UW | School of Computing

2022-23

SCHOOL OF COMPUTING
ANNUAL REPORT

uwyo.edu/soc

DEAR FRIENDS, COLLEAGUES, AND PARTNERS

The School of Computing (Soc) is just one and a half years old, having been approved at the January 2022 Board of Trustees meeting. I was appointed as the first Director in March 2022. A little over one year later, I am very proud of how far the school has come in this short time. I am thrilled to share this report with you, which details our many accomplishments as well as our strategic direction for the future.

The School of Computing was established to nurture computing curiosity across disciplines and backgrounds, enhance interdisciplinary research in computing across the university, and capitalize upon emerging innovations for teaching, research, and economic diversification. Computing innovations are all around us now – artificial intelligence, quantum computing, large language models like ChatGPT, virtual reality and mixed reality, digital twins, digital humanities, exascale computing, precision and automated everything --- and we are working on partnerships across the University and Wyoming to make sure that we are supporting their use across disciplines.

We have begun making numerous strong partnerships across the University and Wyoming to support these goals; we are excited to continue to grow current partnerships and nurture new ones moving forward.

I am extremely proud of the School of Computing team; their dedication and hard work is the reason we have a solid foundation in place to build on, and so many accomplishments in such a short time. I would like to personally thank the core SoC team for their exceptional diligence and professionalism during this startup phase. and would like to recognize our numerous affiliate and research faculty for their expertise and contributions over this past year and a half. Anyone else you would like to thank? I didn't include names because I thought it might get too cumbersome with so many people thank…

One of our big accomplishments this year was moving the Wyoming Geographic Information Science Center (WyGISC) into the School of Computing. This will greatly boost our data science expertise and capacity and also place WyGISC in a unit where it can continue to promote and grow all aspects of spatial computing. I would like to thank the WyGISC faculty and staff for their patience and grace throughout this transition. We are excited to finally have you with us!

I invite you to explore our accomplishments and ongoing projects in this report, which highlights our research endeavors, educational initiatives, and outreach efforts. Together we can supply a workforce for Wyoming with 21st-Century skills as well as preserve the Wyoming we love through using computing to address Wyoming's Grand Challenges.
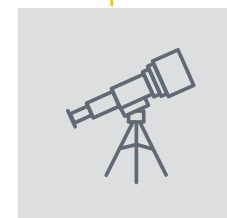
Sincerely,

Gabrielle

Gabrielle Allen
Director, School of Computing

ABOUT THE SCHOOL OF COMPUTING

MISSION

Position our land grant institution as: a national leader in computational and digital research, education, and engagement; a computational hub for students, faculty, staff, community, and our industry/state/academic partners; a steward, supporter, and developer of digital skills and computational thinking for all.
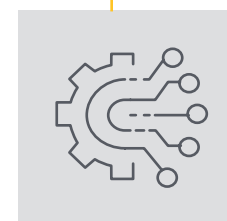
VISION

Create a unique and inspirational School of Computing with national impact and global reach, providing Wyoming and the world with agile and ethical computing professionals, empowered to address societal challenges that are inherently interdisciplinary.

BACKGROUND

The School of Computing at the University of Wyoming was approved by the Board of Trustees in January 2022 after a year of planning that involved input and discussions among broad stakeholders. In March 2022, Dr. Gabrielle Allen was appointed as the inaugural Director, and in May 2022 the School was provided with initial office space in the Bureau of Mines. Startup funding particularly for activities that impact economic development was provided by a $1.15M award from the Wyoming Innovation Partnership. Initial core funding for FY23 was approved in the May 2022 Board of Trustees meeting.

The school is initially being incubated in the College of Engineering and Physical Sciences, with plans to become an independent unit on a 3–5-year timescale. Within the College, the School has access to effective and immediate support for business operations, academic programming and other essential support during its startup phase.

The School of Computing has a mission to collaborate with and impact all units and disciplines at the University of Wyoming and will be developing appropriate partnerships. Important partners within the University include the Advanced Research Computing Center, Science Initiative, Tier 1 Engineering Initiative and the Center for Entrepreneurship and Innovation. The focus on broad engagement extends to external partners, including K-12 schools, community colleges, industry, community partners, national laboratories, and NCAR. Other important partners include the Wyoming Innovation Partnership, and units providing computing services and infrastructure such as ARCC, 3D visualization center, WyGISC, NSF EPSCOR, NIH INBRE.

