

Computer Science Newsletter 2024

Western Washington University Computer Science Department
For Alumni and Friends

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MAKE WAVES.

Letter From the Chair

Hello Alumni and Friends of CS at Western,

What a year it has been! Firstly, grads, grads, and more grads. Last academic year we graduated 160 BS students from across computer science, data science, and cybersecurity, and a whopping 24 MS students -- a record by far! -- from our graduate program. To better manage this growth, Dr. Brian Hutchinson has taken the reins as the Director of our BS Data Science program, while Dr. Wesley Deneke is now the Director of BS Computer Science. They join Dr. Erik Fretheim who is the Director of Cybersecurity. The MS program, directed by Dr. Moushumi Sharmin, now numbers just shy of 50 students, and has been successful at recruiting and welcoming students from outside of the Northwest, including students from abroad. Our ongoing growth is being supported by our new Support Group Manager Jesse Atkins, our new Department Manager Jamie Granger, and three wonderful new faculty who joined in fall 2024 – Drs. Hanxiang Du, Hsiang-Jen Hong, and Fuqun Huang.

Scholarship, too, is coming along wonderfully. We continue to offer our undergraduate and graduate students opportunities to be mentored by faculty on research projects, ranging from virtual reality to deep learning, and from accessibility computing to cybersecurity. The faculty's scholarship efforts are supported by several internal and external grants, including Dr. Fuqun Huang's pilot grant to develop algorithms for developers to reason about the human error mechanism of defects during programming, and Dr. Caroline Hardin's NSF \$230K grant as part of a collaborative team to study and improve pathways for preparing and supporting computer science teachers in K12. Dr. Caroline Hardin also oversees the new BAE CS program.

I am also very proud to report on multiple efforts at increasing access and widening pathways for more and more students to gain entry into computer science, data science, and cybersecurity. Dr. Yasmine Elglaly oversees the Computer Science Distinguished Scholars (CSDS), which now recruits students directly from high school and provides guaranteed and timely entry to the CS major after completing our required pre-major classes. CSDS received a \$30,000 donation which will permit us to offer academic scholarships. For Give Day in May 2023, we created several new donation options, including a student scholarship fund, which has been generously donated to by tens of alumni, who in part funded a half dozen students to attend the Grace Hopper Celebration of Women in Computing conference in Florida in September, and which will permit us to award a likely record number of academic scholarships in spring 2024.

And then there is the new building, Kaiser Borsari Hall, presently under construction, which will open in January 2025. The robotics lab on the ground floor, for which we are presently conducting a faculty search, as well as collaborative learning classrooms, a student sr. project room, and various student study spaces, are all taking shape.

I said it before. I say it now. And with your continued support, I hope to say it again in the future – the department is flourishing, and here's hoping for another successful year!

~ Filip



Caroline Hardin, PhD receives \$230K NSF Grant

School districts across the country need more secondary computer science teachers, especially those who share the identities, values, and lived experiences of the students they teach. However, pathways for preparing and supporting computer science teachers are only just emerging, and many are struggling to recruit promising teachers into the profession and retain them long term. This project will create a consortium of emerging pre-service programs across the Pacific Northwest to address, strengthen, and mature computer science teaching pathways in four ways: 1) organizing and sharing information about teaching pathways, 2) identifying and resolving key barriers to pathways that aspiring teachers face, 3) supporting computer science teacher community building in partnership with new and existing computer science teachers association chapters, and 4) supporting administrative leaders who manage and grow these pathways.

The project's approach is to build an evidence-based networked improvement community, which deeply engages stakeholders across the region to identify opportunities for change, develop sustainable cross-

institutional coordination practices, and use research as one tool of many to inform approaches to change. Research will particularly focus on answering 1) who is and isn't informed about CS teaching pathways, and why; 2) what barriers aspiring teacher with identities marginalized in CS face in pursuing CS teaching careers; 3) how community gatherings amongst teachers with marginalized identities can support teacher retention; and 4) how solidarity amongst teacher education administrative leaders can support sustainability of pathways. These questions will be posed across urban and rural divides, helping to inform how values, communities, and state politics shape equitable access to computer science education in secondary schools across the Pacific Northwest.

