè verre processes still showed Zacharie's unique point-of-view clearly: bold compositions that fill the page along with a real connection with and interest towards nature. Zacharie also used the early lumen work to explore ways of representing larger landscapes with small component parts (feathers represent the earth, leaves positioned to reference the form of whole trees). These pieces successfully use change of scale and perspective to completely transform the materials that Zacharie selected to use to make their lumen prints.

Through their explorations of collage, Zacharie developed greater sophistication in their compositions. At the beginning of this project, Zacharie's imagery adhered strictly to conventional XY grid axis systems -- image components were placed either vertically or horizontally and largely at incremental 90 degree angles. As they discussed this work in class, their approach became more fluid. They allowed the different pieces of the collage to commune based on lines within each image rather than based on an underlying XY grid. Ultimately, this broke the work out of expected conventions and elevated the artwork, infusing it with greater ambiguity, poetry, and visual interest.

Zacharie's final portfolio and sketchbook show the culmination of their artistic development over a few short weeks. The work is playful, rooted in imagery that is meaningful to Zacharie, and prepared with thoughtfulness. Zacharie spent a great deal of time considering the alchemy of alternative photographic processes -- how objects or images can be re-contextualized and infused with new meaning. Zacharie embraced this aspect of the class and flourished. Their contributions to our discussions were always kind, astute and open-minded. Many valuable discussions were prompted by Zacharie's observations and questions. It was truly a joy to work with Zacharie in Experimental Photography.

Straley, Zacharie T — A00425811

Last, First Middle — Student ID

SUGGESTED COURSE EQUIVALENCIES (in quarter hours) TOTAL: 8

8 - Alternative Process Photography

Straley, Zacharie T — A00425811
Last, First Middle — Student ID

January 2020 - June 2020: General Biology: Cells, Populations, and Ecosystems

32 Credits

DESCRIPTION:
Faculty: Lalita Calabria, Ph.D., Clarissa Dirks, Ph.D., Carri LeRoy, Ph.D. and Alison Styring, Ph.D.

This two quarter program provided students with an introductory overview of the five main areas of General Biology: (1) Evolutionary Biology - including Mendelian genetics, concepts important to understanding evolution including natural selection, genetic drift, and Hardy-Weinberg equilibrium, speciation and phylogenetics, an overview of major taxonomic groups, and the role of cellular processes such as mitosis and meiosis in reproduction and gene flow. (2) Diversity of Life - we provided a broad overview of the major lineages of life including: Bacteria, Archaea, Protists, Green Algae, Land Plants, Fungi, and Animals. (3) Introductory Ecology - including behavioral, population, community, ecosystems, and global ecology as well as concepts in conservation biology and Earth systems. (4) Animal Systems - including the placement of animals among eukaryotes, major taxonomic groups of animals, and key adaptations important to the radiation of major lineages. This also included an introduction to sensory systems, and a survey of the vertebrate central nervous system and sensory systems. (4) Cellular and molecular biology, particularly the study of biomolecules, the genetic code, transcription and translation, and gene expression. We also strongly emphasized learning of physiology by studying cellular respiration and photosynthesis. (5) Plant systems – including plant form, function and development, plant organs, cells and tissues, as well as plant sensory systems. Throughout the program, we paired the study of biology with Introductory Statistics (Statistics I), Pacific Northwest Natural History and Science Communication. The program used the *Biological Sciences, 6th Edition*, textbook by Scott Freeman. Students were evaluated according to criteria specified below in each component. Students completed some or all of the various parts of the program described below.

In winter quarter, biology lectures and workshops focused on the origins and diversity of life on earth with an emphasis on animals, key concepts essential to understanding evolutionary biology, and introductory principles of ecology. In spring quarter, the emphasis shifted towards learning cellular and molecular biology, as well as, plant structure and physiology.

