Western Washington University Computer Science Department
For Alumni and Friends

In This Issue:

Letter from the Chair
Data Science BS
Digital Humanities Minor
Secondary Education BAE
Neurodiversity

Accessibility Research Lab
Research Showcase
New Faculty
Awards
Scholarship Winners
Dear Alumni and Friends of Western Washington University Computer Science,

This past fall, we welcomed students back to campus for the first time since the initial months of 2020. As we continue to transition from a fully remote operation modality necessitated by the COVID-19 pandemic to a greater in-person presence, there is a palatable renewed sense of promise and hope for the future. I am looking forward to an even greater in-person presence in the coming months, which will further invigorate our many efforts in offering a stellar equity-based learning experience for our students across our several degrees and certificate programs.

Despite the challenges brought on by remote learning and the varied effects of the pandemic, I am happy to report that in many respects, the department has forged ahead with several initiatives, and has made strides on multiple fronts. Despite many colleges nationwide reporting a decline in enrollment, our CS classes have more-or-less remained at pre-pandemic levels. Namely, classes are full, and our yearly graduation numbers are steady. As such, CS at Western continues to serve Washington state and the region, by graduating upwards of 200 students each year who then go on to excel and innovate in a variety of technology careers. Faculty scholarship is also going strong. Dozens of student co-authored manuscripts were published since February 2019 in peer-reviewed conferences or reputable journals.

On the curricular side, there are two exciting new programs that have launched. First is the new data science BS. It aims to instill in students the skillsets and capacity to apply rigorous mathematical and computational methods for collecting, analyzing, and visualizing data, especially the types of large data sets that are commonplace in media, social networking platforms, and scientific research. The data science program is off to a strong start, as evidenced via a full capacity enrollment in the inaugural offering of DATA 311, Fundamentals of Data Science. Second, our newly fashioned Bachelor of Arts in Education, Computer Science (BAE CS), has been formally approved by the state of Washington to graduate students who are endorsed to teach computer science in K12. This new BAE CS, which is only the third such degree in Washington, is in partnership with the Woodring College of Education, and Science Math and Technology Education (SMATE) at Western. It is yet another testament to our commitment to serve the state and region, and represents the exciting new offering of a Bachelor of Arts degree.

In addition, our ABET accreditation has been renewed as part of the routine 5-year evaluation cycle. With it, we are acknowledged of setting for ourselves high standards, which in turn benefits our students, who go on to careers in industry as well as to Ph.D. programs, both of which expect the type of rigor that we offer across our curriculum.

Looking towards the future, and with the support of the college and university, we are committing to take on a variety of challenges and to capitalize on opportunities. A new building, Kaiser Borsari Hall, is slated to open in early 2025, and will include additional faculty offices and state-of-the-art innovative student learning spaces as well as a robotics lab, all of which will expand our existing CS research and teaching spaces. We are also proceeding with multiple new faculty hires, hoping to welcome professors with specialties in cyber security, data science, and others. New technical and academic support hires, are also underway. These and other efforts highlight our continued expansion and innovation, in line with the exciting and fast-paced computing and technology disciplines that we serve.

Dr. Filip Jagodzinski
ANNOUNCING THE DATA SCIENCE BS

The Computer Science Department at Western Washington University is excited to announce a new Bachelor of Science degree program in Data Science. “Data has become increasingly important not only in technology-related fields, but practically every discipline and pursuit,” says Assistant Professor Scott Wehrwein. “The Data Science program will provide students with the foundational knowledge and practical skills needed to analyze and draw insights from the data that they will inevitably encounter wherever their career path takes them.” Sample careers this program will prepare students for include data scientist, machine learning scientist, and data engineer. These jobs are among the fastest growing in the country, and students pursuing them often land interesting, challenging and lucrative jobs directly out of college.