This is a collaborative award between University of Washington (PI Amy Ko), Western Washington University (Co-PI Caroline Hardin), Central Washington University, Washington State University, Whitworth University, University of Oregon, and Boise State University. WWU's share of the award is \$230,000.

ALP Workshop 2023 Yudong Liu, PhD

Dr. Yudong Liu and select scholars from all over the world (including USA, Italy, China, and Israel) successfully organized the first Ancient Language Processing Workshop in September 2023—ALP 2023—at Varna, Bulgaria.

Dr. Liu ran the workshop and presented a student-coauthored poster at the event. ALP provides a forum to advance this subfield of NLP and offer a place where researchers and practitioners can meet and discuss their latest work, exchange ideas in addressing shared epigraphical challenges in language processing across various ancient languages, and address the unique challenges faced by ancient language machine translation. In response to the wide interest, this event will be offered biennially.

This work is important because ancient languages contain important historical and cultural information. Advances are continually being made in applying language technologies to ancient languages such as Sumerian, Akkadian, Latin, Ancient Greek, and Ancient Chinese, especially in the construction of digital language

resources and resources to facilitate automatic analysis. The workshop on Ancient Language Processing aims to focus specifically on ancient languages and scripts from the emergence of writing in Mesopotamia and Egypt. 3000 BCE to the entire world up until 800 AD.

Languages of interest include, but are not limited to:

- Mesopotamia: Sumerian, Akkadian
- Iran: Elamite, old and middle Persian
- Levant: Eblaite, Amorite, Aramaic
- Ancient Hebrew, Phynician, Ugaritic
- Anatolia: Hittite, Luwian and minor Anatolian languages
- Egypt: Ancient Egyptian, Coptic
- Mediterranean: Linear A and B, Ancient Greek, Latin
- Arabia: Ancient North Arabian, Old Arabic
- India: Sanskrit, Eastern Panjabi, Pali
- China: Literary Chinese, Tibetan
- Mesoamerica: Mayan
- Japan: Old Japanese





Travel Log: Notes from the CS Department's first faculty-led study abroad program by Dustin O'Hara

This past summer, I had the good fortune of traveling abroad with a small group of computer science and internet studies students. It was the CS Department's first faculty-led study abroad program. We spent 5 weeks in the United Kingdom, focusing on digital humanities and exploring the UK's cultural heritage. We began and ended the trip in London and spent a month in the southwest region of Cornwall. In London, we toured notable museums and the national British Library, meeting with the library's digital team, and Miriam Redi a research scientist from Wikipedia. We took the train to Cornwall in time to participate in the Golowan summer solstice festival, which involves revived Celtic rituals, including the 'serpent dance.' Hundreds of locals, along with some WWU students, joined hands to dance through the town in a serpent-like shape. Musicians playing traditional folk music accompanied the dancers, and at night, flaming torches illuminated the crowd. At an unpredictable time and place, dancers encountered a mythical horse skeleton character named Penglaz, who jumped out of a dark alley to join the dance. It's a wild, community-driven, and vibrant example of cultural heritage as an active, lived experience, that is continually reinvented. Watching the students dance with Penglaz was definitely a highlight of the trip.

Post-Golowan, we settled into a slower rhythm, making ourselves at home in a large house near The Ladder, a

non-profit cultural center we partnered with. The students began group projects, researching traditional Cornish myths and folklore. We visited Cornish archives and libraries and attended a heritage conference at the University of Exeter. The students' research informed the development of original 'hyper-audio' projects that used the Alexa voice interface to navigate linked audio files. Topics of the student projects ranged from folk narratives to witchcraft, and holy wells. Ryan Harang, Jacob Windbigler, and Carter Staley created a 'choose your own adventure' audio story inspired by Cornish folklore, featuring encounters with mythical characters and an angry giant, alluding to the legendary founding of Cornwall. The students' creativity and enthusiasm were inspiring.

We concluded the trip with more time in London, reflecting on our experiences. The students valued the connections made with folks from the UK, such as Kieron O'Hara, an emeritus professor of computer science from the University of Southampton, and Joshua Nawras and Felix Mortimer, co-founders and directors of The Ladder. Many of the students also described gaining a greater sense of independence and confidence from their travels and day trips. I was struck by the close, convivial relationships that formed through shared meals and walks, creating a strong cohort experience. Personally, I will remember the students and trip fondly.



