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Equity in STEM: Utilizing Student Experience to Better Inform Policy and Practice

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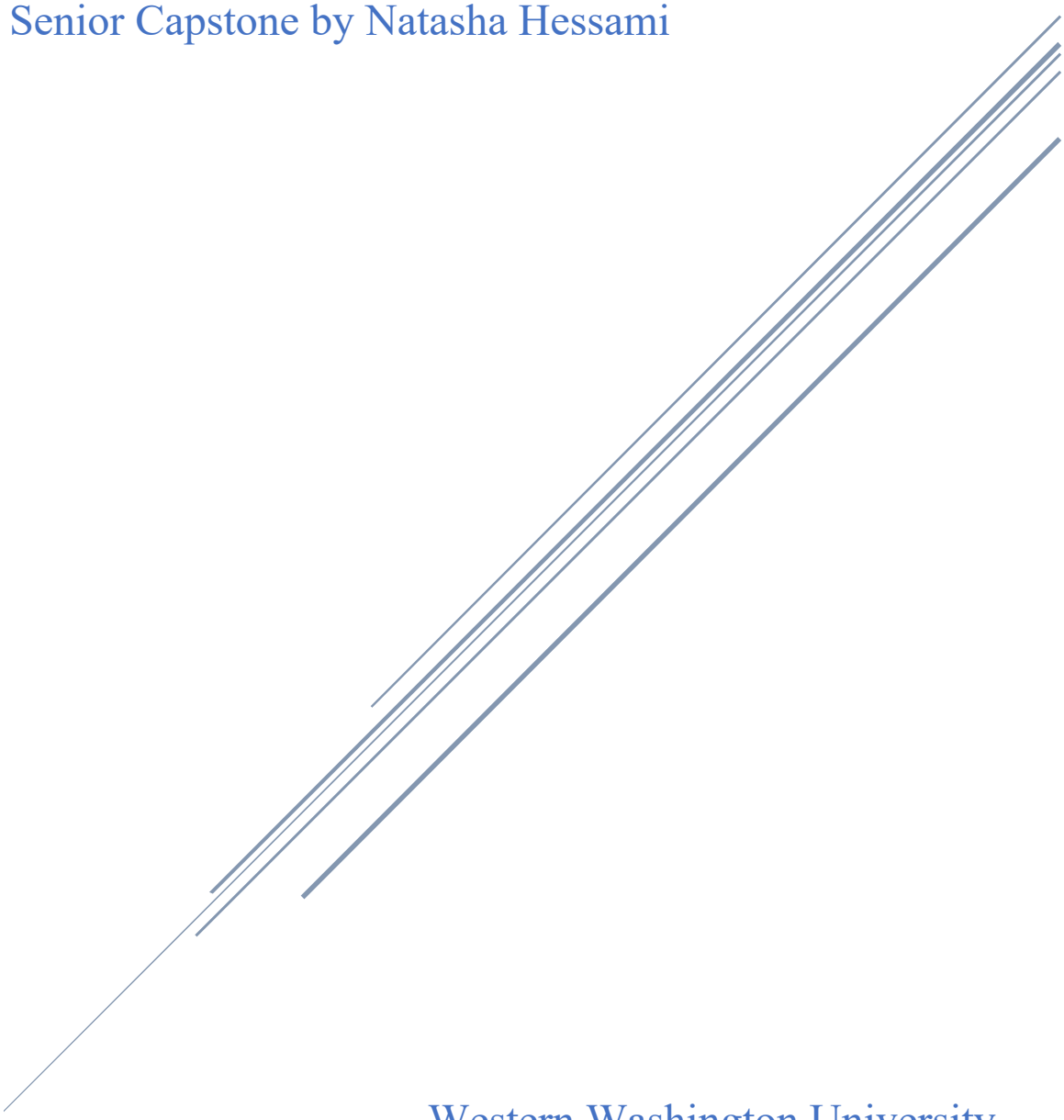
EQUITY IN STEM: UTILIZING STUDENT EXPERIENCE TO BETTER INFORM POLICY AND PRACTICE

Honors Senior Capstone by Natasha Hessami



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Acknowledgements

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Introduction

Not all people who feel marginalized are underrepresented, and not all underrepresented people feel marginalized. The views and opinions expressed throughout this project are my own, with acknowledgement of influential experiences and people throughout my life.

Throughout this report I will be using "we" and "I". Few ideas, events, proposals, or conclusions were reached on my own, and "we" acknowledges the work of my community.

Outline

This report has four distinct elements:

(1) Introduction with my personal story and background on why I engaged so heavily in equity issues around STEM.
(2) A review of the grant development and guidance for implementation of the CSE Student Ambassador program. This program was developed to cultivate and continue diverse leadership within the sciences and to maintain regular communication between students, faculty, and the administration.
(3) A review and discussion of two seminar presentations regarding equity in STEM I facilitated within CSE. Feedback and comments from student and faculty participants will also be presented and discussed.
(4) Lastly, I will provide brief suggestions for staff and faculty for creating and promoting a more equitable culture in STEM. In this section I outline background sourced through literature and experience on some inequities within higher education and the sciences.

Personal Story

With the exception of section 1, I will not be focusing on my personal experiences throughout this project. That being said, I do want to provide a brief background on my identities and experiences to give the reader better context regarding my perspectives. My twin brother and I were born in Richmond, BC, Canada in 1996. My father is a refugee from Iran who had come to Canada with his family in 1979. My mother was born and raised in Idaho with Native American ancestry. We moved to Spokane, Washington in 2008 and I enrolled at Western Washington University in Fall of 2014. My identity has always been firmly "mixed" – celebrating both Christmas and Naw Ruz, having Persian food for Thanksgiving, and presenting as non-white.

I am graduating from WWU with a major in biochemistry, minor in math, and from the Honors College. During my time here, I have tutored for four years, volunteered as a Peer Health Educator, engaged in 3.5 years of biochemistry research and served as the ASVP for Governmental Affairs. I have had two summer research experiences: an internship optimizing the solubility of the L-Polymerase from *Ebolavirus* at the Center for Infectious Disease Research in Seattle, WA, and a Research Experience for Undergraduate's optimizing APOBEC3G's binding affinity at UCSF. I feel the need to mention my engagement in "real science" as a way to qualify my abilities as a scientist. I am rarely the top scoring student in the class, but I do love and understand science.

I have a lot of privilege. Both of my parents went to college. I went to a great public high school with access to AP classes. My family is supportive and encouraging. I have always had stable housing and never experienced food insecurity. I am documented. I do not have an accent relative to where I live. Although I appear non-white, I am still relatively light skinned. I have worked hard and received numerous scholarships and internship opportunities. I work hard in my classes and am able to get good grades. I do not have any learning or physical disabilities and am neurotypical.

My exposure, perspective, and response to these issues has largely stemmed from experience and conversation. Through the Honors program I have been engaged with some literature and coursework that focuses on critical race theory and feminism theory. These classes were namely: Bioethics of Life and Death, School to Prison Pipeline, and History of Women of Color in the US. My involvement and leadership in the Society for the Advancement of Chicanos/Native Americans in Science (SACNAS) has reinforced my understanding regarding the need for diverse leadership and mentorship within STEM. Finally, and perhaps most importantly, my personal experiences combined with countless hours of conversation with my diverse peers have helped better inform me of issues regarding equity in STEM.

Experiences and selection of project

Microaggressions

During my time in university I have had countless experiences with "microaggressions". According to dictionary.com, a microaggression is: *a statement, action, or incident regarded as an instance of indirect, subtle, or unintentional discrimination against members of a marginalized group such as a racial or ethnic minority.* Here are a few that stand out to me:

I was accepted to a prestigious Research Experience for Undergraduates (REU) and University of California San Francisco. A student in my lab said, "you only got that because you are a brown girl". My feelings of pride and excitement were immediately extinguished, and I remember not wanting to share the good news with others out of shame. This comment stuck with me for years.

My family was having dinner with my mother's cousin. My mother's cousin was quizzing my twin brother, who is majoring in wildlife biology, about his experiences in university. I remember feeling excited to share my experiences in biochemistry and biophysics research, traveling to present my research, and my goals for graduate school. My mother's cousin turned to me after an engaging conversation with my brother about his internships and research and asked me, "So, do you have a boyfriend?". I felt small and inadequate.

I was discussing concern about losing some scholarships as I entered into my 5th year of undergrad. A lab colleague said, "I wish I was poor and a woman like you so I could get scholarships". I immediately addressed how inappropriate these comments were and suggested better ways to express shared frustration regarding student debt.

I was told by a friend recently I was taking up too much space while engaging in equity in STEM conversations. I believe they were speaking specifically about meetings with faculty, chairs, and the dean I had been a part of. This comment set me back for a while as I reflected on how I was

going about these conversations. Thanks to conversations with friends and mentors we concluded that *I should be taking up this space*.

I do not doubt the individuals in these situations (and countless more) had no intentions of being malicious. But hearing comments like this regularly eat away at your self-confidence and sense of belonging.

Timeline of events within CSE

Spring of 2018 Tian-Qing Yen asked me to co-facilitate a workshop titled "Cultivating an Inclusive Environment in STEM". We are friends, and I was already demonstrating commitment and engagement towards equity in the sciences. This workshop was focused on microaggressions, and Tian-Qing's report can be found in CEDAR.

