Computer Science Newsletter 2021

Western Washington University Computer Science Department

For Alumni and Friends

In This Issue:

LETTER FROM THE CHAIR

Hello Alumni and Friends of Computer Science,

I am sure this year has been completely different for you as it has been for us. Teaching and learning on-line as necessitated by the pandemic has made it a very challenging year. Internet issues have caused even more than the usual challenges. But, even with all the challenges, our faculty and students have managed to keep teaching and learning about Computer Science and Cybersecurity in all of our programs of study.

This year we welcomed three new tenure track faculty, two new non-tenure track faculty and one returning NTT faculty. In this time of Zoom, many of us have not met in person. One of our new NTT faculty has never yet been to campus! Faculty have been teaching from as far away as Texas and North Dakota.

Despite the challenges, faculty and students have been conducting research and writing papers. Papers from our department have been presented or accepted to several conferences including Grace Hopper, SIGCSE, DeepMath and NAIsys. Students have been keeping the clubs operating and the department has been working to keep students as connected as possible.

Plans move forward for the new Electrical Engineering and Computer Science building. We have passed the "pre-design" phase and are now actively working on the design. The building will be built in the parking lot east of CF and will have a connecting skybridge. This project will provide for more office space, research space and teaching lab space for our department. We still need private donations to fully fund this much needed expansion.

I wish for you a great 2021 and look forward to the time when school will be face-to-face again. Even then, I suspect that we will continue to use the many new tools to help students succeed that we were forced to develop during these difficult times.

Phil Nelson
Chair

INTERNET STUDIES LECTURE SERIES

The internet has been quite the lifeline for many of us this year. With classes online many of us spent more time sitting in front of our computers and less time having the serendipitous conversations and epiphanies that make up life on campus. But within the constraints of this new modality of working and learning we seem to be finding our way. For the 2020-21 academic year the Internet Studies Center (ISC) organized an exciting guest lecture series. Hosting the lectures on Zoom meant we were able to invite a line up national and international speakers who could simply join us from their homes.

The ISC lecture series presents leading scholars and practitioners whose work challenges and extends our understanding of digital technology and its place in the world. During the fall quarter speakers touched on a wide range of critical topics, from the historic development of software and its relationship to the liberal and mechanical arts, to the role of big data in contemporary activism, to the creative affordances of information-centric networking, to name but a few. The lectures are happening nearly every week and are open to the public, so feel free to attend any of the talks or watch them after the fact on YouTube. Whatever you do, don't be a stranger.

For more information about the lecture series visit the ISC website: https://cs.wwu.edu/isc/isc-lecture-series

NEW BUILDING

The Computer Science Department has been growing rapidly for several years and there is now a new building on the horizon which will be named Kaiser Borsari Hall. It is named for Fred Kaiser and Grace Borsari, founders of Alpha Technologies, who provided a $10 million lead gift to help fund the project. The Computer Science Department will expand into Kaiser Borsari Hall which will also house programs in electrical engineering and energy science. We look forward to additional office space for faculty and staff, lab space to support teaching and research, and active learning classrooms. Completion of the building is targeted for Summer 2024.

CS/M SCHOLARS PROGRAM FOCUSES ON INCREASING DIVERSITY IN CS

A major effort over the last ten years to address diversity and inclusion has been the CS/M Scholars Program. Funded by a $590K grant from the NSF in 2011, the program was focused on increasing the participation of women in CS and Math. Followed on by a $1M grant in 2018, the program has expanded its scope and is focused on preparing students for careers in CS and Math. This new grant includes a robust education research component and a near-peer mentoring program. Over forty alumni have participated as mentors to the program and several more have contributed to monthly events aimed at developing leadership skills and providing career guidance. The program has laid a foundation for a new department-wide mentoring program and our fledgling CS Distinguished Scholars Program that will continue after the grant expires in two years.

NEW MENTORING PROGRAM

The department is rolling out a new near-peer mentoring program. Professor Fizzano is working on this effort with officers from the Association for Women in Computing. The new mentoring program will be based on experiences with the CS/M Scholars Program mentoring program and also the Sisters+ mentoring program that the AWC has run for several years. The plan is to have experienced students serve as mentors to newer students. The mentors will provide encouragement, guidance, and perspective to the newer students as they navigate challenges in their academic journey. There are 30 or so mentors already signed up and starting in winter we'll be finding first and second year students to pair with the mentors. Ideally, the program grows so that eventually any new student who wants a mentor can have one. A long term plan is to also involve alumni to help mentor seniors as they approach graduation and embark on their career.