Club Spotlight: WWU Competitive Programing Club

On February 25th 2023, the Western Washington University Competitive Programming Club competed in the International Collegiate Programming Contest regionals at University of Washington Spokane. After practicing for multiple quarters, two teams of three people from WWU entered the Division II section of the competition. Those teams took first and second place in Washington, and one team took fifth place in the whole of the Pacific Northwest region.

The Competitive Programming Club has a mission of helping students gain helpful skills for job-finding while having fun. It's a fancy name on a resume, but it also provides a stress-free environment to meet people and practice for interviews/programming competitions. Members aren't required to compete but are informed of upcoming competitions and are surrounded by people who they could team up with.

The morning of the competition, the team left their hotel and arrived at UW at 9 AM. Everyone was greeted with free breakfast foods and beverages as we got settled in and went over the rules. At 11 AM, the competition began. Each team was given 13 programming problems of varying levels of difficulty. Each would have to try to solve as many problems as they could (and pass runtime limits) within the next five hours. A balloon was delivered to teams for each problem they completed, and midday the teams were treated to Subway! At 4 PM, the competition ended. Throughout the competition, a leaderboard is available, but the leaderboard is frozen an hour before the

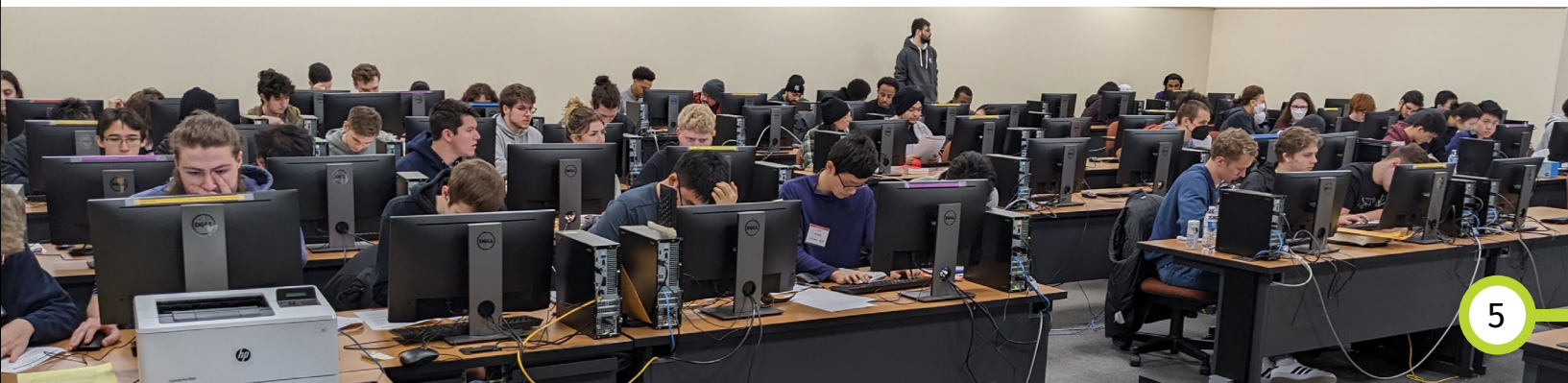


competition ends to add a bit of secrecy to who will win in the end.

After the timer ran out, we all gathered in a room as the ICPC dramatically revealed the final leaderboard by showing us how many more problems each team solved in the last hour, one by one. After lots of leaderboard excitement, it was revealed that the WWU Binary Bandits, which included Joe Ewert, Owen Wright, and Indie Cowan, got second in Washington and 17th place in the Pacific Northwest. Then it was revealed that the WWU Generative Pre-Trained Transformers, which included Ethan Temple, Joey Capps, and Sky Duryee, got first place in Washington and fifth place in the Pacific Northwest. More than 50 teams competed in Division II in the Pacific Northwest. The team celebrated with a dinner in Seattle.

The Competitive Programming Club is excited to participate in more contests throughout the year and bring home more titles. Congratulations to the competitors for bringing home medals and plaques! Thank you to Robin Preble for leading the club as President this year and to See-Mong Tan for being our faculty advisor.

The Competitive Programming Club is always open to new members and is education centered. If you want a fancy-sounding extracurricular and medals on your resume, as well as the skills to pass a technical interview, come join us in the spring! Open to all students who have completed CSCI 141 or have equivalent experience.