ACCOMPLISHMENTS

IN THE SPRING & SUMMER OF 2022:

Sponsored 5 graduate research assistants from 5 different units across campus

Hired initial staff:
- Dr. Raya Hegeman-Davis, *Director of Engagement*
- Beth Leonard, *Assistant Director, Business Operations*
- Judy Yates, *Administrative Associate*

IN THE FALL OF 2022:

Hosted 4 cross discipline computing colloquia speakers

Established 16-member Internal Advisory Board

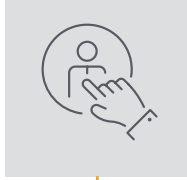**$4750** Collected $4,750 in donations at initial Giving Day

Recruited 34 Founding Adjunct Faculty from 17 units across campus

Hosted virtual seminar on Cyberinfrastructure for AI

FALL 2022-SPRING 2023:

Participated in engagement events

- UW STEM Carnival
- Laramie Tech Talk
- Cybersecurity Symposium
- Equality in Computing Reading Group
- NWSC Tours
- National Lab Day
- WANG and NSA visit

- Native American Affairs Advisory Council Community Dinner
- WyGISC Geospatial Forums
- UW in your Community Events
- Women in STEM Conference
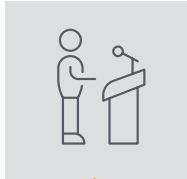- Native American Summer Institute

WINTER 2023:

Hired two research scientists
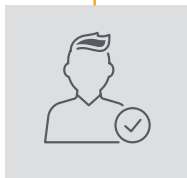- Jian Gong
- Andrew Kirby

SPRING 2023:

Hosted a Faculty Enrichment Program visiting scholar from Uzbekistan

Hosted 6 cross discipline computing colloquia speakers

Awarded 16 graduate students computing scholar positions from 10 different units across campus
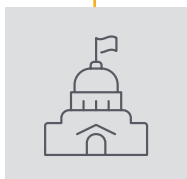
Moved the Wyoming Geographic Information Science Center (WyGISC) and the Data Science Center into the School of Computing

Awarded 2 Data Science Center Faculty Fellowships

Partnered in the 5-year contract with Cardiff

Funded 16 Faculty Awards for Advancing Computing from 12 different units across campus

FALL 2023:
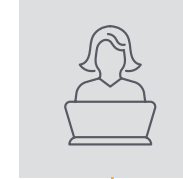
Hired 5 new Faculty

Allocated 7 UW Derecho Professorships to the NWSC Supercomputer

Launched a new Minor in Computing

Developing a new B.S. in Applied Software Development degree in partnership with Sheridan, Western, Northwest, and Central Wyoming Community Colleges (to be available Fall 2024)

IN ACADEMICS

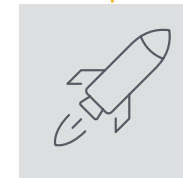**OUR OVERRIDING MOTIVATION IS TO PROVIDE STUDENTS WITH NEW OPPORTUNITIES IN APPLIED COMPUTING**

- We are currently offering a Minor in Computing for the Fall of 2023 that students in any major can take to give them practical computing expertise and experiences for success in all disciplines and all careers.
- Working with our colleagues in Electrical Engineering and Computer Science, Wyoming Community Colleges, and with funding from the Wyoming Innovation Partnership, we submitted a Request for Authorization for a new block transfer degree in Applied Software Development. We expect the 15 students already enrolled in Sheridan College to transfer to UW for their final 2 years in Fall 2024, in addition to student pipelines being developed with Northwest, Western, and Central Wyoming.
- To support these academic programs and interdisciplinary research, we have collaboratively hired four new assistant professors in AI/ML and Big Data. These faculty will have joint positions with Anthropology, Physics and Astronomy, Zoology and Physiology, the Haub School, and Mathematics and Statistics. In addition, we partnered with the NSF WyACT project in a joint hire with Atmospheric Science and a new assistant professor starting this Fall will have a partial appointment with the School.
- Working with the NCAR Wyoming Supercomputer Center Liaison, Vice President Chitnis, and Provost Carman we have put in place a UW Derecho Professor program to help recruit new faculty and support existing faculty where access to significant guaranteed computer resources on the new Derecho computer at NWSC will advance their computational research. Each of these 20 positions, in any discipline and at any faculty rank, will receive up to 5 million core hours on Derecho for the lifetime of the machine. We have used these positions so far to assist in recruiting four new faculty members across the university and to support three current professors. This program is ongoing.
- We merged with the established Wyoming GIS Center which will help fuel our new school particularly in data science with their 8 current tenure track faculty and research scientists, and also moved the smaller Data Science Center into the school where we can use it as scaffolding to build up broader data science activities.