NCWIT COLLEGIATE AWARD FINALISTS

First year CS/M Scholar Abigayle Peterson (left) and senior Erin Howard (right) have been selected as finalists for the NCWIT Collegiate Award which honors the outstanding computing accomplishments of undergraduate and graduate students who self-identify as women, genderqueer, or non-binary.

Abby was selected for her work designing and developing "Magnify Wellness", a free mental wellness app available on the iOS app store. Abby is passionate about ensuring that everyone has access to mental health resources. She started to code the app while in high school and now works with over 70 people around the world to maintain and enhance the app.

Erin was selected for a project entitled "Leveraging Statistical Analysis to Develop Training Labels for Time Series Data". This project started during a summer Distributed Research Experience for Undergraduates. Initially, the focus of the project was on time series data related to binary stars but Erin expanded this work to apply to all time series data. When asked how it feels to be selected, Erin said that it felt wonderful. In particular, Erin appreciates that this award is specifically for all underrepresented genders, not just women.

Congratulations to Erin and Abby for their amazing work!

AMBASSADOR PROGRAM OPENS DOOR TO GREATER INCLUSIVITY

Established in 2019, the Ambassador Program is an exciting and much needed step in achieving the Computer Science Department's vision of equity, inclusion and diversity. In this rapidly changing world of higher education, we interact with students, staff, and faculty, whose background, experiences, and expectations are diverse - warranting a nurturing, supportive, and understanding culture that ensures success of all. The Ambassador Program aims to carry out this mission by electing one faculty as the Community Ambassador (CA) and two Student Ambassadors (SA), whose primary purpose is to provide a safe space where issues related to equity, diversity, and inclusion can be raised and discussed, and ideas for improving departmental culture can be generated. Currently Associate Professor Dr. Moushumi Sharmin is serving as the Community Ambassador and Gabrielle Cervantes (CS Senior) and Sydney Kaster (CS Junior) are serving as the Student Ambassadors. The ambassadors hold weekly community hours open to all. In addition, the CS department created an opportunity to anonymously report issues to any or all the ambassadors.

CYBERSECURITY NEWS

NEW CYBERSECURITY COORDINATOR

Lauren Kemper is the new Program Coordinator for Western's Cybersecurity program in Poulsbo. Lauren brings her personal experiences of attending community college and a university extension campus to help students on their journey. Lauren helps guide prospective and current Western on the Peninsulas students from application to graduation.

CYBERSECURITY TEAM TAKES 3rd IN 2020 PRCCDC

The WWU Cybersecurity team participated in the Pacific Rim Collegiate Cyber Defense Competition (PRCCDC) in 2020 taking 3rd place. This adds to the team's history of successes in the competition. The 2020 competition was altered this year to an on-line format. The team is already preparing for the 2021 competition, which will also be on-line.

A COVID - 19 YEAR

Caroline Hardine working from home with her kids.

This past year has been like no other. The Covid-19 pandemic, which first tested us last March, continues to require faculty, staff and students to overcome many challenges. We are grateful for the dedication, caring and resiliency of the CS Department and Western community.

Our CS Clubs pivoted to virtual events using a variety of web-based tools. The CS Tutors (formerly known as CS Mentors) continue to offer tutoring via online Zoom hours, keeping this vital program running. The impact of continuing these resources is significant, and our department is grateful for the leadership and resourcefulness demonstrated by our students. Discord channels and other new activities and clubs were created, including the Object-Oriented Design Club and the faculty and staff led TGIF-- a virtual social which offers a different theme or activity each week.

We are proud of our Western's CS students who have remained committed to their education and have not let the challenges of remote learning stop them.

SALMON RESTORATION PROJECT MAP

My name is Taichen Rose and I had the pleasure of being a Software Developer Intern with the Nooksack Salmon Enhancement Association (NSEA). NSEA is an organization based in Whatcom County, and its mission is to educate the community to take action, keeping wild salmon for generations to come. NSEA invests in the restoration of salmon runs by enhancing rivers, creeks, and riparian habitat. Amy Johnson, Advancement Manager from NSEA envisioned a project that will showcase all of these restoration projects.