Spring of 2018 I won the AS Election for ASVP for Governmental Affairs. In this position I coordinate 100 students to travel down to Olympia and lobby for higher education needs. I was asked to lobby for a STEM expansion package that included a $60 million capital request to build a new building. I was initially honored and excited, but soon started to feel as though I was being used by a college in which myself and my peers did not feel fully supported.

Summer of 2018 found out a professor in Chemistry and advisor for my club – Society for Advancement of Chicanos and Native Americans in Science (SACNAS) - was leaving. He was one of the few faculty of color in the Chemistry department and his departure left a huge hole in my club.

Summer of 2018 I found out our other SACNAS advisor from Chemistry was not going to be teaching in the Fall due to climate in the department. I was shocked at losing my two primary allies within chemistry in such a short time frame.

Fall of 2018, as the national drama of Brett Kavanaugh's appointment to the Supreme Court played out 24/7, I found out about allegations that Dr. Mark Wicholas had been overtly sexist and exclusionary regarding hiring and tenure promotion in Chemistry. I was frustrated that the Chemistry Department was set to hold a symposium in his honor despite this.

Fall of 2018, around 40 students (many belonging to underrepresented identities) gathered in Dean Brad Johnson's office to air grievances and discuss issues within CSE.

Fall of 2018, following the meeting in Dean Johnson's office I found myself dedicating around 10 hours (unpaid) a week to advocacy efforts. These efforts quickly consumed my little free time and I was neglecting the biochemistry research I was supposed to be doing. I made the difficult decision to quit research to focus on advocacy efforts. I want to emphasize **I felt so obligated to address and fight for improved diversity, equity, and inclusion in STEM at WWU that I quit research. I became a statistic of the "leaky pipeline" phenomenon.** From Fall of 2015 to November 2018 I thought my honors project was going to be titled "Exploiting the reactivity of sortase homologs in generating isopeptide bonds". That being said, I am leaving Western proud of my efforts and happy about the switch of time and energy to this activism work.

CSE Student Ambassador Program – Encouraging Diverse Leadership

I have developed a more robust package of documents titled "College of Science and Engineering Student Ambassador Program" to guide implementation, and it includes the complete grant application to SEJF. This document can be found within the Dean's office upon request. Below is a summary for general information.

Origins of Student Advisory Group

On October 26, 2018 around 40 students, faculty, and staff gathered in the Dean of CSE's office to discuss issues in the college as they relate to equity, inclusion, and diversity. Female undergraduate TA's shared experiences of being called names, ignored, and not knowing avenues to seek out resources or support. Marginalized students in research labs shared experiences of feeling imposter syndrome, sexual harassment, and also not knowing how to report or where to find support. There were many other stories that reflected a range of experiences ranged from "mild" micro-aggressions to overt racism and sexism.

This large meeting was productive in the sense that the Dean was now aware of various happenings within his college, but because there were so many people and they were upset – not much productive conversation was able to happen. A de facto "Student Advisory Group" was developed out of necessity for students to push change and for the Dean to consider the perspective of students. These students dedicated hours to meeting with the Dean, chairs of various departments, faculty, EID committee, and each other to discuss in a constructive way how CSE can be equitable in practice. Each of the students involved with the first Student Advisory Group belonged to a marginalized identity, and each were dedicated to leveraging their negative experiences to better the experiences of those who come later.

Tensions were high during fall quarter during the big meeting, and even some of the smaller Student Advisory Group meetings after. By January of 2019 it became clear to students that the Dean was genuinely wanting to collaborate and allocate time and resources to doing better. The AS CSE Student Senators joined us for many meetings, and they became more casual in nature. We discussed experiences we had, the Dean updated us on programming and initiatives within the college, and we all talked about areas for potential growth and improvement.

None of these students were compensated, and some dedicated well over 200 hours of unpaid labor over the course of two and a half quarters. Recognizing the need to codify and operationalize the Student Advisory Group efforts were made to ensure this group did not end when most of its members graduated. With this in mind, as well as compensate students for their labor, I applied to and was awarded a Sustainability, Equity, and Justice Fund Grant to serve as seed funding. The $10,450 awarded will cover the first-year salaries of CSE Student Ambassadors. Every chair within CSE departments pledged to give $600 per year to the program, and a generous donation of $20,000 will help keep this going for the years go come.

Development of grant proposal

The motivation to develop a paid ambassador program was two-fold: the primary reason was to operationalize diverse student leadership with a focus on equity in STEM, and the second was to compensate students for their labor. We were looking for a way to ensure our de facto student advisory group didn't die as many of us graduated.

I wanted to ensure this group was codified and operationalized for the coming years, as both the students and the Dean benefited greatly from regular conversations regarding equity and inclusion efforts. I have been engaged in numerous conversations around campus about how students, especially marginalized students, are rarely compensated for the labor they put into trying to change racist and sexist structures within the university. I asked if there was funding available with CSE to compensate students and was told no. A friend of mine was in the process of applying to a grant from the *Sustainability, Equity, and Justice Fund* and I felt confident compensating students for equity work would fit within this grant's mission. I reached out to the grant manager for guidance, then hopefully set out on writing a grant proposal.

Thanks to the 2018-2019 SEJF committee, $10,450 was awarded as seed funding to begin compensating students for their labor towards equity and inclusion within CSE. A conversation with a generous donor a few weeks later led to the donation of $20,000 to continue funding this program for a few years. Each chair within CSE also committed to providing $600 per academic year. With this commitment to funding, dedicated and intentional direction, and administrative support this program will be integrated into the college and play a vital role in keeping communication open between students, faculty, and the administration.

The importance of compensation

We all want to be compensated for our work. Research in the chemistry lab is compensated through credit hours, bragging rights, and the occasional "Outstanding Poster Presentation" award. Engaging in research at WWU as an undergraduate student is a privilege, especially considering the 5-20 hours a week it necessitates without monetary compensation. This excludes students who need to work through college to afford rent, food, and other necessities.

Social justice and activism work are self-selected fields. Individuals who are not facing oppression are generally less likely to engage in this work. Thus, those engaging in this work are more likely to be people of color, queer, disabled, first generation, low income, etc. All students should be compensated for their work, *especially* those who are marginalized and have historically been taken advantage of.

Implementation Recommendations

First, I want to acknowledge that I understand this program will evolve to fit the needs of all involved. As the grant writer and de facto leader of the 2018-2019 Student Advisory Group I want to offer my recommendations – I hope these are referred to and considered throughout implementation and when questions or concerns arise. Again, a more robust document titled "College of Science and Engineering Student Ambassador Program" was developed.

The CSE Student Ambassadors will live within the Deans office, with primary guidance from the Associate Dean. Regular communication with department chairs and CSE Community Ambassadors will (hopefully) become the norm.

Definitions and acronyms

CSE Student Ambassadors (CSE SA) – seven students, one from each department within CSE. Students must be either pre-majors or majors within their department. Students will be selected

during spring quarter and will serve as CSE SA's for the follow academic year (no summer quarter service).
AS CSE Student Senators – two students to represent the entire College of Science and Engineering in the Associated Students Student Senate. These students will be elected in the fall through the AS elections.
Student Advisory Group – CSE Student Ambassadors and CSE Student Senators, nine students' total. The primary role of the Student Advisory Group is to meet with the Dean and Associate Dean of CSE 2-4 times per quarter. This is the primary group where both ambassadors and senators will be working together.
CSE Community Ambassadors (CSE CA) - Faculty from each department within CSE who are dedicated to promoting equity, inclusion, and diversity within the college. This program was developed by Regina Barber DeGraaff and will be implemented at the same time as the SA program. Although they are independent, CA's and SA's will naturally be working together on many issues.

Summary of quarterly obligations of CSE SA's

CSE SA's are set to work 8 hours per month. Each quarter is 10 weeks, and the end of the quarter is busy for students as they prepare for finals and final projects. With this in mind, the following obligations are outlined on a quarterly basis and hours are a "minimum", with discretion given to ambassadors and other stakeholders in how best to spread the work. Mission creep is expected but discouraged. Due to budget constraints, CSE SA's cannot be compensated for more than 24 hours/quarter. Below is an outline of minimum obligatory meetings that each ambassador should be engaging in, putting their quarterly obligations at 11 hours. Remaining time can be allocated however SA's see fit. They may find themselves engaging in work that goes above and beyond the expectations of this role – if this is the case a conversation with the Associate Dean must happen to better parse out how to allocate hours.

Obligation	**Hours per quarter**
Meet with department chair	1
Student Advisory Group Meetings (CSE SA's, CSE Student Senators, Dean, Associate Dean)	3
Meet with STEM Inclusion and Outreach Specialist	1
Meet with respective CSE Community Ambassador	3
Meet with fellow ambassadors and/or senators.	3
Total hours of mandatory meeting time:	**11**

Structure of management and relations

CSE SA's will meet with various faculty and administration within their departments and the college. Meetings are time intensive, and we all need to be mindful of each other's time. I have recommended the following meetings on a quarterly basis to ensure communication channels stay open.