IN RESEARCH:

OUR PRIMARY GOAL IS TO ADVANCE APPLIED COMPUTING RESEARCH ACROSS DISCIPLINES AND WITH BROAD UTILIZATION.

- We have hired two research scientists, whose expertise spans exascale computing, computational science, sensors, AI and data-driven science
- We have already been part of proposals for external funding totaling some $45M, working with over 11 departments, involving national laboratories, community colleges, and industry partners.
- We have just appointed 16 graduate computing scholars for FY24 in a competitive process, 8 in engineering areas, and 8 across other disciplines. We will be working with these early career scholars who will enrich the school with their ideas and enthusiasm for computing next academic year.
- We made 16 competitive faculty awards to support research, academics and engagement activities in computing.

IN ENGAGEMENT

OUR MISSION IS TO SUPPORT COMPUTING AND DATA SCIENCE BROADLY FOR UW STUDENTS, WYOMING COMMUNITY COLLEGE STUDENTS AND FACULTY, WYOMING INDUSTRY, AND WYOMING COMMUNITIES.

- We are working to be the academic computing hub for the university. An internal advisory board representing all colleges has met twice, we have some 40-adjunct faculty from across the university.
- We are building relationships with Wyoming companies, community colleges, high schools, national labs, and non-profits.
- We have active web pages, social media, take part in student recruiting activities, UW in the Community events, and initial advancement activities

THE FUTURE:

THE SCHOOL OF COMPUTING WILL CONTINUE TO GROW WITH NEW PROGRAMS, FACULTY, AND STUDENTS TOWARDS OUR MISSION OF BECOMING A NATIONAL LEADER IN COMPUTATIONAL AND DIGITAL RESEARCH, EDUCATION, AND ENGAGEMENT.

Continue to prioritize academic programming.