Alumni Profile Miranda Skar

Cybersecurity BS 2019

Miranda is a Senior Security Testing Consultant at Aon-- a British-American professional services and management consulting firm that offers a range of risk-mitigation products.

Where are you working?

After graduation, I joined Aon through their Cyber Associate program, a 9-month training program exposing associates to different fields such as Advising, Security Testing, Digital Forensics, and Incident Response. I joined the Security Testing team and have grown to a Senior Security Testing Consultant.

What do you enjoy about your job?

I really enjoy security testing. My favorite projects are mobile application, social engineering, and external network engagements. Since technology is continually changing, there are always new vulnerabilities to find and exploit. I like having a job where I can continue to learn and expand my knowledge.

I have done many different types of social engineering projects, including phishing, vishing, and physical testing. I really enjoy physical tests. The goal is to gain physical access to the client's office and plug a device into their network that gives us outside access to their company network. I feel like I am in a spy movie!

I have become a subject matter expert on social engineering and given presentations on the subject at Black Hat and internally at my company. I have also been published on the subject in articles for Cyber Security Awareness Month.

What is in the future for you?

I want to continue to work in consulting. It gives me access to so many different environments, clients, and types of engagements.

I also enjoy helping with recruiting, mentoring, and managing. After joining Aon, I was given the opportunity to contribute to recruiting by working with the internal steering committee to organize promotional materials and set up shifts for the recruitment booth at WiCyS conferences. I, along with other ladies of Security Testing, were able to gain additional women to the team, doubling

our numbers. I have attended the Women in Cyber Security conference since I was a student, and it feels wonderful to be able to volunteer now and give back to the community.

Part of my personal development for the future involves learning and improving management and mentorship skills through mentoring and managing new consultants. I take the time to schedule regular meetings to check on their progress, answer their questions about working in the field, demonstrate techniques to add to their toolbox as pentesters.

At Aon, we have developed a support group for women in Testing where we continue to share knowledge and experience with each other and help build confidence.

Why did you decide to go into the field of Cybersecurity?

In high school, I was interested in learning front end coding to design websites and that led to learning more about cybersecurity to build secure websites. I have always been a curious person, even wanting to become an investigator at one point. This curiosity is what led me into cybersecurity and eventually Security Testing.

I had just had my second child and I was thinking about going back to school. Whatcom Community College and Western Washington University had just started their Cybersecurity program. I thought that given my past interests it would be a wonderful fit. I started the program and the more I learned the more I loved it!

How has the Cybersecurity Program prepared you for your career?

The combination of technical hands-on work and the theory behind it all really helped me prepare. Exposure to the tools that I now use daily (Kali Linux, Burp Suite) really helped too.

What is something about the Cybersecurity program that you absolutely loved?

I really loved being a part of a cohort that went through the whole program together. It was wonderful to have the same people around me for years. I was able to connect and collaborate with my classmates-- the type of people who help you as much as you help them. I am still in contact with people from my cohort. I even have someone from school working with me at my company!

What advice would you give to a student interested in Cybersecurity?

Be inquisitive. Actively learning and evolving with the ever-changing field of cybersecurity. It is constantly changing with new technology and exposure to the public. Be honest and own up to mistakes; your reputation and trust is everything in cybersecurity. Develop your soft skills as a team player goes far in cybersecurity because oftentimes there's collaboration going on.

Are there any final thoughts you would like to share?

My elevator speech is that I break things and tell companies what I did so they can fix it. I have always been the one to push a button too many times to see what happens. As a security tester, I constantly realize how many things I do in my real life to test things. If a recipe calls for a crazy amount of butter, I wonder what happens if I don't add it. I divide the recipe in half, add butter in one and not the other, and taste test the results. So yes, lemon curd can be made without butter!



Neal Digre, \$10M XPRIZE Rainforest Competition

Neal Digre, a 2016 alum of the WWU Computer Science Department, is part of a team that has reached the final round of the 5-year \$10M XPRIZE Rainforest Competition, having advanced from the May 2023 semi finals held in Singapore.

Rainforests, and the rich biodiversity within them, hold tremendous scientific and environmental value to humanity. The goal of the XPRIZE Rainforest Competition is to engage experts across a wide range of disciplines and spur innovation in technologies for monitoring biodiversity, in order to improve our understanding of the rainforest ecosystem.