Laboratory and field exercises were intended to deepen the understanding of concepts covered in lecture. Labs focused on the process of science in biology with a particular emphasis on experimental design, data collection, statistical analysis, and scientific communication. Winter quarter labs covered field methods, taxonomy, microscopy, spectroscopy and PNW natural history. In Spring quarter, labs were taught remotely due to COVID-19. We utilized simulations and independent home-based lab and field experiences covering restriction digestion, gel electrophoresis, bacteriology, plant anatomy and and reproduction. There were three, multi-part labs that took students through the process of scientific inquiry from data collection to interpretation of results and communication of findings. The exercises involved 1) the collection of microscopic meiofauna from moss samples, 2) the collection and analysis of stream water nitrate using spectroscopy, 3) seed bioassays assessing different wavelengths of light on germination. Students documented their work in the lab and field via a detailed and organized notebook and lab reports.

Weekly Statistics assignments in winter quarter involved hands-on work in a computer lab and the use of both Excel and JMP Pro 14 statistical software. Computer labs focused on statistical concepts, practical application of statistical methods to data collected in lab and field exercises, and other quantitative reasoning skills applied to biology. Students learned key concepts in understanding the central tendency, variation and spread of data, different variable types, and hypothesis testing. Specific hypothesis tests included t-tests, linear regression, analysis of variance (ANOVA) and chi-square analysis. Students

gained proficiency in the use of software for the purposes of creating effective data visualizations and interpreting patterns in nature.

In spring quarter, students learned about Pacific Northwest Natural History with an emphasis on plant identification and plant phenology. Students engaged in virtual plant walks and made weekly observations in a class *iNaturalist* project, an online citizen science tool for documenting biodiversity. The ability to sight recognize 25 native plants using scientific names was assessed through an online practical exam at the end of the quarter. Students also gained experience with analyzing and interpreting long-term phenological data sets utilizing an online visualization tool created by the National Phenology Network (NPN). Their learning was supported through a series of workshops and online discussions which culminated in a final report including data generated through NPN software, as well as, a reflective paper summarizing results from their class *iNaturalist* project.

At the end of each quarter students engaged in a self-directed research project. In winter, students completed independent projects that allowed them to delve into a topic in biology of their choice. Their assignment was to gather information on their topic from reputable resources including at least seven peer-reviewed research articles. In spring, In spring, students further engaged in learning the scientific process by reading scientific papers, completing graphing exercises, and learning data collection techniques. They also worked in groups to develop, execute, and present a field-based research project focusing on mollusk diversity and/or plant phenology. Through these assignments, students gained skills in data collection and analysis, finding reliable scientific information, synthesizing information from numerous sources, and communicating their research to an audience. Their learning was demonstrated through an annotated bibliography summarizing each source (winter only), a research paper and a five-minute Ignite-style presentation at the end of each quarter.

EVALUATION:
Written by: Lalita Calabria, Ph.D., Clarissa Dirks, Ph.D., Carri LeRoy, Ph.D. and Alison Styring, Ph.D.

It was a pleasure having Zacharie, who goes by Zach, in this program. Zach’s attendance and participation was excellent, which contributed overall to success in this program. Zach was committed to doing well and learning concepts and methods in General Biology, Statistics, Science Communication and Natural History. Zach’s engagement with the class material was commendable and his participation with others increased their enthusiasm for the material. Throughout two quarters, students read two to three chapters in the Freeman *Biological Science* textbook each week and answered all review questions at the back of each chapter. They turned in answers to these questions at the start of class each week. Zach was able to complete all of these assignments on time. Doing this regular work was a benefit to Zach's study of the material this quarter.