Continue to hire excellent faculty to provide new interdisciplinary computing courses – next year we will focus on hires that support core computing areas with Tier 1 engineering in addition to the digital humanities. We also will be hiring again with the NSF WyACT project.
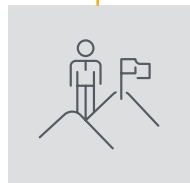
We will provide Undergraduate research opportunities now that we have a solid base to support and mentor these students.
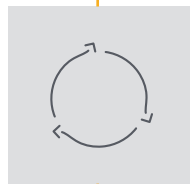
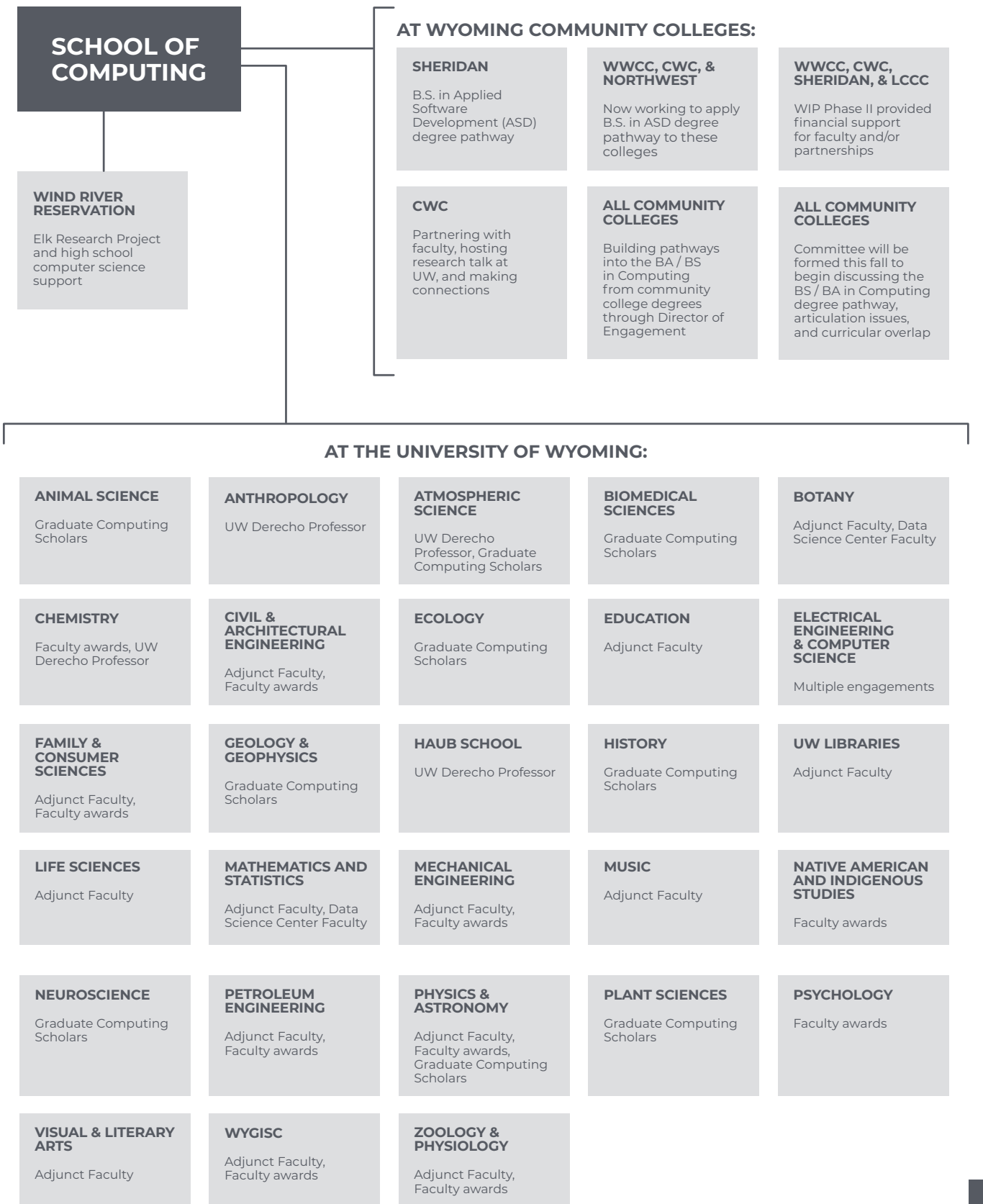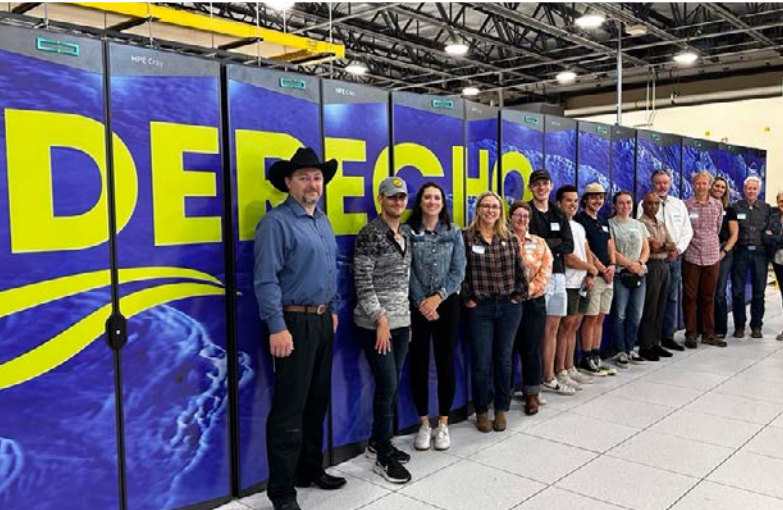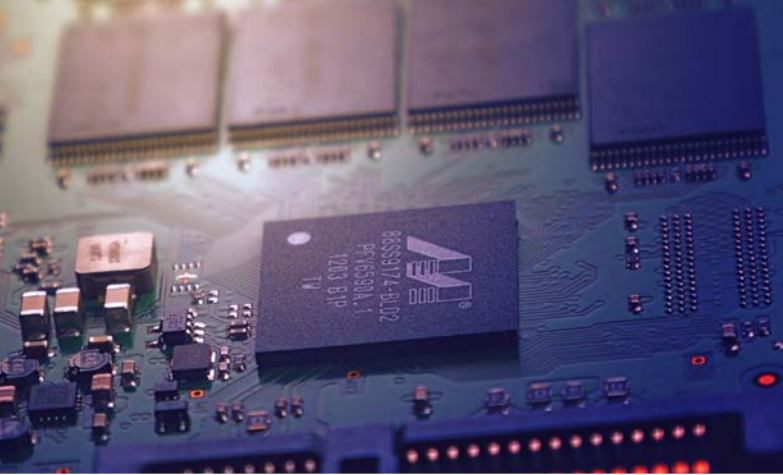We will also build on existing WyGISC programs and begin new activities with the Data Science Center.