“Data science is a set of skills that allows you to take all kinds of diverse datasets and learn something from them,” notes Assistant Professor Kameron Harris. “It’s exciting how interdisciplinary this work is. Programmers can work with people in politics, physical sciences, social sciences, industry, agriculture... really anywhere that data are available and people want to know what stories they can tell.”

Associate Professor Brian Hutchinson, who oversaw the design and implementation of the program, describes how it was designed to better meet the needs of the growing number of students seeking data science careers: “There are three legs to the curriculum, split fairly evenly in terms of courses and credits. First, there is a computer science core, emphasizing programming skills, data structures, algorithms and databases. Second, a Mathematics core, emphasizing probability and statistics, calculus and linear algebra. Finally, students will emphasize data science specific courses, including two new core classes, four data science electives drawn from relevant offerings in computer science and math, and a three quarter data science senior project sequence. Altogether, it is a rigorous and modern program that will prepare our students to succeed in data science careers.”

The Data Science program officially launched in September 2021 and has already received its first batch of applicants to the major. The initial target is to graduate 35 Data Science majors per year, growing over time as demand dictates and resources allow.

If you know of internship or career opportunities that would be relevant to our Data Science majors, or if you would like to establish or contribute to scholarship funds in support of these majors, please contact cs.dept@wwu.edu.

DIGITAL HUMANITIES MINOR

In partnership with the Global Humanities and Religions Department, the Computer Science Department and Internet Studies Center will now offer a Digital Humanities minor degree program. Digital Humanities involve a combination of computing and humanities research. While the Digital Humanities minor is new to Western, faculty in computer science and the humanities have been engaged with digital humanities research for years. In this regard, the new program builds upon a long tradition of computational humanities and research that actively bridges computing and the liberal and fine arts.

Through the design and use of computational tools and methods, the digital humanities are characterized by an engagement with collaborative and interdisciplinary modes of knowledge production, scholarship, publishing, and teaching. Computer Science Professor James Hearne and Internet Studies director Dustin O’Hara contributed to the organizing of the new minor. Both Hearne and O’Hara agree that the new “DH” minor will foster exciting interdisciplinary collaborations and new modes of inquiry between the humanities and computer science faculty and students; offering CS students an opportunity to engage with the humanities while offering humanities students an opportunity to engage with computing. The DH program builds upon the interdisciplinary mission of the Internet Studies Center and aligns core internet studies classes with a new CS digital humanities class in which students work with cultural datasets to produce an original digital project.
Beginning in Winter of 2022, WWU will offer a brand new Computer Science Secondary Education Bachelors of Education degree. One of the first of its kind in the nation, the program will allow students to become endorsed middle and high school computer science teachers in Washington State in just 4 years.

Department Chair Filip Jagodzinski exclaims that this is a very exciting development for CS, Western, and for the state of Washington. “With the state’s official endorsement of the new BAE CS program to prepare future high school teachers to teach computer science, CS at Western is poised to address the dire shortage of qualified K-12 teachers with CS expertise. The addition of BAE CS to the other CS degrees and certificates now offered at Western highlights our commitment to serve the needs of the state and region. And a big thank goes out to Drs. Qiang Hao and Caroline Hardin, for their tireless efforts to design, propose, and ultimately have approved, this new degree, which is only the third such degree in the state of Washington, and the first new teacher certification program at Western in 15 years.”

“CS at Western is poised to address the dire shortage of qualified K-12 teachers with CS expertise.”

Filip Jagodzinski, CS Department Chair

Assistant professor of Computer Science Dr. Caroline Hardin says it offers students the opportunity to pursue their passion for computer science: “Teaching Computer Science is one of the best ways to use technology to make a difference in kids’ lives”. In co-designing the major with Dr. Qiang Hao, they paid special attention to emphasizing the digital skills which all high school students should gain, such as basic understanding of computers, digital privacy, and ethical use of technology. Coursework is completed amongst two different departments: Computer Science and Woodring College, with additional courses taken from the Data Science and Science, Math, and Technology Education programs. A teaching internship at a local middle or high school occurs during students’ last quarters at WWU helps them develop and demonstrate teaching competence at the middle or high school level.