Title	Role/duties
Dean of CSE	• **Meet with student advisory group 2-4 times per quarter** • Keep SAG up to date on efforts within the college and in departments relating to student experiences especially as it relates to equity, inclusion, and diversity

	• Listen to concerns and needs brought forward by ambassadors and make a meaningful effort to address the issue in collaboration with students, faculty, and staff • Review applications and select new ambassadors each year
Associate Dean of CSE	• **Meet with student advisory group 2-4 times per quarter** • Primary coordinator and manager for ambassadors. This includes but is not limited to: coordinating new hire orientation, serving as a resource in navigating college and university structures, and helping ambassadors connect with faculty and departmental chairs as needed • Review applications and select new ambassadors each year
STEM Inclusion and Outreach Specialist	• **Meet with ambassadors once per quarter** • Support ambassadors in navigating issues surrounding EID within the college • Work with the Associate Dean of CSE during new ambassador orientation to help inform ambassadors on institutional history, the scope of their work, and other resources on campus • Inform ambassadors of their office hours and be available for general conversation and support
Payroll Manager	• Provide initial payroll training to new ambassadors • Approve timesheets • Note if ambassadors are logging too few or too many hours per month (less than 6 or more than 12) and check in with the student and the Associate Dean of CSE ***Note**: payroll management is being done by the Administrative Services Manager within the Engineering & Design department for (at least) the first year of the program.*
Chair of CSE Departments	• **Meet with their departmental student ambassador a *minimum* of once per quarter** • Inform and consult with student ambassador on initiatives within the department that impact students, especially as they relate to equity, inclusion, and diversity
CSE Community Ambassador	• **Meet with student ambassador a 2-4 times per quarter** (i.e. during CSE CA community hours) • Support student ambassador in student centered initiatives, especially as they relate to equity, inclusion, and diversity • Inform and consult with student ambassador on happenings within their department that impact faculty, students, and staff
AS CSE Student Senators	• **Meet with student ambassadors once per quarter outside of SAG** • Serve as a resource to SA's on how to navigate university structure

Selection of CSE Student Departmental Ambassadors

The first year of implementation (AY 19-20), ambassadors will be selected in the fall with their term of engagement beginning right after hiring and ending spring of 2020. For subsequent

years, advertisement of the position and selection will happen during the last half of fall quarter. Current ambassadors, the Associate Dean, the Dean, and the STEM Inclusion and Outreach Specialist will review applications and select.

General application requirements include: Minimum of 2.5 GPA, declared pre-major or major within a CSE department, and a commitment to student advancement especially in areas relating to equity, inclusion, and diversity. Students who apply do not need to already hold a leadership position on campus – this program is intended to cultivate and promote diverse leadership.

Evaluation of program

Each student ambassador will be required to submit a one-page quarterly summary of their experiences, successes, setbacks, and any other pertinent information about the quarter. This will serve as the student perspective on how they are able to contribute and steer change. The Dean of CSE will be able to compare how their decision making has changed since students have been regularly engaged in the conversation. Chairs and faculty can compare general student success and engagement of marginalized and underrepresented students in activities such as research and TA positions to gauge success.

Some aspects of this program will be hard to evaluate. Did a pre-major in Engineering & Design who became a SA stay in her major because of it? Was the leadership experienced in the program a stepping stone for a student to run for AS Senate or the AS Executive Board? Did students find a stronger sense of community that helped contribute to their overall academic success? Did a student in Chemistry 161 have a good experience thanks to something the SA program promoted, and now they want to be a chemistry major? I know these impacts sound lofty, but my success as an undergraduate can be traced back to a handful of impactful conversations and experiences.

Evolution of program

The critical needs in 2019 will be different from those in 2025. During this time there will also be thousands of new students coming and going from Western Washington University. As much as it hurts my type-A personality to say this, I am looking forward to stepping away and seeing where this program goes. I hope we continue to see diverse leaders compensated for their time, but beyond that I know and understand the group may change. I trust the folks within the Dean's office, Community Ambassadors, the STEM Inclusion and Outreach Specialist, future Student Ambassadors, and all others committed to enacting change as it relates to EID within STEM will continue on this journey.

Seminars– Cultivating an Inclusive Research Environment

I advertised a "Student Led Discussion" around equity in STEM mid spring. This event was poorly attended and ended up being a casual conversation. I will be focusing on the chemistry seminar throughout this section, but Biology was very similar.

Development of seminar

The issue of self-selection is evident when holding seminars or workshops focused around something like micro-aggressions; those who are impacted are most interested in going, and those who are the aggressors are least likely to attend. This was apparent at the "Cultivating an Inclusive Environment in STEM" workshops co-facilitated by Tian-Qing Yen and myself last year – the demographics were overwhelmingly female, with strong attendance by underrepresented minority groups.

Conversations on how best to reach audiences who would not generally self-select for a seminar or workshop focused on equity in STEM led us to multiple options. We considered tricky titles, targeted advertising, or trying to mandate attendance.

All students who participate in research credits within the Chemistry Department are required to attend Friday seminars – these are usually talks by experts regarding biochemical or chemical research. Tim Kowalczyk was the seminar coordinator for winter 2019, and he set aside a Friday Seminar time to dedicate to the topic of equity in STEM. Together we developed a guided and engaging seminar with the intention of informing participants of inequities in chemistry and begin the conversation on the prevalence of dominant identities within chemistry spaces. This PowerPoint was adapted by Merrill Peterson and Adrienne Wang for our presentation to Biology students. Biology research students are not required to go to seminar's like chemistry students are, so we loosened the emphasis on research and made it more general to academic and lab spaces.

Seminar content and presentation

We started small in our efforts to guide participants to figure out their own identity within Chemistry or Biology. Everyone had a single piece of paper to help guide the activities, we collected demographic data, and there were entrance and exit questions.

Our first activity was a name game – what is the story behind your name? Our names are core to our identity – one of the first things we share with people we meet. Judgements can be made on names, and there are clear commonalities shared between many (i.e. having your father's surname). Next, we asked participants to note some identities they hold based on a list; options included white, non-white, queer, straight, outdoorsy, nerdy, gamer, foodie, tired all the time, and future doctor. We intentionally included lighthearted identities to parse out commonalities and emphasize individuals are more than their gender, skin color, and sexual orientation.

Then we asked students to take 30 seconds to write down the names of prominent, famous scientists. We prompted them to think about who is in their textbooks, who constants and theories are named after. Then, we asked students to write down the names of 3 white male

scientists. Then take 30 seconds to write down the names of three prominent female scientists. Then three scientists of color, then three disabled scientists. It was evident student were struggling to come up with three names of scientists that were not white or male. We did not spend a lot of time reflecting on this, instead I just said "take a moment to sit with this". And we moved on to some statistics that reflected gender and racial disparities within STEM.

We went through statistics that outlined the leaky pipeline, how men are generally paid more, and how Asians and whites have overrepresentation in ACS membership even when compared to their population in the US. We felt presenting statistics were important to convince those who don't believe there are inequities within STEM.

The presentation wrapped up with a slide showing the faces of the last ~10 years of Nobel Laureates. There are two women, an Indian man, and a few Japanese men. The rest are white men. We put this slide up in the context of the overwhelming representation of white male scientists in our textbooks and in reference to theories and constants… *of course men dominated science in the 1800s, but things are better now, right?* Yes, things are better. But there is still overrepresentation of white men at the highest echelon of scientific success. We discussed how it is a privilege to see your identities reflected in your faculty, presidents, Nobel Laureates, and in textbooks.

Results

Self-reported knowledge and interest

Below are self-reported scores on perceived knowledge and interest in issues relating to equity, inclusion, and diversity in STEM from the chemistry seminar. Although we did collect data on the biology seminar, I did not include it in this report.

The knowledge question was: *How would you assess your own knowledge (1-10; 1 being low and 10 being high) of how folks from different walks of life than yours experience the science, technology, engineering, and math (STEM) community? (i.e. have you experienced microaggressions, read articles, or attended a conference related to minorities in STEM?)*

The interest question was: *Rate your interest level (1-10) in learning more about how to engage in conversations about these issues and addressing them.*

Not surprisingly, self identified non-binary and transgendered students claimed to be most knowledgeable and most interested in these issues of EID within STEM. Throughout discussions on the gender balance in the sciences, non-binary and transgendered identified individuals are so marginalized their identities rarely even make it on the questionnaire. The general trend for all groups demonstrates an 'average' knowledge regarding EID issues in STEM, but a much greater interest in learning more.

Self-reported knowledge and interest in EID from Chemistry Seminar

	Knowledge	Interest
Faculty	5.1 ± 2.3	8.8 ± 1.6
All students	5.0 ± 1.9	8.1 ± 2.2
Female students	5.1 ± 1.6	9.0 ± 1.3
Male students	4.7 ± 2.2	7.1 ± 2.6
Non-binary/trans students	6.2 ± 2.9	9.0 ± 1.7
White student	4.9 ± 1.8	8.2 ± 2.1
Non-white students	5.1 ± 2.4	7.9 ± 2.6
White male students	4.8 ± 1.8	7.3 ± 2.3

Written feedback and requested resources

Below are some selected responses to the prompt: How would you assess your state of preparation for engaging in dialogue about supporting an inclusive environment in STEM? What sorts of additional resources would you like to have in order to help support an inclusive future for STEM professionals?