Digre's team, Team Waponi, is one of six finalists in the competition. For the competition, they developed the "Limelight" -- a device that measures rainforest diversity by collecting audio and photographic samples. The device is designed to be delivered to the rainforest canopy autonomously via drones, where it then lowers into forest layers for sampling. The images and audio recordings collected are relayed via mesh network and analyzed in real time for insect species identification using machine learning. Digre's primary contribution to the team is to this machine learning component: he trained the neural networks used to identify insect species from audio recordings of their calls.

Digre acknowledges Western Washington University for the skills and knowledge that have allowed him to not only participate, but help his team make it all the way to the final round of the competition. In particular, he credits the strong foundation in machine learning and deep learning he obtained by participation in undergraduate research in Professor Hutchinson's Machine Learning Research Group.

More details on the XPRIZE Rainforest Competition and Team Waponi can be found at <https://rainforest.xprize.org/>, and the competition winners will be announced in Q3 of 2024. The department wishes Neal Digre and Team Waponi the best of luck!

New Faces



Weidan Walker

Program Assistant

Weidan is our front desk customer service expert. What Weidan enjoys most about their role on the CS Department Office team is “working with the students and helping them achieve their goals.”



Kjatosa Ruvalcaba

Program Coordinator/Advisor

Kjatosa joined the CS Department advising team. Kjatosa is excited to help students achieve their goals and feel supported on their journey to success. Kjatosa is working toward earning her own BS in Computer Science.

Sneha Shinde

Cyber Range Software Developer/ WWU Poulosbo Campus

Sneha joins the Poulosbo Cyber Range Team in providing Washington State with a secure and controlled virtual environment for cybersecurity training. “I’m excited to really make a difference and help advance cybersecurity education.”

Sally Bass, MS

Cyber Range Resource Associate/ WWU Poulosbo Campus

Sally specializes in cybersecurity education research. “I am excited to work at WWU because I can help make a difference in cybersecurity education. I love how inclusive Western is and am happy to be a part of this wonderful learning community.”

Jamie Granger

Computer Science Department Manager

Jamie brings 13 years of WWU experience to the CS department. “I am excited to bring my experience in finance and project management to my new role here in Computer Science. It has been invigorating working so closely with the exceptional CS students. Our faculty and staff are a top notch team of which I am privileged to be a part of.”

Jesse Atkins

Computer Science Support Group Manager

“After working 7 years for WWU Facilities Management, I enjoy being a part of an academic department where I can experience directly the impact of my work on students and on the mission of the university.”



Logan Sizemore, MS

Instructor

Logan teaches a wide range of programming and data science classes. “I find immense joy in building a classroom community where students come together sparking ‘aha’ moments. The meaningful connections I make with my students energizes me as an educator.”

Manoj Prasad, PhD

Instructor

Manoj teaches at Western’s Kirkland location at the Lake Washington Institute of Technology. Manoj comes to us with valuable industry experience. “I hope to combine academic knowledge and my experience to get students ready for their work-life.”

Mubarek Mohammed, PhD

Instructor

Mubarek teaches computer systems and secure software development at the Kirkland site of our Cybersecurity 2+2 Program in partnership with the Lake Washington Institute of Technology. Mubarek brings fresh industry experience to his teaching from working as a software engineer for Google and Amazon.

Hsiang-Jen Hong, PhD

Assistant Professor

Hsiang-Jen’s research is in cybersecurity, blockchain technology, and computer networks, with a specific focus on algorithmic design. “I’m truly enthusiastic about working at WWU. The campus’s natural beauty is awe-inspiring. During my interview, I was deeply impressed by the energy and enthusiasm of the students.”

Hanxiang Du, PhD

Assistant Professor

Hanxiang teaches data science classes and her research interests include learning analytics, educational data mining, machine learning and artificial intelligence in education, K-12 computer science education, and XR in medical training.

Fuqun Huang, PhD

Assistant Professor

Dr. Huang pioneers approaches for advancing the reliability, safety, and security of software systems by delving into the cognitive mechanisms underlying software defects. She integrates cutting-edge knowledge from this domain into her computer science courses.