This project was started by Zach Cooper and Juniper Still. The initial map design was created through a tool called Mapbox. After the basic map was created, we needed to create a database to store the information and choose our frameworks for the application. Interns met with Amy weekly to discuss progress. The project was passed to me, with the map displaying mock data icons. My task was to update the database adding in new fields. I was also tasked to upload the map to the NSEA website. This, however, was problematic since we had to find a third-party application to help host this to NSEA's web page. A solution was found using Mapbox to do all the heavy lifting.

The map is currently on the NSEA website, this map and database of projects will help showcase, to the community, all the hard work that volunteers and organization members have contributed for NSEA's mission. As time progresses, community members can look at this map and become inspired to roll up their sleeves and also contribute, cleaning up the environment so the salmon can continue to grow.

BIOINFORMATICS STUDENTS MODEL COVID-19 SPREAD AND MUTATIONS

Students in the computer science bioinformatics classes during the most recent spring and fall terms worked on a variety of group projects, many of them related to COVID-19. In the spring 2020 term, projects included assessing the sensitivity of the Susceptible, Exposed, Infectious, and Recovered (SEIR) epidemiology infectious disease model, and developing algorithms for understanding the effects of coronavirus spread in response to social relaxation measures following mask-mandate and lockdowns in Whatcom County. Other projects included a structural analysis of the effects of single and multiple mutations to proteins of the COVID-19 proteome, and the formulation of a network-based approach for modeling how coronavirus spreads among households, schools, and workplaces.

Proteins are chains of amino acids that assemble into three dimensional biomolecules, which carry out the majority of biochemical processes inside all living organisms. Among their many roles, proteins perform critical functions in the immune response, signal transduction and propagation, digestion, and tissue repair. A change -- a mutation -- to the amino acid sequence of a protein can have deleterious structural ramifications, which may render a protein nonfunctional. During spring 2020, computer science and biology students Gideon Wolfe, Othmane Belhoussine, Anais Dawson, Maxwell Lisaius, and others, explored how mutations to 8 amino acids affect the stability of the 306 amino acid main protease (MPro) of the COVID-19 proteome (Figure 1).

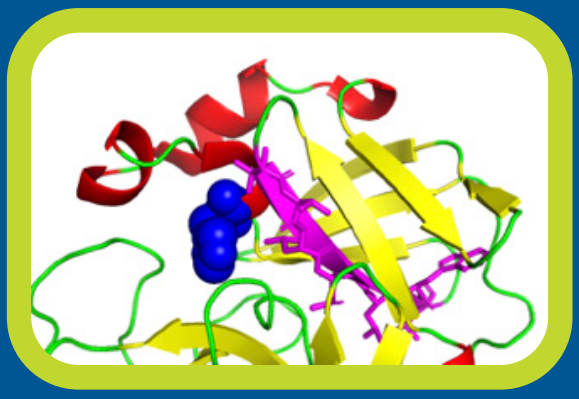


Figure 1: Amino Acids 25-32 (Magenta) of the main protease (MPro) of SARS-CoV-2, in proximity to amino acid 41 (blue) which forms part of the active site.

Mutations to MPro were performed in silico, to generate 152 mutants. Two computational approaches, Site Directed Mutagenesis (SDM), and short runs of Molecular Dynamics (MD), were used to assess the effects of the mutations in the 152 mutants. SDM gives a stability prediction measure known as ΔΔG, which can be used to assess the impact of a mutation, while MD computational experiments generate relaxation profiles which can be assessed to determine how much energy a protein must exert to return to a stable state in response to a mutation, which is an indirect measure of the effect of an amino acid substitution. To identify which amino acids have the biggest impact on the stability of the protein when mutated, the students developed a voting scheme, to give proportional weights to metrics with higher standard deviation values from the mean value of a metric for all mutants. It was found that four amino acids in MPro are predicted to have a significant effect on the structural stability of the protein, as judged by the effects that their mutation has on the protein's structure. Although this work is still in progress, already the preliminary results were found worthy of publication, which was presented by Gideon Wolfe at the BCB conference, the ACM flagship venue for bioinformatics.

During the fall 2020 bioinformatics class, biology and computer science students Sakari Woods, Raiden Van Bronkhorst, Annika Goranson, Jacob Nemeth, and Jade Jordan, developed the groundwork for a network-based model to simulate COVID-19 transmission rates among individuals across home, work, and school locales. The ultimate goal of the project is to simulate and study transmission scenarios and infection rates among households comprised of individuals that also engage with others in school and work environments (Figure 2). The developed multi-layer model permits a user to perform hypothesis tests by modifying network-specific parameters, including number of households, and employees per work location. Transmission rates are modeled as connections among nodes, and such a model permits examining the impacts of altering specific variables, and how they affect COVID-19 infection rates.