The BAE allows WWU students to become licensed computer science teachers in just four years by pairing fundamentals of CS with practical experience teaching. Once students pass the Washington Educator Skills Test (NEST) they become licensed CS teachers in Washington State without needing graduate-level courses. Washington State passed a mandate recently that all high schools need to offer an opportunity for students to take CS classes, creating a high demand for well-trained CS teachers. WWU is leading the field of CS education with this new major.

Learn more about the program’s curriculum and admissions requirements BAE/CS Information.

Interested students should reach out to Dr. Caroline Hardin (Caroline.Hardin@wwu.edu) or Dr. Qiang Hao (Qiang.Hao@wwu.edu) to discuss career objectives and how the CS BAE can help.
In the Computer Science Department, we are working on creating a more inclusive environment for all students, especially neurodiverse students. Although there is broad diversity across the population, some individuals have neurological variations that make it particularly challenging for their communication, self-expression, and self-regulation. Neurodivergence is a broad umbrella. Neurological variations can include autism, ADHD, dyslexia, dyspraxia, dyscalculia, and dysgraphia. Nearly 10% of CS students have ADHD, 2% are on the autism spectrum, along with students with dyslexia and dysgraphia. Our neurodiverse students are not only performing well in academics but also many are active members of student clubs and different research labs. Several of our neurodiverse students won prestigious scholarships in international conferences including the Grace Hopper Celebration of Women in Computing. By engaging in various department, college, and university-wide activities to promote awareness regarding issues related to diversity and inclusion, our neurodiverse students are making notable contributions to the CS department and the broader community.

In recent years, the CS Department has improved support for neurodiverse students in their learning activities and overall college experience. For example, the department promotes and embraces student-centered learning approaches. Faculty are encouraged to design their courses with flexibility in mind and use a variety of teaching and assessment techniques, which enable students to learn and demonstrate their knowledge effectively. Also, the department is offering professional development workshops that better prepare faculty to create a learning environment that is equitable and welcoming to our diverse students. Building awareness of how students are impacted is key to providing the right assistance.

Our Department provides students with communication methods to support them in sharing their experiences and giving feedback. The Department currently has two CS faculty members who serve as Community Ambassadors (CA) along with two Student Ambassadors (SA), whose role is to identify diversity, equity, and inclusion issues that can bring positive changes in the department. The CAs and SAs hold weekly office hours for students, staff, and faculty, and encourage discussion on DEI issues. These efforts combined are part of the CS Department’s mission to provide an inclusive environment for all our students. As a department, we embrace neurodiversity and are constantly trying to create and maintain an equitable, welcoming, and inclusive environment.

With a growing number of our students having ADHD, CS Advisor Mary Hall asked what they wish teachers understood about them. Students most want their teachers to understand that ADHD isn’t an excuse for irresponsibility. It’s a real medical condition that makes many simple everyday tasks and time management a Herculean effort.

One student said, “It is difficult to keep track of important deadlines and dates—even if we are reminded numerous times. Additionally, it is difficult to focus on tests and exams and takes us longer. Reaching out to Mary Hall and discussing my ADHD really kicked things into high gear!”