- I wish I knew more/felt more confident about talking about this in my work place.
- I didn't feel prepared to talk about it coming, but I was willing to do so. Seminars like this are extremely helpful
- Mandatory seminars such as this for physics and engineering departments
- I would love articles and more views to help discuss this topic further
- It is important to have some kind of facilitator as it is hard to bring this up when you are the one affected and others wont recognize what they are saying can affect others
- My state of preparation is best described as "slowly improving" I think ive gotten a much better awareness of issues students have faced, but still need work establishing an environment where these issues can be avoided
- Case studies with implementation of mechanisms to re-steer department/group and date for positive and negative outcomes
- I have attended many workshops/discussions around this topic, but still don't feel entirely prepared. Maybe it just comes with time and experience
- I understand people struggle with being marginalized but I struggle to see other perspectives
- I'd like more faculty/student dialogue
- Next time you do this type of thing you should request that lab groups sit together. It would have been more helpful during some of the prompts
- Educating folks on terminology
- Accepting mistakes of others and working with them
- I think more frequent, positive discussions around these issues would be beneficial

Many of these comments speak for themselves. There were a few blank papers turned back in, and a few white male students graded themselves around a 6 or 7 for knowledge and around a 3 or 4 for interest. I believe the feedback demonstrates general positive receptiveness among a

predominately white group. I particularly like the last comment, a want for more frequent positive discussion. I can appreciate how white folks; especially white men can feel attacked (see suggested books at the end) when these topics come up. Approaching these conversations in casual, proactive, and positive ways can help with broader understanding and empathy.

Suggestions for future seminars

As I said before, I think seminars like these should become commonplace within CSE. Although there is room to weave social justice, science history, and politics into our STEM courses, we will never have the same exposure as those within the humanities. There is a critical need to inform students that inequities do exist even in the logical, fact based, seemingly-removed-from-emotions science content we love to learn about.

Each department is different, and I think it is prudent for the chair of each department, in collaboration with those who are already doing this work, to put on at least one seminar a year within their department. Making it mandatory for research students, incentivizing with extra credit, or making it mandatory for all new majors are all good ways to increase attendance by those who would normally self-select out (read: those in the majority).

Suggestions for creating more inclusive classroom spaces

Background

Let's start with a fact: universities in the United States were *for white men. Women and people of color were explicitly excluded from most academic spaces until the early 1900s.* Institutions of higher education are intentionally and inherently exclusionary. It has been, and will continue to be, an uphill battle to distance universities from their sexist and racist beginnings. Historically Black Colleges and Universities (HBCU) and women's only colleges were developed to provide marginalized groups the opportunity to pursue higher education.

Up to 2019, there have been 180 Nobel Prizes in Chemistry, with 181 Nobel Laureates. Five have been awarded to women.

Up to 2019, there have been 109 Nobel Prizes in Physiology or Medicine, with 216 individual Nobel Laureates. 12 have been awarded to women, and only one has received an unshared Nobel Prize.

What is imposter syndrome? It is the feeling that you don't belong. No matter how well you do or how much praise is received - it is this pervasive feeling of "otherness". I don't doubt that people belonging in the majority may feel this way sometimes. What do Darwin, Planck, Newton, Bohr all have in common? They are some of the biggest names in modern science, theories and constants we apply every day are named after them, and they are all white men. Can you name one theory or constant or law that is named after a woman of color? If you think the gender imbalance is a thing of the ancient past, I encourage you to re-read the statistics regarding Nobel Laureates.

I will preface by saying I have had overwhelmingly positive classroom experiences and have felt a sincere passion and sense of caring from professors at Western Washington University. I have been in three research labs (two internships, one at Western), all three of my PI's have been white men. I have taken 14 chemistry classes (including labs, excluding research credit) at Western -I have had three female identifying professors, and one was non-white. I have taken nine math classes, three physics classes, one computer science class, and six biology classes – in these 19 classes/labs combined, I have had eight female identifying professors, one of which was non-white. Just to summarize, out of 33 distinct science courses I have had two female faculty of color. I feel like an imposter.

General course recommendations

There are 110 credits required in the biochemistry major and not a single required course relates the topics of science to the real world. I know there are already classes that look at science policy, history of science, and bioethics happening in different departments. I can understand and appreciate the difficulties of allocating funding, changing major requirements, and developing new courses. That being said, I don't have much empathy – change needs to happen, and starting now will ensure it happens sooner rather than later. Below are some suggestions on courses that could be housed within CSE or done in collaboration with content matter experts around the university. By requiring students graduating from CSE to take a class that helps them relate science to the real world, Western will ensure their graduates are better prepared for their future endeavors.

Science Policy – How is research funding allocated? How does policy limit what types of research can be conducted? How are experts consulted when policy is written as it relates to scientific research (i.e. climate change, abortion)?

Science Communication – Regina Barber DeGraaff already teaches an amazing class on this – encourage your students to enroll in it. This university does not deserve her.

Science and Religion – When and how has science and religion clashed? Are science and religion mutually exclusive? Are scientific and religious explanations incompatible? How do science and religion play out in politics and education?

History of Science – What were some of the most revolutionary scientific discoveries, and how were they made? How have women and people of color been excluded from scientific spheres? Why were most discoveries we learn about made in Europe? *(ahem, eurocentrism and colonialism)*

Bioethics – Paul Dunn taught an Honors seminar on this, we answered questions such as: when does life begin, and are abortions ethical? Is assisted suicide ethical, and if so in what cases? Is healthcare a basic human right?

On syllabus day

Acknowledge you (faculty) don't have answers to everything, was a student once upon a time, and are still learning. Students often feel intimated and disconnected from faculty, especially in

the sciences. It can be hard to ask a clarifying question on a "basic" mechanism in organic chemistry when we know you have discovered and published another mechanism.

Set class norms. This does not need to take up more than 5 minutes. Establish that questions are welcomed, mistakes will happen, and everyone needs to be respected. Remind students who speak up daily to leave space for others and encourage collaboration and inquiry.

Pass out note cards to gather some information about your students. Ask for their preferred name, pronouns, and anything else they want to share. Are they working 30 hours per week? Do they commute 2 hours each day? Do they have kids to take care of? Are they taking 2 lab courses and feeling stressed about it? Is this the second time they are taking this class? Did they recently experience a family emergency, or perhaps are going through one right now? Welcome these comments not to excuse a student's lack of engagement (I hold the opinion everyone should be held to a high standard and be expected to complete all assigned work), but to understand what other stressors students may be going through. It may be the case students won't want to share these details, and that is ok too.

Inform students that you care. If they are experiencing outside stressors that are affecting their coursework, encourage them to discuss them with you. I understand faculty are also under an immense amount of pressure to keep up their scholarship, research, and service. I understand faculty are too often underpaid, underappreciated, and are subject to the stressful politics of their department and the university as a whole. In no way am I trying to suggest faculty take on a therapist role for each and every student in their class – there are counselors and therapists available at Western for this. However, inviting students to share their current experiences can help you better understand how to accommodate. Again, I want to stress that I believe all students need to keep up with coursework, and just because a student is experiencing hardship does not mean they deserve an easy A. Do consider how a one-day extension on an assignment, help setting up testing accommodations, or grace in making up a missed exam can significantly lower a student's stress and result in improved comprehension and grades.

Inform students of resources. The tutoring center, the counseling center, the health center, your office hours, supportive clubs, other supportive staff or faculty.

Tell your students they all belong in the classroom.

Middle of the quarter

Send out a mid-quarter evaluation. Ask students what is working well, what they thought of that first homework, how prepared they felt for that first exam. Ask them what they could have done better, and what you can do better. Ask if they feel comfortable asking questions in class, and if not, what could improve the classroom climate. Ask them if they are comfortable with their lab partner. Encourage students to come to your office hours if they are struggling. This does not need to take up more than 5-10 minutes at the end of a class period (or the beginning, this will garner more responses). It makes students feel like you care, and it helps you improve and adapt your quarter to this particular class's needs. See *example mid-quarter evaluation* in the appendix for an example of a mid-quarter evaluation.

For PI's and research groups

One of the primary reasons I chose Western was the emphasis on undergraduate research. I was thrilled to start in a lab during fall quarter of my sophomore year at Western. I was on my own project, and eventually trained an undergraduate and a graduate student in the lab. My experience in a chemistry lab at Western has been overwhelmingly positive.

When students sign up for research in the chemistry department, we are required to take a safety training course. This is necessary as there are toxic chemicals and dangerous (and expensive!) instruments we use daily.

Undergraduate research often looks like 5-25 hours per academic week spent in lab, and for some 40 hours a week in the summer. Students are interacting with their peers on a regular basis. Labs can be stressful and small. Students do not receive any sort of training related to sexual harassment, workplace rights, or available resources – something that every other student job on campus requires.

A majority of my negative experiences in my lab are because of interactions I had with other students. I maintain these students had no ill intentions, but their attitudes and comments made me feel inadequate, dumb, and out of place. There were multiple months where I was too uncomfortable to come into lab on the weekends out of fear of being alone with certain lab colleagues. I knew my feelings were impeding my engagement in research, but I wasn't sure if they were valid or who to talk to. My PI was always kind and encouraging towards me, but they did not see or hear much of the problematic rhetoric, and until recently did not *explicitly* welcome comments or complaints about lab the lab environment.

First, acknowledge and accept the fact that there are identities that dominate lab spaces. Acknowledge and accept the fact that underrepresented groups in STEM may experience amplified feelings of imposter syndrome, microaggressions, or even explicit exclusion.

I suggest dedicating part of an initial lab meeting to discussing lab norms and rules. Establish a basis of curiosity, respect, collaboration, and kindness. Encourage questions and mistakes. Invite all students to confront and report issues as they come up. If your lab is dominated by white men, and you have one woman of color – talk with her when she gets into the lab and acknowledge the dominate identity. Remind her she is in the lab because of her credentials and potential.