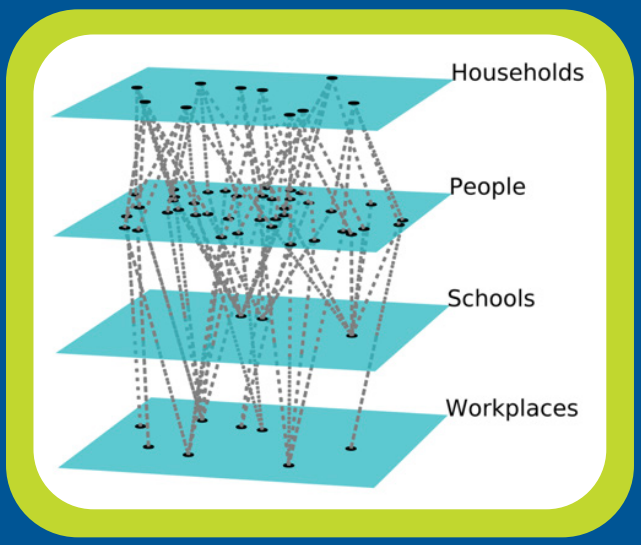


Figure 2: Network-based model for simulating transmission rates among households comprised of individuals that engage with school and workplace communities.

NEW CS FACULTY

Kameron Decker Harris

I earned my PhD in Applied Mathematics from the University of Washington. After graduating, I worked in the labs of Bing Brunton (UW Biology) and Rajesh Rao (UW Computer Science) as a postdoc for 3 years before coming to Western.

My specialty is the application of computation and mathematics to neuroscience, an area known as “computational neuroscience”. Basically, I study models to better understand how brains work and also to use biological principles in computation. I also like to apply mathematical techniques more broadly, and have worked in social science and genomics. I love the enthusiastic and inquisitive students I have met at Western so far! I look forward to developing a computational neuroscience course that will cover my research as well.

Skiing has been a passion since my childhood in Vermont. I’ve skied in Chile and Canada, and have schussed off the summits of Tahoma (Rainier), Koma Kulshan (Baker), and Shuksan by various routes. I also really enjoy walking in the woods, mushroom collecting, biking, and cooking. I am married to an elementary educator, Meira, who is a great resource for teaching tips and my favorite adventure partner.

See-Mong Tan

I graduated with a PhD from the University of Illinois at Urbana-Champaign, where my research was in multimedia network systems. My path was through industry, where I founded an Internet video streaming startup out of grad school, sold it, and founded another internet video streaming startup that failed in the dotcom crash in the early 2000s.I then spent a bunch of time in senior management jobs at Apple for QuickTime, Microsoft for Windows Media and Windows networking, Amazon for Amazon Video, and Google for Google Maps.

My first love is the academic environment, so I am delighted to join the department. I hope to inspire a new generation of computer scientists in topics from software engineering to operating systems and networking. My research interests are in synthetic vision systems. I like to fly airplanes, sail, and bicycle when the weather is warm.

Yasmine El-Glaly

This fall I joined the Computer Science Department at Western as an Assistant Professor of Computer Science. I pursue research on the accessibility of digital information and design systems that support people with disabilities in achieving their learning goals. I also research best practices to educate computing students on topics of accessibility and inclusive design. I received my PhD in Computer Science from Virginia Tech. I received my MSc and BSc degrees in Computer Science from Egypt, where I grew up.

I like reading novels and biographies. I enjoy exploring nature. I particularly like walking along seashores and waterfronts, hiking and swimming.

Jeff Woodcock

I earned a Masters of Software Engineering from California State University Fullerton. I come from industry and my area of specialty is teaching the Senior Project Series classes that offer students software development experience. I love teaching at WWU because of the feeling of family. I hope the students feel it too. In the CS Department, we are not just doing a job to get the students out the door, but instead we care and connect, and communicate about how to offer students the best education and prepare them for the workplace.

In my spare time I play older PC games, write small PC games, have great conversations with my son. I do some research on data compression and game networking algorithms. Most of all I just love my family and give thanks for them every day.

Syeda Selina Akter

I joined the Western Washington University faculty in Fall 2020. Before joining at Western, I taught at California State University at Fullerton for a semester. I received my PhD from Washington State University. My doctoral study was on applying graph-based approaches to sensor network prediction tasks.