The School will continue to build towards large, interdisciplinary external funding and industry partnerships as well as capitalize on established partnerships. It is anticipated that one additional research scientist will be hired in FY24.

STAY UP TO DATE BY FOLLOWING US:

@uwyocomputing

OUR COLLABORATION IN THE STATE

SCHOOL OF COMPUTING

AT WYOMING COMMUNITY COLLEGES:

SHERIDAN	**WWCC, CWC, & NORTHWEST**	**WWCC, CWC, SHERIDAN, & LCCC**
B.S. in Applied Software Development (ASD) degree pathway	Now working to apply B.S. in ASD degree pathway to these colleges	WIP Phase II provided financial support for faculty and/or partnerships
CWC	**ALL COMMUNITY COLLEGES**	**ALL COMMUNITY COLLEGES**
Partnering with faculty, hosting research talk at UW, and making connections	Building pathways into the BA / BS in Computing from community college degrees through Director of Engagement	Committee will be formed this fall to begin discussing the BS / BA in Computing degree pathway, articulation issues, and curricular overlap

WIND RIVER RESERVATION

Elk Research Project and high school computer science support

AT THE UNIVERSITY OF WYOMING:

ANIMAL SCIENCE	**ANTHROPOLOGY**	**ATMOSPHERIC SCIENCE**	**BIOMEDICAL SCIENCES**	**BOTANY**
Graduate Computing Scholars	UW Derecho Professor	UW Derecho Professor, Graduate Computing Scholars	Graduate Computing Scholars	Adjunct Faculty, Data Science Center Faculty
CHEMISTRY	**CIVIL & ARCHITECTURAL ENGINEERING**	**ECOLOGY**	**EDUCATION**	**ELECTRICAL ENGINEERING & COMPUTER SCIENCE**
Faculty awards, UW Derecho Professor	Adjunct Faculty, Faculty awards	Graduate Computing Scholars	Adjunct Faculty	Multiple engagements
FAMILY & CONSUMER SCIENCES	**GEOLOGY & GEOPHYSICS**	**HAUB SCHOOL**	**HISTORY**	**UW LIBRARIES**
Adjunct Faculty, Faculty awards	Graduate Computing Scholars	UW Derecho Professor	Graduate Computing Scholars	Adjunct Faculty
LIFE SCIENCES	**MATHEMATICS AND STATISTICS**	**MECHANICAL ENGINEERING**	**MUSIC**	**NATIVE AMERICAN AND INDIGENOUS STUDIES**
Adjunct Faculty	Adjunct Faculty, Data Science Center Faculty	Adjunct Faculty, Faculty awards	Adjunct Faculty	Faculty awards
NEUROSCIENCE	**PETROLEUM ENGINEERING**	**PHYSICS & ASTRONOMY**	**PLANT SCIENCES**	**PSYCHOLOGY**
Graduate Computing Scholars	Adjunct Faculty, Faculty awards	Adjunct Faculty, Faculty awards, Graduate Computing Scholars	Graduate Computing Scholars	Faculty awards
VISUAL & LITERARY ARTS	**WYGISC**	**ZOOLOGY & PHYSIOLOGY**		
Adjunct Faculty	Adjunct Faculty, Faculty awards	Adjunct Faculty, Faculty awards		

