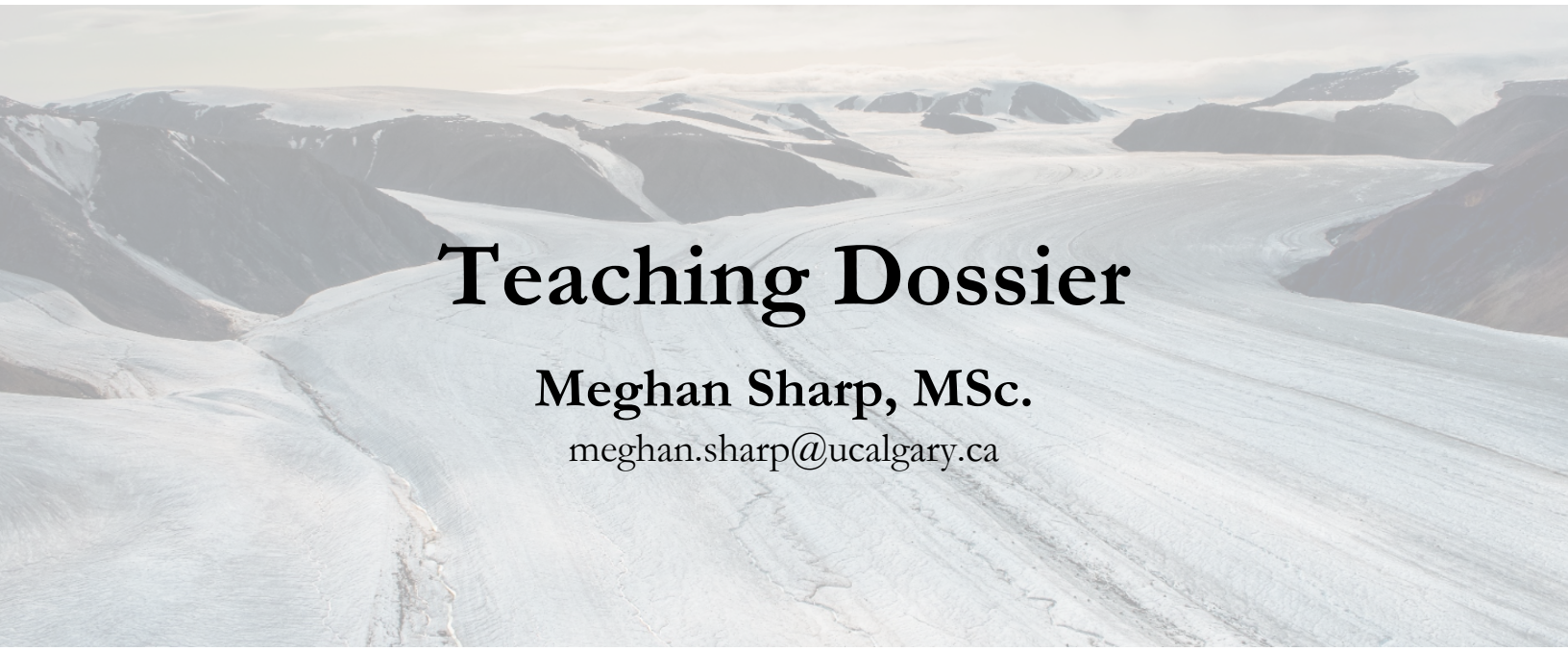

Teaching Dossier

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Teaching Responsibilities

2021 GOPH 419: Computational Methods for Geophysicists

Role: Teaching Assistant (Laboratory)

Level: 3rd year undergraduate

Required/ Elective: Required

2020 GOPH 517: Time Series Analysis and 1D Data Processing

Role: Teaching Assistant (Laboratory)

Level: 4th year undergraduate

Required/ Elective: Required

2020 GOPH 419: Computational Methods for Geophysicists

Role: Teaching Assistant (Laboratory)

Level: 3rd year undergraduate

Required/ Elective: Required

2019 GOPH 351: Introduction to Geophysics

Role: Teaching Assistant (Laboratory) & Substitute Lecturer

Level: 2nd year undergraduate

Required/ Elective: Required

Teaching Philosophy

The students that leave my classroom are curious, confident, team-oriented versions of those that first entered; that is my intent, at least. Owing credit to the teachers of my past, as well as the learners that I have taught both in and outside a formal classroom setting, I believe that learning is most effective when it is self-driven– a "follow-your-nose" approach to the subject matter. This is the foundation of my teaching beliefs. This approach is not effective, however, when learners are expected to simply "dive-in" without guidance. Thus, the following three teaching beliefs and strategies are designed to reinforce each other and are rooted in learning through curiosity.