I am teaching courses on Systems, Data Structures, Algorithms and Ethics in Computer Science. I look forward to living in beautiful Bellingham and getting to know my colleagues and the students of Western Washington University. Outside of work, I enjoy yoga and capoeira. I love forests and beaches and enjoy walking in the beauty of nature.

Shri Mare

I earned my PhD in Computer Science from Dartmouth College, Hanover, New Hampshire. After my PhD, I spent time as a postdoc at the University of Washington. I am interested in computer security and privacy, broadly defined. My current focus is on usable security and privacy, which involves studying human aspects of security and designing solutions that are secure and easy to use.

I am delighted to teach at Western. I appreciate the wonderful students, and the positive department culture. I like that classes are small, which make it easy to connect with students and give them individualized attention. I really enjoy interacting with students, faculty, and staff. In my spare time I enjoy getting outdoors--hiking and running. Indoors, I enjoy badminton, woodworking, and board games.

FACULTY OF THE YEAR 2020

Every year the ACM student chapter conducts a survey to honor a faculty member as the Faculty of the Year. In 2020, Dr. Aran Clauson received this honor. Students praised Aran for being a caring and passionate teacher, having a great sense of humor, and for his story telling ability.

Here are some comments that students shared:
"Back when we were in person, every once in a while in Aran's office, he would tell us about his plans to teach premajor students. You could see the excitement in his eyes. He's a treasure to the department."

"Aran has such a mind for helping students. I really feel he cares if we learn a subject and understand the mechanics rather than tick off a box on the syllabus. His willingness to help and continue to guide struggling students is incredible, especially at the same time offering extra challenges to students who can handle it."

Congratulations, Aran!

OUTSTANDING FACULTY MENTOR 2020

WWU Outstanding Faculty Mentor Award 2020 Goes to Brian Hutchinson. Brian 's research is in collaboration with the Computing and Analytics Division of Pacific Northwest National Laboratory. His research is highly interdisciplinary: he and his students work with domain experts to use machine learning to tackle important scientific problems arising in astronomy, biology, climate science, education, linguistics, materials science, oceanography, and many other domains. His group also works on fundamental machine learning research, including adversarial machine learning and few shot learning. He is passionate about mentorship in all forms: he has mentored over 70 undergraduate and master's research students; he mentors department TAs and graders as the department's first TA Coordinator; he has helped to organize and run the College of Science and Engineering TA Training program; and he co-founded and served as the first chair of the CS department's Student-Centered Learning Committee, designed to support junior faculty's growth as effective instructors.

Congratulations, Brian!

OUTSTANDING GRADUATES

Left to Right -
Josh Stuifbergen -
CISS Outstanding Graduate
Ivan Chuprinov -
CS Outstanding Graduate
Alex Covington -
CS Outstanding Graduate
(Masters Program)

2020-2021 SCHOLARSHIP WINNERS

Nathaniel Burns - Community College Accelerator Scholarship
Zephren de la Cerda - Mark Lockwood Memorial Scholarship Fund
Melissa Swift - Scottish Rite Computer Science Graduate Fellowship
Abby von Boeselager-Smith – DocuSign CS Scholarship
Tyler Greer - DocuSign CS Scholarship
Beryn Staub-Waldenberg - Westcott Scholarship in CS
Sydney Kaster - Westcott Scholarship in CS
Gemma Gendreau - David W. Cole Endowment
Josh Myers-Dean - Dr. James Lee Johnson Memorial Endowment
Logan Pashby - Dr. James Lee Johnson Memorial Endowment
Caelan Booker - CS Graduate Fellowship
Eric Slyman - Track Global Fellowship in CS
Jay Roybal - Cloud Security Alliance Scholarship for Cyber Security
Dallas Lyons - Faithlife CS Scholarship
Alex Gavin - Lars and Elaine Giusti Scholarship for CS
Jade Jordan - Ugwoaba Scholarship for CS Athletes and Women in Computing Scholarship
Jonathon Derr - Anthony G. Vallot, Jr. - Memorial Scholarship