As assessed through weekly quizzes covering General Biology: Evolution and Ecology and Animal Physiology content, Zach consistently showed mastery of the material. This represents a strong ability to study a lot of material each week and receive high marks on quizzes often covering three chapters of content in General Biology. Zach consistently scored at the top of the class on quizzes. Zach did exceedingly well on quizzes in all content areas: evolutionary biology, introductory ecology, diversity of life on Earth, and animal systems. Zach's work in laboratory demonstrated effective application of knowledge and substantial learning in the area of animal systems and physiology. Zach's lab and field notebook was well-organized and reflected a considerable amount of work in lab, in the field, and follow-up work outside of class. Zach's final project focused on health benefits and research on psilocybin mushrooms. The presentation was well-organized and thought-provoking. Zach's annotated bibliography was of excellent quality and reflected a substantial amount of research on the topic including peer-reviewed journal articles.

Straley, Zacharie T — A00425811
Last, First Middle — Student ID

In the area of General Biology: Molecular Biology, Zach demonstrated an overall excellent comprehension of the concepts and skills presented as evidenced by work in online lectures and problem-solving sessions. Performance on online quizzes indicated that Zach had a very good understanding of the material in Molecular Biology. Zach turned in all assignments and was very engaged in learning the material. Zach showed strong enthusiasm for learning biology and worked very well with peers during workshops. Zach turned in all plant physiology assignments and demonstrated an overall good comprehension of the Plant Physiology concepts presented as evidenced by work in lectures, virtual labs and online quizzes. Zach turned in two of three plant physiology labs and two of three homework assignments.

Zach did strong work on statistics assignments in winter quarter. All assignments were completed on time and met or exceeded expectations. Zach went above and beyond expectations and attempted two statistics extension assignments to do advanced learning for extra credit. Zach did exceedingly strong work on assignments that involved dimensional analysis, manipulating data and formulas in Excel to calculate summary statistics, and hypothesis testing using Student's t-tests, linear regression, and ANOVA.

Zach completed nearly all of the required entries into our class iNaturalist project, which included high quality photographs and complete descriptions of vegetation and floral characteristics, as well as notation of phenological phases. Zach also completed formal peer reviews and helped to identify peers posts in iNaturalist to increase the quality of the observations in our class project. Zach's National Phenology Network plant phenology report and iNaturalist learning reflection showed a very good ability to analyze and interpret patterns in biodiversity datasets. Overall, it is clear that Zach utilized these online citizen science tools to deepen their understanding of natural history of the PNW. On the final sight identification exam, Zach demonstrated an excellent ability to sight identify 25 common native plants using scientific names.

Zach demonstrated excellent learning and engagement in Scientific Communication. Zach participated in seminars of primary literature about SARS-CoV-2 and COVID-19 biology. Zach completed several experimental design, graphing and data analysis assignments meant to improve understanding of the scientific process. As a culminating research experience, Zach engaged in a small group studying mollusk diversity and abundance in two different tree stands. Zach's team was tasked with both writing a scientific paper and developing an oral Ignite presentation on their research. It involved considerable time outside of class as well as collaboration and organization. Following faculty feedback, the group was able to revise their paper and significantly improve the manuscript to meet expectations for formatting, scientific analysis, content, and completion with at least 8 citations. The group gave a very good presentation of their work and Zach was an equal contributor.

Zach was a helpful, conscientious and hard-working student whom we enjoyed working with in the program

SUGGESTED COURSE EQUIVALENCIES (in quarter hours) TOTAL: 32

6 - General Biology: Ecology and Evolutionary Biology with Laboratory
4 - General Biology: Animal Systems and Physiology with Laboratory
6 - General Biology: Molecular and Cellular Biology
4 - General Biology Plant Systems and Physiology
3 - Pacific Northwest Natural History
4 - Introductory Statistics
5 - Scientific Communication

EVERGREEN

The Evergreen State College • Olympia, WA 98505 • www.evergreen.edu

EVERGREEN TRANSCRIPT GUIDE

Accreditation: The Evergreen State College is fully accredited by the Northwest Commission on Colleges and Universities.

Degrees Awarded: The Evergreen State College awards the following degrees: Bachelor of Arts, Bachelor of Science, Master of Environmental Studies, Master of Public Administration and Master In Teaching. Degree awards are listed on the Record of Academic Achievement.