We are a team: A learning environment that invites questions is one in which the teacher and learners play on the same team. As a 15-year-old high school student, I hated mathematics. This drastically changed when the teacher of my *Introduction to Functions* math class demonstrated how math could be "fun" (I am now a geophysicist and enjoy teaching math). Her enthusiasm while teaching was not only engaging, it was inviting. We sang the quadratic formula and alternated teaching our classmates the properties of various functions on the chalkboard. Students had the opportunity to take on the teacher-role– we played on the same team. Ultimately, a safe space for student participation was created, one that I strive for in all the classes I teach.

We evolve: As a learner, have you ever felt lost to the point of "imposterism"? In an advanced upper-level course during my undergraduate degree, I was encouraged to learn with this "follow-your-nose" approach that I now advocate for. My learning was inhibited, however, as I felt as though I did not have a foundation on which to ask questions; I felt lost, not curious. Realizing this, my instructor built my self-confidence by identifying areas of my pre-established knowledge and naturally, sparked my curiosity in the subject. Following this teacher and role-model, I believe in a gradual progression to attaining knowledge, building from the learner's foundation. Moreover, I strongly consider the value of *self-confidence* in my teaching approach– a self-confidence that guides a learner to develop questions and to ask them.

We are curious: Once a team-based environment is established in the classroom, with a defined learning foundation (either individually or collectively), students have the confidence to form and ask questions. As a result, a deeper level of understanding of the subject matter can be achieved as learners explore their questions. This self-driven understanding ensures that learners *evolve* as their knowledge base grows and it reinforces the identity of an instructor-learner *team* as students ask questions. The interconnectedness of these three beliefs is why I choose to implement a "follow-your-nose" approach to my teaching.

In order to implement these beliefs, I draw on a quote from the wilderness education organization, Outward Bound Canada:

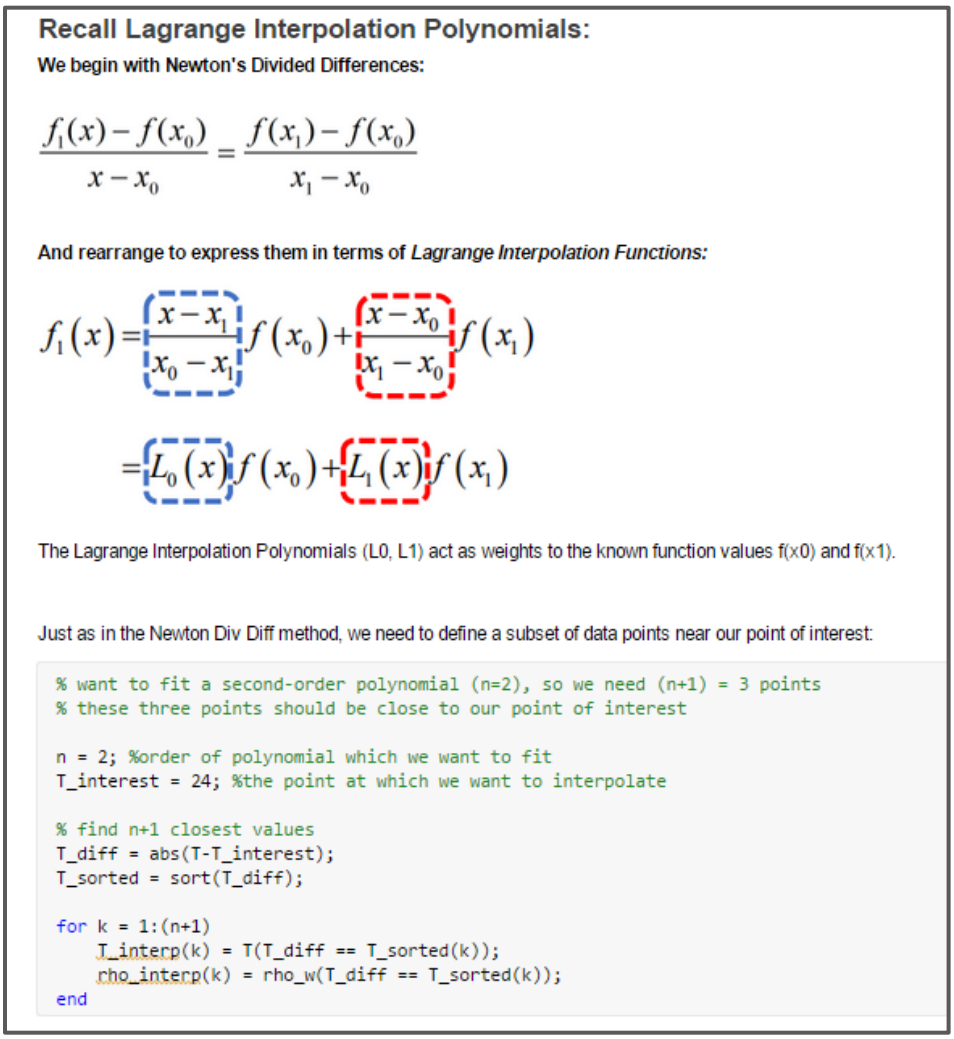
> "the wonderful thing about outdoor education is that often the test comes first, and the lesson comes second"

During an internship as an instructor with Outward Bound Canada (an experiential teaching role), I found this "test-first" strategy had the capability to push students to the tops of mountains and problem-solve as a team. I strive to bring this outdoor strategy inside through collaborative demonstrations. For instance, in my demonstrations for computer coding classes, I build computer codes *with* the class instead of *for* the class. This is an example of "diving in" with guidance. It establishes the basis of what the students already know, and we learn by making mistakes and overcoming "road-blocks". From this learning foundation, students are encouraged to spark their curiosity through flexible assignments that relate to their own interests and their own questions.

In a team-based classroom, it is important that the teacher is also a learner. Thus, I strongly value constructive feedback from my students. Through participation in future teaching workshops, I will improve the speed in which I cover material and adapt this rate to fit a variety of students' needs. Many of my past students have described my teaching presence as "approachable" (Figure A.1) and commented on the effectiveness of my strategies as I "point [them] in the direction you need to go" (Figure A.2). I view this feedback as evidence of the effectiveness of a team-based learning environment.

Teaching Methodologies and Materials

My teaching employs a "test-first" strategy that sparks student curiosity and builds a team-based learning environment. For example, when leading laboratories for computer programming-based courses, I begin each session with an interactive demonstration that is related to the students' assignment. I build a "live" programming script that combines text, figures and code. We alternate amongst students, taking turns filling in a line of code to perform a specific task. The following is an excerpt from one of my activities:



Recall Lagrange Interpolation Polynomials:

We begin with Newton's Divided Differences:

$$\frac{f_1(x)-f(x_0)}{x-x_0}=\frac{f(x_1)-f(x_0)}{x_1-x_0}$$

And rearrange to express them in terms of *Lagrange Interpolation Functions:*

$$f_1(x)=\frac{x-x_1}{x_0-x_1}f(x_0)+\frac{x-x_0}{x_1-x_0}f(x_1)$$

$$=L_0(x)f(x_0)+L_1(x)f(x_1)$$

The Lagrange Interpolation Polynomials (L0, L1) act as weights to the known function values f(x0) and f(x1).

Just as in the Newton Div Diff method, we need to define a subset of data points near our point of interest:

```
% want to fit a second-order polynomial (n=2), so we need (n+1) = 3 points
% these three points should be close to our point of interest

n = 2; %order of polynomial which we want to fit
T_interest = 24; %the point at which we want to interpolate

% find n+1 closest values
T_diff = abs(T-T_interest);
T_sorted = sort(T_diff);

for k = 1:(n+1)
    T_interp(k) = T(T_diff == T_sorted(k));
    rho_interp(k) = rho_w(T_diff == T_sorted(k));
end
```

Figure 1. Example interactive demonstration for coding-based classes

This strategy ensures that "we are a team" (teaching belief #1) as we work together to solve the problem, that "we evolve" (teaching belief #2) as students are challenged to apply course concepts. Laboratory assignments that follow these exercises ensure that "we are curious", as students adapt these activities to their own personal interests (teaching belief #3).

Professional Learning and Development

Certificates:

2021 Graduate Student Certificate in University Teaching and Learning | University of Calgary

Badge 1: Emerging Teachers Development

Badge 2: Learning Spaces & Digital Pedagogies

Badge 3: Developing Your Teaching Dossier

Badge 4: SoTL Foundations

Badge 5: Theories and Issues in Postsecondary Learning and Teaching

Student Feedback and Course Evaluations

Student feedback from Teaching Assistantships suggests that my effort to provided flexible office hours was appreciated. This feedback also suggests that I have successfully promoted student learning and curiosity by guiding them to learn from mistakes and explore their "why" questions. I am continuing to adapt the speed of my laboratory demonstrations and presentations to complement a variety of student needs.

"She was available to help, not just with labs but the lecture material too! … She should teach more classes in the future!"

- Anonymous Teaching Assistant Evaluation (Figure A.3)

"Would find out the answer to a 'why' questions if she didn't know… Willing to help us find out where we went wrong…"

- Anonymous Teaching Assistant Evaluation (Figure A.4)

"She did a really great job thoroughly explaining things. Sometimes she went a bit slow… but generally her presentations were really helpful"

- Anonymous Teaching Assistant Evaluation (Figure A.5)

Awards and Recognition

2021 Student Union Teaching Excellence Award

Badge 1: Emerging Teachers Development

Badge 2: Learning Spaces & Digital Pedagogies

Badge 3: Developing Your Teaching Dossier

Badge 4: SoTL Foundations

Badge 5: Theories and Issues in Postsecondary Learning and Teaching

Summary and Goals

Student feedback suggests that a team-based learning environment facilitates a curiosity-driven approach to learning in the classes that I teach. I hope to maintain this area of strength as my teaching career progresses from teaching assistantships to more permanent, lead teaching roles. I also hope to test my teaching philosophy and strategies in a wider breadth of subjects. In future classes, I will apply skills that I have learned from various workshops and the Graduate Student Certificate in University Teaching and Learning in order to structure presentations and demonstrations that can flow at a variety of speeds- a goal I have developed based on student feedback and teaching evaluations. I look forward to receiving feedback from my peers on my current performance as a teaching assistant, to involve myself in other educational committees, and to create close mentorships with future students.

Appendix

Figure A.1: Anonymous USRI Teaching Assistant evaluation form

Survey of Student Opinion of
Laboratory Teaching Assistants in the Department of Geoscience

Course: GOPH 351 Term/Year: Fall 2019 Teaching Assistant: Meghan Sharp
Section: 1

Please provide feedback for the Teaching Assistant. Your constructive comments will be taken into consideration for future planning. The information is collected under the authority of the Freedom of Information and Privacy Act. Contact person: Dr. Bernhard Mayer, Department Head. The forms will be kept securely in a sealed envelope until after your final course grades have been submitted to the Registrar. **Please check the box that best represents your experience in the laboratory component of this course.**

The T.A.:	A Strongly Agree	B Agree	C Neutral	D Disagree	E Strongly Disagree
1. Was knowledgeable about the subject.	✓				
2. Was prepared for lab sessions and presented the material in an organized way.	✓				
3. Communicated concepts effectively and enthusiastically.	✓				
4. Clearly communicated the instructions and expectations for the lab assignments.	✓				
5. Returned lab assignments within a reasonable time.		✓			
6. Was approachable and helpful in answering questions.	✓				
7. Treated students fairly and with respect.	✓				
8. Provided useful feedback about assignments.	✓				
9. Overall assessment.	✓				

Other comments:
Was very helpful & approachable. Responds to email quickly. Keep up the great job!

Nov. 9/17

Figure A.2: Anonymous USRI Teaching Assistant evaluation form

Survey of Student Opinion of

Laboratory Teaching Assistants in the Department of Geoscience

Course: Geology 351 Term/Year: F2019 Teaching Assistant: Meghan Sharp.

Section: Lab 1

Please provide feedback for the Teaching Assistant. Your constructive comments will be taken into consideration for future planning. The information is collected under the authority of the Freedom of Information and Privacy Act. Contact person: Dr. Bernhard Mayer, Department Head. The forms will be kept securely in a sealed envelope until after your final course grades have been submitted to the Registrar. **Please check the box that best represents your experience in the laboratory component of this course.**

The T.A.:	A Strongly Agree	B Agree	C Neutral	D Disagree	E Strongly Disagree
1. Was knowledgeable about the subject.	X				
2. Was prepared for lab sessions and presented the material in an organized way.	X				
3. Communicated concepts effectively and enthusiastically.	X				
4. Clearly communicated the instructions and expectations for the lab assignments.	X				
5. Returned lab assignments within a reasonable time.	X				
6. Was approachable and helpful in answering questions.	X				
7. Treated students fairly and with respect.	X				
8. Provided useful feedback about assignments.	X				
9. Overall assessment.	X				

Other comments:

Meghan is an excellent TA. She points you in the direction you need to go at the start of every lab. She is a very helpful TA

A+

Nov. 9/17

Figure A.3: Anonymous USRI Teaching Assistant evaluation form

Survey of Student Opinion of
Laboratory Teaching Assistants in the Department of Geoscience

Course: GEPH 351 Term/Year: Fall 2019 Teaching Assistant: Meghan Sharp
Section: Lab 1

Please provide feedback for the Teaching Assistant. Your constructive comments will be taken into consideration for future planning. The information is collected under the authority of the Freedom of Information and Privacy Act. Contact person: Dr. Bernhard Mayer, Department Head. The forms will be kept securely in a sealed envelope until after your final course grades have been submitted to the Registrar. **Please check the box that best represents your experience in the laboratory component of this course.**

The T.A.:	A Strongly Agree	B Agree	C Neutral	D Disagree	E Strongly Disagree
1. Was knowledgeable about the subject.	✓				
2. Was prepared for lab sessions and presented the material in an organized way.	✓				
3. Communicated concepts effectively and enthusiastically.	✓				
4. Clearly communicated the instructions and expectations for the lab assignments.		✓			
5. Returned lab assignments within a reasonable time.	✓				
6. Was approachable and helpful in answering questions.	✓				
7. Treated students fairly and with respect.	✓				
8. Provided useful feedback about assignments.	✓				
9. Overall assessment.	✓				

Other comments:
Appreciated the fact she was available to help, not just w/ labs, but the lecture material too! She is great! She should teach more classes in the future!

Nov. 9/17

Figure A.4: Anonymous USRI Teaching Assistant evaluation comments (Fall 2019)

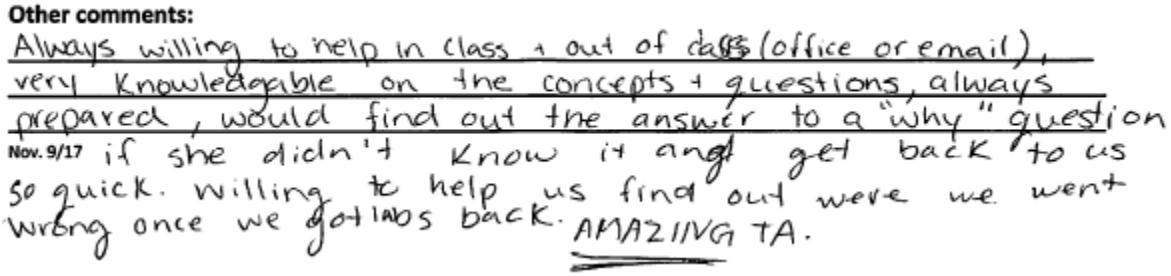
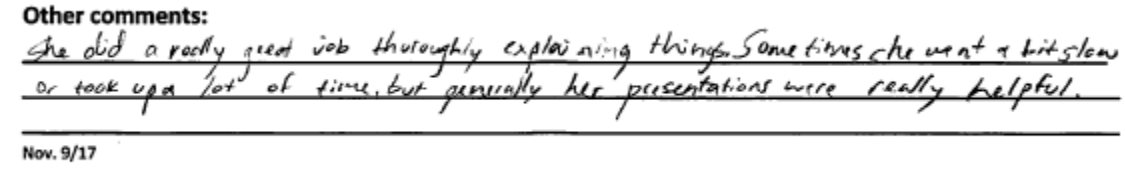

Other comments:
Always willing to help in class + out of class (office or email), very knowledgible on the concepts + questions, always prepared, would find out the answer to a "why" question if she didn't know it and get back to us so quick. willing to help us find out were we went wrong once we got labs back. AMAZING TA.
Nov. 9/17

Figure A.5: Anonymous USRI Teaching Assistant evaluation comments (Fall 2019)


Other comments:
She did a really great job thoroughly explaining things. Sometimes she went a bit slow or took up a lot of time, but generally her presentations were really helpful.
Nov. 9/17