The CS Advisor Mary Hall now includes questions on the premajor application to encourage neurodiverse students to communicate their learning strengths and weaknesses to provide early support for success in the major. Western also has a Disability Access Center to aid students with accommodations to meet their special needs as learners, such as note-takers. With increased awareness and support, our neurodiverse students are thriving in this challenging and competitive field that is computer science.
There is a growing cohort of faculty, staff, and students at Western and in Computer Science that are actively investigating issues of accessible technology and design. Like curb cuts or ramps in the built environment, accessible computing aims to re-make the digital ecosystem with disabilities in mind. In this regard, accessible computing is closely related to usability and human-computer interaction, but accessibility pushes us to question many of the normative expectations we might have about how a person will interact with the things we create and put out into the world. The field of disability studies posits that there are two models of disability, the first being a medical pathologizing of the individual, and the second being the social construction of disability. The social construction of disability is predicated on the idea that as we design and build the world around us, we tend to make choices that reflect normative expectations for what a person can do. Any one accessibility problem might represent a minor inconvenience, but in aggregate they end up creating profound barriers for equitable participation in society.

My own interest in accessible computing is relatively new. It started when David Engebretson, an expert in web accessibility, who also happens to be blind and uses a screen-reader visited one of my classes to review student work. It was an enlightening encounter. Out of necessity David has developed a tremendous capacity for patience as he navigates a digital landscape that was not designed with him in mind. Shortly after our first meeting, I joined David over Zoom as he attempted to retrieve a specific academic paper from the university library’s website. This was meant to be a simple exercise to see how accessible the university’s online library systems were. To describe the process as confusing would be a gross understatement. It was like navigating an infinite labyrinth of unmarked doors. Unfortunately, this kind of experience is all too common for people that use screen-readers. This marked the beginning of what has become an ongoing collaborative effort we’ve dubbed the Accessibility Research Lab (ARL), that includes Yasmine Elglaly and Brian Hutchinson from Computer Science, and David Bass from the Western Library, and many dedicated and hardworking computer science and internet studies students. The expertise and passion of this group has been inspiring to witness. And now we have several projects on the go, including a university funded research project to run a student-centered accessibility evaluation of the university’s digital tools and systems; the urgency of which has only increased with our adoption of remote instruction during the pandemic.

Accessible computing is a growing area of research and professional practice in which students can make a meaningful impact, addressing practical and urgent needs that are often overlooked or misunderstood. But accessible computing is also an object lesson in the social production of technologies. It’s not just a matter of having a more inclusive notion of “users,” accessible computing challenges us to ask who is included in the design and development new technologies. As the disability rights movement slogan goes, “Nothing About Us Without Us.”

Computing is increasingly a meta-discipline that is entangled in nearly every facet of life and field of study. In this context, accessible computing is one of many fronts in which the field of computing is grappling with questions of ethics and approaching something akin to a moment of critical self-reflection regarding the role we play in the creation of new technologies and the reproduction of longstanding inequities. As a public university and computer science department it is our responsibility and privilege to engage in such matters.
RESEARCH SHOWCASE
Kameron Decker’s Neural Network Research

Have you ever struck a drum or shaken a sheet of metal and wondered how the sound gets made? Maybe you’ve noticed that different shaped drums—or casserole pans—have different sounds. This is because each has distinct ways of vibrating that reflect the material and geometry of the drum.

So far this might not seem relevant to computer science, much less networks. Networks can describe many situations, like towns connected by roads, people and their contacts, or websites connected by hyperlinks.

But there is a deep connection: Drums and networks have characteristic modes called eigenvectors paired with strengths or eigenvalues. In a drum, these determine the different frequencies and their power that we hear as sound. In a network, these reveal important patterns of connectivity such as central hubs important for the spread of information or disease. The Pagerank algorithm uses eigenvectors to find the most relevant web pages containing the search keywords you type into Google.

I recently published a paper where we studied the largest eigenvalues of random bipartite networks with coauthors Gerandy Brito (Georgia Tech CS) and Ioana Dumitriu (UCSD Math). In the networks we studied, we showed that the top two eigenvalues are separated nearly as far apart as possible. This means that these networks are really good at spreading information, and we can use them to construct things like error correcting codes. This paper was 7 years in the making after a long saga of rejections and corrections, so don’t be discouraged, research students!

Many people have asked “can you hear the shape of a drum?” It turns out the answer, in general, is no. Our research is similar, in that we ask “how much does a network reveal from its characteristic modes?” We are still figuring out the answer.