Educational Philosophy:

Our curriculum places high value on these modes of learning and teaching objectives:

- Interdisciplinary Learning
- Collaborative Learning
- Learning Across Significant Differences
- Personal Engagement
- Linking Theory with Practical Applications

Our expectations of Evergreen Graduates are that during their time at Evergreen they will:

- Articulate and assume responsibility for their own work
- Participate collaboratively and responsibly in our diverse society
- Communicate creatively and effectively
- Demonstrate integrative, independent, critical thinking
- Apply qualitative, quantitative and creative modes of inquiry appropriately to practical and theoretical problems across disciplines, and,
- As a culmination of their education, demonstrate depth, breadth and synthesis of learning and the ability to reflect on the personal and social significance of that learning.

Our students have the opportunity to participate in frequent, mutual evaluation of academic programs, faculty and students. In collaboration with faculty and advisors, students develop individual academic concentrations.

Academic Program

Modes of Learning: Evergreen's curriculum is primarily team-taught and interdisciplinary. Students may choose from among several modes of study:

- **Programs:** Faculty members from different disciplines work together with students on a unifying question or theme. Programs may be up to three quarters long.
- **Individual Learning Contract:** Working closely with a faculty member, a student may design a one-quarter-long, full-time or part-time research or creative project. The contract document outlines both the activities of the contract and the criteria for evaluation. Most students are at upper division standing.
- **Internship Learning Contract:** Internships provide opportunities for students to link theory and practice in areas related to their interests. These full- or part-time opportunities involve close supervision by a field supervisor and a faculty sponsor.
- **Courses:** Courses are 2-6 credit offerings centered on a specific theme or discipline.

The numerical and alpha characters listed as Course Reference Numbers designate modes of learning and are in a random order.

Evaluation and Credit Award:

Our transcript consists of narrative evaluations. Narrative evaluations tell a rich and detailed story of the multiple facets involved in a student's academic work. A close reading of the narratives and attention to the course equivalencies will provide extensive information about student's abilities and experiences. Students are not awarded credit for work considered not passing. Evergreen will not translate our narrative transcript into letter or numeric grades.

Transcript Structure and Contents: The Record of Academic Achievement summarizes credit awarded, expressed in quarter credit hours. Transcript materials are presented in inverse chronological order so that the most recent evaluation(s) appears first.

Credit is recorded by:

Quarter Credit Hours:	Fall 1979 to present
Evergreen Units:	1 Evergreen Unit (1971 through Summer 1973) equals 5 quarter credit hours
	1 Evergreen Unit (Fall 1973 through Summer 1979) equals 4 quarter credit hours

Each academic entry in the transcript is accompanied by (unless noted otherwise):

- The Program Description, Individual Contract or Internship Contract which explains learning objectives, activities and content of the program, course or contract.
- The Faculty Evaluation of Student Achievement provides information on specific work the student completed and about how well the student performed in the program or contract.
- The Student's Own Evaluation of Personal Achievement is a reflective document written by the student evaluating his or her learning experiences. Students are encouraged but not required to include these documents in their official transcript, unless specified by faculty.
- The Student's Summative Self Evaluation is an optional evaluation summarizing a student's education and may be included as a separate document or as a part of the student's final self- evaluation.

Transfer credit for Evergreen programs, courses and individual study should be awarded based upon a careful review of the transcript document including the course equivalencies which are designed to make it easier for others to clearly interpret our interdisciplinary curriculum. These course equivalencies can be found at the conclusion of each of the Faculty Evaluation of Student Achievement.

The college academic calendar consists of four-eleven week quarters. Refer to the college website (www.evergreen.edu) for specific dates.

This record is authentic and official when the Record of Academic Achievement page is marked and dated with the school seal.
All information contained herein is confidential and its release is governed by the Family Educational Rights and Privacy Act of 1974 as amended.
If, after a thorough review of this transcript, you still have questions, please contact Registration and Records: (360) 867-6180.