Discuss the importance of collaboration and diversity in science. Tell your research group about the scientists from China, India, Germany, or Canada that were in your lab group during your Post-Doc. Remind students of the collaborative studies happening between labs in New York and Tokyo. Remember that most universities in the United States were built for white men.

Revisit these conversations periodically throughout the year. Dedicate part of a lab meeting to these topics whenever a new student joins the group.

If a student brings an issue to your attention take them seriously. Ask them what steps they feel comfortable taking. A mediated conversation? A casual conversation with whomever is causing issues? A serious conversation? A dedicated lab meeting to discuss it with everyone? Ask colleagues for advice, and keep the wishes of the student in mind.

What if you say the wrong thing?

I have received overwhelming feedback that faculty and staff want to engage in efforts towards creating more inclusive and equitable classroom spaces but are hesitant to say/do the wrong thing.

First, this is valid. Second, recognize your discomfort in engaging in these conversations may be similar to the discomfort felt by minority and marginalized students experience engaging in scientific discourse. Are you worried you may say the wrong thing and students will think you are insensitive or racist? Underrepresented students may be afraid to ask or answer a question in class because they are afraid it will reflect poorly not only on them, but their entire racial/ethnic/gender group. Acknowledge you are trying your best and you don't know everything. I will say it again – I am no expert on issues of equity in STEM. My knowledge comes from experience, literature, and conversation.

I encourage you to read some of the referenced literature. Engage in conversations with willing students, faculty, staff, and administration. Listen to the experiences of female, non-binary, trans, and non-white colleagues and *believe them.* Go to seminars, symposiums, and workshops dedicated to these issues. Ask for forgiveness and try your best. Some marginalized students may feel bitterness and resentment, know this will happen and that their feelings are valid. Some majority students may question or dismiss your efforts to create and encourage an inclusive classroom space.

Privilege

Although white men living today are not responsible for the policies and practices of their great-great grandfathers, they must take on the responsibility of engaging in anti-racist and anti-sexist action. In an inequitable society, being complicit is supporting the oppressor. The labor of working towards equity has always fallen on the shoulders of the oppressed. The notion that these issues are not your [white male] problem is *deeply* rooted in privilege. The privilege of having professors and PI's that look like you. The privilege of seeing people that reflect your identities in textbooks, on TV, and in scientific spaces. The privilege of always being the dominate group within the United States. Privilege does not mean you did not work hard – I commend the dedication and intelligence needed to enter the world of academia in the sciences. But you need to acknowledge the hidden (and not-so-hidden) structures that set you up for success.

Conclusion

I have not even scratched the surface. In this report I have reflected on about a year's worth of my dedicated work at Western Washington University. I have no formal training. I have only taken two classes where race is at the center of our discussions, one where gender is, and one where class/privilege is. As I wrap up my studies at Western, I am woefully aware of the lack of discussion or even acknowledgement of these issues in any of my science classes. I appreciated when my professor in Molecular Biology repeatedly pointed out how Watson and Crick disrespected, disregarded, and then stole the research of Rosalind Franklin. I appreciated when my Biochemistry professor shared with the class that he had failed a class during undergrad. I appreciated when my PI told me if I was having any issues in lab, I could talk to him about them. Science has a rich history of racism and sexism that is not understood, acknowledged, or challenged by enough people. Science is hard, students are struggling, and universities were not built with the success of all in mind.

We have seen amazing progress in the rights of women and people of color of the past hundred years, but we have not yet reached equity. Western Washington University does not exist in a vacuum, and unfortunately the whole world is operating under a racist and patriarchal structure. I will continue to channel the energy of Civil Rights activists and feminists before my time to tear down structures put in place to keep us down, and you should too.

Suggested resources for further learning

I have kept this list short. For me, experience and conversations has been most informative and impactful.

Books

White Fragility: Why it's So Hard for White People to Talk About Racism
by Robin DiAngelo

Websites

Southern Poverty Law Center
https://www.splcenter.org/

Brene Brown on Empathy
https://www.youtube.com/watch?v=1Evwgu369Jw

The Whiteness Project
http://whitenessproject.org/

Robin DiAngelo
http://robindiangelo.com/

Peggy McIntosh and the SEED Project
http://nationalseedproject.org/

Vanguard STEM
http://vanguardstem.com/

Articles and Blogs
'When You're Accustomed to Privilege, Equality Feels Like Oppression'
http://www.huffingtonpost.com/chris-boeskool/when-youre-accustomed-to-privilege_b_9460662.html

"Bias Isn't Just A Police Problem, It's A Preschool Problem"
http://www.npr.org/sections/ed/2016/09/28/495488716/bias-isnt-just-a-police-problem-its-a-preschool-problem?utm_source=facebook.com&utm_medium=social&utm_campaign=npr&utm_term=nprnews&utm_content=20160928

"Academia, Love me Back"
https://vivatiffany.wordpress.com/2016/10/27/academia-love-me-back/

Podcast
Scene on Radio, Seeing White
https://www.sceneonradio.org/seeing-white/

Appendix

WWU College of Science and Engineering Underrepresented Student Needs

The document below was drafted by the first Student Advisory Group and presented to Dean Brad Johnson as a summary of student needs
November 5th, 2018

WWU College of Science and Engineering Underrepresented Student Needs

Historically underrepresented students in WWU's College of Science and Engineering have expressed frustrations regarding lack of resources and support that are promoting an ongoing toxic climate within the College of Science and Engineering and hindering their academic success. Past efforts to support these unrepresented students have failed to implement the resources and mentorship required to reconcile the issues faced. If we, as student leaders, are not confident that these needs will be met, WWU students will not be able to provide lobbying efforts for the 2019-21 Biennium Budget Decision Package (which specifically claims a "proven track record" of support not felt by underrepresented students).

- Quarterly departmental meetings dedicated to inclusion and equity that includes a student voice
- Club mentorship as act of service for tenure promotion
- An increase in diverse seminar speakers
- Students representation on faculty search committees
- Achievable goal of 75% faculty attendance to diversity and inclusion training
- Increased transparency to students, staff and faculty within the college regarding the current state of this initiative
- Dedicated space for clubs in the new science building(s) proposed in the decision package
- Diversity training for research labs and graduate students
- VP for Diversity (WWU)
- Associate Dean of Diversity/Inclusion and Communication (CSE)
- Advisor/Admin position dedicated to helping underrepresented students (Departmental)

Lia Cook - *Out in Science President, Society for Advancement of Chicanos/Native Americans in Science Co-President*
Natasha Hessami - *Society for Advancement of Chicanos/Native Americans in Science Co-President, AS VP for Governmental Affairs*
Celida Moran - *Society for Advancement of Chicanos/Native Americans in Science Treasurer*
Kris Aguayo - *Society for Advancement of Chicanos/Native Americans in Science Club Liaison*
Franchine Ninh - *Association of Women in Computing Co-President*
Selome Zerai - *National Society of Black Engineers President*
Valerie Beale - *Women in Physics Co-President, Material Science Club Co-President*
Kelly Yokuda - *Chemistry Club Member*

Seminars

PowerPoint

Link to google slides: https://docs.google.com/presentation/d/1Gq-L0_XmieEEAb8PrQQmKRHb9JLQE28wAOIptVfYMB0/edit?usp=sharing

Cultivating an Inclusive Research Environment

•••

WWU Chemistry Department

Facilitators

Natasha Hessami

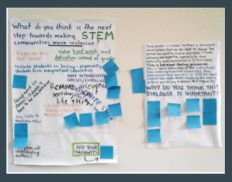
- She/her/hers
- 5th year Biochemistry major
- Worked in Dr. John Antos' lab Fall 2015-Fall 2018 (#sortase)

Tim Kowalczyk

- He/him/his
- 5th year faculty in chemistry
- Computational materials scientist and research advisor

Context

- Late September, 2018: Dr. Mark Wicholas Symposium is cancelled
- October 26th, 2018: Meeting in Brad Johnson's (Dean of CSE) office
- December 7th, 2018: University-wide forum



- **Knowing how to work with diverse populations is essential in any occupation**

Goals and Norm-setting

- How can we identify where power structures exist and biases arise?
- How can we approach engagement in conversations about these realities?
- How can we take and apply these skills in our professional lives?
- We will not have answers to these questions, but hope to start thinking about them.
- Let's talk about some norms for this guided discussion:
  - Active listening: when someone else is talking, focus on hearing their full perspective rather than formulating a response before they're finished
  - Give grace with others' mistakes; keep in mind that we're all learning
  - Believe the experiences of others

Tell us about your name

This is a discussion about identity and about our stories,

So let's start with a

Take a moment to th ur name. Then in groups of 2-4, let's share out. Practice active listening.

Did you notice any commonalities among the stories in your group?

- Are you named after a grandparent?
- Are your names similar to your siblings?
- If you have a middle name, does it have a story?
- What about your last name?

Identity and Diversity in the STEM Workforce

- **Where do you see yourself reflected in these shared identities?**

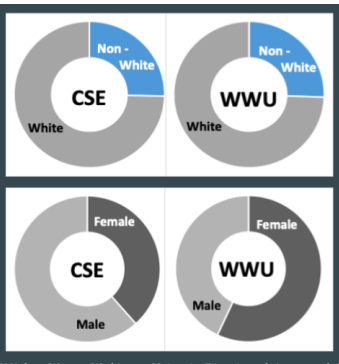
How might some of these identities dominate your lab (or academic) spaces?