I grew up in Colorado and earned an Electrical Engineering degree from Colorado State University. I moved to Bellingham in the ’90s to pursue a Master’s in Business. I earned my MBA from Western. During this time, I served as a graduate teaching assistant and helped teach a statistics course. Since then, I have always wanted to return to WWU and teach.

I have taught both Computer Science and Electrical Engineering courses, including Introduction to Logic System Design, Computer Architecture and Organization, and Microcontroller System Design. I also teach introductory programming courses.

During my spare time, I enjoy spending time with my family and friends. I like to hike, bike and travel. I have been fortunate to have traveled around the world a couple of times, visiting over 30 countries.

I teach Data Structures and Computer Architecture courses at Western Washington University, but I am also a student! Having recently started law school at Seattle University, I am reminded of the challenges that students face, and I leverage this perspective as an educator to better serve the needs of my students. I also work in the Advanced Controls group at the PACCAR Technical Center in Mt. Vernon, Washington, where I develop autonomous and battery electric vehicles.

Previously, I worked as a research engineer at Ford Motor Company in Dearborn, Michigan. I received my master’s degree in Mechatronics from the Royal Military College of Canada in Kingston, Ontario.

I joined the WWU community primarily because of its commitment to diversity and inclusion. I am inspired by the Computer Science Department’s mission to enhance representation within its student body, and I am excited to support all of my students as they pursue academic and professional success.

My free time is devoted to learning about the law. I believe that the intersection between law and computer science will become increasingly relevant as society continues to adopt automation and new technologies, and I hope to make an impact in this burgeoning space.

Michael Koepp

Austin Thind
I earned my MS in Computer Information Systems from the University of Houston Clear Lake. My bachelor's degree is in Control and Systems Engineering from the University of Technology Baghdad, Iraq.

My engineering work had been in the design and development of Supervisory Controls and Data Acquisition Systems (SCADA), Distributed Control Systems (DCS), Intelligent Transportation Systems (ITS), and internetworking. My software development experience includes middleware, cybersecurity security controls and data metrics. I currently work as a cybersecurity engineer responsible for information security controls for the Change Healthcare platforms.

Industry experience enhances my teaching at Western. My specialty areas include senior project, technical writing, cybersecurity, framework, API and data aggregation. What excites me most about Western is their commitment to diversity and inclusion.

In my spare time, I enjoy reading, the Internet of Things, framework design, martial arts, good friends, and a good meal.

NEW ADDITION TO CS ADVISING STAFF

Tatyana Stahler joins us in the new role of Academic Program Coordinator for the CS Department, which will add advising bandwidth to our expanding CS degree programs. Tatyana graduated from WWU BS/BA Dance. Tatyana is currently working toward a Master of Education in Adult & Higher Education. When asked what she most enjoys about working at Western, Tatyana shared, “I enjoy working at WWU for the close student relationships we can build due to the community focus of the institution. WWU is a student-centered learning environment that is always striving to make improvements to the academic journey for its students; and the same is true for the Computer Science Department. I am excited about the growth and new opportunities in the department.”

Outside of working at WWU, Tatyana enjoys time with family and her partner, and playing with her energetic husky, Hero. Tatyana is also an active member of Bellingham Repertory Dance, where she performs, teaches, and helps run the dance collective.
Our ACM student chapter conducts a survey each year to honor outstanding CS faculty and presents the award at our end-of-the-year picnic. In 2021, Dr. Scott Wehrwein received this award and was recognized for being an inspirational and caring instructor and research advisor dedicated to student success.

Students shared these comments:
“Twill always jump at the chance to say good things about Scott. He clearly takes joy in teaching and mentoring and I have seen that in action as his student, his research advisee, and his TA. He genuinely cares about students! Also, he’s REALLY good at explaining difficult, abstract concepts.”