Capstone Project: Karen Faculty Project



In the challenging tropical environment of the Thai-Burmese border in a region known as the Karen state, field medics require rapid and reliable access to vital medical information to assist refugees. The ability to deliver effective healthcare is intrinsically tied to the quality and accessibility of medical information. There was an issue with many local medics speaking mostly Karen while most medications are listed in English and have charts written in English. The Karen Medical Formulary, as a dedicated mobile application, not only replaces the vulnerability of paper versions to humidity but also offers lightweight portability, instant search capabilities, and the flexibility to cater to the multilingual needs of both medics and patients. With our app,

information retrieval will be swift with intuitive search features, allowing for quicker decision-making in critical situations. Committed to enhancing healthcare delivery, the formulary app will ensure that essential medical knowledge is just a tap away, anytime, anywhere.

The Karen Medical Formulary is an essential tool developed to support improved healthcare in challenging environments. This project is a collaborative effort led by WWU students Chantel Nelson, Ellie Skiffington, Liam Dean, Nathan Lochmiller, guided by the expertise of Aran Clauson and local experts Dr. Elisabetta, Dr. Reme, Katie Wierenga, and Dr. John Shaw. It is based on the formulary written by Dr. Elisabetta and her team.

Project Beacon

Computer Science at Western is continuing their partnership with Project Beacon, the Global Mentorship Initiative (GMI), and Microsoft to offer a cohort of 25 students the opportunity to receive tech-specific career coaching.

Students over a 14-week period meet 1-on-1 during weekly online meetings with an assigned Microsoft employee who mentors each jr. and sr. student on how to write a convincing resume, prepare for job interviews, learn how to use AI to facilitate a job search, create a career plan alongside achievable goals, and establish a professional network via LinkedIn.

Students from past cohorts have praised Project Beacon, as it has “helped me find my self-confidence.” This partnership enshrines efforts from industry leaders to offer guidance in a well-structured, organized and professional setting, and enables the CS department to continue to offer enriching opportunities beyond the classroom.



Scholarship Recipients and Awards 2023 - 2024

Scholarship Recipients

Mayla Ward	Mark Lockwood Memorial Scholarship Fund
Madisen Cordell	David W. Cole Endowment
Ian Cambridge	Mark Lockwood Memorial Scholarship Fund
Mitchell Thompson	Dr. James Lee Johnson Memorial Endowment
Logan Giddings	Dr. James Lee Johnson Memorial Endowment
Hidemi Mitani Shen	CS Graduate Fellowship
Katie Christensen	Track Global Fellowship in CS
Justice Baum	Anthony G. Vallot, Jr. Memorial Scholarship
Natalie Norris	CS Citizenship Award
Keagan Roth	CS TAG Scholarship
Anthony Baker	Community College Accelerator Scholarship
Selah Bellscheidt	Scottish Rite Computer Science Graduate Fellowship
Jason Wild	Westcott Scholarship in CS
Dustan Lawrence	Westcott Scholarship in CS
Dylan Carroll	Faithlife CS Scholarship
Ian Crawford	Lars and Elaine Giusti Scholarship for CS
Isabel Rodriguez	Ugwoaba Scholarship for CS Athletes
Sky Duryee	Tuition Waiver



Outstanding Staff Member of the Year
Laura Ghan



Faculty of the Year
Brian Hutchinson



Alumni of the Year

Kurt Price, BS CS 2018

Selected from among the thousands of CS Alumni, as the Outstanding Alumni for 2023. Since graduation, he has joined AWS as a Software Development Engineer and works on the AWS Config team. Over the past few years Kurt has mentored several students in the Computer Science program and organized talks on campus to help interested students prepare for jobs in the industry. Congratulations Kurt, and thanks for giving back to the department!



Computer Science Department, MS 9165
516 High Street, Bellingham, WA 98225

Thanks for supporting our mission and making a difference in the lives of current and future students!

To donate, visit

<https://cs.wvu.edu/support-computer-science>

Donations can be directed to Student Research Support, the Cybersecurity Program, the Data Science Program, Student Clubs, and others.

Credits

Editor: Mary Hall

Designer: Emma Johnson

Contributors

Aran Clauson

Jamie Granger

Mary Hall

Caroline Hardin

Brian Hutchinson

Filip Jagodzinski

Dustin O'Hara

Robin Preble

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