- Male
- Female
- Non-binary
- Queer
- Straight
- White
- Non-White
- Mixed
- Extrovert
- Tired all the time
- Outdoorsy
- Comic nerd
- Hippie
- Future Doctor
- Disabled
- Viking
- Broke ($)
- Undergrad
- Masters
- Immigrant
- Gamer
- Foodie
- Bro
- Nerd
- Musician
- Dancer
- Ambitious

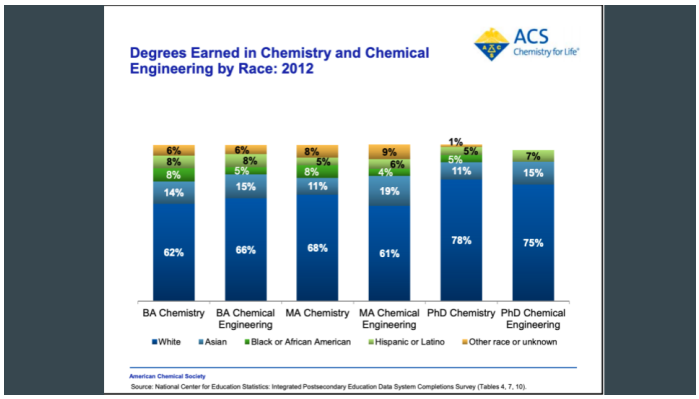
Dominant and Subordinate Identities in STEM culture

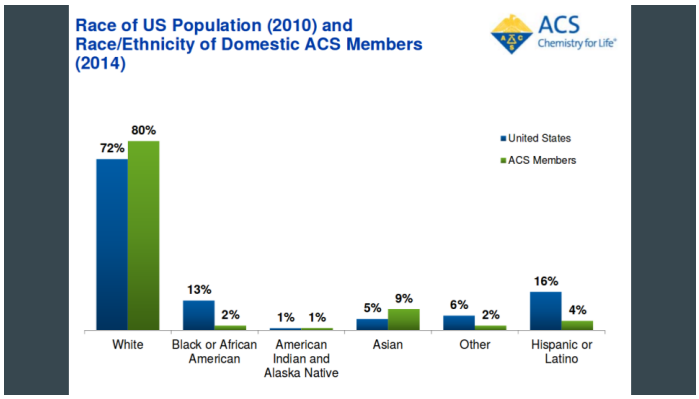
Quick write and share - notable scientists

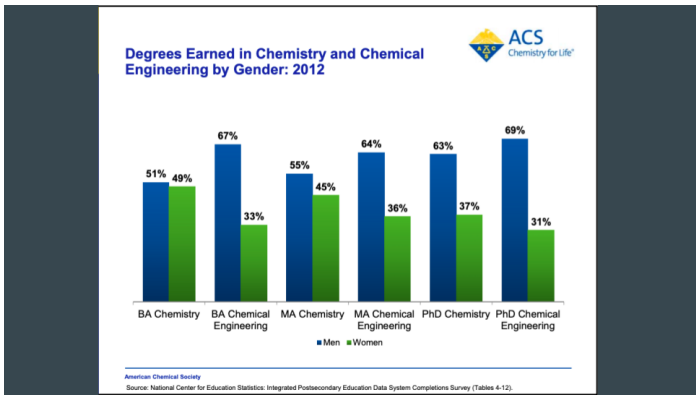
- Write down the names of **5 notable scientists**
- Write down the names of **3 white male scientists**
- Write down the names of **3 female scientists**
- Write down the names of **3 scientists of color**
- Write down the names of **3 scientists with disabilities**

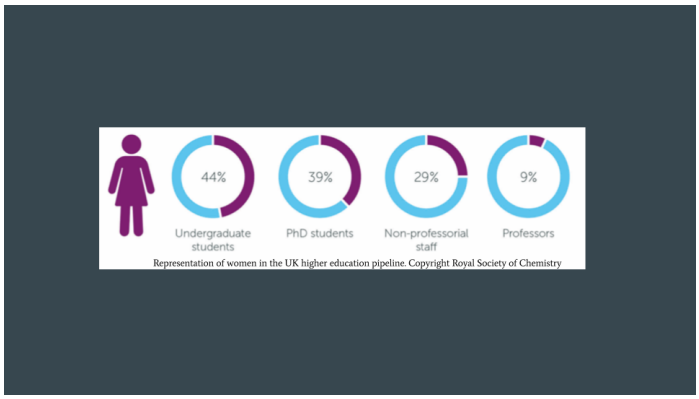


Sources:
University data (Fall 2018) from Western Washington University Diversity website: wwu.edu/diversity
College of Science & Engineering data provided by CSE Dean Brad Johnson









Dominant and Subordinate Identities in STEM culture

Male White Straight Able-bodied

Female Nonbinary Non-White Queer Disabled

What are some of the impacts of these dominant identities on participation and experiences in the STEM pipeline?

Handout

Entrance/Exit Slip

Fostering an Inclusive Research Environment: WWU Biology

Entrance Slip

1. Would you tell us a little about yourself? These questions are optional.

   What is your primary role at Western (student, faculty, staff, other?) _____

   How do you identify racially/ethnically? _____

   What is your gender identity? _____

2. How would you assess your own knowledge *(1-10; 1 being low and 10 being high)* of how folks from different walks of life than yours experience the science, technology, engineering, and math (STEM) community? (i.e. have you experienced microaggressions, read articles, or attended a conference related to minorities in STEM?)

3. Rate your interest level *(1-10)* in learning more about how to engage in conversations about these issues and addressing them.

Fostering an Inclusive Research Environment: WWU Biology

Exit Slip

How would you assess your state of preparation for engaging in dialogue about supporting an inclusive environment in STEM? What sorts of additional resources would you like to have in order to help support an inclusive future for STEM professionals?

Fostering an Inclusive Research Environment: WWU Biology

This is a space for you to jot down your own thoughts and notes throughout the discussion.

Introduction, Goals, Norm-Setting

"Tell Me About Your Name" Discussion

Identity and Diversity in the STEM Workforce

Dominant and Subordinate Identities in STEM Culture

Next Steps

Chemistry seminar raw data

Table 1: Raw data of responses from the Chemistry Department. Select identities have been redacted because these individuals could be identified in the department just based on their race and gender. For example, I am the only (to my knowledge) Iranian/Native American/White female identified student in the department.

Role	Race	Gender	Knowledge	Interest
faculty	[redacted]	[redacted]	8	8
faculty	[redacted]	[redacted]	5	9
faculty	[redacted]	[redacted]	7	10
faculty	white	male	7	10
faculty	white	male	3	10
faculty	white	male	5	10
faculty	white	male	2	5
faculty	white	male	8	8
faculty	white	male	3	10
faculty	white	male	3	8
g. student	[redacted]	[redacted]	5	10
g. student	white	male	0	7
g. student	white	male	5	10
g. student	white	male	5	9
student	white	female	4	10
student	white	female	4	9
student	white	female	6	10
student	white	female	5	9
student	white	female	6	10
student	white	female	7	10
student	white	female	6	6
student	white	female	3	10
student	white	female	8	10
student	white	female	7	8
student	white	female	6	8
student	white	female	5	9
student	white	female	5	10
student	white	female	3	10
student	white	female	2	8
student	white	female	4	10
student	[redacted]	[redacted]	4	7
student	[redacted]	[redacted]	6	7
student	[redacted]	[redacted]	5	10

student	[redacted]	[redacted]	8	9
student	latinx	female	4	10
student	latinx	female	4	6
student	asian	female	8	10
student	asian	female	5	8
student	asian	female	5	8
student	asian	female	3	10
student	white	male	5	4
student	white	male	4	7
student	white	male	5	10
student	white	male	7	10
student	white	male	5	8
student	white	male	4	8
student	white	male	3	7
student	white	male	6	3
student	white	male	5	6
student	white	male	5	8
student	white	male	7	4
student	white	male	7	8
student	white	male	3	8
student	white	male	5	3
student	white	male	7	5
student	white	male	1	8
student	white	male	6	10
student	white	male	5	10
student	mixed	male	2	2
student	latinx	male	4	10
student	latinx	male	9	10
student	asian	male	7	6
student	asian	male	0	3
student	[redacted]	[redacted]	3	7
student	[redacted]	[redacted]	8	10
student	[redacted]	[redacted]	8	10

Example Mid-Quarter Evaluation

CHEM 468 S19 Assessment 1 (Week 3)

1. Overall, rate the PyMOL assignment on a scale of 1-5. _____
1 – this assignment was stupid, I didn't learn anything, and I don't think it's relevant to biochemistry.
5 – this assignment was useful, I learned a lot, and I think it's very relevant to biochemistry.

Please provide any comments (good or bad) about this assignment. Was it useful?

2. Overall, rate the sustainability project on a scale of 1-5 (5 is high). _____

Please provide any comments (good or bad) about this assignment. Do you think it will help prepare you to write and present your research proposal?

3. Are the expectations for the research proposal clear to you? If not, what do you need clarified in the next couple of weeks?

4. What do you hope to get out of the X-ray crystallography section of this quarter (e.g., theory, in practice, applications, etc.)?