“Great and knowledgeable instructor, fantastic mentor and advisor, and overall a really solid human!”

“Scott’s teaching style and method of explanation really works well with the way I like to learn. He does a good job of starting with an intuitive approach, adding on the math to set the stage, and tying a particular topic into its larger context nicely.”

Congratulations, Scott!

Outstanding Computer Science (BS) Graduate: James Browning
Outstanding Cybersecurity Graduate: Ben Paros
Outstanding Computer Science (MS) Graduate: Anais Dawson

Congratulations to our winner, Melissa Swift!
# 2021-2022 Scholarship Winners

<table>
<thead>
<tr>
<th>Name</th>
<th>Scholarship Fund</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nathaniel Burns</td>
<td>Community College Accelerator Scholarship</td>
</tr>
<tr>
<td>Dani Sprague</td>
<td>Mark Lockwood Memorial Scholarship Fund</td>
</tr>
<tr>
<td>David Kipnis</td>
<td>Scottish Rite Computer Science Graduate Fellowship</td>
</tr>
<tr>
<td>Nick Harang</td>
<td>Computer Science Department Scholarship Award</td>
</tr>
<tr>
<td>Ann Tseng</td>
<td>Computer Science Department Scholarship Award</td>
</tr>
<tr>
<td>Ivan Jensen</td>
<td>Westcott Scholarship in CS</td>
</tr>
<tr>
<td>Robin Balatbat</td>
<td>Westcott Scholarship in CS</td>
</tr>
<tr>
<td>Selah Bellscheidt</td>
<td>David W. Cole Endowment</td>
</tr>
<tr>
<td>Grant Chou</td>
<td>Dr. James Lee Johnson Memorial Endowment</td>
</tr>
<tr>
<td>Dalton Lange</td>
<td>Dr. James Lee Johnson Memorial Endowment</td>
</tr>
<tr>
<td>Brennan Vanden Bos</td>
<td>CS Graduate Fellowship</td>
</tr>
<tr>
<td>Seth Briney</td>
<td>Track Global Fellowship in CS</td>
</tr>
<tr>
<td>Cody Scheepbouwer</td>
<td>Cloud Security Alliance Scholarship for Cyber Security</td>
</tr>
<tr>
<td>Keegan Mangahas</td>
<td>Faithlife CS Scholarship</td>
</tr>
<tr>
<td>Colton Hagan</td>
<td>Lars and Elaine Giusti Scholarship for CS</td>
</tr>
<tr>
<td>Madeline Carter</td>
<td>Ugwoaba Scholarship for CS Athletes</td>
</tr>
<tr>
<td>Trevor Ortega</td>
<td>Anthony G. Vallot, Jr. Memorial Scholarship</td>
</tr>
</tbody>
</table>

Pictured (Top left to bottom right): Trevor Ortega, Dani Sprague, Nick Harang, Ann Tseng, Selah Bellscheidt, Cody Scheepbouwer
Thanks for supporting our mission and making a difference in the lives of current and future students!

To donate, visit: cs.wwu.edu/donate

Credits:
Editor: Mary Hall
Creative Advisor: Dustin O’Hara
Designer: Corey Chandler

Contributors:
Mary Hall, Filip Jagodzinski, Dustin O’Hara, Kameron Decker, Yasmine Elglaly,
Brian Hutchinson, Caroline Hardin, Qiang Hao, Moushumi Sharmin, Michael Koepp,
Austin Thind, Abdul Wahab Derwish, Tatyana Stahler, Ridley Williams

Photo Credits:
Robert Ashworth (pg. 1), Dick Lyon (cover), Ryan Stone (back cover)
These works are licensed under the Creative Commons Attribution 4.0 Generic License. To view a copy of this license, visit http://creativecommons.org/licenses/by/4.0/

Electronic Edition:
cs.wwu.edu/newsletter

Western is an equal opportunity institution.