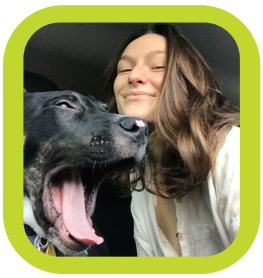





Top Left to Right - **Tyler Greer - Melissa Swift - Josh Myers-Dean - Jade Jordan Bottom Left to Right - Beryn Staub - Waldenberg - Alex Gavin - Eric Slyman - Gemma Gendreau**
Not Pictured - **Zephren de la Cerda - Nathaniel Burns - Jonathon Derr - Dallas Lyons - Jay Roybal - Caelan Booker - Logan Pashby - Sydney Kaster**

CITIZENSHIP AWARD WINNER

Congratulations **Abby von Boeselager-Smith!**



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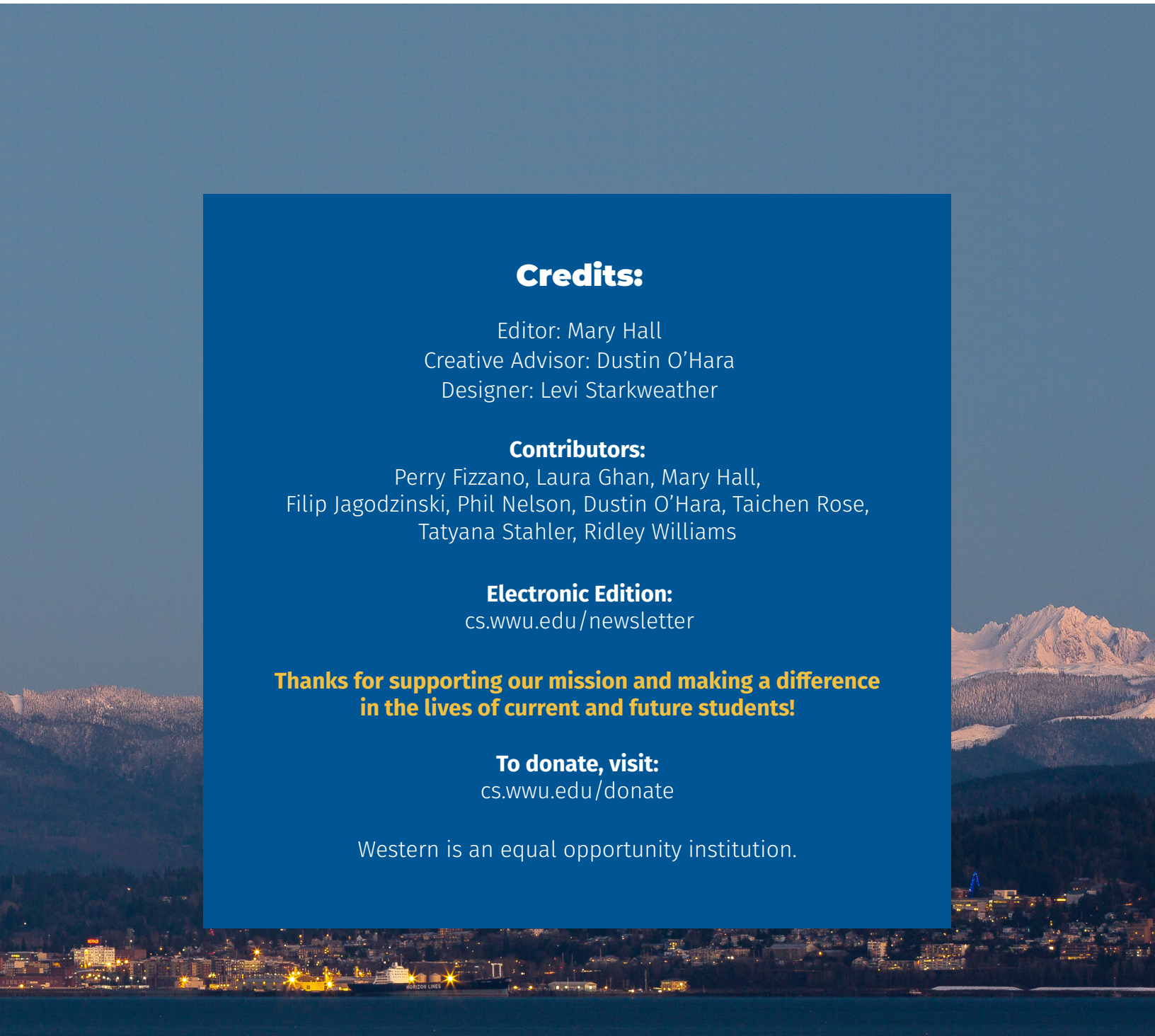

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