Sabbatical Leave Report

A. Applicant

Name: Andrea Alexander

Department: Disability Resources Department

Type of Leave: Course Revision and Update

Leave Dates: Spring 2022

B. Purpose of Leave

DRD 390.3, Success at Work, is a course that is required in our College to Career Program. For my sabbatical, I revised and updated the course so that it fits in with the three-year cohort program as part of the second year instead of the third year. This included revising and updating the course activities and content. The activities were adjusted to reflect the second year of participation in the College to Career Program and are more individualized for students based on where they are in their career planning. The students enrolled in this program typically experience autism and/or Intellectual Disabilities and I assured that the materials and activities are accessible and meet their individual needs.

C. Objectives

All objectives are complete.

1. Revised and updated each Canvas module for this course to make sure that it is in line with the second-year experience of our College to Career students.
2. Reviewed and made recommendations to my department curriculum committee to update to the Course Outline of Record.
3. Revised the existing course calendar and associated lesson plans.

D. Narrative

The College to Career program is a three-year cohort program for students who experience autism or Intellectual Disabilities that focuses on preparing students for employment in their chosen field. Students move through the program as cohorts with the goal of employment at the completion of their third year. Previously, students took this course in the final semester of their third year of the program. This is inconsistent within the program as we are encouraging students to work prior to this class but many students need the material offered in this class prior to their job search. Moving this class to the second year has helped them to prepare for their job search

and then they still have one year in the program with support as they search for and find employment.

Objective 1: As a result of changing where it falls in the sequence of courses for this program, I reviewed and revised the materials used in each Canvas module (see attached) and updated materials so that they are relevant and appropriate to the stage of job search that students are in. I also added additional resources and materials to the Canvas modules as many students are already employed while some are just starting out. I added additional materials and resources so that it is relevant to students in various steps of their employment journey. This sabbatical gave me the opportunity to connect with additional agencies and other departments on campus and add their employment support information to Canvas as an additional resource for students in this class.

Objective 2: I revised and made recommendations for updating the Course Outline of Record to our department curriculum committee for changes that are in line with changing this course to the second year instead of the third. The department curriculum committee may forward recommendations to the District curriculum committee prior to the 2024/25 cycle when the COR is due to be reviewed and updated. I focused on the course objectives and activities and updated them to reflect the support that students need while enrolled in this course during their second year of the program.

Objective 3: Finally, I revised the course calendar and activities for this class (see attached). I also included guest speakers and information from other agencies that I collaborated with so that students have current up to date resources that will support them in their job search and placement for their third year of C2C.

E. Evaluation Summary

1. How did this sabbatical leave enhance my work performance at the college?

Having the time to update this course and revise how it falls within the sequence of courses in the College to Career program will better prepare the students in this program for employment and completion in this program. I previously was able to make adjustments each year after teaching it but we have completed ten years of the College to Career program and this allowed a more in-depth analysis at what the students need from this class so that they are getting what they need from the class. The sabbatical allowed me the time to delve into materials and collaborate with others to determine the most relevant content. It allowed me to re-design assignments and modules in Canvas that had been effective in the hopes that they will now be more meaningful for students. It also allowed me the time to take a step back and review how this course content can be woven into other required courses so that students are making meaningful connections with the material across courses throughout their three years in the program.

2. **How did this sabbatical leave benefit students in my discipline?**

This course is required for students in the College to Career program but is also open to other students in the college. All students taking this class will benefit from the updated resources and collaborations included in the new Canvas modules. College to Career students will also benefit by having this course offered in their second year so that they have additional support in their third year while they are actively engaging in their job search. I have also included additional collaboration with other College to Career support staff so that students are able to make those connections in their second year as they embark on their job search. The current cohorts started this program remotely due to Covid and they are used to doing everything remotely. While they developed important remote skills during that time they have not made the same interpersonal connections with support staff. Incorporating these resources into the class will help reinforce those relationships and give students the support that they need to succeed.

3. **How did this sabbatical leave benefit my department?**

My department benefits by having this course updated and revised so that this course is more closely aligned with our College to Career program goals.

4. **How did this sabbatical leave address the SRJC Strategic Plan and/or your department's education plan?**

This proposal addressed Goal A of the strategic plan by supporting student success and eliminating barriers for students in the College to Career Program. It addressed Goal B by engaging students in learner centered environments by providing current high quality course materials and activities for students to improve their engagement. It addressed Goal C by focusing on the unique needs of students with disabilities and the students in the College to Career program as well as providing relevant career education to meet student needs.

F. Abstract for Board Report Summary

Andrea Alexander updated and created new materials and activities for DRD 390.3 – Success at Work. This is a required course for our College to Career students who experience autism or Intellectual Disabilities. This sabbatical project resulted in revisions to the curriculum, updated modules and activities/materials, updated course calendar and additional collaborations and resources for support for students in the class. The project focused on updating the course materials so that they support students in their job search for gainful employment and their completion of the College to Career Program at Santa Rosa Junior College.

G. Appendices

- DRD 390.3 Course outline spring lesson plan schedule (pdf)
- Canvas screen shots of updated modules (pdf)
- DRD 390.3 course outlines changed recommended (pdf)
- DRD 390.3 syllabus spring (pdf)
- DRD 390.3 power point presentations for Sabbatical report (pdf)

Sabbatical Leave Report

A. Applicant

Name: (Michael) Shawn Brumbaugh

Department: Biological Sciences

Type of Leave: Project

Leave Dates: Fall 2022 (postponed from Fall 2021)

B. Purpose of Leave

Bio 2.2 is a lab intensive course that relies heavily on a lab manual written by a former instructor whose last major revision was in 2014. A substantial amount of information in this manual, particularly the taxonomy and cladistics, needs updating along with general editing and reorganization to better reflect the style and content emphasis of the current instructors.

Intent: To revise the Bio 2.2 (Evolution, Genetics & Zoology) lab manual to make it more 'user friendly' for students with updated information and better organization.

Overall Outcome: A revised lab manual that includes 1) updated information regarding the taxonomy and cladistics of select animal groups, and 2) editing and formatting that makes the journal more 'user friendly' for students.

C. Objectives

1. I completed drafts of eight chapters in the lab manual (provided in the Addendum). In reviewing my original proposal, I see that I poorly detailed my Objectives regarding the total number of chapters. My intent was to work on a total of eight chapters, six would be revisions of existing chapters and two would be new additions to the lab manual. Therefore, my Objective 2 was originally intended to be a subset of Objective 1. I detailed this more clearly in the Narrative section of the proposal. I apologize for any confusion and apparent inconsistency.

   Also, I originally proposed having each of these chapters be dedicated to a major animal group, but in consultation with the other Bio 2.2 instructor, I decided to prioritize one of these eight chapters to a significant revision of the Cladistics lab. Cladistics is the topic of the first lab, and because it establishes foundational terminology and concepts for understanding evolutionary relationships in future labs on animal diversity, we felt its revision was an immediate priority.

2. Of the eight chapter drafts submitted, three (not two) are new chapters:
    - *Amphibians*
    - *Reptiles – Lizards, Snakes, Turtles and Crocodilians*
    - *Reptiles – Dinosaur Evolution*.

    Amphibians were previously absent from the lab manual, and Reptiles had a very cursory introduction but lacked substantial information on the group. I also wrote an additional new chapter on dinosaur evolution that focuses on the evolution of features that ultimately led to modern birds and the development of flight. The chapter on *Birds* was then revised to focus specifically on bird anatomy, morphology, diversity, and the dynamics of flight.

The eight chapters are available to view in OneDrive along with the current Bio 2.2 Lab Manual to compare revisions and additions (see Appendices G)

D. Narrative

The current Bio 2.2 lab manual includes chapters dedicated to major animal groups that provide a general survey of animal diversity with an emphasis on evolution, morphology and anatomy.

Objective 1: I produced revised drafts for five (instead of six) existing chapters.
- Cladistics
- Hexapoda – Insects
- Amniote Evolution
- Reptiles – Birds (the Avian Dinosaurs)
- Synapsida - Mammals

Objective 2: I produced drafts for three (instead of two) 'new' chapters:
- Amphibians
- Reptiles – Lizards, Snakes, Turtles & Crocodilians
- Reptiles – Dinosaur Evolution (leading to Birds)

My initial proposal Objectives proposed the completion of six existing chapters and two new chapters. While the Chapter, *Reptiles – Dinosaur Evolution* is technically a new chapter in the manual, it began as a revision of the chapter on *Birds*. However, in addition to revising the material on birds, the information on dinosaurs needed considerable reorganization and content development to feature the sequence of evolutionary events that led to flight in birds. In the past, we delivered this information in a lecture to provide evolutionary context to birds, but I decided to develop this material as a separate chapter to guide students through the construction of an evolutionary tree that highlights the evolution of flight.

In writing these chapters, I reviewed the scientific literature and recently published texts for updated taxonomy and cladistics. I also reviewed numerous sources for images that illustrated information specified in the lab. This involved time on the computer searching for suitable material and reading at home in the company of my dog, but mostly this sabbatical gave me the

time to think, learn, and reflect in a way that is not possible while teaching and managing student needs.

E. Evaluation Summary

1. How did this sabbatical leave enhance my work performance at the college?

The revised and new chapters present updated information that otherwise needed to be added or corrected. There was a lot of "the manual notes this, but that has changed so now add this…". As I have modified my teaching and as a new instructor has joined the course, several of the labs have taken a new focus with different emphases. The revised and additional chapters better reflect the information stressed by myself and the other instructor of Bio 2.2 leading to better delivery of information.

2. How did this sabbatical leave benefit students in my discipline?

As an 'in-house' lab manual, students are provided with a thorough, yet inexpensive ($30) guide to the different lab topics and activities for the course. This manual was largely written by a former instructor in 2014 and reflect that individual's emphasis and 'voice.' Aligning the content and language that represents that of the current instructors clarifies and streamlines the delivery of information to students. Furthermore, students are being provided with updated information, especially regarding classification and evolutionary relationships among groups of animals, establishing foundational knowledge for future coursework. Some of this work resulted in the creation of revised cladograms (evolutionary trees) – simplified from the literature to be more accessible for students while still emphasizing the major trends. With many of these updates, I have included citations of scientific papers to reinforce the importance of identifying sources of information, ideally from peer-reviewed journals. I have also added numerous images that will help students identify specific features and visualize various organisms (especially those that are extinct!), giving them a deeper connection and understanding.

3. How did this sabbatical leave benefit my department?

I have provided the mentioned chapters to Dr. Kirsten Swinstrom, the other instructor for Bio 2.2, and we continue to discuss revisions. This is an ongoing process as Dr. Swinstrom is currently on sabbatical working on revisions in other chapters the course manual. From this year's work, we will make substantial improvements to the Bio 2.2 Lab Manual, a primary resource for this intensive lab-based course that is part of the biology major sequence for transfer.

4. How did this sabbatical leave address the SRJC Strategic Plan and/or your department's educational plan?

Bio 2.2 is a required course in our biology majors program and needed for student transfer into biology programs at four-year colleges. The foundational skills that students develop in this

course, particularly many of the skills gained in lab, are instrumental for their academic and professional success upon transfer and beyond into graduate and professional programs in biology. A goal of the SRJC Strategic Plan is to Foster Learning and Academic Excellence by "implement[ing] responsive instructional practices that increase the learning and success of our diverse students." Furthermore, effective lab activities can be particularly important in "engag[ing] and spark[ing] intellectual curiosity in learner-centered environments," another goal of the SRJC Strategic Plan. The revised and additional chapters produced during my sabbatical will improve the accessibility of information and strengthen foundational skills developed in a lab setting to further student success in future academic pursuits upon transfer.

F. Abstract for Board Report Summary

Shawn Brumbaugh, an instructor in the Biological Sciences, spent his Fall 2022 sabbatical (rescheduled from Fall 2021) revising the lab manual for Bio 2.2 - Evolution, Genetics & Zoology, a required course in the biology majors sequence that is needed for transfer into many four-year college biology programs. The sabbatical project allowed Shawn to update the classification and evolutionary relationship of many major animal groups covered in this introductory zoology course, and to incorporate this information into the lab manual along with new content and organizational improvements. Shawn's revisions and new chapter additions align the content of the lab manual to current knowledge reflected in the scientific literature and contribute to a more effective lab experience for students, thereby advancing SRJC's Strategic Plan: to Support Student Success, Foster Learning and Academic Excellence.

G. Appendices

The eight chapters can be found in my OneDrive Folder: Brumbaugh_S_021023_SabRpt_Appendices. I have also provided the current Bio 2.2 Lab Manual to reference for chapter revisions and additions.

Brumbaugh_S_021023_SabRpt_Appendices

https://srjc-my.sharepoint.com/:f:/g/personal/mbrumbaugh_santarosa_edu/Erth6TraeORIjvrGYmJryHABjS5eMMJXC4Mew6vYqIjeeA?e=lZOyPi

1. Cladistics
2. Hexapoda – Insects
3. Amniote Evolution
4. Amphibians
5. Reptiles – Lizards, Snakes, Turtles & Crocodilians
6. Reptiles – Dinosaur Evolution (leading to Birds)
7. Reptiles – Birds (the Avian Dinosaurs)
8. Synapsida - Mammals

9. Bio 2.2 Lab Manual_Spring 2023.pdf

Sabbatical Leave Report

A. Applicant

Name: Canon Crawford

Department: Learning and Information Resources

Type of Leave: Independent Study

Leave Dates: Spring 2022

B. Purpose of Leave

I investigated information literacy instruction trends that are related to librarian teaching in a community college setting. Information literacy is routinely described as a set of skills that includes articulating information needs and fulfilling them through research and synthesis. I examined current perceptions of information literacy, sometimes referred to as information literacy frameworks, and discovered instructional approaches that are well suited to community college settings. This research identified how trends in information literacy instruction fit within the community college curricula and offered ideas about adapting them for instruction at Santa Rosa Junior College.

C. Objectives

1. Performed a literature review that focuses on trending practices in information literacy instruction and the connection to the community college curricula. The literature review is included as Appendix 1., Four Trends Impacting Information Literacy Instruction in Community Colleges.
2. Organized the findings of the literature review to support the design of instructional materials and assignments for *LIR 10: Introduction to Information Literacy* at Santa Rosa Junior College. The instructional materials are included as Appendix 2., Developing Assignments for *LIR 10: Introduction to Information Literacy*.

D. Narrative

Objective 1: I conducted a literature review that included scholarly publications, professional organizations, and community college resources to identify trending practices in information literacy instruction. I also attended one online conference focused on the evolving perception of information literacy instruction. My literature review summarized four key trends to consider in the community college setting: innovation in information literacy instruction, open pedagogy, critical information literacy, and digital literacy.

Objective 2: Within the literature review I discussed the design of interactive participation assignments in an online course. I consequently designed six assignments for *LIR 10:*

Introduction to Information Literacy. I suggested two digital apps, *Padlet* and *Hypothes.is*, to incorporate in synchronous or online asynchronous modalities. These digital apps are flexible to accommodate a range of brainstorming and evaluative practices in the context of interactive participation assignments. I implemented several *Padlet* and *Hypothes.is* assignments during Fall Semester 2022 after completion of development.

First Activity - Analysis of Information Literacy Models: I reviewed conceptions of information literacy and discovered a variety of perceptions in the academic literature.

Second Activity - Organizational Reports: I reviewed reports and other publications from professional and academic organizations such as the *Association of College & Research Libraries* (ACRL). The ACRL is prolific in terms of offering professional guidance through publications, continuing education opportunities and conferences.

Third Activity - Conference Attendance: On May 13, 2022, I attended the *California Conference on Library Instruction* entitled, "Engaging in Speculative Pedagogy: Reimagining Library Futures with Creative Foresight." Several presentations were key in prompting me to study participation assignments within an online, asynchronous course and develop opportunities for students to interact with each other while engaging research projects.

Fourth Activity - Extensive Survey of Academic Literature: I utilized online research tools including *The Library Literature & Information Science Full Text* database, advanced web searches and citation analysis. Once I established themes, I focused on information literacy in a community college setting.

Fifth Activity - Completion of the Literature Review: After completing the research, I summarized the findings in a report format with a Works Cited. Please refer to Appendix 1., Four Trends Impacting Information Literacy Instruction in Community Colleges.

Sixth Activity - Development of the Course Materials: I developed six assignments with notes about instructions and assessment using two "apps" that can be embedded in Canvas. Please refer to Appendix 2, Developing Assignments for *LIR 10: Introduction to Information Literacy*.

E. Evaluation Summary

1. How did this sabbatical leave enhance my work performance at the college?

My literature review has provided me with extensive knowledge of information literacy theory and practice within the context of community colleges. In particular, I have taken modality into consideration when designing materials and assignments for online asynchronous, online synchronous and hyflex sections of *LIR 10: Introduction to Information Literacy*.

2. How did this sabbatical leave benefit students in my discipline?

I have incorporated external online apps, *Padlet* and *Hypothes.is,* into the Canvas LMS to support student engagement in an online, asynchronous section of *LIR 10: Introduction to Information Literacy*. *Padlet* offers an important function for an online, asynchronous information literacy course. Anonymous brainstorming exercises free students to focus on ideas and not perception of them. *Hypothes.is* offers social annotation within an embedded Canvas

app. Student discussion of ideas in texts provide opportunities for review of information sources. Social annotation can also be applied to thematic readings such as the role of algorithms, cost of information in the context of the textbook industry and also mis/disinformation.

3. How did this sabbatical leave benefit my department?

I distributed my literature review and assignment ideas to faculty in my department. The literature review is designed to provide a path to learning more about issues and trends in information literacy across community colleges. I summarized four trends that influenced my design of new participation assignments. The assignments and instructional materials are built around two online apps, *Padlet* and *Hypothes.is.* A demonstration of the apps took place during my Sabbatical presentation, and I will provide additional demonstrations upon request.

4. How did this sabbatical leave address the SRJC Strategic Plan and/or your department's educational plan?

My department's mission statement emphasizes student-centered learning, critical thinking and intellectual discovery. The use of two apps, *Padlet* and *Hypothes.is*, in an online, asynchronous course provide students with options to exchange ideas and interact with sources in critical and creative ways. Anonymous brainstorming exercises reveal possibilities through sharing, and social annotation offers engagement with sources.

F. Abstract for Board Report Summary

Canon Crawford reviewed and identified trending instructional practices in teaching information literacy at community colleges. He summarized relevant findings from the literature review to support the design of materials and assignments for *LIR 10: Introduction to Information Literacy* at Santa Rosa Junior College. The findings, which are outlined in a report with cited references and examples of information literacy instruction materials and practices, have been published for access by all faculty in the department. Canon presented to the Library and Information Resources department for discussion of information literacy and curriculum development.

G. Appendices

1. Four Trends Impacting Information Literacy Instruction in Community Colleges
2. Developing *Padlet* and *Hypothes.is* Assignments for *LIR 10: Introduction to Information Literacy*

Sabbatical Leave Report

A. Applicant

Name: Mark Ferguson

Department: Mathematics Department

Type of Leave: Research with Course Material Development

Leave Dates: Fall Semester, 2022, August through December

B. Purpose of Leave

In addition to revitalization of my mind and body, I was able to improve math department materials related to mathematics and applications that rely heavily on three-dimensional graphics and integration with antiderivatives. I generated a library of interactive, three-dimensional computer graphics and guidelines to assist students who take and instructors who teach (primarily) Math 1B and Math 1C.

C. Objectives

1. Researched current software options for students and instructors to easily access mathematical graphics library/guidelines.
2. Developed the graphics library/graphics guidelines using CAS (computer algebra software).
3. Posted and advertised graphics library/ graphics guidelines throughout the SRJC math department.
4. Generated and distributed a "user's guide" to share with instructors so that they may share it with their students.

D. Narrative

1. *Objective 1: Researched current software options for students and instructors to easily access mathematical graphics library/guidelines*. This research lasted only about three weeks as the bulk of the work involved constructing the library. The research was done online and through trials, although it was helpful to survey a number of other mathematics faculty as to their computer algebra software preferences. I researched factors such as cost, accessibility, ease of use, and compatibility of each computer algebra system. Maple Computer Algebra Software was chosen because it excelled with these factors and because of its superior graphics, user interface, and "Maple Cloud," which turned out to be an integral part of the entire project.

2. *Objective 2: Developed the graphics library/guidelines using CAS (computer algebra software)*. Once the software was selected, building the library began. This step took most of the time—about three months—because there were many graphics that were created to build the library. Each graphic was inspired by an exercise from our current calculus textbook: Calculus, Early Transcendentals by James Stewart, Eighth Edition (inspired is key, so that if our textbook or edition changes, the graphics library will still be usable). Each graphic hits on a relevant and important calculus topic and is in color and moveable (moveable in the sense that the user is able to grab the graphic and turn it to a useful vantage point, for their particular perspective/application). Each graphic includes a reference to the text (chapter, section, exercise number), a date stamp, and any necessary notes or credits. It was necessary to organize the library—in order of topics matching our text order of topics and available on the Maple Cloud—so that the graphics are readily available for the students and instructors and listed in an expected, common order. Furthermore, the graphics were produced in order in which they occur in the text to preserve the "developmental" progression of the mathematical topics in the text.