NEW SCHOOL OF COMPUTING FACULTY

The University of Wyoming School of Computing's vision to create a unique and inspirational School of Computing with national impact and global reach, providing Wyoming and the world with agile and ethical computing professionals, empowered to address societal challenges that are inherently interdisciplinary is coming to life as we welcome our first round of faculty through a faculty cluster hire in Applied Artificial Intelligence/Machine Learning (AI/ML) and Big Data. The new faculty will be on campus and collaborating starting this fall.

These accomplished individuals were selected for their expertise and dedication to advancing AI/ML and Big Data within their areas of expertise. Their joint appointments will foster collaboration among various disciplines and departments across campus as they bring diverse research expertise in computer science, ecology, astrophysics, data science, archaeology, and atmospheric science. These are all highly relevant to the rich research landscape that addresses the state's conservation and management needs, advances STEM applications of AI/ML and big data tailored to the unique environment, explores modeling techniques applicable to Wyoming's porous media, investigates the impact of climate stress on arid communities, and studies raven behavior in complex food landscapes within the state's national parks.

ELLEN AIKENS

Assistant Professor, joint with the Haub School of the Environment and Natural Resources, adjunct in Zoology and Physiology, and affiliate with the AMK Ranch specializes in the ecology and conservation of animal movement.

SEAN FIELD

Assistant Professor, joint with Anthropology, and a UW Derecho Assistant Professor focuses on archaeological visualization.

BENJAMIN KOGER

Assistant Professor, joint with Zoology and Physiology, and adjunct in the Haub School of the Environment and Natural Resources concentrates on collective animal behavior.

MERIDITH JOYCE

Assistant Professor, joint with Physics and Astronomy, and adjunct in Mathematics and Statistics strength is in the stars.

STEFAN RAHIMI

Assistant Professor, major appointment in Atmospheric Science, joint with the School of Computing, hired with the new NSF WyACT EPSCOR track 1 project, and a UW Derecho Assistant Professor is leading research on hydroclimate shifts and climate projection quality.

DANE TAYLOR

Assistant Professor, joint with Mathematics and Statistics, and adjunct in Electrical Engineering & Computer Science is fluent in network theory and neural networks.

SCHOOL OF COMPUTING CENTERS

WYOMING GEOGRAPHIC INFORMATION SCIENCE CENTER (WYGISC)

WyGISC is an interdisciplinary academic center focused on education, research and development of geospatial information and technologies and their applications in science, government, business and other areas. They are focused on the development and education of geospatial information and technologies and their applications.

Their mission is to advance the knowledge and application of geographic information science and technology through research, education, and service. WyGISC aspires to become a premier interdisciplinary academic center in geographic information science research and education while strengthening our unique leadership role in service and outreach to the university, state, and region.

DATA SCIENCE CENTER

The Data Science Center will provide an academic hub for data science at UW, providing the key academic component in a "UW Data Science Collaboratory" (DSC, Library, ARCC, WyGISC, WNA, Maker Space, Extension along with disciplinary partners including AHC, INBRE Data Core, WYNDD, RMH, 3D Viz, NSF WyACT, etc).

Recently, the School of Computing hired Dr. Camellia Okpodu (Botany) and Dr. Tim Robinson (Mathematics and Statistics) as Data Science Center Faculty Fellows for the 2023-2024 academic year. The selection committee recognized the applicant's continued pursuit of excellence in data science through research, teaching, and engagement, and their commitment to contributing to building a data science community at the University of Wyoming.

As Faculty Fellows, Dr. Okpodu and Dr. Robinson will actively engage with the Data Science Center which has recently moved to the School of Computing where it will work to energize curriculum development, student opportunities and interdisciplinary research in data science.