5. Please provide any positive or constructive feedback for Professor Amacher at this point in the quarter

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1. Do you meet with your academic advisor every year? _____ If not, do you think it'd be useful? _____

2. Do you feel like the chemistry department has a sense of *community*? _____
If not, what could we do to help?

If yes, is there anything else that would make it better?

3. Do you fulfill the requirements to graduate with department honors (GPA $\geq$ 3.5, research), but are choosing not to apply? Why not?

CSE Student Ambassador SEJF Grant Application

Sustainable Action Fund Grant Program

MEDIUM GRANT APPLICATION
2018-19

This application is for requests from $5,001 up to $35,000. For detailed application instructions and further information about the program, please refer the *Medium Grant Application Toolkit* located on our website at wwu.edu/sustain/programs/SEJF/apply/.

Submit completed application by delivering a hard copy and emailing a scanned version (including signatures) to the SEJF Grant Program Manager Johnathan Riopelle at Viking Commons Room 24. Applications must be provided in both forms in order to be reviewed. Email: johnathan.riopelle@wwu.edu.

SECTION 1: Project Concept.

a. **Project Title:**
College of Science and Engineering Departmental Ambassadors

b. **Describe your proposed project:**

I am requesting funding to launch a pilot program referred to as the "College of Science and Engineering (CSE) Departmental Ambassador" program. There will be one student from each department, selected through a nomination and application process. This person will serve as a liaison between students, faculty, and the Dean for CSE. The student will hold the title of "Program Support Staff 2" and will be paid within the range of $14.85-$19.30 hourly. Departmental Ambassadors shall engage in no more than 12 hours of committee work and meetings per month. Selected students are CSE majors and demonstrate commitment to equity, inclusion, and diversity (EID).

Two of the seven students can either self-select or be nominated to sit on the CSE EID committee. Both students will be allotted an additional 2 hours per month, with a cap of 14 hours per month. The EID committee consists of representatives from all colleges. Their purpose is to serve as a committee to facilitate discussions and recommendations regarding efforts in equity, inclusion, and diversity.

It is imperative the Dean of CSE stays informed of happenings in their college, both positive and negative. Deans can be far removed from the classroom and lab environments, thereby too often are "out of the loop" on current student issues. By having a dedicated student in each department, the Dean can stay better informed and include student voices and perspectives when drafting budget proposals, initiatives, and reviewing policies.

Departmental Ambassadors will be expected to engage in conversations and meetings with individuals such as the Department Chair, interested faculty or staff, the Dean of CSE, and CSE Student Senators. Regular conversation with marginalized or struggling peers in a casual capacity will ensure Departmental Ambassadors are well equipped to speak to the general department climate in an informed and effective way. By creating these channels of conversation everyone within CSE (students, faculty, staff, and the Dean) will be better informed on happenings. This is important because miscommunication, or complete lack of communication, can (and has) led to misinformation, mistreatment, and frustration. Better conduits for students to speak with faculty, their chair, and their dean can allow for proactive discussion and action.

c. Who is the intended audience?

(1) Pre-majors or majors within the College of Science and Engineering who have a passion for and commitment to EID efforts. One per each of the seven departments (Biology, Chemistry, Computer Science, Engineering & Design, Geology, Math, Physics & Astronomy).
(2) Department Chairs and the Dean of CSE who have a commitment to working towards an equitable and inclusive learning environment.
(3) General WWU student population, both declared CSE majors and those who take classes within CSE, who would benefit from a more inclusive classroom/lab culture.

d. How many students will be affected?

(1) Seven students will be directly affected by engaging in this program and receiving a stipend. These students will inform the Dean, chairs, and faculty of positive and negative attributes of each department.
(2) This information can then be used to guide inclusion efforts, potentially having a positive impact the entirety of CSE (around 2000 majors).
(3) Students who have limited interaction with science courses, such as those who take a CSE course as an LSCI, GUR, or Huxley students, will benefit from improved culture. Because these students are not integrated into departments, they may feel extremely uncomfortable bringing any issues up with department chairs or other faculty. By demonstrating clear efforts towards equity and lines of communication these students will hopefully have a better experience, and if issues do arise they will have a path to resolve them. Taking these students into account, an additional 10,000-12,000 students could be impacted by a more positive classroom and lab environment.

e. How long will the project last?

The $10,450 requested will be enough to cover the operating costs of this project for **one academic year (AY 19-20)**. This funding is intended to serve as bridge funding, and the Dean of CSE, Dr. Brad Johnson, has made a verbal commitment to secure funds within the departments/college or university to ensure the long-term efficacy in efforts towards equity and inclusion within CSE.

SECTION 2: Project Goals.

a. What are the goals and desired outcomes of your project?

There are three primary goals:

(1) **Empower students to explore and speak freely on issues of equity and inclusion.** Advertising and implementing a program with clear intentions to improve EID efforts within the university. This will demonstrate to all students that the college, and each department, are interested in hearing what students have to say. When students are given the space to share their thoughts and grievances, it can help alleviate feelings of frustration. We want to focus on proactive actions instead of reactive.

(2) **Compensate students for their labor.** The compensation is key. Unpaid student labor among student activists is a pervasive problem at Western which disproportionately impacts underrepresented students. Compensation will help alleviate financial strain, demonstrate commitment from the college, and legitimize this program. There were eight students who were volunteering their time during winter quarter to essentially do the work this grant is seeking to fund – most have stopped or significantly reduced their engagement and have cited lack of compensation as one reason.

(3) **Assist staff, faculty, and the Dean in staying informed of positive and negative happenings within each department.** I have heard feedback from numerous staff, faculty, chairs, and the Dean that they feel out of the loop. There is no structure in place to facilitate these types of conversations.

There are three desired outcomes:

(1) **Populate the currently operating "Student Advisory Group" moving forward in a codified way**. There are eight students filling this ad hoc committee and not being compensated. Many of these students have ceased their engagement and cite lack of compensation as a source of frustration for the time and energy they are investing in these issues. As we move towards equity, examining equity in pay of persons involved with these efforts must be done.

(2) **Inspire and encourage a permanent funding source to compensate student labor.** Unpaid student labor is a pervasive problem at WWU. The College of Science and Engineering has an opportunity to lead by example at WWU by paying their student leaders for their labor.

(3) **Inform staff, faculty, and the Dean on areas of strength and potential growth surrounding equity and inclusion to better shape institutional and college level initiatives.** Having a regular source of student voices will ensure all departments are taking their largest constituencies into account when implementing any initiatives surrounding EID efforts. Furthermore, this provides a place for student voices to be heard before decision packages, budget proposals, and other EID initiatives are brought forward by the Dean.

b. How will your project positively impact sustainability at Western?

Looking at sustainability through the lens of STEM, it is clear that classroom and lab practices of the past have not been sustainable, equitable, or just. Western needs to be proactive in providing students with an interdisciplinary learning environment that prepares students to be global citizens. This proposal is focused on the "equity and justice" side of the Sustainability, Equity, and Justice

Fund. I am seeking to expand conduits of communication to ensure next steps in shaping culture and practice within CSE are sustainable, equitable, and just.

Each department will have slightly different positive impacts. For example, in Geology there are important needs related to the sustainability of the future (of geoscience) as a profession in the recruitment and retention of diverse students. The geosciences face some of the least diverse demographics when compared to other STEM fields. Geology cannot afford to have a poor environment that could affect the departments retention.

c. How does your project tie into broader campus sustainability goals or initiatives, including Western's Sustainable Action Plan?

This program will support social sustainability by promoting cultural competency through and regular engagement with students beyond the classroom and lab spaces.

Additionally, most, if not all of the CSE departments are involved in research and education that directly addresses sustainability. Having an educational and research environment in which it is safe for diverse voices to be heard increases the likelihood that those sustainability solutions will take into consideration a broader array of perspectives. As such, that will increase the likelihood that the solutions will be widely embraced by society.

SECTION 3: Project Participants

a. Team Information: A team should consist of two to five individuals, including the advisor.

Team Advisor Information (Faculty or Staff) Student proposals must include a staff or faculty advisor. The role of the advisor is to provide assistance and guidance to the team during the development, implementation, and post-implementation stages of the proposal process.

Team Lead: There must be at least one team lead designated for the project. This individual is expected to serve as the communication liaison for the project.

Name	Department/School Students provide major/minor	Position: Faculty/staff/student Students provide expected graduation quarter/year	Western email address
Team Advisor: Amy Lazzell	Engineering & Design	Staff/Administrative Services Manager	lazzela@wwu.edu
Team Lead: Natasha Hessami	Biochemistry	Student/Spring 2019	hessamn@wwu.edu
Team Member: Brad Johnson	CSE	Dean	Brad.Johnson@wwu.edu
Team Member: Regina Barber Degraaff	Physics	Faculty/ STEM Diversity and Outreach Specialist	Regina.Barber Degraaff@wwu.edu

b. Project Stakeholders

Does your project involve labor, include involvement, or require permission from organizations, departments, or individuals on campus or in the community? These project partners are your stakeholders; list them below. Each stakeholder must provide a signature of approval for this project. Insert additional rows as necessary. For more information, please refer to the Medium Grant Toolkit.