   During the graphic library building process, notes were taken and an outline was developed for the guidelines. The guidelines for each graphic were fully developed once the entire graphic library was ready for use. These guidelines, categorized with each graphic, by topic, include brief descriptions that tie the graphic to the exercise topic. The guidelines are intended to help users appropriately "use" each graphic for each associated exercise. The goal of these guidelines is not to answer the specific question from the exercise, rather it's to enhance each graphic with a few sentences that might tie the exercise to the graphic and deepen the learning experience for the student.

3. *Objective 3: Posted and advertised graphics library/graphics guidelines throughout the SRJC math department*. When I returned from my sabbatical, I originally thought it would be necessary to collaborate with our website builders to post/incorporate the graphics library/graphics guidelines into (a convenient location) on our Mathematics Department website. It turned out to be more efficient and more easily accessible to post the graphics library/graphics guidelines on my Faculty Profile site, under "Links," on the SRJC website, and notify instructors of this location via email. This step took 2-3 weeks and began during the previous step. Advertising occurred electronically, at department meetings, through email to my students, and around the department offices (posted flyers of the "user's guide" (see Objective 4)) on doors and bulletin boards). I have made myself available to present/inform, in person and in the classroom, to calculus instructors and their students, and have also offered to create additional graphics—associated with calculus exercises—upon request.

4. *Objective 4: Generated and distributed a "user's guide" to share with instructors so that they may share it with their students*. The user's guide is intended to be a guide on where/how to access the graphics (as opposed to the graphics guidelines, from Objective 3, which are intended to help users appropriately "use" the graphics for each associated exercise). It was developed after the graphics library/graphics guidelines were developed and integrated into my Faculty Profile on the SRJC website. The user's guide took less than a week to develop. The user's guide is posted in our department; provided to my students,

and was emailed to our department faculty within the first few weeks of Spring Semester 2023.

E. Evaluation Summary

1. How did this sabbatical leave enhance my work performance at the college? The graphics library/graphics guidelines have already provided me extra resources to teach Math 1C more efficiently, and I expect the same in Math 1A and Math 1B. The extra time saved—from not having to explain why an equation can be visualized in a specific way—and the deeper understanding achieved from the visual tied to the mathematics, has allowed me to spend my class time and energy on other important applications or discussions. In addition, spending the time to analyze the mathematics of these surfaces, from building the graphics library using that math, has allowed me to learn about—in a deeper way than usual—the mathematics, how I can better reach my students, and the new technology and software that is available today.

2. How did this sabbatical leave benefit students in my discipline? It is commonplace for students, studying mathematics and applications that rely heavily on three-dimensional graphics and integration with antiderivatives, to have insufficient resources to visualize three-dimensional regions, curves, and surfaces. The graphics from the graphic library and the graphics guidelines have already assisted students in Math 1C—and I expect the same in Math 1A and Math 1B—in visualizing three-dimensional mathematical functions and surfaces.

3. How did this sabbatical leave benefit my department? The graphics library/graphics will allow mathematics instructors who use the library to teach (primarily) Math 1B and Math 1C more efficiently. The extra time saved—from not having to explain why an equation can be visualized in a specific way—will allow instructors to spend their energy on other important applications.

4. How did this sabbatical leave address the SRJC Strategic Plan and/or your department's educational plan? The project promoted diverse teaching/learning experiences in our math classrooms and improved accessibility to students or instructors with little experience with computer algebra software, or to those who struggle to visualize three-dimensional regions, curves, and surfaces.

F. Abstract for Board Report Summary

Mark Ferguson developed a library of interactive, three-dimensional computer graphics and accompanying guidelines to assist students who enroll in, and instructors who teach, calculus at

SRJC. The proposed graphics library/graphics guidelines are intended to promote diverse teaching/learning experiences in our math classrooms and improve accessibility to students or instructors who have little experience with computer algebra software, and to help those who struggle visualizing three-dimensional regions, curves, and surfaces. Mark's project involved: 1) Researching current software options for students and instructors that would allow them to easily access a mathematical graphics library with accompanying graphics guidelines, 2) Developing the graphics library/graphics guidelines using the CAS (computer algebra software) chosen in (1), 3) Posting and advertising the graphics library/graphics guidelines in the SRJC math department, and 4) Developing and distributing a graphics library user's guide to share with instructors so that they may better share the library with their students.

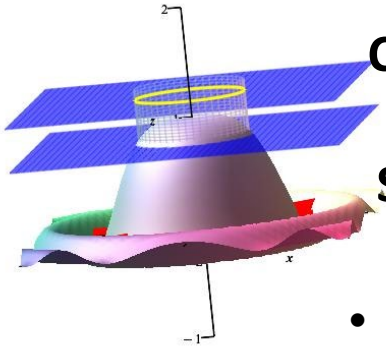
G. Appendices

I. Appendix 1: Users Guide

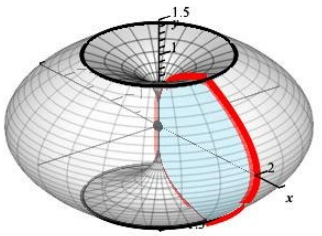
(see next page)

Attention SRJC Calculus Instructors and Students

You are welcome to use and have free access to a



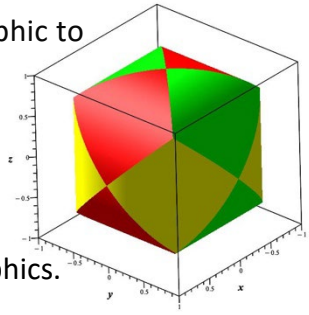
Calculus (Maple) 3D Graphics Library for Select Stewart Calculus Exercises in:



- **MATH 1A, First Semester Calculus, Stewart Chapter 6**
- **MATH 1B, Second Semester Calculus, Stewart Chapters 8, 12, and 13**
- **MATH 1C, Third Semester Calculus, Stewart Chapters 14, 15, and 16**

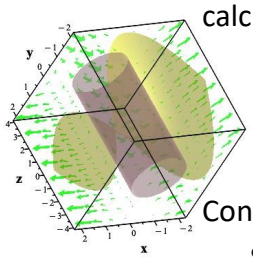
To access these graphics on the SRJC Website:

1. Find Mark Ferguson's Faculty Profile: https://profiles.santarosa.edu/mark-ferguson.
2. Click on the "Links" tab.
3. Scroll down to the exercise from our Stewart Calculus text and click on the graphic to view.



Note:

- The files are ordered in the same way as the Stewart Calculus topics.
- All you need is a browser; it's not necessary to have Maple to view these graphics.
- Zoom in or out or move the graphic to find a different view.
- Use on computers, tablets, or smartphones with Internet access.
- Graphics were developed to help students gain a deeper understanding of select calculus topics.



Click on any one of the available exercises to see a moveable Maple graphic and brief guide associated with that exercise.

Contact Mark Ferguson, mferguson@santarosa.edu:

- If you have questions, concerns, corrections to the posted graphics
- If you would like to see a graphic related to a different exercise or topic

- If you would like a Word document with a list of the graphics and a guide to each

II. Appendix 2: Graphics Guidelines

Calculus (Maple) Graphics Library for Select Stewart Calculus Exercises

(Click on any exercise to see a moveable Maple graphic and brief guide associated exercise with that exercise.)

Click this link for a Word document of the Maple graphics library with brief guide to each exercise.

SRJC Course: MATH 1A, First Semester Calculus, Stewart Chapter 6

Solids of Revolution (volume)

§6.2, #10, Stewart Calculus 8th

In exercise 10 from section 6.2 you are asked to find the volume of the solid obtained by rotating a region about the y-axis. This graphic illustrates the solid of revolution. The light blue region inside the gray solid "generates" the solid of revolution by "sweeping once around" the y-axis. The red curves are segments of the curves given in exercise 10. Move the image to see it from different perspectives.

§6.2, #14, Stewart Calculus 8th

In exercise 14 from section 6.2 you are asked to find the volume of the solid obtained by rotating a region about the line y = -1. This graphic illustrates the solid of revolution. The light blue region inside the gray solid "generates" the solid of revolution by "sweeping once around" the line y = -1. Two of the red curves are segments of the curves given in exercise 14; the third is included to compete the boundary of the blue region. Move the image to see it from different perspectives.

SRJC Course: MATH 1B, Second Semester Calculus, Stewart Chapters 8, 12, and 13

Surface (area) of Revolution

§8.2, #10, Stewart Calculus 8th

In exercise 10 from section 8.2 you are asked to find the area of the surface obtained by rotating a curve about the x-axis. This graphic illustrates the surface of revolution. The red curve "generates" the surface of revolution by "sweeping once around" the x-axis. Move the image to see it from different perspectives.

§8.2, #16, Stewart Calculus 8th

In exercise 16 from section 8.2 you are asked to find the area of the surface obtained by rotating a curve about the y-axis. This graphic illustrates the surface of revolution. The red curve "generates" the surface of revolution by "sweeping once around" the y-axis. Move the image to see it from different perspectives.

Area and Volume with Cross Product

§12.4, #28, Stewart Calculus 8th

In exercise 28 from section 12.4 you are asked to find the area of the parallelogram given four vertices. This graphic illustrates the parallelogram in space, along with the four (red) vertices. Move the image to see it from different perspectives.

§12.4, #36, Stewart Calculus 8th

In exercise 36 from section 12.4 you are asked to find the volume of the parallelepiped given four vertices (that create three adjacent edges). This graphic illustrates the parallelepiped in space, along with three vectors that generate the parallelepiped. Move the image to see it from different perspectives.

Lines and Planes

§12.5, #13, Stewart Calculus 8th

In exercise 13 from section 12.5 you are asked to determine if two lines are parallel. This graphic illustrates the two lines in space; the blue line is the line incident with the (red) points (-4,-6,1) and (-2,0,-3) and the green line is the line incident with the (red) points (10,18,4) and (5,3,14). Move the image to see it from different perspectives.

§12.5, #14, Stewart Calculus 8th

In exercise 14 from section 12.5 you are asked to determine if two lines are perpendicular. This graphic illustrates the two lines in space; the blue line is the line incident with the (red) points (-2,4,0) and (1,1,1) and the green line is the line incident with the (red) points (2,3,4) and (3,-1,-8). Move the image to see it from different perspectives.

§12.5, #40, Stewart Calculus 8th

In exercise 40 from section 12.5 you are asked to find the equation of a plane that passes through the line of intersection of two planes and is perpendicular to a third plane. This graphic illustrates the three planes and the line of intersection in space; the blue and green planes intersect along the red line and the plane you are searching for is perpendicular to the yellow plane. Move the image to see it from different perspectives.

Cylinders and Quadric Surfaces

§12.6, #40, Stewart Calculus 8th

In exercise 40 from section 12.6 you are asked to use a computer with three-dimensional graphing software to graph the surface. This graphic illustrates the surface (in red). Move the image to see it from different perspectives.

§12.6, #42, Stewart Calculus 8th

In exercise 42 from section 12.6 you are asked to use a computer with three-dimensional graphing software to graph the surface. This graphic illustrates the surface (in blue). Move the image to see it from different perspectives.

§12.6, #52, Stewart Calculus 8th

In exercise 52 from section 12.6 you are asked to show that the curve of intersection of two surfaces lies in a plane. This graphic illustrates the two surfaces (one blue and the other green) along with the yellow curves of intersection (of the blue and green surfaces) and the red plane in which the yellow curves are embedded. Move the image to see it from different perspectives.

Vector Functions with Space Curves

§13.1, #5, Stewart Calculus 8th

In exercise 5 from section 13.1 you are asked to find the limit. This graphic illustrates the space curve (blue) and an arrow (red) pointing at the suspected limit, if it exists. Move the image to see it from different perspectives.

§13.1, #43, Stewart Calculus 8th

In exercise 43 from section 13.1 you are asked to find a vector function that represents the curve of intersection of the two surfaces. This graphic illustrates the cone (blue), the plane (yellow), and the curve of intersection (red). Move the image to see it from different perspectives.

§13.1, #46, Stewart Calculus 8th

In exercise 46 from section 13.1 you are asked to find a vector function that represents the curve of intersection of the two surfaces. This graphic illustrates the semi-ellipsoid (blue), the cylinder (yellow), and the curve of intersection (red). Move the image to see it from different perspectives.

§13.1, #49, Stewart Calculus 8th

In exercise 49 from section 13.1 you are asked to determine if the two particles collide. This graphic illustrates the space curve r[1] (blue), the space curve r[2] (green), and an arrow (red) pointing at a suspected point of collision or point where the paths intersect. Move the image to see it from different perspectives.

§13.1, #50, Stewart Calculus 8th

In exercise 50 from section 13.1 you are asked to determine if the two particles collide or if their paths intersect. This graphic illustrates the space curve r[1] (blue), the space curve r[2] (green), and arrows (red) pointing at a suspected points of collision or points where the paths intersect. Move the image to see it from different perspectives.

Calculus with Vector Functions

§13.2, #20, Stewart Calculus 8th

In exercise 20 from section 13.2 you are asked to find the unit tangent vector at a specified point. This graphic illustrates the vector function (blue), the unit tangent vector (green), and the point (red). Move the image to see it from different perspectives.

§13.2, #26, Stewart Calculus 8th

In exercise 26 from section 13.2 you are asked to find parametric equations for the tangent line to the given curve at a specific point. This graphic illustrates the vector function (blue), the tangent line (green), and the specific point (red). Move the image to see it from different perspectives.

§13.2, #27, Stewart Calculus 8th

In exercise 27 from section 13.2 you are asked to find a vector equation for the tangent line to the curve of intersection of two cylinders at the point (3,4,2). This graphic illustrates the curves of intersection (blue), the tangent line (green), the point (3,4,2) (red), and the two cylinders (yellow is symmetric about the z-axis; pink is symmetric about the x-axis). Move the image to see it from different perspectives.

TNB Vectors and Planes

§13.3, #14, Stewart Calculus 8th

In exercise 14 from section 13.3 you are asked to find the arc length function for a curve measured from the point (0,1, "sqrt (2)") and then find a point along the curve that is 4 units (along the curve) from (0,1, "sqrt(2)"). This graphic illustrates the vector function (blue), the point (0,1, "sqrt(2)") (red), and the point that is 4 units (along the curve) from (0,1, "sqrt(2)") (green). Move the image to see it from different perspectives.

§13.3, #48, Stewart Calculus 8th

In exercise 48 from section 13.3 you are asked to find the unit tangent, normal, and binormal vectors of a vector function at a specified point. This graphic illustrates the vector function (blue), the unit tangent vector (green), the unit normal vector (yellow), the unit binormal vector (brown), and the point (red). Move the image to see it from different perspectives.

§13.3, #50, Stewart Calculus 8th

In exercise 50 from section 13.3 you are asked to find the equations of the normal plane and the osculating plane of a curve at a specified point. This graphic illustrates the curve (blue), the unit tangent vector (green), the unit normal vector (yellow), the unit binormal vector (brown), the normal plane (gray), the osculating plane (pink),and the point (red). Move the image to see it from different perspectives.

Calc. App. and TN Comp. of Acc. Vector

§13.4, #28, Stewart Calculus 8th

In exercise 28 from section 13.4 you are asked to asked to determine if a baseball goes over the center field fence after a batter hits the baseball. This graphic illustrates the path of the baseball (blue), the initial velocity vector when the ball is hit (green), the point that indicates where the bat made contact with the ball (red), and the home run fence (yellow). Move the image to see it from different perspectives.

§13.4, #40, Stewart Calculus 8th

In exercise 40 from section 13.4 you are asked to asked to find the tangential and normal components of the acceleration vector. This graphic illustrates, at time t=0 (giving the (red) point (0,2,1)), the position vector function (blue), the unit tangent vector (green), the unit normal vector (yellow), the acceleration vector (brown), and the tangential and normal components of the acceleration vector (black line segments beginning at the point (0,2,1) along the unit tangent and unit normal vectors that are the lengths of the tangential and normal components, respectively, of the acceleration vector). Move the image to see it from different perspectives.

SRJC Course: MATH 1C, Third Semester Calculus, Stewart Chapter 14

Multivariable Functions with Level Curves and Surfaces

§14.1, #6, Stewart Calculus 8th

In exercise 6 from section 14.1 you are asked to check to see how closely a wind-chill model fits data given in Table 1 from Example 2 in section 14.1. This graphic illustrates the model in a reasonable window for the data in the table. The origin is in black. Move the image to see it from different perspectives.

§14.1, #6 with Contour Map, Stewart Calculus 8th

In exercise 6 from section 14.1 you are asked to check to see how closely a wind-chill model fits data given in Table 1 from Example 2 in section 14.1. This graphic illustrates

1. The function (purple) with horizontal traces that, when viewed from the positive z-direction, resembles a contour map.

2. Horizontal traces without the function that, when viewed from the positive z-direction, resemble a contour map.

The origin is in black. Move the image to see it from different perspectives.

§14.1, #22, Stewart Calculus 8th

In exercise 22 from section 14.1 you are asked to find and sketch the domain of the function. This graphic illustrates

1. The domain of the function (top illustration, all points that are strictly inside the red surface are in the domain of the function).

2. Three level surfaces of the function (bottom illustration, the level surfaces are the yellow, green, and blue ellipsoids in space, but this illustration has the "top" of the ellipsoids cut away in order to see all three).

The origin is in black. Move the image to see it from different perspectives.

§14.1, #52, Stewart Calculus 8th

In exercise 52 from section 14.1 you are asked to draw a contour map of the function showing several level curves. This graphic illustrates

1. The function (top illustration, in purple) with horizontal traces that, when viewed from the positive z-direction, resembles a contour map.

2. Horizontal traces without the function (bottom illustration) that, when viewed from the positive z-direction, resemble a contour map.

The origin is in black. Move the image to see it from different perspectives.

§14.1, #54, Stewart Calculus 8th

In exercise 54 from section 14.1 you are asked to sketch both a contour map and a graph of the function and compare them. This graphic illustrates

1. The function (purple) with horizontal traces that, when viewed from the positive z-direction, resembles a contour map.

2. Horizontal traces without the function that, when viewed from the positive z-direction, resemble a contour map.

The origin is in black. Move the image to see it from different perspectives.

§14.1, #70, Stewart Calculus 8th

In exercise 70 from section 14.1 you are asked to describe the level surfaces of the function. This graphic illustrates four level surfaces of the function.

The origin is in black. Move the image to see it from different perspectives.

Limits for Functions of Two Variables

§14.2, #10, Stewart Calculus 8th

In exercise 10 from section 14.2 you are asked to find the limit, if it exists, or show that the limit does not exist. This graphic illustrates the function (yellow) and three different paths (red) in the xy-plane to the (x,y) point at which your investigating the limit ((x,y) is going to (0,0)).

The point (0,0,0) is in blue (note that z = 0 is not necessarily the limit).

The origin is in black (only blue will show if (x,y) is going to (0,0)). Move the image to see it from different perspectives.

§14.2, #11, Stewart Calculus 8th

In exercise 11 from section 14.2 you are asked to find the limit, if it exists, or show that the limit does not exist. This graphic illustrates the function (yellow) and three different paths (red) in the xy-plane to the (x,y) point at which your investigating the limit ((x,y) is going to (0,0)).

The point (0,0,0) is in blue (note that z = 0 is not necessarily the limit).

The origin is in black (only blue will show if (x,y) is going to (0,0)). Move the image to see it from different perspectives.

§14.2, #12, Stewart Calculus 8th

In exercise 12 from section 14.2 you are asked to find the limit, if it exists, or show that the limit does not exist. This graphic illustrates the function (yellow) and four different paths (red) in the xy-plane to the (x,y) point at which your investigating the limit ((x,y) is going to (1,0)).

The point (1,0,0) is in blue (note that z = 0 is not necessarily the limit).

The origin is in black. Move the image to see it from different perspectives.

§14.2, #13, Stewart Calculus 8th

In exercise 13 from section 14.2 you are asked to find the limit, if it exists, or show that the limit does not exist. This graphic illustrates the function (yellow) and three different paths (red) in the xy-plane to the (x,y) point at which your investigating the limit ((x,y) is going to (0,0)).

The point (0,0,0) is in blue (note that z = 0 is not necessarily the limit).

The origin is in black (only blue will show if (x,y) is going to (0,0)). Move the image to see it from different perspectives.

§14.2, #42, Stewart Calculus 8th

In exercise 42 from section 14.2 you are asked to use polar coordinates to confirm the value of the limit and then graph the function. This graphic illustrates the function (pink) and three different paths (red) in the xy-plane to the (x,y) point at which your investigating the limit ((x,y) is going to (0,0)). Also, the yellow circle in the xy-plane represents a "delta ring" (the two other yellow circles are intended you remind you where the "delta ring is) while the two blue planes represent an "epsilon range" (from "minus epsilon" up to "plus epsilon").

The point (0,0,0) is in blue (note that z = 0 is not necessarily the limit).

The origin is in black (only blue will show if (x,y) is going to (0,0)). Move the image to see it from different perspectives.

Partial Derivative and Tangent Line Illustrations

§14.3, #11, Stewart Calculus 8th

In exercise 11 from section 14.3 you are asked to find two partial derivatives, interpret, and illustrate. This graphic illustrates the function (gray), curves (black) that are incident with the surface (one curve is where x=1 is constant and the other curve is where y=2 is constant) and go through the point (1,2,8), and two tangent lines--a green tangent where y is constant at 2 and a blue tangent where x is constant at 1 (both go through the point (1,2,8)).

The point (1,2,8) is in red and is the ordered triple when x=1 and y=2.

The origin is in black. Move the image to see it from different perspectives.

§14.3, #20, Stewart Calculus 8th

In exercise 20 from section 14.3 you are asked to find two partial derivatives. This graphic illustrates

1. (Top) The function (gray) with the partial derivative function (with respect to x) in yellow.

2. (Bottom) The function (gray) with the partial derivative function (with respect to y) in green.

The origin is in black. Move the image to see it from different perspectives.

§14.3, #82, Stewart Calculus 8th

In exercise 82 from section 14.3 you are asked to find the rate of change of temperature with respect to distance at the point (2,1) in the x-direction and the y-direction. This graphic illustrates the function (gray), curves (black) that are incident with the surface (one curve is where x=2 is constant and the other curve is where y=1 is constant) and go through the point

(2,1,10), and two tangent lines--a green tangent where y is constant at 1 and a blue tangent where x is constant at 2 (both go through the point (2,1,10)).

The point (2,1,10) is in red and is the ordered triple when x=2 and y=1.

The origin is in black. Move the image to see it from different perspectives.

Tangent Planes, Linear Approximations, and Differentiability

§14.4, #6, Stewart Calculus 8th

In exercise 6 from section 14.4 you are asked to find the equation of the tangent plane to the given surface at the specified point. This graphic illustrates the surface (gray), tangent plane (blue), and the point for which the plane is tangent to the surface (red). In addition, the tangent line relative to the partial derivative with respect to x (the green line) and the tangent line relative to the partial derivative with respect to y (the yellow line) are embedded in the blue plane. Recall that the tangent plane is generated by the set of all tangent lines to the surface at the (red in our example) point.

The origin is in black. Move the image to see it from different perspectives.

§14.4, #16, Stewart Calculus 8th

In exercise 16 from section 14.4 you are asked to explain why the function is differentiable at the given point, and to find the linearization of the function at that point. This graphic illustrates the surface (gray), tangent plane (blue), and the point for which the plane is tangent to the surface (red).

The origin is in black. Move the image to see it from different perspectives.

§14.4, #20, Stewart Calculus 8th

In exercise 20 from section 14.4 you are asked to find the linear approximation of the function and use it to approximate f(1.02,0.97). This graphic illustrates the surface (wire frame), tangent plane (blue), the point for which the plane is tangent to the surface (red), and the point on the tangent plane (1.02, 0.97, the approximation for f(1.02, 0.97)), in green.

Directional Derivative and Gradient Vector

§14.6, #12, Stewart Calculus 8th

In exercise 12 from section 14.6 you are asked to asked to find the directional derivative of the function at the given point. This graphic illustrates the unit direction vector in the xy-plane (in green), the line with "slope" equal to the directional derivative (blue), the point at which we're asked to compute the directional derivative (red, the point (1,2,1/5)), and the function (gray).

The origin is in black. Move the image to see it from different perspectives.

§14.6, #27, Stewart Calculus 8th

In exercise 27 from section 14.6 you are asked to show that a differentiable function decreases most rapidly at a point in the direction opposite to the gradient vector. This graphic illustrates (top-to-bottom) this using the function in 27b in three graphics:

1. The line (blue) with "slope" equal to the directional derivative in the direction opposite the gradient vector, the (red) unit direction vector of the blue line, the yellow point at which we're asked to compute the directional derivative (the point (2,-3,60), and the function (gray).

2. The level curves along with a unit vector (green) pointing in the direction opposite of the gradient vector; the direction where the fuction decreases most rapidly. Notice that the gradient vector is perpendicular to the level curves.

3. A view of the function (gray) in 3D near the origin along with a unit vector (green) pointing in the direction opposite of the gradient vector, but in 3D (with z=0) so that we can compare the function and the (opposite) direction of the gradient vector.

The origin is in black. Move the image to see it from different perspectives.

§14.6, #32, Stewart Calculus 8th

In exercise 32 from section 14.6 you are asked to:

a. Find the rate of change of temperature at the point (2,-1,2) in the direction toward the point (3,-3,3). This graphic illustrates the (yellow) level surface of the temperature function when T = 200(e^(-43)) degrees Celsius, along with the (green) direction vector initially at (2,-1,2) and in the direction toward the point (3,-3,3).

b. Find in which direction does the temperature increase the fastest at (2,-1,2). This would be in the direction of the (blue) vector, shown here perpendicular to the (yellow) level surface of the temperature function when T = 200(e^(-43)) degrees Celsius.

The origin is in black. Move the image to see it from different perspectives.

§14.6, #34, Stewart Calculus 8th

In exercise 6 from section 14.4 you are asked to find the equation of the tangent plane to the given surface at the specified point. This graphic illustrates the surface (gray), tangent plane

(blue), and the point for which the plane is tangent to the surface (red). In addition, the tangent line relative to the partial derivative with respect to x (the green line) and the tangent line relative to the partial derivative with respect to y (the yellow line) are embedded in the blue plane. Recall that the tangent plane is generated by the set of all tangent lines to the surface at the (red in our example) point.

The origin is in black. Move the image to see it from different perspectives.

Finding Maximum and Minimum Values for Multivariable Functions

§14.7, #16, Stewart Calculus 8th

In exercise 16 from section 14.7 you are asked to find the local extreme values or saddle points, and then asked to provide a graph with a reasonable view. This graphic illustrates the multicolored surface along with local extreme values or saddle points in green, blue, and red. The origin is in black, unless the origin is also an extreme value or saddle point.

Move the image to see it from different perspectives.

§14.7, #34, Stewart Calculus 8th

In exercise 34 from section 14.7 you are asked to find the absolute extreme values of a function on a specific set D. This graphic illustrates the gray function along with the (pink) region in the xy-plane that represents the specific set D. Blue curves are embedded in the gray surface and represent the boundaries of D if they were projected into the surface. The extreme values are green and red and the origin is in black.

Move the image to see it from different perspectives.

§14.7, #42, Stewart Calculus 8th

In exercise 42 from section 14.7 you are asked to find the point on a plane that is closest to the point (0,1,1). This graphic illustrates

1. The multicolored plane with the desired plane point (in red) that is closest to the point (0,1,1) (also in red). A blue line (perpendicular to the plane) connects the two points.

2. The "square distance" paraboloid (in yellow) that is probably easiest to use when minimizing distance. The (red) point is the absolute minimum. Recall that, since a square root function is increasing, it's safe to minimize the "square distance" because this absolute minimum (x,y) will also minimize the square root of the square distance (although the "z's" might be different).

3. The "distance" surface (in tan) that has the same minimum (x,y) coordinates as the "square distance" above, but different z-value associated with the (x,y) ordered pair that results in the minimum (the absolute minimum is in red).

The origin is in black.

§14.7, #44, Stewart Calculus 8th

In exercise 44 from section 14.7 you are asked to find the point on a surface that is closest to the origin. This graphic illustrates

1. The multicolored surface with the two desired points (in red) that are closest to the origin (in black). Notice the y-axis is incident with both points and the origin.

2. The "square distance" paraboloid (in yellow) that is probably easiest to use when minimizing distance. The (red) point is the absolute minimum. Recall that, since a square root function is increasing, it's safe to minimize the "square distance" because this absolute minimum (x,z) will also minimize the square root of the square distance (although the "y's" might be different).

3. The "distance" surface (in tan) that has the same minimum (x,z) coordinates as the "square distance" above, but different y-value associated with the (x,z) ordered pair that results in the minimum (the absolute minimum is in red).

§14.7, #58, Stewart Calculus 8th

In exercise 58 from section 14.7 you are asked to show that P is no more than 2/3. To do this it is helpful to remember that p+q+r=1 and q and r are nonnegative with q+r no more than 1. Using these facts it becomes simpler to visualize P, along with the specific set for which P is defined (call this set D). This graphic illustrates the gray function P(q,r) along with the (yellow) region in the qr-plane that represents D. Blue curves are embedded in the gray surface and represent the boundaries of D if they were projected into the surface. The absolute maximum is represented with the red point and the origin is in black.

Points along the boundary that were maximums (but not the absolute maximum) are green and are incident with the blue curves.

Lagrange Multipliers with Level Surfaces and Curves

§14.8, #6, Stewart Calculus 8th

In exercise 6 from section 14.8 you are asked to use Lagrange multipliers to find the extreme values of the function subject to the given constraint. This graphic illustrates:

1. The gray surface with its (red) extreme values which are subject to having (x,y) values on the blue curve in the xy-plane. The yellow curve embedded in the gray surface is a projection of the blue circle into the surface to better illustrate that the extreme values satisfy the constraint.

2. The contour map of the gray surface in the xy-plane along with the constraint (blue) circle. Notice that the green level curves, in particular, are tangent to the blue circle at the red points... this is where the tangents, and therefore the gradients of the blue circle and the (green) level curves are parallel. The green curves represent the largest and smallest values of c so that our function f(x,y) = c intersects the blue circle.

The origin is in black. Move the 3D image to see it from different perspectives.

§14.8, #10, Stewart Calculus 8th

In exercise 10 from section 14.8 you are asked to use Lagrange multipliers to find the extreme values of the function subject to the given constraint. This graphic illustrates:

1. Points (red) that correspond to the absolute maximum. The gray surface is a level surface with constant equal to the absolute maximum value. Notice that the yellow constraint ellipsoid is tangent to the gray level surface at each point that results in an extreme value... and therefore the gradients of the yellow constraint ellipsoid and the gray level surface are parallel. The gray level surface represents the largest values of c so that our function f(x,y,z) = c intersects the yellow constraint ellipsoid.

2. Points (green) that correspond to the absolute minimum. The gray surface is a level surface with constant equal to the absolute minimum value. Notice that the yellow constraint ellipsoid is tangent to the gray level surface at each point that results in an extreme value... and therefore the gradients of the yellow constraint ellipsoid and the gray level surface are parallel. The gray level surface represents the smallest values of c so that our function f(x,y,z) = c intersects the yellow constraint ellipsoid.

The origin is in black. Move the image to see it from different perspectives.

§14.8, #18, Stewart Calculus 8th

In exercise 18 from section 14.8 you are asked to find the extreme values of the function subject to the given constraints. This graphic illustrates:

1. A red point that correspond to the absolute maximum. The gray surface is a level surface with constant equal to the absolute maximum value. Notice that the blue intersection curve of the two constraints (the pink plane and the yellow cone) is tangent to the gray level surface at the (x,y,z) point that results in an extreme value... and therefore the gradient of the blue intersection curve and the gray level surface are parallel at the red point. The gray level surface represents the largest values of c so that our function f(x,y,z) = c intersects the blue intersection curve .

2. A green point that correspond to the absolute minimum. The gray surface is a level surface with constant equal to the absolute minimum value. Notice that the blue intersection curve of the two constraints (the pink plane and the yellow cone) is tangent to the gray level surface at the (x,y,z) point that results in an extreme value... and therefore the gradient of the blue intersection curve and the gray level surface are parallel at the green point. The gray level surface represents the smallest values of c so that our function f(x,y,z) = c intersects the blue intersection curve.

The origin is in black. Move the image to see it from different perspectives.

SRJC Course: MATH 1C, Third Semester Calculus, Stewart Chapters 15

Riemann Sums, Double Integrals, and Volumes

§15.1, #3a, Stewart Calculus 8th

In exercise 3a from section 15.1 you are asked to use a Riemann sum to estimate the value of a double integral. The sample points (blue) are taken to be the upper right corner of each subrectangle (yellow) in the xy-plane. The volume of the four boxes will approximate the volume below the red surface and above the xy-plane in R^3.

The origin is in black. Move the image to see it from different perspectives.

§15.1, #22, Stewart Calculus 8th

In exercise 22 from section 15.1 you are asked to calculate the iterated integral. This graphic reminds readers that some integrals can be thought of as volumes. The multicolored function is in the first octant and the integral can be interpreted as the volume below the function and above the xy-plane, bounded by the "plain" colored sides.

The origin is in black. Move the image to see it from different perspectives.

§15.1, #42, Stewart Calculus 8th

In exercise 42 from section 15.1 you are asked to find the volume of a solid. This graphic illustrates the solid with the multicolored function above the xy-plane in the first octant, bounded by the "plain" colored sides.

The origin is in black. Move the image to see it from different perspectives.

§15.1, #48, Stewart Calculus 8th

In exercise 48 from section 15.1 you are asked to find the average value of the function over a given rectangle. This graphic illustrates the surface from f(x,y) with a tan plane over the given rectangle. The tan plane represents the "average height" of the function over the given rectangle.

The origin is in black. Move the image to see it from different perspectives.

Double Integrals over General Regions, Volumes

§15.2, #26, Stewart Calculus 8th

In exercise 26 from section 15.2 you are asked to find the volume of the given solid. This graphic illustrates the multicolored wireframe surface with boundaries that make up the rest of the solid in the first octant. Notice the region in the xy-plane over which you're integrating is a triangle.

The origin is in black. Move the image to see it from different perspectives.

§15.2, #30, Stewart Calculus 8th

In exercise 30 from section 15.2 you are asked to find the volume of the given solid. This graphic illustrates the multicolored wireframe surface with boundaries that make up the rest of the solid in the first octant. Notice the region in the xy-plane over which you're integrating is a triangle.

The origin is in black. Move the image to see it from different perspectives.

§15.2, #42, Stewart Calculus 8th

In exercise 42 from section 15.2 you are asked to use a CAS to find the volume of the given solid. The solid is the region below one (purple) paraboloid and above another (green) paraboloid but pinned inside a vertical (blue) cylinder of radius 1. This graphic illustrates the volume in two stages:

1. The upper and lower paraboloids intersecting along a yellow curve, but the blue cylinder punching through them (intersecting the paraboloids along the red curves).

2. The actual desired solid with the upper and lower paraboloids intersecting the blue cylinder along the red curves (without the parts of the paraboloids outside the cylinder).

Notice the region in the xy-plane over which you're integrating is a circle.

The origin is in black. Move the image to see it from different perspectives.

Double Integrals with Polar Coordinates

§15.3, #20, Stewart Calculus, 8th

In exercise 20 from section 15.3 you are asked to use polar coordinates to find the volume of the given solid. This graphic illustrates the solid which is defined to be the region below the (blue) cone and above the (yellow) ring.

Notice the region in the xy-plane over which you're integrating is a ring.

The origin is in black. Move the image to see it from different perspectives.

§15.3, #25, Stewart Calculus, 8th

In exercise 25 from section 15.3 you are asked to use polar coordinates to find the volume of the given solid. This graphic illustrates the solid which is defined to be the region above the (tan) cone and below the (orange) sphere. The solid looks somewhat like a pink lemonade sherbet ice cream cone.

Notice the region in the xy-plane over which you're integrating is a circle.

The origin is in black. Move the image to see it from different perspectives.

Probability Applications with Double Integrals

§15.4, #30, Stewart Calculus, 8th

In exercise 30 from section 15.4 you are asked to compute probabilities. This graphic illustrates

30a) The solid (blue, underneath the multicolored surface) that represents the probability asked for in part a. Notice the region of inegration is a square.

30b) The solid (green, underneath the multicolored surface) that represents the probability asked for in part b. Notice the region of inegration is a triangle.

The origin is in black. Move the image to see it from different perspectives.

§15.4, #31b, Stewart Calculus, 8th

In exercise 31b from section 15.4 you are asked to compute a probability. This graphic illustrates the solid region (yellow, underneath the red wireframe surface) that represents the probability asked for in part b. Notice the region of inegration is an ellipse and the red surface is the two-variable version of the "bell curve."

Move the image to see it from different perspectives.

Triple Integrals

§15.6, #22, Stewart Calculus, 8th

In exercise 22 from section 15.6 you are asked to find the volume of a solid. This graphic illustrates the solid region using a yellow cylinder and two red wireframe disks (one "vertical" and one is "slanted"). Using triple integrals there are several perspectives regarding the region of integration; however, the region usually perceived to be easiest in this example is a circular disk in the xz-plane.

The origin is in black. Move the image to see it from different perspectives.

§15.6, #40, Stewart Calculus, 8th

In exercise 40 from section 15.6 you are asked to find the mass and center of mass of the solid. This graphic illustrates the solid region using a yellow cylinder and three tan planes. Using triple integrals, to find the mass and center of mass, there are several perspectives regarding the region of integration; however, a region usually perceived to be easiest in this example is inside a parabola in the yz-plane. The center of mass is in red.

The origin is in black. Move the image to see it from different perspectives.

Triple Integrals with Cylindrical Coordinates

§15.7, #22, Stewart Calculus, 8th

In exercise 22 from section 15.7 you are asked to find the volume of the solid that lies within both a cylinder and a sphere. This graphic illustrates the solid region using a yellow cylinder and two pink "caps." Using triple integrals, there are several perspectives regarding the region of integration; however, a region usually perceived to be easiest in this example is inside circle in the xy-plane.

The origin is in black. Move the image to see it from different perspectives.

§15.7, #23, Stewart Calculus, 8th

In exercise 23 from section 15.7 you are asked to find the volume of the solid that is enclosed by the cone and the sphere. This graphic illustrates the solid region using a yellow cone, pink sphere, and blue plane at the base. Using triple integrals, there are several perspectives regarding the region of integration; however, a region usually perceived to be easiest in this example is inside circle in the xy-plane. Notice that this solid enclosed by the cone and the sphere is the region "below" the cone, and not above it (this solid looks like the "ice cream cone holder" and not the "ice cream cone").

The origin is in black. Move the image to see it from different perspectives.

Triple Integrals with Spherical Coordinates

§15.8, #27, Stewart Calculus, 8th

In exercise 27 from section 15.8 you are asked to find the volume of the solid that lies between two cones but within a sphere. This graphic illustrates the solid region using a yellow sphere and two green cones (for illustration, radius 2 was chosen for the sphere). When using triple integrals with spherical coordinates it's not necessary to identify a region in a plane (for setting up the limits of integration) if the surfaces are defined in terms of spherical coordinates... for example, with this solid, take rho from 0 to 2; theta from 0 to 2Pi, and phi from... ?

The origin is in black. Move the image to see it from different perspectives.

§15.8, #46, Stewart Calculus, 8th

In exercise 46 from section 15.8 you are asked to find the great-circle distance from Los Angeles to Montreal. This graphic illustrates the (blue) earth, the equator and prime meridian (both in black), a red vector that points to Los Angeles, and a yellow vector that points to Montreal. The pink plane slices through the earth (through the center of the earth) and is incident with the red and yellow vectors (a great circle is the circle of intersection of a sphere and a plane through the center of the sphere).

Move the image to see it from different perspectives.

Change of Variables

§15.9, #21, Stewart Calculus, 8th

In exercise 21b from section 15.9 you are asked to find the volume of the earth. Since the earth is not a perfect sphere, a change of variables changes the "earth ellipsoid" into a sphere, for easier calculations. Finding volume with a triple integral sets the integrand equal to 1, though, and all that's left is to choose the spherical limits of integration. (with Jacobian) This graphic illustrates the mapping between xyz-space and rho,theta,phi-space in that a sphere in rectangular coordinates (immediately below) can be thought of as a box (far below) in rho,theta,phi-space. The blue sphere has limits of integration: rho from 0 to 1, phi from 0 to Pi, and theta from 0 to 2Pi. The pink box has dimensions 1, Pi, and 2Pi, corresponding to the values for rho, phi, and theta. Note that this does not say that the volume of the sphere is (1)(Pi)(2Pi).

The origin is in black. Move the image to see it from different perspectives.

SRJC Course: MATH 1C, Third Semester Calculus, Stewart Chapter 16

Vector Fields, Gradient Fields

§16.1, #24, Stewart Calculus, 8th

In exercise 24 from section 16.1 you are asked to find the gradient vector field of the function f. The graphic illustrates the three-dimensional gradient field (red arrows) along with a (multicolored) level surface of the function of three variables given in exercise 24. Notice that the red arrows are perpendicular to the level surface at every point.

The origin is in black. Move the image to see it from different perspectives.

§16.1, #28, Stewart Calculus, 8th

In exercise 28 from section 16.1 you are asked to find the gradient vector field of the function f, together with a contour map of f, and explain their relationship. The graphic illustrates

1. The (multicolored) surface in three dimensions along with the (red) contour map projected into the xy-plane.

2. A gradient field (green arrows) along with a (red) level surface of the function of two variables given in exercise 28. Notice that the green arrows are perpendicular to the level curve at every point.

The origin is in black. Move the 3D image to see it from different perspectives.

Line Integrals and Line Integrals over Vector Fields

§16.2, #6, Stewart Calculus, 8th

In exercise 6 from section 16.2 you are asked to evaluate the line integral. The graphic illustrates the curve over which you are to integrate (in red) and a (blue) fence underneath the red curve, whose height is determined by the integrand of the line integral. The value of the line integral equals the area of one side of the blue fence.

The origin is in black. Move the 3D image to see it from different perspectives.

§16.2, #42, Stewart Calculus, 8th

In exercise 42 from section 16.2 you are asked to find work done by the electric field on a particle as it moves along a line between two points. This graphic illustrates the electric vector field along with the path (red) of the particle, beginning at the green point and ending at the blue point.

The origin is in black. Move the image to see it from different perspectives.

§16.2, #48, Stewart Calculus, 8th

In exercise 48 from section 16.2 you are asked to determine the amount of paint to paint both sides of a fence. The graphic illustrates the curve under which your fence resides (in red) along with its (blue) fence underneath. Recall that the value of the line integral equals the area of only one side of the blue fence.

The origin is in black. Move the 3D image to see it from different perspectives.

The Fundamental Theorem of Line Integrals

§16.3, #18, Stewart Calculus, 8th

In exercise 18 from section 16.3 you are asked to find a potential function and calculate the line integral. This graphic illustrates the vector field along with the path (red), beginning at the green point and ending at the blue point.

The origin is in black. Move the image to see it from different perspectives.

§16.3, #30, Stewart Calculus, 8th

In exercise 30 from section 16.3 you are asked to show that the line integral is not independent of path. This graphic illustrates the vector field along with a closed path (red). A line integral is independent of path if and only if the line integral is 0 for every closed path. Since the line integral over the red closed path is not 0, this provides a case where the line integral over a closed path is nonzero (and therefore the line integral is not independent of path). One could choose the test from exercise 29 to show this as well.

The origin is in black. Move the image to see it from different perspectives.

Green's Theorem

§16.4, #12, Stewart Calculus, 8th

In exercise 12 from section 16.4 you are asked to use Green's Theorem to evaluate the line integral. This graphic illustrates the integrand from the double integral (the multicolored plane) and the (gray wireframe) region in the xy-plane over which to integrate.

The origin is in black. Move the image to see it from different perspectives.

§16.4, #14, Stewart Calculus, 8th

In exercise 14 from section 16.4 you are asked to use Green's Theorem to evaluate the line integral. This graphic illustrates the integrand from the double integral (the multicolored plane) and the (gray wireframe) region in the xy-plane over which to integrate. This double integral can be interpreted as the volume of the solid bounded by the multicolored surface, the wireframe base, and pink sides.

The origin is in black. Move the image to see it from different perspectives.

Curl and Divergence

§16.5, #21, Stewart Calculus, 8th

In exercise 21 from section 16.5 you are asked to show that a certain kind of vector field is irrotational. Irrotational vector fields are fields where the curl of the vector field is 0 for all (x,y,z) points. This graphic illustrates:

1. An irrotational vector field (red) near the origin.

2. A more general illustration of curl as it relates to a velocity field (the (green) field is <-y,x,0>)... particles near a point in the fluid tent to rotate about the axis that points in the direction of the curl of the field at that point. The length of this (blue) curl vector measures how quickly the particles mover around such an axis.

The origin is in black. Move the image to see it from different perspectives.

§16.5, #22, Stewart Calculus, 8th

In exercise 22 from section 16.5 you are asked to show that a certain kind of vector field is incompressible. Incompressible vector fields are fields where the divergence of the vector field is 0 for all (x,y,z) points. This graphic illustrates:

1. An incompressible vector field (red) near the origin.

2. A more general illustration of divergence as it relates to a fluid velocity field (the (yellow) field is <x,2y,3z>)... the divergence of a vector field represents the net rate of change (over a region like the box shown) of the fluid flowing from a point, per unit volume; i.e., it measures the tendency of the fluid to diverge from a point.

The origin is in black. Move the image to see it from different perspectives.

Parametric Surfaces

§16.6, #24, Stewart Calculus, 8th

In exercise 24 from section 16.6 you are asked to find the parametric representation of the surface. This graphic illustrates a gray cylinder with parameters theta and y because the cylinder is symmetric to the y-axis. Also, the two yellow "caps" for the cylinder are parametrized with parameters r and theta, with constant y-values. Cylindrical coordinates are used.

The origin is in black. Move the image to see it from different perspectives.

§16.6, #29, Stewart Calculus, 8th

In exercise 29 from section 16.6 you are asked to find the parametric representation of the surface. This graphic illustrates a gray surface of revolution obtained by rotating the red curve about the x-axis. The parameters are theta and x.

The origin is in black. Move the image to see it from different perspectives.

§16.6, #32, Stewart Calculus, 8th

In exercise 32 from section 16.6 you are asked to find graph the Mobius strip. The Mobius strip is special in that it known to be a "non-orientable" curve. This graphic illustrates the strip in gray.

The origin is in black. Move the image to see it from different perspectives.

Surface Integrals and Surface Integrals over Vector Fields

§16.7, #44, Stewart Calculus, 8th

In exercise 44 from section 16.7 you are asked to find the rate of flow outward through the hemisphere. This graphic illustrates the velocity field in yellow and the hemisphere in blue wireframe.

The origin is in black. Move the image to see it from different perspectives.

§16.7, #46, Stewart Calculus, 8th

In exercise 46 from section 16.7 you are asked to find the charge enclosed by the unit cube. This graphic illustrates the (multicolored) cube with the yellow electrical field.

Move the image to see it from different perspectives.

Stokes' Theorem

§16.8, #4, Stewart Calculus, 8th

In exercise 4 from section 16.8 you are asked to use Stokes' Theorem to evaluate the special surface integral. This graphic illustrates the (blue) cone in the x-direction with the green vector field. The red ring is the intersection of the (pink) plane x=2 and the blue cone.

The origin is in black.

Move the image to see it from different perspectives.

§16.8, #12, Stewart Calculus, 8th

In exercise 12 from section 16.8 you are asked to use Stokes' Theorem to evaluate the line integral over the vector field. This graphic illustrates the (pink) cylinder, the yellow hyperbolic paraboloid, the red curve of intersection, and the green vector field.

The origin is in black.

Move the image to see it from different perspectives.

Sabbatical Leave Report

A. Applicant

Name: Alexa Forrester

Department: Philosophy Department

Type of Leave: Formal Coursework, Project

Leave Dates: Fall 2021 – Spring 2022

B. Purpose of Leave

The intent of my project was to refresh the course Philosophy 12: Environmental Philosophy by (1) exploring the viability of adding field studies into the course and (2) completing an update of course literature and primary sources.

C. Objectives

1. I researched the viability of adding field studies to Philosophy 12
    a. I completed an initial precedence search & feasibility study
    b. I explored route and venue options, and community partnerships
    c. I produced a written report describing my efforts, findings and recommendations in 1a and 1b. [Appendix 1]

2. I completed a Philosophy 12 (Environmental Philosophy) literature update, broadening the Phil 12 curriculum to include more diverse and current perspectives, updating the COR and creating a syllabus and lesson plans. In lieu of the original planned annotated bibliography for fellow instructors, I created a more concise tool – an updated list of recommended texts for the course.

D. Narrative

<u>Objective 1: Explore the Viability of Adding Field Studies</u>

I started my sabbatical project with a simple question: How can I replace the four walls of my Emeritus Hall classroom with outdoor, on-the-land experiences for my Environmental Philosophy students? My precedence search and feasibility study began with me articulating the factors that guide assessment of the feasibility of any given option for field studies:

1. Equity – Including field trips in a course raises a host of equity issues in our community college setting where most of our students are parttime and/or low income, many are

differently-abled, and many have responsibilities that prevent them from modifying their weekly schedules. To design field experiences that all students could participate in and benefit from was my guiding aim.

2. Learning Outcomes – To ensure the time spent in the outdoor classroom was connected to the learning outcomes for the class, I needed to look for specific types of outdoor experiences, ones that highlighted questions and ideas we were learning about in the texts.
3. Community Partnerships – Related to learning outcomes, I needed to discover who in the county was willing to spend time with me and my students and to be part of our educational project.
4. Cost – Many potential learning experiences in and around Sonoma County lands come with costs (equipment for longer outdoor experiences, transportation costs, entrance fees to parks, fees for tour guides or other services). Figuring out how to cover these costs sustainably, semester after semester, was a concern.
5. Liability – Requiring students to attend class off campus, on properties not primarily owned or operated by the college, and not designed primarily as classrooms, introduces risks to the college. I needed to research how to ensure the safety and well-being of students.

The work of evaluating the feasibility of any given field experience began early in the fall of 2021, and involved four simultaneous workstreams that continued for the entire year. [A complete enumeration of this work can be found in Appendix 1]

First, I reached out to fellow SRJC faculty who take students on trips for any reason (athletic faculty, science faculty, music faculty) to ask them about the logistics of things like van use, overnight stays, funding, etc.

Second, I began weekly excursions to many of Sonoma County's regional and state parks on my own, to get a sense of the trail networks, learn about the history of the land, and map out potential routes for me and my students.

Third, I began outreach to a number of potential community partners, including LandPaths, NDN Collective, Daily Acts, The Ecology Center, The Cultural Conservancy, and numerous small-scale farmers and land stewards. Some of this work involved participating as a volunteer in the projects and work days hosted by these organizations.

And finally, I began research into the history of the contemporary 'outdoor industry', the significant inequities in access and participation for historically marginalized groups, looking specifically for people who were trying to make the outdoors an inclusive and welcoming space for all.

I must report that some of these workstreams were hampered by the ongoing pandemic. It was particularly hard in the fall of 2021 to get ahold of potential community partners, many of whom had been forced to alter their programing and staff assignments in the wake of Covid-19 restrictions. As just one particularly disappointing example, LandPaths had for many years offered a weeklong program called "TrekSonoma" in which participants joined a week-long

cross-Sonoma-County hike, stopping to learn about and connect with the land, and build community around our shared environment. I had hoped to join one of these treks and perhaps use it as a model for an overnight trip for students. But the program was still suspended due to Covid, and I was unable to participate. As a work around, I was at least able to interview one of the staff members who designed the program, Emmett Hopkins. All in all, I would say that setbacks like these were minor, and did not prevent me from making well-informed judgements about how to proceed with field studies. But perhaps I would have made different choices if the pandemic hadn't upended things.

Please see Appendix 1 for my report on my findings and recommendations. I have had the joy of putting these recommendations into practice in my Environmental Philosophy class this fall. Please see the Evaluation Summary below for more details.

Objective 2:

Throughout the year, I researched new and non-Western works of environmental thought. This included contemporary environmental philosophy journals, historical and contemporary works from indigenous writers, and literature, reporting, and arts emerging from the contemporary global environmental justice movements.

One minor change I made to my plans was to convert the project of an annotated bibliography into a more concise tool, an "Updated List of Texts for Philosophy 12." [Appendix 3] The planned purpose of the annotated bibliography had been to provide my colleagues a snapshot of all the resources I had consumed and considered, and my judgments of how they might or might not be good options for inclusion in Environmental Philosophy. But, given the volume of sources I read, the time-consuming nature of writing summaries of each work, and the fact that many of them did not end up being directly relevant and therefore, not included in my ultimate recommendations, I opted to create a more concise tool (Appendix 3) which maps new recommended assigned readings to a variety of diversity goals. This can be used in conjunction with the Sample Course Schedule (in Appendix 1) as a guide for other instructors seeking to add or update resources.

Prior to this sabbatical project, the sources I assigned for this course were disproportionately from white, male, non-contemporary authors drawn from the colonial canon (i.e. philosophical essays and research produced and published by the educational system that was designed for and led by Europeans and their colonial descendants in the Americas and elsewhere.) For this reason, the questions I considered when evaluating new sources to add were the following:

- Recency: Was this work published in the past 5 years (2018 or later)?
- Diverse Perspective: Was at least one lead author/creator of this resource not of European/colonial descent?
- Diverse Content: Does this piece focus on the experience and/or ideas of people not of European/colonial descent?
- Youth Perspective: Does this piece focuses on or include the experience and/or ideas of students and other young people, who will bear the brunt of the consequences of our environmental philosophies?

- Gender: Does at least one lead author/creator identify as non-male and/or does the content of the piece addresses gender roles and their relationship to environmental concerns?

The results of this literature update are documented in Appendices 2 - 4. In section E3 below, I discuss how I have shared these resources with my department.

- Sample Syllabus & Course Schedule [Appendix 2]
- Recommended assigned readings list, with notation to capture the diversity of thought and perspectives considered in the course. [Appendix 3]
- Recommended changes to the COR for Philosophy 12 [Appendix 4]

E. Evaluation Summary

1. How did this sabbatical leave enhance my work performance at the college?

Completing the objectives of this sabbatical reinvigorated my study and understanding of environmental philosophy and allowed me to practice a more deeply engaged pedagogy. My enthusiasm for teaching the course has increased, and I am now more aware of how, in the past, I was unwittingly reinforcing colonial narratives. While I do believe that many historical figures I have taught in the past continue to be relevant to the ongoing conversations within environmental philosophy, I understand more fully how my unbalanced focus on those figures crowded out other vital voices and perspectives.

It is reassuring to me that now a more diverse set of my students will "see themselves reflected" in the authors and perspectives we consider throughout the semester. The course encourages students to understand the commonalities among and differences between different approaches to environmental philosophy, and to use them as building blocks for their own views.

On a personal level, I feel more connected than ever to Sonoma County and the people working daily to keep our land and communities strong in the face of significant environmental challenges.

2. How did this sabbatical leave benefit students in my discipline?

As I mentioned in Section D above, I have had the joy of putting the recommendations for fieldwork into practice in my Environmental Philosophy class this fall. Just last week my class visited the Riddell Preserve, stewarded by Land Paths, where three Land Paths staff members – Miles, Benjamin, and Lara – led us on an educational hike through old growth Madrone trees. As we helped remove invasive French Broom from the property, we discussed the difference between "land management" and "land stewardship," the difference between "good" fire and "bad" fire, and the very notion of wilderness itself.

This week, we headed out again to Singing Frogs Farm, where owner and operator Elizabeth Kaiser showed us their regenerative farming techniques, which lead to more nutrient-dense crops, and soil that sequesters more carbon, retains more water, and requires no synthetic

fertilizer inputs. The farm and the people who tend it provide a real-world example of the ethical frameworks we are studying in class, including ecofeminism, kincentrism, and Aldo Leopold's "Land Ethic." It is philosophy in action. Here is a photo from this recent field trip:

In addition to bringing the practical implications of various philosophers alive for students, these first-hand experiences help our students in other ways: They illustrate the existence of viable career paths that students may not have previously considered. And finally, seeing real live examples of people relating to the land in positive and regenerative ways also helps mitigate the climate anxiety and sense of ecological dread that many of our students live with.

3. How did this sabbatical leave benefit my department?

I have shared my updated reading suggestions with my whole department via email.

One of my colleagues who also teaches Environmental Philosophy in the department is sitting in on my class this entire semester and participating in the field trips with me, to learn about the changes I have made and prepare herself to teach the updated version of the course.

I have shared many of the new assignments and lesson plans I have developed with this same colleague by adding her to my Canvas course as an observer, and I have offered to do the same for any other colleagues interested in poking around in the details of the revised course.

Earlier this month, I brought my proposed changes to the Phil 12 Course Outline of Record before my department colleagues in a department meeting. This led to interesting and generative conversation about what it means to "decolonize" our curriculum. It also positioned me to move forward with the curricular updates this fall.

4. How did this sabbatical leave address the SRJC Strategic Plan and/or your department's educational plan?

My project has led to the introduction of course components that directly embody the SRJC mission statement. Time spent in the natural world has been shown to improve physical health and mental wellbeing, including gains in cognitive performance, creativity, and concentration, as well as emotional and social wellbeing.

The updated class has created learning opportunities for the students that help contribute to all our strategic goals, but most particularly B, fostering learning, C, serving our diverse community, E, establishing a strong culture of sustainability, and F, cultivating a healthy organization.

By allowing our students to engage with and witness first-hand the work of those who are currently stewarding and cultivating our land, we help build community around the solutions we will certainly need in the coming decades. Further, bringing students into direct relationship with the land itself, we are taking one small step towards making good on our recently adopted land acknowledgement statement – honoring with gratitude the land itself and the people who have stewarded it throughout the generations.

The new syllabus is in line with best practices for inclusive and welcoming learning spaces. I look forward with renewed enthusiasm to teaching this course for many years to come.

F. Abstract for Board Report Summary

Alexa Forrester refreshed SRJC's environmental philosophy course (Philosophy 12) both by researching and then adding significant field components to the course, and also by revising the course's content. A significant portion of Dr. Forrester's sabbatical work was equity-oriented. The changes she has made to her syllabus help elevate perspectives that have for too long been excluded from the Eurocentric environmental philosophy canon, and the field components she has added are in line with SRJC's recently adopted land acknowledgment – honoring with gratitude the land itself and the people who have for generations stewarded the land. As climate disruption and the 6th mass extinction force humanity to reconsider our relationships with the natural world and with each other, this updated course is now fit to provide students the experiential and philosophical moorings required for that task.

G. Appendices

- Appendix 1: Report: Feasibility of Adding Field Studies to Environmental Philosophy
- Appendix 2: Sample Syllabus and Course Calendar
- Appendix 3: Updated Texts for Philosophy 12: Environmental Philosophy
- Appendix 4: Recommended Changes to the Philosophy 12 Course Outline of Record

Sabbatical Leave Report

A. Applicant

Name: Dr. David Kratzmann

Department: Earth and Space Sciences

Type of Leave: Professional Development - Currency in one's field.

Leave Dates: Fall 2021 and Spring 2022

B. Purpose of Leave

The purpose of my sabbatical leave was to improve my instructional teaching through professional development by updating currency in my field (geology and environmental sciences.)

C. Objectives

1. Reviewed the most current literature available on geologic hazard monitoring and mitigation, and global and Californian environmental issues. Objective completed.
2. Visit a US Geologic Survey and/or US Environmental Protection Agency (EPA) facility to learn about monitoring and mitigation techniques. Due to covid restrictions, a physical visit to a site was not possible and was replaced with the following: zoom meetings with scientists, telephone and email contact with researchers, and a survey was created to gather information on current trends. Thus, the objective was completed via Zoom, telephone, email, and survey.
3. Attend a geologic conference to learn about current research. Although physical attendance was not possible, the objective was completed through the use of recorded videos of lectures presented, researchers were contacted via telephone and email, and a survey was created to gather further data on research trends. As such, the objective was completed via video, telephone, email, and survey.
4. Integrated new information into existing course content across multiple classes within Earth and Space Sciences (ESS). Objective completed (and ongoing).
5. Disseminated the newly acquired information to other ESS staff through department meetings, discipline meetings, and individual correspondence. Objective completed (and ongoing).

D. Narrative

This sabbatical was a great opportunity for me to update currency in my field and will allow me to revise my course content by integrating this new information into my teaching methodologies for my existing courses as well as share this new information with my ESS colleagues.

Objective 1. I reviewed current literature on general geology, geologic hazard monitoring and mitigation, as well as global and Californian environmental issues by accessing recently published scholarly journals, and long-format science articles. See Appendix #1 for a list of publications accessed.

Objective 2. A site visit to USGS or EPA offices in the area was not physically completed in person due to covid restrictions. As a result, Zoom meetings, emails, texts, and telephone calls were used to contact academic professionals regarding their current research. Researchers contacted include Dr. Jessica Ball (USGS), Dr. Kelly Garbach (EPA), Dr. David Paez (USGS), Dr. Jeff Chiarenzelli (Professor, St. Lawrence Univ. NY), Dr. Rebecca Carey (Associate Professor, Univ. of Tasmania, Aust), Dr. Roberto Scasso (Director, Institute of Geology. Univ. of Buenos Aires), Dr. Katie Kelley (Professor, Univ. Rhode Island). See Appendix #2 for a list of researchers contacted.

Objective 3. Attendance at a geologic conference was not physically completed due to covid restrictions in place. The American Geophysical Union (AGU) recorded plenary lectures for the 2022 conference and these were accessed and watched in lieu of, and combined with telephone and email conversations with academics from various institutions, and a survey emailed with two broad questions in three research areas: volcanology, environmental science, and natural hazards. The survey was emailed to researchers and professors across both USGS offices and state and private universities. Institutions emailed include; USGS Menlo Park (CA), Univ. Tasmania (AUST), Univ. Rhode Island (URI), Allegheny College (PA), Univ. Canterbury (NZ), Univ. of Birmingham (UK), UC Riverside (CA). See Appendix #3 for summaries of the plenary talks watched and Appendix #4 for the survey questions and example results.

Objective 4. I have started integrating the newly acquired information into existing course content across multiple classes within Earth and Space Sciences (ESS) as I updated my courses (GEOL1 and ENVS12) for the Spring 2023 semester, and will update GEOL1L and GEOL20 for Summer and Fall 2023. As I continue to synthesize the information acquired, I have passed along updates, changes, and newly created activities to ESS colleagues (see objective 5). See Appendix #5 for examples of the curricula created and the relevant/applicable courses.

Objective 5. I have started (and will continue) to disseminate newly acquired information and new instructional resources to other ESS staff through departmental meetings, discipline-specific emails and file sharing, and one-on-one conversations with ESS faculty. The ESS Dept. has a Canvas shell with modules for each discipline for the specific purpose of sharing instruction resources. One completed activity has already been reviewed by ESS colleagues (and is in use this Spring 23), and another has been uploaded to Canvas for review (planned use in Fall 23).

E. Evaluation Summary

1. How did this sabbatical leave enhance my work performance at the college?

This sabbatical leave has allowed me to improve my instructional teaching through professional development by updating currency in my field which, in turn, has allowed me to update the curriculum in all my courses.

2. How did this sabbatical leave benefit students in my discipline?

Students within my current classes are already benefiting from the new knowledge gained as activities have been integrated into my courses. The new information and leading research updates are invaluable to students (and instructors) as it ensures they are receiving the most up-to-date science.

3. How did this sabbatical leave benefit my department?

By keeping current in one's discipline, the entire ESS department can grow as we share newly acquired information. As I continue to synthesize the information collected and create new curricula, my ESS colleagues can grow by receiving the new (or updated) instructional resources and even by participating in the creation or review of new materials. Once created, any further resources will be uploaded to the ESS Dept. Canvas shell (with discipline modules) and shared with all faculty.

4. How did this sabbatical leave address the SRJC Strategic Plan and/or your department's educational plan?

The mission statement of SRJC and the ESS Dept. emphasizes Student Success, Fostering Learning and Academic Excellence. This sabbatical has allowed me to enhance my own technical education and increase my own knowledge base, thus enabling me to:

A. Support Student Success by providing a greater learning experience for students through professional growth and integration of new knowledge.
B. Fostering Learning and Academic Excellence by providing effective teaching programs for our students (through my own professional development.)

F. Abstract for Board Report Summary

David Kratzmann's professional development leave has advanced his knowledge of current research directions and recent breakthroughs in both geology and environmental sciences. This was accomplished through a combination of current literature reviews, zoom meetings, telephone and email contact, and the creation and dissemination of a research survey (emailed to researchers and professors, locally and globally). The learning experience of our students has been greatly enhanced through the ongoing updating of course material and activities. ESS Dept faculty have also benefitted through the dissemination of the newly acquired information. This sabbatical leave has also supported the college's Strategic Plan by providing updated curricula to

support student success, and by fostering learning and academic excellence by providing effective teaching programs.

G. Appendices

#1 Articles Accessed

Select scholarly articles

- A.J.R. Watts et al., Uptake and retention of microplastics by the shore crab Carcinus maenas. Environmental Science & Technology (2014)
- Bowman et al., Human exposure and sensitivity to globally extreme wildfire events. Nature Ecology and Evolution, 1 (2017)
- Ivar R. van der Velde et al., Vast CO_2 release from Australian fires in 2019–2020 constrained by satellite. Nature, 597 (2021)
- Michael Cassidy, Lara Mani. Huge volcanic eruptions: time to prepare. Nature, 608 (2022)
- Lyn Watts et al, Mapping groundwater discharge seeps by thermal UAS imaging on a wetland restoration site, Frontiers in Environmental Science (2022)
- P Colosi & E. Brodsky. How big will the next eruption be? Journal of Applied Volcanology volume 11, Article number: 4 (2022)
- Guido Caniglia et al, Practical wisdom and virtue ethics for knowledge co-production in sustainability science, Nature Sustainability (2022)

Select long-format science articles

- DDT lingers in Michigan Town. Science News (2014, Society of Environmental Toxicology and Chemistry).
- Superbugs take flight from cattle farms. Science News (2015, Environmental Health Perspectives).
- Taking on Superbugs. New York Times (2015)
- Paper-thin solar cell can turn any surface into a power source. MIT (2021)
- New nanomaterial to derive clean fuel from the sea. University of Central Florida (2021)
- Predicting lava flow: Data collection uses a rare, ground-based instrument to pinpoint where and how quickly the landscape is changing. Science Daily (2022)
- Breathable lava suits: volcanologist field-tested and approved. phys.org (2022)
- Using drones to monitor volcanoes: Researchers analyze volcanic gases with the help of ultra-lightweight sensor systems. Science Daily (2022)
- Hidden weaknesses within volcanoes may cause volcano collapse. Science Daily (2022)
- Producing 'green' energy - literally - from living plant 'bio-solar cells'. American Chemical Society (2022)
- Humans may not be able to handle as much heat as scientists thought. Science News (2022).

#2 Contact List

The following is a list of the research scientists contacted via Zoom, email and telephone and sent the research survey:
Zoom: Dr. Jessica Ball (Volcano Hazard Assessment and Communication Specialist, USGS, CA), Dr, Kelly Garbach (Research Scientist, EPA, CA), Dr. David Paez (Research Scientist, USGS, WA).
Telephone/Email: Dr. Jeff Chiarenzelli (Professor, St. Lawrence Univ.), Dr. Steve Carey (Professor emeritus, GSO URI, RI), Dr. Katie Kelley (Professor, Univ. Rhode Island, RI), Dr. Rebecca Carey (Associate Professor, Univ. of Tasmania), Dr. Roberto Scasso (Director, Institute of Geology. Univ. of Buenos Aires), Dr. Rachel O'Brien (Professor, Allegheny College, PA), Dr. Tom Wilson (Univ. of Canterbury, NZ), Dr. Maryjo Brounce (Assistant Professor, UC Riverside, CA), Dr Sebastian Watt (Lecturer, Univ. of Birmingham, UK), Justin Rogers (PhD student, Univ. of Canterbury, NZ).

The following is a partial list of the USGS scientists contacted regarding the research survey: Dr. M. Coombs, Scientist-in-Charge (AVO); Dr. R. Gold, Director, Geologic Hazards Science Center; Dr. C. Mandeville, Volcano Hazards Program Coordinator; Dr. K. Allstadt, Research Geophysicist; Dr. O. Boyd, Research Geophysicist; Dr. R. Briggs, Research Geologist; Dr. B. Brooks, Research Geophysicist; Dr. J. Chan, Geophysicist; Dr. E. Cochran, Research Geophysicist; Dr. J. McGuire, Research Geophysicist; Dr. E. Wirth Moriarty, Research Geophysicist; Dr. C. Yoon, Research Geophysicist; N. Andersen, Volcanologist; Dr. J. Ball, Volcano Hazard Assessment Specialist (CVO); Dr. K. Lynn, Volcanologist (HVO); Dr. J. Griswold, Volcanologist (CVO); Dr. D. Downs, Volcanologist (HVO); Dr. H. Wright, Volcanologist (CVO); Dr. L. Mastin, Physical Volcanologist (CVO); Dr. K. Wallace, Volcanologist (AVO); Dr. S. Sennert, Volcanologist; Dr. E. Johnson, Volcanologist (CVO); Dr. M. Poland, Scientist in Charge (YVO).

#3 Conference Seminar Summaries

AGU (American Geophysical Union) 2022 conference.

Empathy, Science, and Politics. Carlos Alvarado Quesada. Costa Rican Minister of Labor. Starts by talking about books he read early on and how they influenced his love of science and inspired him to get into science and then drift into politics as he realized that politics, political power, and policy will strongly impact the environment. Discussed three (3) aspects of Costa Rican politics and the environment; How to protect more land and ocean areas to maintain ecosystems (30 by 30 goal), The clean and renewable energy goals of the country (even with 90%+ clean electricity they are moving towards hydrogen), and climate change adaptation (particularly in response to hurricanes). Take home message was nothing is impossible. Science needs to lead politics, and politics needs to bring science on board.

The origin of deep mantle diamonds. Prof. Michael Walter. Earth and Planets Lab, Carnegie Science.

Has been looking into the origins of deep mantle diamonds trying to understand where they are formed. Sublithospheric diamonds typically occur in very old cratons (old continental crust) such as Australia, Canada, and parts of the African continent. Diamonds are very resilient and record changes in pressure and temperature (over their entire lifespans) but also contain inclusions of other minerals. Together these suggest two pathways. Deep formation at the upper mantle discontinuity (~660-km-deep) with meta-basaltic signatures suggestive of recycled oceanic crust. Or a shallower pathway at the lithosphere-asthenosphere boundary (~200-km-deep) with a meta-harzburgitic signature whose origins are more difficult to resolve. Interestingly each appears to be emplaced very rapidly through a volcanic process (kimberlites) that probably doesn't occur anymore due to cooling of the mantle.

Crustal formation over time. Dr. Peter Ulmer. Institute of Geochemistry and Petrology, ETH, Zurich.
Research focuses on transcrustal magmatic systems and exploring crystallization differentiation. Has been looking into models of crustal formation and evolution via polybaric fractional crystallization through various magma ascent pathways. All models have been successful and share similar components such as mineral phases and residual liquids. Findings suggest crystallization occurs over a range of crustal pressures and temperatures and goes on to state more experimental work is needed.

Earth's magnetic field. Prof. Cathy Constable. Scripps Institute of Oceanography.
Introduces the magnetic field and its role in shielding up from solar winds but also the way it's used for navigation by people, animals, birds, and even bacteria. Prof. Constable has been studying the variance in the magnetic field using real-time current measurements, proxy data (lava flows, pottery), and models, and is trying to understand how it flips. It's a complicated system with many variables but at the moment it's strong and stable. Changes in the field seem to correspond to changes in core flow (among things) however core flow appears to display hemispherical asymmetries (flow is not even throughout) and the highest rates of change occur at high latitudes. Not fully understood why and more studies and improved models are needed to reconcile some of these ambiguities.

Observing neighborhood-level air pollution inequality from space. Prof. Sally Pusede. University of Virginia.
Introduces urban air pollution and climate change and talks about the disproportionate harm these have on low-income communities and communities of color. Highlights the difficulty in monitoring air quality as it varies substantially within cities and scientists lack spatially complete data that can help resolve air pollution differences – and therefore issues - at neighborhood scales. Then talked about the recent satellite opportunities that will be able to provide information at neighborhood-scales and thus improve our understanding of the emission sources. They might also be able to help identify any variability in air pollution that could be related to climate change. At the moment, policy and science need to merge to inform decision-making related to neighborhood-level air pollution inequalities.

#4 Survey questions

The following two questions were emailed to researchers and scientists at various government bodies and both state and private universities. See Appendix #2 for a list of people emailed.

1) In your opinion, what is the most exciting or cutting-edge research that has been conducted during the last decade (or longer if you think it's that good/cool)?
2) Where do you think the future of research is headed?

Examples of responses:

1) Magma rheology - so many new insights – i.e., Cordon Caulle. submarine volcanology - understanding the role of confining pressure on eruption dynamics. Community engagement into eruption response - more people outside of volcano observatories are engaging in eruption response and science. I think the fundamental advances in volcanology will come about observations of eruptive phenomena.
2) In my opinion, it would be the launching, landing, and the data collection associated with the Mars Rovers. I think it will eventually become focused on the expanding issues related to climate change and ways that we can counteract or mitigate them. I see it as the foremost problem we face along with providing clean water, wholesome food, transportation, and energy to the eight billion people on the planet.
3) I have been working on fO_2 in arcs with an eye towards figuring out how calc-alkaline trends arise. The answer is "it's complicated." I have a project funded to work in the Socorro Island area, including a cruise that has been waiting 3 years to get scheduled. Still waiting… And I'm trying to figure out, using sample-based constraints and statistics, how much water is in the MORB mantle and whether it relates to anything else we can observe, like seismic velocity. I am also trying to find suites of CO_2-undersaturated MORBs, in an effort to do the same exercise for carbon.
4) One of my main interests now is in drones and aerial photography. I've got a large fleet of drones of different types and enjoy flying them around the coast of Rhode Island. I also have a cruise next year off the coast of Baja California looking at simultaneous effusive and explosive activity during submarine eruptions.

#5 New curriculum

(A) Volcanic Gases

This activity would fit into the following courses:
GEOL1 - week 10 (volcanic processes) or week 11 (volcanic hazards) modules,
GEOL1L – week 12 (volcanoes) module,
GEOL20 – week 9 (volcanic hazards and disasters) module.

Learning Outcome:
At the end of this activity will you have an increased knowledge of volcanic gases, where they reside in magmatic systems, and the role they play in monitoring volcanic eruptions. You'll also use quantitative data to assess volcanic risk.

Gas Information:

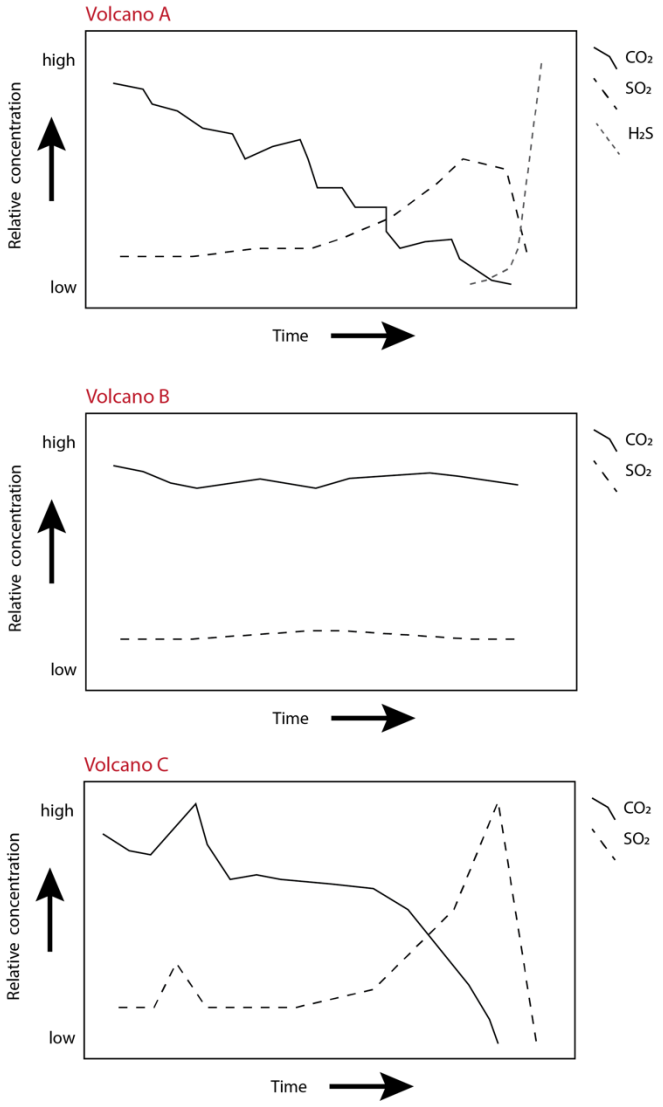
Magma contains dissolved volatile components – gases – which have differing solubilities dependent on pressure, temperature, and the composition of the magma. As magma ascends towards the surface, the ambient pressure decreases, which decreases the solubility of the dissolved volatiles. Once the solubility decreases below the volatile concentration, the volatiles will tend to come out of solution within the magma (exsolve) and form a separate gas phase.

Volcanic gases can leave (escape) the plumbing system of a volcano through a variety of mechanisms including fumaroles, porous ground surfaces, active vents, and magma ascent. As research scientists, we can learn a lot about changes to the magmatic system within a volcano by measuring changes in the emission rate and the relative ratios of key gases such as sulfur dioxide, and carbon dioxide.

The gaseous portion of magma varies from ~1 to 5% of the total weight. Water vapor constitutes 70-90%. The remaining gases include CO_2, SO_2, and trace amounts of N, H, CO, S, Ar, Cl, and F. These subordinate gases can combine with hydrogen and water to produce numerous toxic compounds, such as HCl, HF, H_2SO_4, H_2S, which are typical products of fumarolic activity. (sdsu.edu)

Carbon dioxide indicates new magma from deep in the crust

Carbon dioxide (CO_2) gas separates from magma deeper than other volcanic gases. If increased CO_2 levels are detected at the surface, that may indicate new magma is entering the volcanic system. By regularly monitoring CO_2 at volcanoes, scientists can easily detect those increases (as well as decreases) which leads to a greater understanding of what is happening inside the volcano. CO_2 can also be hazardous – it can collect in soils and can cause trees and other vegetation to die, and if it does not dissipate quickly when it leaves the ground, it can collect in low-lying areas to fatal concentrations. (USGS)



Sulfur dioxide indicates magma is near the surface

Sulfur dioxide (SO_2) is released from a volcano when magma is relatively near the surface. If SO_2 is detected at a non-erupting volcano, it could be a sign that it will erupt soon. By monitoring the amount of SO_2 being emitted from an active volcano, it is possible to calculate the amount of magma that is supplying the eruption. However, SO_2 easily dissolves in water, so if the volcano has abundant surface or subsurface water (e.g., glaciers, crater lakes, a hydrothermal system) it becomes difficult and sometimes impossible to determine how much sulfur dioxide is actually being released. (USGS)

Hydrogen sulfide indicates volcanic activity is relatively quiet

When sulfur gases are released from magma and encounter groundwater as they rise, the sulfur can react with water and form hydrogen sulfide (H_2S). The presence of H_2S typically indicates that volcanic activity is relatively quiet because the groundwater is able to filter out much of the sulfur gas that rises from the magma. Hydrogen sulfide can be measured by collecting a gas sample and then analyzing the complete chemistry in a laboratory. (USGS)

Using Data

Use the following graphs (next page) to answer a series of questions regarding the location of a magma chamber (depth of storage) and the potential for eruption at various volcanic centers.

Based on the gas data available:

1) What can be said about the relative depth of magma storage at the start of monitoring for all three volcanoes shown? Explain why? *Refer to the data in the graphs when explaining your answer*
2) Which volcano[es] (A, B, or C) is/are stable with little or no magma movement 'visible' in the data? Explain why! *Refer to the data in the graphs when explaining your answer*
3) Which volcano[es] (A, B, or C) show[s] magma movement? Explain why! *Refer to the data in the graphs when explaining your answer*
4) Which volcano[es] (A, B, or C) shows evidence for magma interacting with groundwater? Explain why! *Refer to the data in the graphs when explaining your answer*

5) Which volcano[es] (A, B, or C) shows evidence for a recent eruption? Explain why! *Refer to the data in the graphs when explaining your answer*
6) Which volcano[es] (A, B, or C) should be monitored more closely, than the others, in the immediate future? Explain why! *Refer to the data in the graphs when explaining your answer*

Notes: Completed but needs discipline peers to check and comment. Will be ready for use in Fall 2023. Uploaded to ESS Canvas module already for comments.

(B) Consumerism and Society

This activity would fit into the following course:
ENVS12 – week 6 (economics) or week 17 (reflection) modules.

Learning Outcome:
Examine the relationships between humans and the environment.

Activity:
Use the internet to find the song "Society" by Eddie Vedder. Listen to the song a couple of times. Really pay attention to the lyrics. Be present and attentive when listening, don't try to do multiple things. Then search for the lyrics online and read through them, more than once, and think about the words, the lines, the verses. Listen to the song again, with the lyrics.

In your opinion;
(1) What is the message? What social commentary is Eddie making?
(2) Which line or passage of text resonated the most with you? Which is most profound, in your opinion? And why does it resonate?

Notes: How to expand this? A discussion board idea or a stand-alone activity. Sent to ESS colleagues for comments. Ready to use and has been incorporated into my ENVS12 course this Spring (23) as a stand-alone activity.

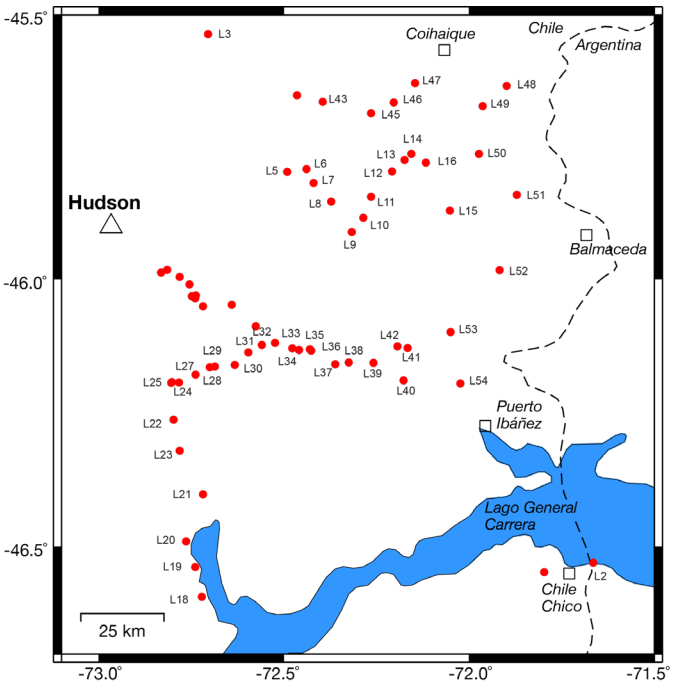
(C) Ash Deposition Mapping

This activity would fit into the following course:
GEOL20 – week 9 (volcanic hazards and disasters) module,
GEOL1 – week 10 (volcanic processes) or week 11 (volcanic hazards) modules,
GEOL1L – week 12 (volcanoes)

Learning Outcomes:
Interpret the role of science in evaluating, predicting, and mitigating natural disasters.
Apply scientific methodologies and principles to answer scientific questions.
Identify and explain processes that formed and continue to shape the landscape.
Recognize the complex interplay between humans and the environment.

Activity:

You will use field-collected data to produce an isopach (deposit thickness) map for the medial (0-10km) area surrounding Hudson volcano, southern Chile. Using the map of sample locations below and the data table provided you will create three (3) maps for the main Holocene eruptions: 6700 years before present, 3600 yrs BP, and the 1991 event.
We'll then assess the impact of the ash deposition on agriculture and infrastructure.



Notes: How to bring in infrastructure data? Use google earth or google/bing maps online. Is it a stand-alone mapping exercise, or are there two versions? The activity needs reviewing by ESS and will be incorporated into courses in Fall 2023 or Spring 2024.

(D) Mt Rainier Lahar Hazards

This activity would fit into the following course:
GEOL20 – week 9 (volcanic hazards and disasters) or week 15 (mass movements) modules,
GEOL1 – week 8 (sedimentary rocks), week 10 (volcanic processes) or week 11 (volcanic hazards) modules,
GEOL1L – week 8 (sedimentary rocks) or 12 (volcanoes).

Learning Outcomes:
Describe and identify Earth materials and landforms.
Identify and explain processes that formed and continue to shape the landscape.

Activity:
Use the attached USGS fact sheet on Mount Rainier to answer the following questions.

1) List the four volcanic hazards associated with Mt. Rainier.
2) What is a Lahar? *Don't just write mudflow – lahar is an Indonesian word for mudflow.*

3) Explain why lahars can occur syn-eruptively (during the event) or post-eruptively (after the event, in some cases many years later). *Hint: When thinking post-eruption, think about the weather in the Pacific Northwest.*
4) Explain why lahars are a natural hazard in the area around Mt. Rainier and not just an extreme natural event. *Use your answer from the question above to help with this one.*
5) Looking at the map provided, describe the pattern of lahar hazards around Mt. Rainier. *What do you 'see' when you look at the map?*
6) How could you explain the pattern or distribution of lahar deposits around Mt. Rainier? *What do you think could be 'controlling' them?*

Notes: What about questions on the other hazards? Expand to include questions on the others. Are they all separate and together form a bigger, integrated activity on Rainier? How to bring in google earth data? Is it needed? ESS review needed but ready to use in GEOL20 in Fall 2023.

(E) Abstract Writing

This activity would fit into the following courses (is very adaptable and could fit anywhere within a course by simply changing the article):
ENVS12 – week 5 (human population) or week 16 (Climate change)
GEOL20 – week 13 (Climate change)

Learning Outcomes:
Interpret the role of science in evaluating, predicting, and mitigating natural disasters.
Recognize the complex interplay between humans and the environment.

Activity:
Your task is to write an abstract to summarize the following article; *Humans may not be able to handle as much heat as scientists thought.* (ScienceNews 2022).

An abstract is a one-paragraph summary of a research project. In journals, the abstract allows readers to quickly grasp the purpose and major ideas of a paper and lets other researchers know whether reading the entire paper will be worthwhile. In conferences, the abstract is the advertisement that the paper/presentation deserves the audience's attention.

Think of the abstract as a condensed version of the whole project. By reading it, the reader should understand the nature of your research question. Although the content will vary according to field and specific project, all abstracts, whether in the sciences or the humanities, convey the following information:

- The purpose of the project identifying the area of study to which it belongs.
- The research problem that motivates the project.
- The methods used to address this research problem, documents or evidence analyzed.
- The conclusions reached or, if the research is in progress, what the preliminary results of the investigation suggest, or what the research methods demonstrate.
- The significance of the research project. Why are the results useful? What is new to our understanding as the result of your inquiry?

Whatever kind of research you are doing, your abstract should provide the reader with answers to the following questions: What are they asking? Why is it important? How did they research/study it? What are those conclusions? What do they mean – think bigger picture?

The abstract should be one paragraph and should not exceed the word limit. Edit it closely to be sure it meets the Four C's of abstract writing:

Complete — it covers the major parts of the project.
Concise — it contains no excess wordiness or unnecessary information.
Clear — it is readable, well-organized, and not too jargon-laden.
Cohesive — it flows smoothly between the parts.

Start by reading through the article and taking notes on the main points, the key items that you want to convey – use the guidelines provided above to aid you as you read through it. You might have to read it, or sections of it, more than once. Access the article here.

Use your notes and the key points to write an abstract 300-400 words long. 12 point Times New Roman font, 1.5 line spacing with 1" margins. You will be submitting the activity through TurnItIn via Canvas.

Notes: Can be tweaked to suit any course using almost any article and updated each year to help prevent the Chegg issue (could AI write one?) Needs to be run through ESS colleagues for comment. Ready for use in Summer or Fall 2023.

Sabbatical Leave Report

A. Applicant

Name: Ying Lin

Department: Mathematics

Sabbatical Leave Dates: Spring 2021 and Spring 2022

Type of Leave: Independent Study and Research

B. Purpose of Leave:

The purpose of my leave was to broaden my mathematical modeling skills and develop projects and data sets that introduce research experiences to students in advanced mathematics courses. These goals were accomplished through a combination of independent study and research.

C. Leave Objectives:

1. *Conduct independent study using Geographical Information Systems (GIS), extract fuel and landscape-related data from existing sources and visualize the results of simulation models of fire spread for wildland-urban interfaces. This independent study will produce a technical report as well as a repository of additional resources (bibliography, data sets, and software) to assist future research.*

   I took several courses on Geographical Information Systems (GIS) from multiple sources to improve my understanding of GIS, a discipline that was completely new to me (see p. 3). I also took a course in fire behavior and experimented with fire behavior simulations using publicly available data on the fuel and weather conditions in Sonoma County. Please see attached for the technical report and p. 6 for a description of the bibliography. Data sets and additional details provided at this link: Sabbatical-Committee.

2. *Conduct independent research on applying various mathematical modeling techniques to the spread of fire in the wildland-urban interface. The methods used in this work will be presented to the local mathematics community.*

   I conducted a literature review of the existing fire behavior modeling approaches and models and created a technical report and annotated bibliography. Please see p. 6 regarding my upcoming presentation at the California Mathematics Council of Community Colleges.

3. *Develop curriculum to add research experience to advanced undergraduate courses such as Math 2, Math 4, Math 5, and a new course on data science under development.*

   I developed several projects that were derived from the data and models related to fire behavior. These projects can be linked to several courses in the current and future curriculum (see pp. 6–7).

D. **Narrative**

Objective 1: *The destructive wildfires since 2017 have dramatically changed the perception of the danger posed by fires in Sonoma County. The direction and rate of the fire spread is uncertain, highlighting the need for quantitative models that can be used to assess the level of fire hazard for wildland-urban interfaces (residential areas near wildlands) as our community goes through the rebuilding process. Such assessment will also be important in the context of climate change, since hazardous conditions may be exacerbated by cycles of extreme weather that expose accumulated fuel to dry and flammable conditions. It is also important for risk mitigation efforts such as fuel treatment near residential areas.*

To develop familiarity with the challenges of fuel reduction in urban-wildland interface, I spent the spring of 2021 living in Redwood Valley, California, volunteering as facility manager for a Buddhist monastery situated on 250 acres of mountainous terrain in a rural area. Learning to use a chainsaw, driving an all-terrain vehicle, and cleaning up brush and other tree damage after a winter storm gave me first-hand experience in land management and fuel treatment, as well as an understanding of the difficulties in carrying out fuel reduction in steep terrains covered by chaparrals and mixed conifers. This understanding has helped me identify features of the available GIS data that are directly relevant to the fuel treatment effort on the ground.

Figure 1: View of the property from top of the hill

Figure 2: Work equipment

Figure 3: Brush piles made of damaged manzanita and madrone branches

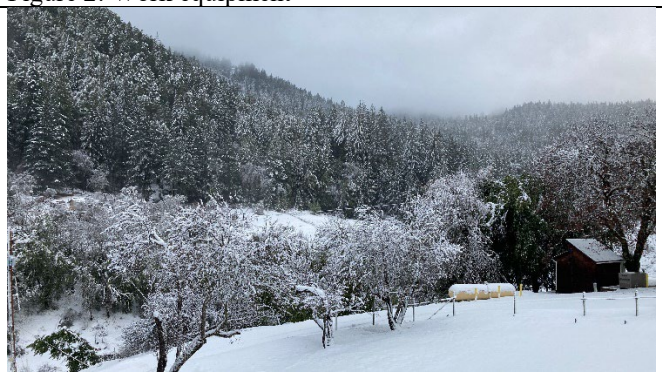


Figure 4: A winter storm in Jan. 2021 brought extensive tree damage

Figure 5: Community effort in forest work and fuel reduction

Figure 6: An area after fuel treatment and a burn pile

I also took a tour of the fuel reduction efforts in and around Sonoma County, including areas that were burned in recent years. The presence of active vegetation growth in the understory, as well as the presence of unburned dead fuels from previous fires highlighted the need for removing ladder fuels in order to reduce the intensity of future fires. I found useful reference values for the vegetation data obtained from remote sensing, such as LiDar and satellite data.

Figure 7: Oak regeneration with active understory growth inside Shiloh Regional Park, an area within the perimeter of the 2017 Tubbs Fire.

Figure 6: Shrub regeneration and presence of dead fuel in Hood Mountain Regional Park, an area within the perimeter of the 2020 Glass Fire.

I will take a course such as GIS 40, GIS 51and/or specialized courses elsewhere to support my independent study with regard to fuel load and landscape data.

I was able to leverage the resources available at SRJC to educate myself about Geographical Information Systems (GIS). I took *GIS 40: Introduction to GIS* as an SRJC student in Spring 2021. Outside the college, I also completed several training courses online, including *ArcPy Essentials* offered by Environmental Systems Research Institute (ESRI) and two courses offered by Coursera: *GIS Data Formats,* and *Design, and Quality,* and *Imagery, Automation, and Applications.* These courses provided me with a working knowledge of the ArcGIS software, which I was able to access through the college's site license throughout my sabbatical.

To improve my understanding of the GIS data used in the simulations, I completed *S190: Introduction to Fire Behavior* through the Wildland Fire Learning Portal, offered through the National Wildfire

Coordinating Group (NWCG). This course gave me an introduction to the common vocabulary used to describe wildfires, as well as weather conditions that are critical to the development of fire.

I will conduct an extensive literature review of existing fire models, as well as examine available data sources (such as those produced by the industry standard software ArcGIS) that can be used to estimate the parameters of the probabilistic model. In addition, I will also develop software tools for extracting data, doing simulations, and visualizing the results of these simulations.

I did not develop new software tools but learned and adapted existing ones for my purposes. Through Sonoma County's Community Wildfire Protection Plan (CWPP) and the Pepperwood Foundation (special thanks to Esther Mandeno), I was able to obtain the 5-meter vegetation map of Sonoma County and used it to run simulations of wildfire behavior in wildland-urban interfaces based on the FlamMap software from the United States Forest Service.

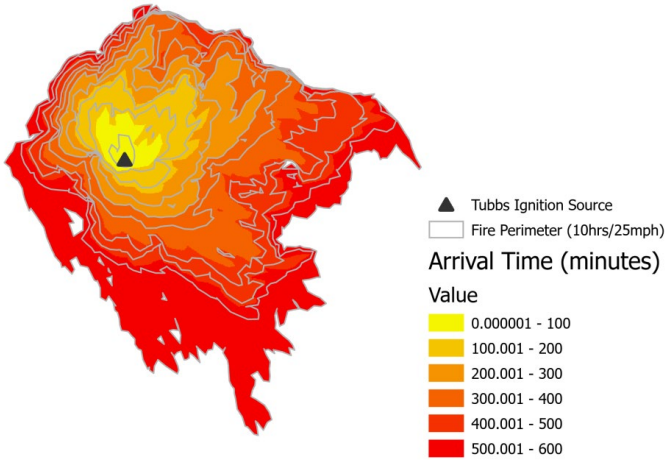


Figure 5: Simulation of Fire Perimeter and Arrival Time in FlamMap

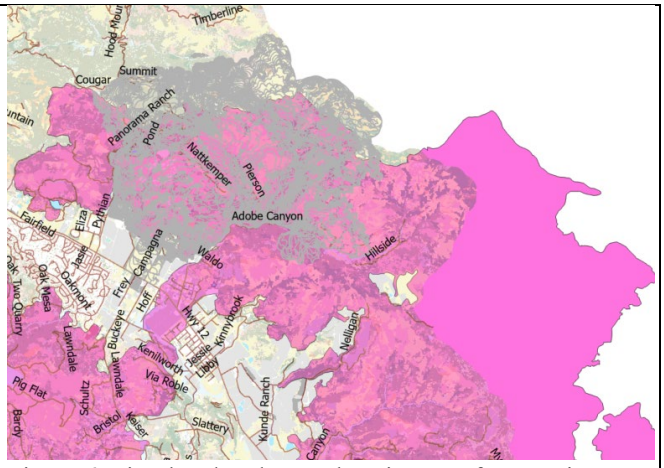


Figure 6: Simulated and Actual Perimeter of Nuns Fire.

Two primary finding were observed from these simulations. First, the predicted burn area tends to be much smaller than the actual burn area when the spotting probabilities were kept low, suggesting that short- or long-range spotting was responsible for the rapid spread of wildfires in the past few years.

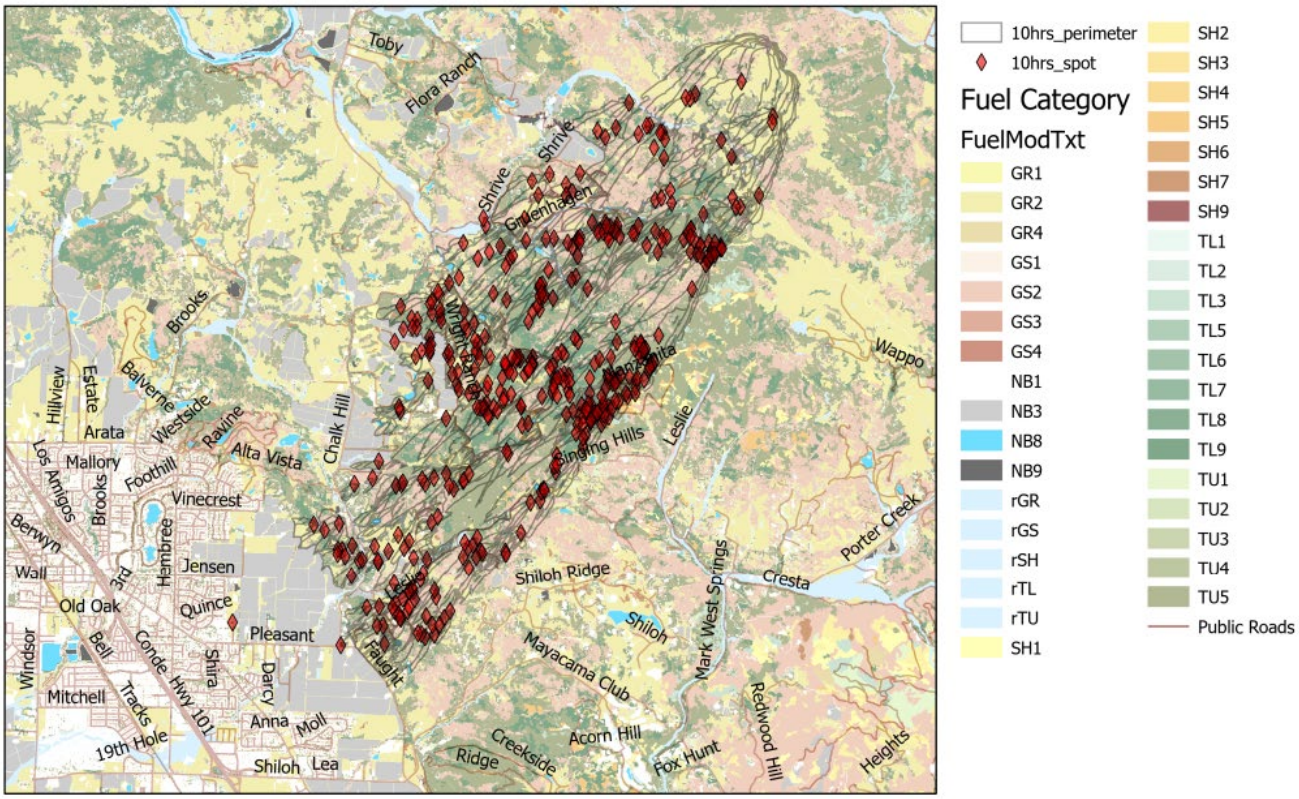


Figure 7: Continuous Fuel and Spot Fire Simulation of Kincade Fire based on the 5m Vegetation Map

The second finding is that the current fuel model fails to capture the highly flammable nature of residential buildings, thus underpredicting the spread of fire when it encroaches into a residential area.

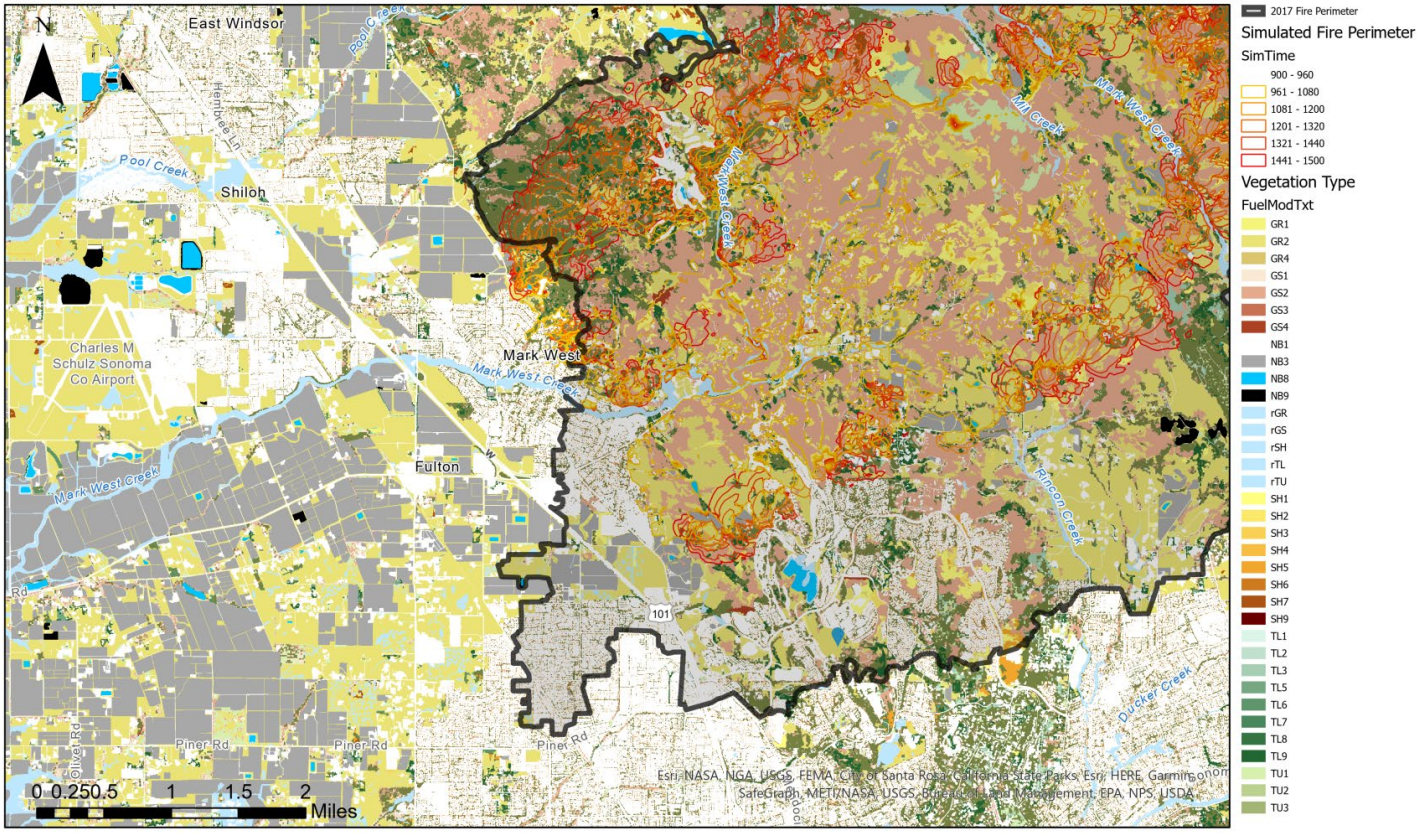


Figure 8: Simulation of Tubbs Fire based on the 5m Vegetation Map

Objective 2: I will be studying the mathematics relevant to fire modeling, such as differential geometry, cellular automata, and stochastic processes. I will also give presentations about how to connect mathematics to real-world problems such as wildfires and fuel management to the local mathematics community.

I developed an annotated bibliography of the existing literature related to the mathematics of fire modeling. Part of the material will be presented to the annual meeting of the California Mathematics Council of Community Colleges in Lake Tahoe in December 2022 in a talk titled "Family of Curves, Envelope and Applications in Wildfire Modeling."

Objective 3: *I will develop three to four projects that align with the math curriculum that students frequently take before they transfer to four-year universities to pursue STEM fields. I will also develop a project on exploratory data mining with the Python programming language that could be integrated into a new introductory course on data science to be approved by the Math department.*

Five projects, each linked to a different course, are included in this folder: Sabbatical-Committee

- Examples of Level Sets and Vector Fields in Math 1C (Calculus 3)
- S-I-R model and the System of Ordinary Differential Equations in Math 2 (Differential Equations)
- The analysis of algorithms for computing fire perimeters in Math 4 (Discrete Math)
- The assessment of burn severity by comparing the data obtained from remote sensing and those from a field monitoring program at the Pepperwood Preserve. This project is appropriate for students taking Math 15 (Elementary Statistics), especially those with a focus on environmental science and/or ecology.

- An explorative data mining project in which students use Python to compute various spatial statistics from the vegetation data. This project can be integrated into a future course that articulates with the Data 8 (Introduction to Data Science) at UC Berkeley. The creation of such a new course is currently underway in collaboration with the Computer Studies department.

E. Evaluation Summary

1. How did the objectives of this sabbatical leave enhance my work performance at the college?

My interest in fire modeling dated back to 2017, shortly after the Tubbs fire, but I had not had the time to work on the computational aspects of the project. The sabbatical allowed me to focus on software development and reading the current literature. It also gave me the time to develop connections to colleagues in other departments (GIS and Biology) and discover fresh perspectives on the courses I am currently teaching and the curriculum I will be developing in the future.

2. How did the objectives of this sabbatical leave benefit students in my discipline?

Since I regularly teach the courses mentioned in Objective #3, I will be able to immediately incorporate the new material into the curriculum while considering how the schedule will accommodate the official course outline of records. Such efforts will deepen the impact already accomplished through the CURE grant, as students benefit the most when faculty mentors use their experience to guide students in exploring their own ideas. Outside the classes outlined in Objective #3, I would also work with students who would like to continue pursuing their research interests through independent studies, preparing them for their senior year at four-year institutions.

Many of our current students have grown up during a period of chronic catastrophe: the 2017 Tubbs fire, the 2019 Kincade Fire, 2020 Glass Fire, and then the Covid-19 pandemic. Such a string of experiences can easily lead to falling into passivity and despair. However, as young climate activists have shown, engaging in action can also be therapeutic as well as empowering. By highlighting the role of mathematics in the human response to these catastrophic events, I am hoping to encourage students who are interested in STEM fields to engage in a different kind of climate action—one that connects their academic study to a larger goal valued by the public.

3. How did the objectives of this sabbatical leave benefit my department?

The mathematics department encourages its faculty to pursue research interests that will help them stay current in the discipline and connect them to the larger mathematics community. The present research project builds upon my previous research experience and will allow me to expand my skills as a mathematician. As a result, I will be able to bring new ideas to curriculum development, such as mathematical tools that can be used for current

environmental issues.

4. How did your proposed project address the SRJC Strategic Plan and/or your department's educational plan?

The educational component of my sabbatical project directly aligns with SRJC's Strategic Plan Objective A: *Support Student Success* and Objective B: *Foster Learning and Academic Excellenc*e. Part of the research that CURE relies on shows that early exposure to research experiences is one of the most effective strategies for improving retention and bridging the equity gap among students of diverse backgrounds. Such experience will encourage STEM students to persist not only through JC, but also after they have transferred to four-year institutions.

The topic of the research project is also relevant to Objective E: *Establish a Strong Culture of Sustainability*. Awareness of the impact of climate change and drought in our local ecosystem helps the local community to better assess the elevated risk of wildfires and be more informed in our rebuilding efforts towards a more resilient community. While the technical report will be directed to the mathematics community, it will have direct relevance to how fire modeling can be used to plan rebuilding in wildland-urban interfaces.

Finally, the utilization of GIS technology also bears on Objective D: *Improve Facilities and Technology*. By exposing mathematics students to the GIS lab and software, we will improve cross-discipline collaboration and build upon our existing resources to expand technological skills for our students.

F. Abstract for Board Proposal Summary

Ying Lin developed new skills in geospatial data analysis and conducted research on fire modeling. His work was summarized in a technical report to be presented to the mathematics community. He also developed five projects introducing course-based research experiences to SRJC students before they transfer to STEM fields at four-year universities.

Sabbatical Leave Report

A. Applicant

Leslie McCauley

Department: Theatre & Fashion

Type of Leave: Independent Study

Leave Dates: Spring 2022

B. Purpose of Leave

To supplement our department's instruction of THAR 1, 2, 11.1, 11.2, 13.1, 13.2, 23, 24, 26 and 28, I gained additional insight and expertise into the directing and design trends in contemporary interpretations of Shakespeare's plays and new theatrical works through observing productions in London, Stratford-upon-Avon, and Edinburgh in the United Kingdom and Dublin, Ireland. This resulted in a lecture presentation that will be used by me, or my colleagues, in our department's course work, as well as in mainstage productions.

C. Objectives

1. Traveled to the UK and Ireland for a period of 4-6 weeks during spring 2022, to cities whose theatre companies are world-renowned. Completed in 4 weeks.
2. Attended productions of Shakespeare plays at professional theatres such as the Globe Theatre, the National Theatre, The Royal Court Theatre and the Donmar Warehouse in London, the Royal Shakespeare Company in Stratford-upon-Avon, and The Abbey in Dublin, Ireland, as well a theatre in Edinburgh, Scotland. Completed 15 productions at 12 different theatres.
3. Researched and attended productions of new plays by notable contemporary playwrights in the cities listed above. Completed.
4. Attended various pre- and post-show discussions, as well as any forums with the writers, directors or designers. Completed but adapted to pandemic: online forums only.
5. Created a lecture presentation for instructional use by me, or my colleagues in their classes, on the directing and design trends in contemporary interpretations of Shakespeare's plays, and the playwrighting trends in new theatrical works. Completed.

D. Narrative

As an instructor of Theatre Arts, my teaching load includes all levels of acting, acting Shakespeare, as well as Theatre History and Literature. As part of our production program, I

direct Shakespeare's plays and contemporary new works. As the Theatre Arts' Artistic Director, I collaborate with teams of faculty and professional designers, choreographers, and musicians. I also serve as Chair of our Play Selection Committee. It is, therefore, critical that I remain current in international theatre trends in staging, interpretation, and design.

To that end, I traveled to the UK and Ireland for a period of 4 weeks during spring 2022*, to cities whose theatre companies are world-renowned. I visited all the cities listed in my proposal: London and Stratford-upon-Avon in England, Edinburgh in Scotland, and Dublin, Ireland. Many of the plays that are produced on Broadway and in American regional theatres begin in the United Kingdom and Ireland. So, I chose these various UK cities as my home base to observe productions that represent the latest in theatrical trends for staging Shakespeare and for mounting new plays.

*Theatres did not open up from pandemic restrictions in Scotland and Ireland until the end of April. Therefore, I was granted permission by the sabbatical committee for my project to begin April 27 and extend until May 31, 2022.

In these cities, I attended 15 total productions at all the theatres listed in my proposal, and many more: the Globe Theatre, the National Theatre, The Royal Court Theatre and the Donmar Warehouse in London, the Royal Shakespeare Company in Stratford-upon-Avon, and The Abbey in Dublin, Ireland. I began my project in Edinburgh, Scotland and because their theatres had only opened a few days before my arrival, there were limited offerings. I was therefore only able to attend one production in Edinburgh. The theatres I attended are known for reinterpreting Shakespeare's plays in inventive productions that include rethinking them through a contemporary lens of equity and inclusion, returning to what is referred to as Elizabethan 'original practices' staging, and, often, incorporating the latest directing and design aesthetics and technology.

Also, while in these cities, I researched and attended productions by notable contemporary playwrights, including productions that have been slotted for Broadway or the American regional theatre circuit. One example is *Straight Line Crazy* at The Bridge Theatre, starring Ralph Fiennes, which, as I write this, is opening in New York for a sold-out run. The National Theatre, The Royal Court Theatre and the Donmar Warehouse in London, in particular, develop and produce many new works that eventually transfer to Broadway.

I attended a total of 15 productions.

- London (10 performances)
- Stratford-upon-Avon (2 performances)
- Dublin, Ireland (2 performances)
- Edinburgh, Scotland (1 performance)

To supplement my observations, I planned to attend various pre- and post-show discussions, as well as any forums with the playwrights, directors, and designers. The theatres were open without any COVID restrictions (none required proof of vaccination, a negative test, masking or social distancing), but the only discussions and forums available were Zoom webinars and pre-performance videos. These proved to be convenient and effective (more effective than any recordings I could have made) and will serve as living resources for my teaching. I documented my studies through extensive notes, travel blogs (attached), and photographs (attached).

Upon my return, I compiled my research into a lecture presentation (attached). This presentation will be used in, or will inform, not only the curriculum of my classes, but those of my colleagues as well. This fall I have already incorporated portions of the presentation and my insights in THAR 13.2A & 13.2B Shakespeare Workshop. Possible other courses include: THAR 1 (World Theatre Through Time), THAR 2 (Introduction to Theatre Arts), THAR 11.1 and THAR 11.2 (Rehearsal and Performance Play/Musical), THAR 13.1A/B (Styles Workshop), THAR 23 (Introduction to Scenic Design), THAR 24 (Introduction to the Design Process), THAR 26 (Introduction to Theatrical Lighting) and THAR 28 (Costume Design).

An unanticipated side bonus of my project is that I was able to experience and learn from the UK theatres' post-pandemic adaptations and trends. These include using COVID-19 revitalization funds to remodel bathrooms to align with gender-fluid identities, the decreased importance of a physical box office in favor of e-ticketing, repurposing of box office space into expanded bar/restaurant space (revenue source), detailed online pre-show content and emailed performance protocol reminders.

E. Evaluation Summary

1. How did this sabbatical leave enhance my work performance at the college?

As a teacher of theatre history, acting, and directing, my sabbatical study and research have allowed me to bring to my current and future students first-hand knowledge and deeper perspective of current international theatre trends. This is directly in line with the College's Goals and Objectives because I am fostering intellectual curiosity, updating currency in my field, and expanding my awareness of best practices around cultural diversity in the theatrical context. I have already incorporated portions of the presentation into my overview lectures this fall in THAR 13.2A/B Shakespeare Workshop, including thematic content/interpretation, and updated casting, historic, production, and design images from Stratford-upon-Avon, and additional Shakespeare sites like The Theatre and The Curtain foundations in north London, and The Globe Theatre.

Spring 2023, I will be directing *Gloria* by one of America's leading black playwrights, Branden Jacobs-Jacobs, so I made a point of seeing his critically-acclaimed *An Octoroon* at the Abbey Theatre in Dublin. I look forward to seeing how that production influences my direction of

Gloria. I am also slotted to direct a Shakespeare play next year, and I plan to incorporate some of the directing and design trends that I saw used at the Royal Shakespeare Company and The Globe.

2. How did this sabbatical leave benefit students in my discipline?

The product of this course of study and research was a lecture presentation for our various Theatre Arts courses. Our students will directly benefit from this presentation, whether it is in a history/literature class, an acting class, or in a main stage production. My students have already benefitted because I have incorporated portions of the presentation into my overview lectures in THAR 13.2A/B Shakespeare Workshop. In particular, I focused on the trend towards equity in casting, which includes not only gender, race and ethnicity, but also socio-economic background, education, transgender-specific roles and the representation of differently limbed actors.

My students' responses were enthusiastic, and they have already realized that there is a place for them in the theatre. This is directly in line with the College's Goals and Objectives because the students are fostering intellectual curiosity, expanding their awareness of cultural diversity, becoming global citizens, and interpreting the economic and technological changes of the world through the lens of the theatrical traditions of one of the world's leading economic powers. Regardless of whether the presentation is also used by my colleagues, my experiences and knowledge gained will inform the department's curriculum and productions.

3. How did this sabbatical leave benefit my department?

The department is benefiting from both a greater intellectual curiosity and an expanded awareness of cultural diversity—qualities necessary to remain credible, relevant, and responsive in our fast-changing world. I am also able to bring my knowledge of contemporary staging and design trends to my collaborations with our design teams, and, ultimately, to manifest these trends on our mainstage, through our students' work, for our community audiences.

I have already seen the benefits of my study this fall in our production program, as I have been able to share and incorporate some of the UK's post-pandemic box office protocols, share my observations with my directing and design colleagues, and suggest important new plays and Shakespeare staging ideas to our Play Selection Committee.

4. How did this sabbatical leave address the SRJC Strategic Plan and/or your department's educational plan?

Our department's goal is to offer students a wide range of training opportunities, in a variety of areas within our discipline: acting, directing, playwrighting, script analysis, design and technical theatre. For my colleagues, the lecture presentation that I developed and my additional insights into the directing and design trends in contemporary interpretations of Shakespeare's plays and

new theatrical works, will foster intellectual curiosity, expand their awareness of cultural diversity, and help move us all toward the ideal of becoming responsive global citizens.

For example, I noticed the following 2020-2022 diversity, equity, and inclusion movements influenced season selection, staffing and casting:

- Black Lives Matter
- #MeToo
- Gender identity
- Addressing exclusivity of classist white theatrical traditions
- World politics

In response to those movements, the performances included the following topics and themes:

- Transgender characters and questions of identity
- Minstrelsy and representation re-examined through the Black lens
- Great women of history as told through a hip-hop musical
- The Palestinian/Israeli conflict examined from the personal and political
- The effects of Hindu nationalism on Ghandi's assassin
- The American 2024 Election and Donald Trump, performed in iambic pentameter, and referencing Shakespeare's plots, and themes
- The British/Jamaican nurse Mary Seacole and the connection between caregiving and race
- New York's city planner Robert Moses and his insidious racist agenda
- The notion of "Englishness," told via a modern, mythic, and raucous English hero
- English history examined through the lens on equity, diversity, and inclusion
- The universality of Shakespeare's plots and their historical relevance to contemporary politics
- Extraordinary design work and use of the latest stage technology
- Universal, middle-aged relationship challenges

F. Abstract for Board Report Summary

Leslie McCauley traveled to the United Kingdom and Ireland to gain additional insight and expertise into the directing and design trends in contemporary interpretations of Shakespeare's

plays and new theatrical works through observing productions in London, Stratford-upon-Avon, and Edinburgh in the United Kingdom, and Dublin, Ireland. To supplement her observations, she viewed various forums with the playwrights, directors, and designers. She documented her studies through extensive notes, a travel blog, and photographs. This resulted in a lecture presentation that will be used, or will inform the department's course work, as well as in mainstage productions.

G. Appendices

- Lecture Presentation
- Travel Blog

Sabbatical Leave Report

A. Applicant

Name: Scott Meehl

Department: Health Sciences

Type of Leave: Independent Study

Leave Dates: Fall 2022

B. Purpose of Leave

The purpose of my sabbatical leave was to identify successful teaching techniques and student learning strategies to increase academic success for ESL nursing students. The goal is to share with fellow nursing faculty those techniques not currently used, or that are underused in our Nursing Program, which could benefit students whose mother language is not English.

C. Objectives

1) In addition to Santa Rosa Junior College, I researched one school of nursing in California with culturally diverse cohorts and conducted interviews of nursing faculty as well as prelicensure nursing students whose first language is not English. The interviews were conducted in person.

2) I researched ten schools in Canada and interviewed via Zoom and in person faculty and students from five schools of nursing in Québec. The schools prepare nurses to be linguistically competent in either French or English to care for a multicultural / multilingual population.

3) Through interviews with faculty and students, I compared and contrasted the teaching strategies in use at the various schools and identified several teaching techniques and learning strategies which could be implemented in our SRJC nursing curriculum to help our ESL nursing students better assimilate course content.

4) I prepared a power point presentation for SRJC nursing faculty on the teaching approaches these schools utilize that foster increased success for nursing students taught in a language other than their mother tongue. The power point will be presented to SRJC nursing faculty as an approved department-specific PDA workshop February 16, 2023.

D. Narrative

The focus of this sabbatical project was to identify successful teaching strategies for nursing students whose primary language was not English. SRJC Associate Degree Nursing cohorts reflect Sonoma County's cultural diversity and significant LatinX community. Identifying successful teaching strategies for these students has the potential to improve ESL nursing student academic performance and program completion.

1) **California: Los Angeles County College of Nursing and Allied Health**
   The Los Angeles County College of Nursing and Allied Health (LACCONAH) is a two-year community college that has an Associate Degree Nursing (ADN) Program. Their website is: https://dhs.lacounty.gov/college-of-nursing-and-allied-health/
   I selected this school because of commonalities with SRJC's Nursing Program: both Programs deliver an Associate of Science Degree in Nursing, the nursing student body/cohort size at both schools are comparable, and both schools require applicants take the Test for Essential Academic Skills (TEAS), with similar minimum scores of 64.7% (LACCONAH) and 62% (SRJC).

   The College has its own independent campus, near the Los Angeles County+USC Medical Center; its primary clinical training hospital. I travelled to Los Angeles and met with the College Provost and three members of the College's nursing faculty[1].

   The student body at LACCONAH reflects the racial and cultural diversity of Los Angeles. Through conversations with nursing students, I learned many are first generation to college and live in homes where English is not the primary language. Our meeting focused on teaching challenges faculty faced with students whose first language was not English, and what remediation strategies were employed for student success. LACCONAH does not provide ESL remediation or support services. Listed below are student support resources:

   - Designated faculty for student tutoring and remediation.
   - "Supplemental instruction available in content areas includes anatomy, physiology, microbiology, nutrition and mathematics/computation skills, and practice of clinical nursing skills." (LACCONAH College Catalog, p. 38)
   - No ESL Department for student support
   - **Essential Function Standards Required of School of Nursing Students**: "Students must demonstrate the ability to read and understand written documents in English. Students must communicate effectively and efficiently in English with patients, families and other health care providers and demonstrate clarity verbally, non-verbally and in writing." (LACCONAH College Catalog, p. 43)

   .

2) Canada

Canada has two official languages: English and French. All Canadian Provinces and Territories are officially bilingual at the Federal level, however official bilingualism does not mean personal bilingualism[2]. Despite being the second largest country in land mass, Canada's population is only 38.25 million, or 11.5% of the US population.

Canada actively encourages immigration and provides all newcomers acculturation and/or language classes in English or French. In Québec Province, arriving immigrants aged 16+ receive free French language training. Children under 16 are enrolled in language classes as part of their schooling. Children who already speak English can attend either an English or French language college for their higher education. Canada also provides incentives for international students to immigrate following completion of a college or university degree.

Being fluent in French and English, I spent several months in Québec visiting ten Colleges with schools of nursing, gained entrée to five nursing programs and interviewed program directors, faculty and students. Colleges in Québec are known as "CÉGEPs"[3]. The five nursing programs I visited enroll many international students whose primary language is neither English nor French. In Canada, these students are referred to as "allophone", and the 2021 census revealed over 9 million Canadians (23.5%) had a mother tongue other than English or French. In spite of Canada's bilingual status, none of the Canadian Colleges I visited taught bilingually. Each school taught their curriculum in either French or English.

At each meeting, I familiarized Program Directors and Faculty with a short Power Point on Santa Rosa Junior College, the ADN Program, and the teaching challenges we experience with students whose primary language is not English. The presentation, in French for the French CÉGEP, and an English version for Collège Vanier, highlighted nursing program similarities and common challenges faculty encounter teaching nursing to students who have verbal language and/or comprehension difficulties[4].

Paired with the presentation, I provided faculty a list of questions to identify learning challenges for allophone nursing students[5].

The Canadian CÉGEP (Colleges) where I exchanged ideas are listed below:
French Language Schools of Nursing

- CÉGEP de Rimouski: https://www.cegep-rimouski.qc.ca/programme/soins-infirmiers
- Collège de Maisonneuve: https://www.cmaisonneuve.qc.ca/programme/soins-infirmiers/
- CÉGEP de Saint-Laurent: https://www.cegepsl.qc.ca/programmes/soins-infirmiers/

- CÉGEP du Vieux Montréal: https://www.cvm.qc.ca/programme/soins-infirmiers/

English Language School of Nursing

- Collège Vanier: https://www.vaniercollege.qc.ca/admissions/program/nursing/

3) Interview Findings

Each CÉGEP requires prospective students take a language entry examination to determine minimum speaking and writing abilities for the language of instruction. Some nursing faculty felt the language entry exam evaluates inadequately the allophone student's command of the language. Once enrolled, faculty frequently discover language deficiencies and difficulties as students struggle to understand and verbalize nursing concepts.

To better understand what language testing entailed, I took the British Council's International English Language Testing System (IELTS) and the French Education International's Test de Connaissance du Français pour le Québec (TCFQ)[6]. While my scores on both exams were very high, I scored higher on the French exam (my second language) than on the English; possibly due to variations in American versus British orthography.

Canadian nursing students have the option to take required language courses in later semesters, which is a potential disadvantage; as their language skills may not grow while the nursing curriculum becomes progressively more complex. Some nursing programs (CÉGEP de Saint-Laurent) have nursing cohorts with over 45% allophone students. The variation in language mastery presents significant challenges for faculty. Some faculty observed allophone students having difficulties caring for more than two patients, when the expectation in the final two semesters is care for four to six patients in a Canadian hospital.

All Canadian colleges I visited had language skills remediation departments to refer students experiencing language difficulties. One consideration suggested by repeatedly by faculty would increase the minimum thresholds for comprehension and communication on the entry language admission exam.

Many strategies for student success are already in place in the SRJC ADN Program. These include:

- Dedicated student success faculty for referral and test remediation.
- Extra skills laboratory remediation sessions
- Didactic "flipped classroom" sessions
- Student teach back

Several novel strategies suggested in our exchanges are the following:

- "Adjunct Tutorial Classes" Two-hour weekly sessions where learning specialists (not nursing faculty) administer comprehension and writing training exercises with the first-year students. Exercises are evaluated by the specialist and remediation recommendations are tailored to each student. Training specialists provide training sessions to reinforce identified areas of weakness: organization, note taking, oral presentation, etc.
- "Tutoring and Academic Success Center": Drop in sessions with learning specialists, (English/French/Mathematics/Nursing) as well as spoken language expression.
- "Casper Test" an online open-response situational judgement test used for entry into English-speaking Canadian universities. Students are presented one a life experience situation and respond concisely. Responses are evaluated for clarity and organization, ethics, empathy, problem-solving and collaboration[7].

4) Presentation to SRJC Nursing

I present my sabbatical findings to the SRJC nursing faculty as part of a PDA day department-specific approved workshop, on Thursday February 16, 2023.

E. Evaluation Summary

1. How did this sabbatical leave enhance my work performance at the college?

   This sabbatical provided a unique opportunity to observe how other nursing programs approach the challenge to increasing student success for ESL students. I recognize the need for improved English language testing and remediation for students.

2. How did this sabbatical leave benefit students in my discipline?

   I have gained a greater sensitivity to the needs of my nursing students, both ESL and native English speakers. Beyond language mastery, nursing requires empathy and an understanding of individuals from different life stages. Language inequities aside, all nursing students need to learn how different generations express their needs and anticipate their age-appropriate care needs. I will incorporate into my didactic and clinical instruction an increased focus on patient acculturation.

3. How did this sabbatical leave benefit my department?

   As previously stated, I am sharing my findings with my nursing colleagues on strategies for improved ESL student success at my PDA day presentation, on February 16, 2023. It is hoped that findings I present will generate faculty interest to test some of these approaches discovered at the Canadian schools.

4. How did this sabbatical leave address the SRJC Strategic Plan and/or your department's?

   The SRJC Associate Degree Nursing Program is overseen by both the College and the California Board of Registered Nursing. As patient care and delivery become progressively more complex, our curriculum and teaching methods must also evolve to meet these changes. Sonoma County's growing LatinX population means we need more culturally sensitive and linguistically competent nurses to meet the care needs of Hispanic and other ethnicities.

F. Abstract for Board Report Summary

In fall 2022, Dr. Scott Meehl met with faculty and students at nursing schools in Los Angeles, California and Québec, Canada, to explore their approaches to increase academic success for students whose first language is different from the language of instruction. Through this collaborative exchange, he presented his findings to the SRJC nursing department for consideration and potential inclusion into the nursing program curriculum.

G. Appendices

1. LACCONAH meeting participants: Vivian Branchick, MS, BSN, RN, *Provost,* Jeffrey Anderson, MSN, RN, *Director of Tutoring and Mentoring*, Maria Caballero, *Director of Student Advisement & Counseling*, Dr. Ruby Griggs-Gabbedon, DNP, RN, *Director, Educational Resource Center.*
2. Royal Commission on Bilingualism and Biculturalism (1967) https://epe.lac-bac.gc.ca/100/200/301/pco-bcp/commissions-ef/dunton1967-1970-eng/dunton1967-70-eng.html
3. Colleges in Québec are referred to by their acronym CÉGEP: *Collège d'Enseignement Général et Professionnel* CEGEP)
4. French language Power Point presentation: *Amélioration des Résultats Académiques en Soins Infirmiers des Étudiants Allophones*, and English language version: *Enhancing Academic Success in Nursing for Non-Native Speakers*
5. French and English versions of Questions.
6. The language assessment exam results are part of a separate attachment.
7. The Casper Test by Altus Assessments: https://acuityinsights.app/faq/

Sabbatical Leave Report

A. Applicant

Name: Geoff Navarro

Department: Counseling

Type of Leave: Independent Study

Leave Dates: Fall 2022

B. Purpose of Leave

The purpose of my sabbatical leave was to investigate best practices of model community college transfer centers to research how each of these centers provides services to first-generation transfer students, specifically Latinx students. The intent of this research was to identify and subsequently propose enhanced transfer services offered by Santa Rosa Junior College to best support first-generation, Latinx transfer students.

C. Objectives

1. Interviewed four transfer center Counselors and researched best practices in serving first-generation, Latinx transfer students.
2. Visited three California community colleges with model transfer centers.
3. Reviewed the most current literature available on successful transfer practices of community colleges in supporting first-generation, Latinx transfer students.
4. Interviewed four first-generation, Latinx transfer students who successfully transferred and will incorporate their success strategies with SRJC transfer students.

D. Narrative

Latinx students who enroll in college are frequently first-generation students who often lack family support and informational capital regarding the college-going process, including university transfer. Research tells us that Latinx students are more likely to come from disadvantaged backgrounds. Targeted institutional support efforts can help Latinx students thrive, and, ultimately, transfer from a community college to a university. As a bilingual, bicultural, Latinx Counselor at SRJC, it is critical that I stay abreast of best practices in serving Latinx transfer students.

My sabbatical afforded me the opportunity to conduct research pertaining to best practices in serving first-generation, Latinx transfer students. Having dedicated time to research best practices at other community colleges was invaluable. I was able to glean ideas and learn other

practices that Transfer Counselors/Directors incorporate into their transfer practices pertaining to Latinx students. Ultimately, the information I gathered, and the success strategies I learned will allow for greater success opportunities for first-generation, Latinx transfer students at SRJC.

Objective 1: On Monday, October 17, I visited Contra Costa College. During my visit, I met with Counseling Department Chair Norma Valadez-Jimenez. I also met by phone with Andrea Phillips, Coordinator of the Transfer Center. At Contra Costa College, they have a program entitled, "*Get on the Bus*." This program allows prospective transfer students to visit university campuses and learn more about opportunities to transfer to universities to complete a bachelor's degree. *Get on the Bus* is heavily advertised to BIPOC (Black, Indigenous, People of Color) students and first-generation college students.

On Thursday, November 10, I visited Southwestern College. There, I met with David Ramirez, a Counselor for The Puente Project, and Michelle Haggar, the Director of Career and Transfer Connections. David explained the *Latinx College Leadership Institute* (LCLI), where 150 Latinx students participated in an annual overnight leadership program to empower and educate students. Community leaders in San Diego and Latinx college faculty collaborated to facilitate a series of workshops for Latinx students as part of this leadership program.

On Thursday, December 15, I visited Napa Valley College. There, I met with Dr. Sherry Tennyson, Career Counselor and Transfer Counselor. I also spoke by phone to Elizabeth Lara-Medrano, the Transfer Center Coordinator/Counselor. At NVC, their Transfer Center offers a collaborative workshop with the Extended Opportunity Programs & Services (EOPS) called, "Transfer 101." EOPS students are comprised of first-generation college students, many of whom are Latinx. This informational workshop explains the basics of transfer from a community college to a university. The NVC Transfer Center also sends out an electronic newsletter to every enrolled student. According to Elizabeth Lara-Medrano, 4,000 students open this electronic newsletter.

Objective 2: As mentioned above, I visited three community colleges during my sabbatical: Southwestern College, Napa Valley College, and Contra Costa College. I toured each college's Transfer Center and met with Counselors and Transfer Center Directors/Coordinators.

Objective 3: I began my sabbatical by studying the websites of the community colleges I ultimately visited. I read about the student support programs at each institution that are in place to support Latinx students, especially Latinx transfer students. I also read pertinent information online pertaining to best practices in supporting, retaining and serving first-generation, Latinx transfer students. My research gave me new perspectives on current methodologies and delivery practices.

Objective 4: I interviewed four Latinx students who transferred from California community colleges to universities. My goal was to gather information from these Latinx transfer students to find out what, specifically, helped them at their respective community college to complete their transfer goal.

1. Roberto Alvarenga, Contra Costa Community College: having at least one go-to person at my former college who I got to know and who I could rely on for support and information regarding the transfer requirements and process really helped.
2. Marisol Vargas, Southwestern College: getting help with my university applications made the biggest difference because I had no idea what I was doing. It was overwhelming. My parents couldn't help me.
3. Arturo Guerra, Napa Valley College: having the opportunity to step foot on university campuses made transferring real for me.
4. Araceli Malfavon, Southwestern College: Puente saved my life. Having programs geared towards Mexican-American (Latinx) students is super important.

E. Evaluation Summary

1. How did this sabbatical leave enhance my work performance at the college?

   As a bilingual, bicultural, Latinx Counselor at SRJC, it is critical that I remain aware of best practices in serving Latinx transfer students. Researching and studying the best practices inherent to other Transfer Center service models has allowed me to consider ways to enhance the manner in which I serve Latinx transfer students in order to increase retention and success.

2. How did this sabbatical leave benefit students in my discipline?

   My experience visiting three California community colleges and speaking with other community college Counselors/Directors who work closely with Latinx transfer students provided me with different ideas and potential approaches in working with Latinx transfer students.

3. How did this sabbatical leave benefit my department?

   I will meet with my colleagues in the Transfer Center to convey my key findings and to discuss possible ideas to enhance the services we offer to Latinx students. Studying the approaches and services of other community college Transfer Centers has helped me to explore what possible changes we can implement to best serve Latinx students.

4. How did this sabbatical leave address the SRJC Strategic Plan and/or your department's educational plan?

   My sabbatical project aligns with Goal A, supporting student success: "expand and sustain access by eliminating barriers, expanding strategic outreach efforts and delivering service effectively through current technologies." My research will be shared with other Counselors in the Transfer Center and within our department.

F. Abstract for Board Proposal Summary

During the fall 2022 semester, Geoff Navarro researched best practices for community college transfer centers and enhanced his current levels of knowledge pertaining to first-generation, Latinx transfer students. Geoff consulted with other California community college Transfer Center Directors, and Counselors who work directly with Latinx transfer students. Geoff visited three community colleges with model transfer centers to garner information that will benefit Latinx transfer students at SRJC. These strategies will be incorporated into his work with Latinx SRJC transfer students.

G. Appendices

The Puente Project: https://www.thepenteproject.org

Napa Valley College: https://www.napavalley.edu/student-services-and-resources

Southwestern College: https://www.swccd.edu/student-support/transfer-center

Southwestern College: https://www.swccd.edu/student-life/learning-communities

Contra Costa College: https://www.contracosta.edu?student-services/transfer

Inside Higher Ed: https://www.insidehighered.com/quicktakes/2020/09/03/report-top-difficulties-latinx-students-face

Sabbatical Leave Report

A. Applicant

Name: Jessica Pardoe

Department: ESL

Type of Leave: Online curriculum development

Leave Date: Fall 2022

B. Purpose of Leave

The purpose of my sabbatical leave was to develop Canvas modules for ESL 10, which will provide students with focused grammar and vocabulary practice and instruction in specific academic genres. These modules will be available for all ESL instructors to import into their Canvas courses.

C. Leave Objectives

1) I researched the English grammatical constructions and vocabulary typical of common academic genres across the disciplines. My objective has been completed.

2) I created original Canvas modules for ESL 10, a transfer-level, genre-based reading and writing course, focusing on academic grammar and vocabulary development in specific academic genres. My objective has been completed although I focused more heavily on academic vocabulary.

3) I shared modules with all ESL instructors for use in their classes via our Canvas ESL Instructor Resources site. My objective has been completed.

D. Narrative

Objective One: Based on previous surveys of ESL students in our credit program, I determined the top two fields of study, which were health sciences and business. From these fields, I identified the most common academic genres, or types of writing assignments, to focus on in the development of my online modules. I relied heavily on the published works of linguists Ken Hyland, Ann Johns, and Dana Ferris, who specialize in the linguistic constructions representative of genres across the content areas. I also relied on information gathered in a previous survey of SRJC ESL students to compile notes of the grammatical forms and vocabulary typical of these writing types.

Objective Two: I spent the bulk of my sabbatical leave developing Canvas modules for ESL 10 based on the two academic disciplines identified in my research detailed in Objective One. In addition to these two academic disciplines, I also developed a module for general academic vocabulary acquisition based on the Academic Word List. Each module focuses on building vocabulary and grammar knowledge in one of the academic disciplines. In total, I created 15 Canvas modules. There are five modules per discipline: Health Sciences, Business, and general academic vocabulary/grammar. Each module contains six sections: vocabulary presented in context, vocabulary presented in isolation, a reading comprehension check. definition practice, collocations and word forms practice, free response questions, and a reading comprehension/vocabulary quiz.

Objective Three: At the culmination of my sabbatical leave, I uploaded the ESL 10 Canvas modules to our ESL Instructor Resources site along with instructions for use. ESL 10 instructors will be free to incorporate the modules into their courses, and the modules will also serve as models for the future development of online support materials for our other credit ESL classes.

E. Evaluation Summary

1. How did this sabbatical leave enhance my work performance at the college?

Our department has worked hard (for years!) to create ESL 10 and get the course approved. Over my sabbatical, I had the opportunity to reflect on this course and to create meaningful materials that will assist our students in reaching their academic goals through a better understanding of the writing conventions in their chosen disciplines. Through this process, I was able to connect with my colleagues across the college to get a better sense of the writing demands in their respective areas and use this information along with my research to identify what students need to know to be successful writers and readers in their content classes and beyond. These connections to our students and their goals along with my colleagues and their content-area expectations have enhanced my understanding of where our students want to go and what will be expected of them once they get there.

2. How did the objectives of this sabbatical leave benefit students in my discipline?

ESL 10 is our department's newest course addition. We offered the class for the first time in Fall 2019. It is a transfer-level, genre-based reading and writing course that students can take in lieu of English 1A to fulfill the local writing requirement as well as the composition requirements for transferring to a CSU or UC. One feature of the course is an additional .5 unit, which serves to promote our students' continued academic English development by focusing specifically on college-level grammar and vocabulary. To facilitate practice in these areas, our department has traditionally used the online platforms provided by textbook companies. However, these web-based programs have a number of problems, namely that they are expensive for our students to purchase and difficult for them to access. They also do not meet all the needs of our specific courses. ESL students will benefit from the Canvas modules I created over my sabbatical as they will receive the practice in disciplinary academic vocabulary and some common grammatical constructions without incurring additional costs. The materials I created during my sabbatical project will help students attain their academic goals by aiding them in becoming better writers and readers across the disciplines.

3. How did the objectives of this sabbatical leave benefit my department?

The modules I developed will also benefit the ESL Department as these exercises will replace the need to rely on online platforms offered by textbook companies. While many of the platforms provide auto-grading features, our instructors still have to transfer the grades from these sites to their Canvas gradebooks. Developing Canvas grammar and vocabulary modules for ESL 10 has helped address this issue as teachers can import the modules into their Canvas sites. The modules can also serve as models for future online curriculum development as we hope to create Canvas practice materials for all levels of our ESL pathway. Lastly, these modules provide a useful trove of curricular materials for instructors as ESL 10 is a new course with few existing resources.

4. How did your project address the SRJC Strategic Plan and/or your department's educational plan?

This sabbatical project specifically addressed the objectives in the SRJC Strategic Plan of supporting student success, fostering learning and academic excellence, and improving technology. Research shows that second-language learners need ample practice in the target language to progress. While students get substantial exposure to conversational English through their daily experiences, it is difficult to find the time and space to provide students with all the practice they need in academic English. These Canvas modules provide additional practice for students in academic English, while minimizing the grading burden on instructors and eliminating the cost of purchasing access to an online platform for students.

F. Abstract for Board Report Summary

Jessica Pardoe created original Canvas modules for ESL 10, a transfer-level, genre-based reading and writing course for multilingual students, focusing on academic grammar and vocabulary development in specific academic genres. The development of these modules is based on her research of English grammatical constructions and vocabulary typical of common academic genres across the disciplines as well as her study of the cognitive science behind how second-language learners develop strong academic literacy skills in English. All modules have been shared with ESL instructors for use in their courses via the department's Canvas ESL Instructor Resources site. ESL students can now benefit from the additional English language practice facilitated by these modules without incurring any costs typically associated with the online platforms offered by textbook companies.

G. Appendices

Sources used during sabbatical leave:

The Knowledge Gap by Natalie Wexler

Language at the Speed of Sight: Why We Read, Why So Many Can't, and What Can Be Done About It by Mark Seidenberg

Reading in a Second Language: Moving from Theory to Practice by William Grabe

Reading in the Brain by Stanislas Dehaene

Science of Reading

Link to Canvas modules:

ESL 10 Academic Vocabulary/Grammar Canvas Modules

Additional narrative:

Since graduate school, I've been interested in academic vocabulary acquisition and the ways in which vocabulary is truly the portal to knowledge and one of the most profound ways a second-language learner can improve both their reading and writing skills. Second language learners must know between 95 and 98% of the vocabulary in a passage to comprehend the text effectively (Grabe). And as Natalie Wexler

explains, “The most important factor in determining whether readers can understand a text is how much relevant vocabulary or background knowledge they have. While a limited amount of instruction in comprehension strategies can help some students derive meaning from text, that’s only possible if they have enough knowledge to make sense of the text in the first place” (47).

In our ESL course outlines of record, we usually list the acquisition and use of vocabulary as one of the goals of the class. However, it’s somewhat misleading to consider vocabulary acquisition as one item in a list of many things that we need to teach our students. Some of this is the nature of the Course Outline of Record genre, but in actuality, we must start with vocabulary as the portal to knowledge before we expect our students to do anything with a text. The inconvenient truth is that students need exposure to vocabulary and knowledge to create a threshold of understanding necessary for comprehending academic texts. One person I read referred to this as a “knowledge party.” At the end of the day, reading is decoding words and understanding what they mean. You cannot successfully hack this process with reading strategies.

This was truly the springboard for my project. I set out to create vocabulary and relevant grammar exercises in Canvas for ESL 10 students to help students acquire the underlying vocabulary needed to understand disciplinary texts. While I accomplished my goal of creating modules, my sabbatical also gave me greater insight into the direction we should take the course. ESL 10 should really be taught as a learning community with another disciplinary course, and/or it needs to include more explicit focus on knowledge building in representative disciplines. We are currently asking our ESL 10 students to do a lot of analysis and critique of disciplines that many have very little knowledge of yet. My research during my sabbatical project helped me realize how much more relevant academic vocabulary and content these students need to build the background knowledge needed to meet the reading and writing demands of their content-area classes.

I am profoundly grateful for this time of reflection and research. I don’t think I would have come to these important conclusions regarding this transfer-level class without the time and space to consider the course from a different perspective. I am confident these realizations will help me build a class that will be beneficial to multilingual students as they begin to tackle the reading and writing demands in their disciplines.