Name	University Department and Position	Involvement in Project	Stakeholder signature of approval
Amy Lazzell	Engineering & Design, Department Manager	Management of student payroll systems	
Andreas Riemann	Physics & Astronomy Department Chair	Consulted for final proposal, meet with ambassador minimum 1/quarter in AY19-20, work to ensure continuity of project	
Bernard Housen	Geology Department Chair	Consulted for final proposal, meet with ambassador minimum 1/quarter in AY19-20, work to ensure continuity of project	
Jeff Newcomer	Engineering & Design Department Chair	Consulted for final proposal, meet with ambassador minimum 1/quarter in AY19-20, work to ensure continuity of project	
Merrill Peterson	Biology Department Chair	Consulted for final proposal, meet with ambassador minimum 1/quarter in AY19-20, work to ensure continuity of project	
Spencer Anthony-Cahill	Chemistry Department Chair	Consulted for final proposal, meet with ambassador minimum 1/quarter in AY19-20, work to ensure continuity of project	
Perry Fizzano	Computer Science Department Chair	Consulted for final proposal, meet with ambassador minimum 1/quarter in AY19-20, work to ensure continuity of project	
Tjallilng Ypma	Math Department Chair	Consulted for final proposal, meet with ambassador minimum 1/quarter in AY19-20, work to ensure continuity of project	
Brad Johnson	Dean of CSE	Consulted for final proposal, meet with ambassador minimum 1/month in AY19-20, work to ensure continuity of project	

If your project team is proposing a temporary or permanent facility or property modification, then a Project Owner Form must be submitted with the application. Form can be found on SEJF website: wwu.edu/sustain/programs/SEJF/apply

c. Will any Associated Students clubs be involved?

Club	Involvement in Project	Club representative signature
Society for the Advancement of Chicanos/Native Americans in Science (SACNAS)	Recruit students, encourage and facilitate conversations regarding equity in STEM	
Out in Science	Recruit students, encourage and facilitate conversations regarding equity in STEM	
National Society of Black Engineers (NSBE)	Recruit students, encourage and facilitate conversations regarding equity in STEM	
Women in Computing	Recruit students, encourage and facilitate conversations regarding equity in STEM	
Women in Physics	Recruit students, encourage and facilitate conversations regarding equity in STEM	
Society for Women Engineers	Recruit students, encourage and facilitate conversations regarding equity in STEM	
Chemistry Club	Recruit students, encourage and facilitate conversations regarding equity in STEM	
Western's Association of Mathematics	Recruit students, encourage and facilitate conversations regarding equity in STEM	
Biology Club	Recruit students, encourage and facilitate conversations regarding equity in STEM	

d. Each SEJF Project team is required to meet with their project coordinator on a regular basis. This individual will provide support and advisement on your project. Communication with your project advisor is necessary for your project to proceed. Initial below to acknowledge this agreement.

SEJF Project Coordinator	Initials	Date
Team Lead	**Initials**	**Date**

SECTION 4: Project Timeline.

a. Describe your project's progress and promotional activity. Outline all tasks that are required to complete the projects, and all means in which you will promote the project to the campus, in the table below. Insert additional rows as necessary.

Action	Purpose	Initiation	Completion
Advertisement via email and posters	Recruit interested students	05/06/2019	05/24/2019
Review applicants	Select one student per department	05/27/2019	05/31/2019
Student ambassador spring meeting/orientation	Meet before summer with selected students to discuss purpose	06/06/2019	
Student Advisory Group, minimum monthly meetings with Dean	Ambassadors meet regularly with Dean to discuss CSE climate	09/25/2019	06/05/2019
Minimum once/quarter meetings with respective departmental Chair	Ambassadors meet regularly with their departmental Chair to discuss department climate	09/25/2019	06/05/2019

b. **Where will the project be located?**
Project will be decentralized throughout WWU's College of Science and Engineering. There is no physical component to this project.

c. **Planned project completion date:**

The SEJF grant shall fund the CSE Departmental Ambassador program for AY 19-20. Although funding will end Spring 2020, this program is expected to continue indefinitely with secured institutional funding.

d. **Project final report due date:** 06/15/2020 Project coordinator initials:

SECTION 5: Project Budget.

a. Provide an itemized list of the budget items required for this project. Include equipment, construction costs, publicity, labor, and any other costs. Include funding amounts from other sources that will impact project cost (see 5b.). Insert additional rows as necessary.

Student ambassadors will be classified as Program Support Staff 2 with a wage range of $14.85-$19.30 beginning 1/1/2020. Here is the job classification description: Under general supervision, provides program support services of moderate complexity and variety. Maintains records including accounting of financial documents. Compiles reports of moderate complexity. Compiles database on moderately complex research statistics. Assembles and codes data. Confers with researchers regarding data collection and display. Prepares and/or reviews forms requiring some interpretation to insure compliance with University, departmental, and/or program rules and regulations. Provides information requiring knowledge of University, departmental, and/or program policies and procedures. May train and direct other student employees.

Individual ambassador compensation

Hourly Wage	Max hours/pay period	Pay period/ quarter	Quarters in AY 19-20 active	Maximum wage/ Ambassador
$15 Program Support Staff 2, wage minimum beginning 01/01/20	6	5	3	$1,350/AY
$15 Additional compensation for students on EID committee	1	5	3	$225/AY

Item	Cost per Item	Quantity	Cost
Ambassador compensation	$1,350	7	$9,450
Additional compensation for EID committee commitment (two students **maximum**)	$225	2	$450
Food for mandatory spring ambassador training	500	1	500
Advertisement	50	1	50
Compensation for spring ambassador trainer	225	1	225
Total project budget			**$10,450**
Total of all other funding sources, listed below			**$0**

a. Additional funding sources: The SEJF Committee encourages the identification of additional funding sources to augment SEJF funds, and failure to secure such support may prevent approval of an application. List pending, approved, and denied applications for funding from other sources, along with amounts requested from those sources.

Funding Source	Status	Amount
N/A, due to the (late) timing of this proposal, no other funding sources have been secured for AY 19-20.		

b. If the project is implemented, will there be any ongoing replacement, operational, maintenance or renewal costs? If yes, has a source of funds been identified to cover those costs? This must be communicated to the appropriate stakeholder.

Ongoing cost	Amount	Responsible Stakeholder	Signature
AY 20-21 Ambassador compensation	$6,400/year, repeatable every year	Brad Johnson (college level) AND/OR departmental Chairs	
AY 20-21 Ambassador compensation	$600/year, repeatable every year	Andreas Riemann, Physics & Astronomy Department Chair (departmental level) AND/OR college level	

AY 20-21 Ambassador compensation	$600/year, repeatable every year	Bernard Housen, Geology Department Chair (departmental level) AND/OR college level	
AY 20-21 Ambassador compensation	$600/year, repeatable every year	Jeff Newcomer, Engineering & Design Department Chair (departmental level) AND/OR college level	
AY 20-21 Ambassador compensation	$600/year, repeatable every year	Merrill Peterson, Biology Department Chair (departmental level) AND/OR college level	
AY 20-21 Ambassador compensation	$600/year, repeatable every year	Spencer Anthony-Cahill, Chemistry Department Chair (departmental level) AND/OR college level	
AY 20-21 Ambassador compensation	$600/year, repeatable every year	Perry Fizzano, Computer Science Department Chair (departmental level) AND/OR college level	
AY 20-21 Ambassador compensation	$600/year, repeatable every year	Tjallilng Ypma, Math Department Chair (departmental level) AND/OR college level	

c. How will the success of the project be measured? Describe the quantitative and/or qualitative sustainability metrics you will use to measure the success of your project. A data collection plan is required for all projects.

Metric *(qualitative or quantitative)*	**Description**	**Impact**
Regularity in meeting *(quantitative)*	Ambassadors successfully meet at a minimum of 1/mo with the Dean and at a minimum of 1/quarter with their respective Chairs. Entering hours in Timesheets will serve as an additional way to track meetings.	Regular and open lines of communication between students/Chairs/Dean
Sense of purpose from Ambassadors – reported *(qualitative)*	Ambassadors and their peers feel secure that faculty, staff, and administration are listening to their needs	When students do not feel heard or cared for, confrontational pushback occurs
Quarterly reports	Each ambassador will be required to submit a 1-page quarterly report detailing their meetings, advocacy efforts, and experiences throughout the quarter.	These reports will be sent to their respective Chair, Team Advisor (Amy Lazzell), and the Dean to assess involvement and commitment to the program.

a. Is there any additional information about the project that you would like to share?

Sustainable Action Fund Grant Program

MEDIUM GRANT - APPLICATION

PROPOSAL REVIEW

Once your project proposal is complete, you must print and receive hand-written signatures from the individuals listed below. After signatures are received, applications can be delivered as a hard copy to the SEJF Grant Program Manager, Johnathan Riopelle at Viking Commons Room 24 or by scanning the application and emailing it to johnathan.riopelle@wwu.edu.

Please set an appointment with the Sustainable Action Fund Grant Program Manager to review your draft proposal before submitting your application.

Sustainable Action Fund Grant Program Manager, Johnathan Riopelle
Viking Commons, Room 24
Available by appointment
Email: johnathan.riopelle@wwu.edu
Phone: (360) 650-4501

Signature: _____ Date: _____

This signature confirms that the application has been accepted for SEJF committee review; it does not indicate funding approval.

Comments:

Seth Vidaña, Director of Sustainability, Western Washington University
Viking Commons, Room 25
Phone: (360) 650-2491

Signature: _____ Date: _____

This signature confirms that the application has been accepted for SEJF committee review; it does not indicate funding approval.

Comments: