

University of Wyoming School of Computing

Report to Academic Affairs/Student Affairs Committee

Gabrielle Allen, Director

September 25th, 2024



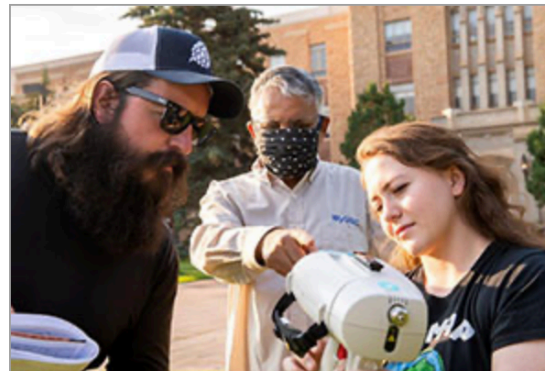
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UW Trustees Approve Launch of School of Computing

Published January 13, 2022



UW Senior Research Scientist Ramesh Sivanpillai, center, works with students Nicholas Case and Sarah Weidler to review spectral reflection data taken of grass and trees, as collected by a hand-held spectrometer. Use of computing and new data science technologies to solve real-world problems across all disciplines is at the heart of UW's new School of Computing. (UW Photo)

The University of Wyoming's commitment to raise its performance in computing and technology, both to improve students' education and better serve the state and nation, has taken a major step forward with the creation of a new School of Computing.

UW's Board of Trustees voted today (Thursday) to authorize the launch of the new academic unit. Reporting to the provost, it initially will be housed in the College of Engineering and Applied Science to accelerate its development. Eventually, the School of Computing will become a separate unit similar to the School of Energy Resources and Haub School of Environment and Natural Resources, with its own dean and interdisciplinary connections across the university.

"Computing's impact is found in virtually every discipline today, and new data science technologies such as artificial intelligence, machine learning and blockchain are starting to transform every academic discipline, every industry and every aspect of modern society," UW President Ed Seidel says. "Access to world-class infrastructure and workforce training in computing and data is critical for Wyoming citizens and for UW's students. The School of Computing will be the catalyst for the university to emerge as a leader in rural computing and data science, and to generate additional revenue streams and industry partnerships."

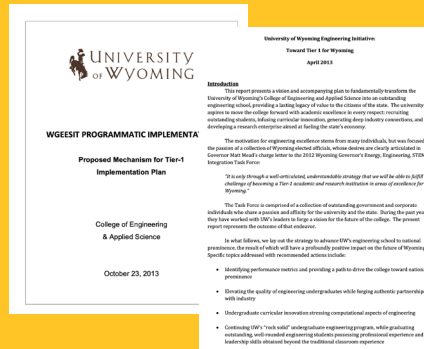
The school will begin operations immediately, including appointment of an interim director, hiring of initial staff members and advertising for faculty members. One-time funding from the federal American Rescue Plan Act allocated by Gov. Mark Gordon will be used to accelerate the development of the school.

January
Press
Release
2022

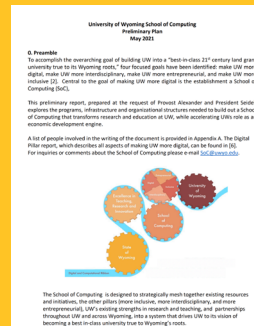


Planning & Vision

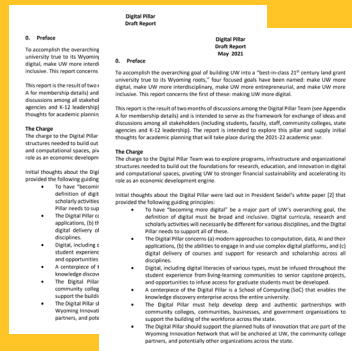
Tier 1 Engineering (2013)



SoC Preliminary Plan (5/21)

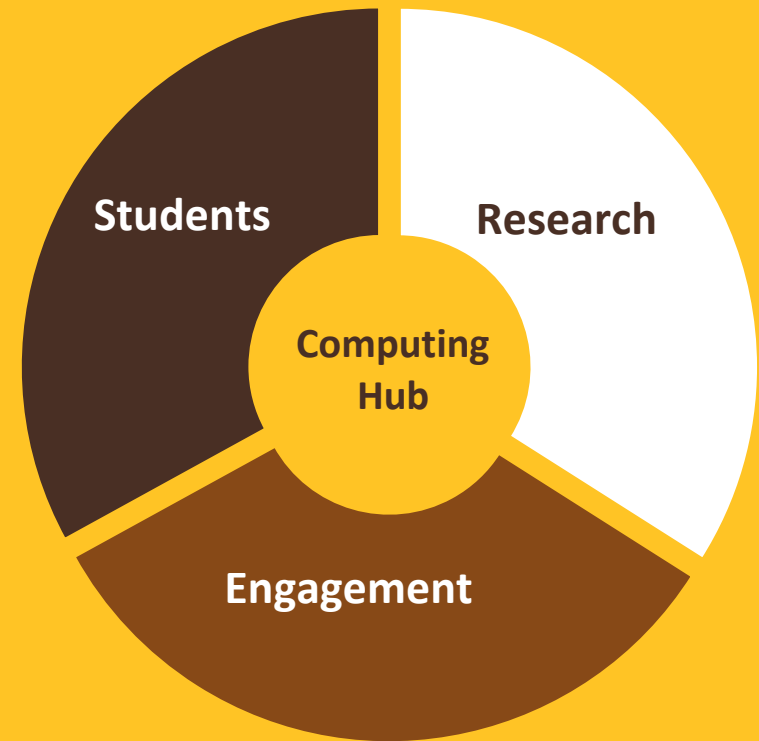
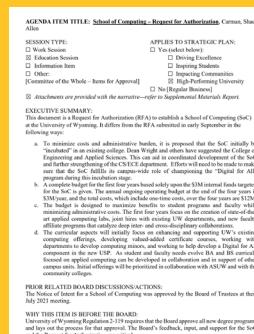


Digital Pillar & Interdisciplinary Report (5/21)



Many involved in
SoC Planning

Request for Authorization (1/22)



- National leader in computing education, research & engagement
- Hub of computing innovation and knowledge exchange for UW & WY
- Champion for Computing For All and Digital Literacy
- CEPS Partner in Tier 1 Computational Science & Engineering Goals



School of Computing

Timeline for SoC Rollout (short version)

Year 0	Spring 2022	Appoint Director, hire staff
Year 1	AY2022-2023	Staff start, 1st searches for faculty/research scientists, corporate partnerships, national labs, faculty affiliates
Year 2	AY2023-2024	1 st faculty cohort, curricula committee, provide new courses, 2 nd faculty/research scientist searches, develop minors, undergrad program
Year 3	AY2024-2025	2 nd faculty cohort, authorization of BA/BS, 2+2 agreements with CCs, develop courses, recruit first class of SoC majors, 3 rd faculty/research scientist searches
Year 4	AY2025-2026	3 rd faculty cohort, enroll 1st SoC BS class, work with other UW programs on minors, 4 th faculty/research scientist searches
Year 5	AY2026-2027	4 th faculty cohort, evaluate, access, modify programs; consider graduate degrees.



Plan Metrics for Year 5 (Summer 2027)

FTE Joint Faculty
Res Scientists

10-13

Graduate
Assistants

5

Undergrad
Scholars

15

Faculty
Affiliates

10

Research Funding

\$300K
yr/fac

Industry Funding

\$500K
per yr

Undergrad Students in SoC
programs & classes

\$700K
per yr

Foundation Funding

\$1M
per yr



School of Computing

Revisit appropriate metrics this year

SoC Dashboard: All Metrics On Track



19

Core Faculty

44

Affiliate Faculty

9

Derecho
Professors

105+6

Enrolled Students

5

Postdocs

16

GAs



174

Student
Experiences

24

Graduate Computing Scholars

62

UG Researchers

49

Faculty Fellows

5+8+2

Credentials

11

New Courses



\$9.5M

Federal

\$5.5M

State/UW

\$570K

Industry

\$730K

\$/yr/faculty

6

Research
Infrastructures

10

Industry
Partners

19 Core Faculty

11 Tenure track (2 WyGISC)

4 Instructional (2 WyGISC)

4 Research scientists (2 WyGISC)

- Joint Tenure with Haub School, UW Casper, Anthropology, Physics & Astronomy, ZooPhys, Atmospheric Sciences, Mathematics
- Faculty affiliated with PhD Program in Hydrology, NSF WyACT, SI WyldTech, SI Rural Community, EECS, Idaho National Lab, Mathematics, Physics & Astronomy, AMK



Ellen Aikens



Shannon Albeke



Gabrielle Allen



Gabriel Barrile



Sean Field



Jian Gong



Jeff Hamerlinck



Jake Hawes



Paddington Hodza



Meredith Joyce



Andrew Kirby



Ben Koger



Austin Madson



Beth McMillan



Shanshan Li



Stefan Rahimi



Ramesh Sivanpillai



Dane Taylor



Chen Xu



School of Computing

2023

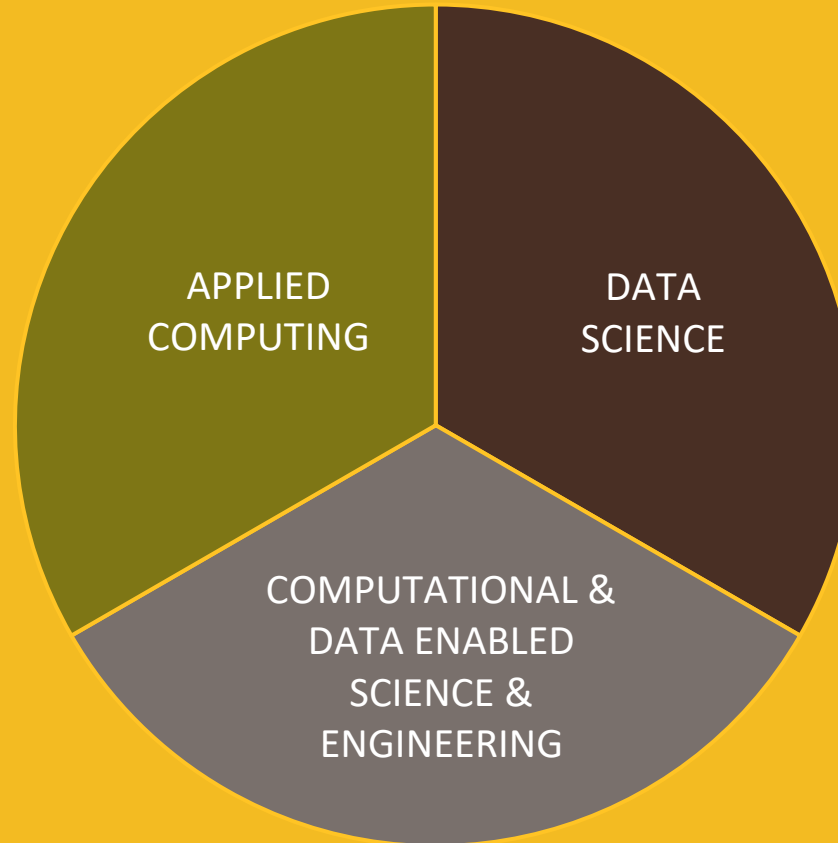
WyGISC

2024

Expanding UW Computing

BS Applied Computing
Computing Minor
USP Courses

BS Applied Software
Development



BS Data Science

CSE UG Minor
CSE Grad Minor

MS AI
MS QISE

Enrolled Students

On schedule

- BS Applied Computing, Fall'25
- Minor Computing, Fall'23
- New courses (11 new/17 dev)

In addition

- BS ASD (Fall'24)
- BS Data Science (Fall'25)
- BS GIST (Fall'23)
- 2 MS Degrees with EECS/Phys
- Admin for CSE minors
- Crosswalk of UW computing courses

Elements

- Experiential learning (NSF Proposal)
- Transfer pathways
- Ready for USP Digital Literacy

UNDERGRADUATE DEGREE	ENROLLMENT	
	AY23-24	AY23-24
BS Applied Software Development	*	2
Minor Computing	*	2
Minor Interdisciplinary Computational Science (with MathStats)	0	1
BS Geospatial Information Science and Technology	*	7
Certificate in GIS - Undergraduate	29	38
Certificate in Remote Sensing - Undergraduate	10	12
BS Applied Computing **	**	**
BS Data Science **	**	**
TOTAL	39	62
GRADUATE DEGREE	ENROLLMENT	
	AY23-24	AY23-24
MS Artificial Intelligence (with EECS)	*	2
MS QISE (with EECS/Physics)	*	0
MS in GIST (Thesis and Professional)	19	21
Certificate in GIS - Graduate	13	15
Certificate in Remote Sensing - Graduate	1	5
Certificate in UAS - Graduate	2	4
Minor Interdisciplinary Computational Science Graduate (with MathStats)	1	2
TOTAL	36	49
	75	111

NSF Proposal (\$1.13 Million): Experiential Data Science Across Wyoming

Under
Review

PI Dane Taylor (SoC/Math)

Co-PIs: William Cain (Education), Diksha Shukla (EECS),
Jeff Hamerlinck (WyGIS), and Andrew Lincowski
(Eastern Wyoming College)

- Help prepare WY workforce & economy for data-driven future
- Establish industry-focused, experiential learning activities for students at UW and WY community colleges
- Create paid internships, coding hackathons, educational workshops and undergraduate research experiences
- Partners: Wyoming Game & Fish, Argonne National Lab, and 4 industry partners (West, Flowstate, Inspirato and Concordant)

Computing Opportunities for all UW Students

174

Students
Impacted

36

Academic
Units

48%

Female

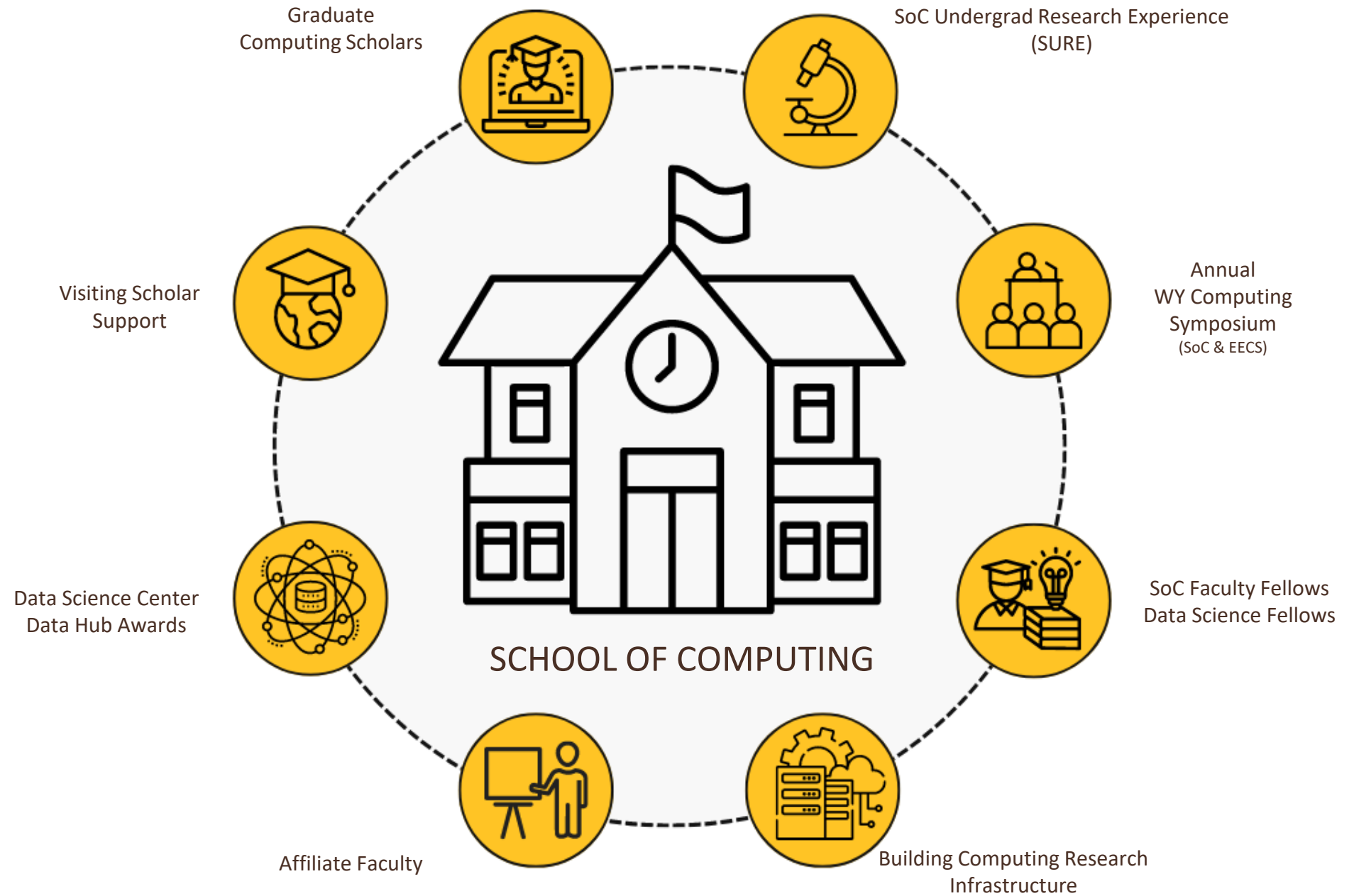
52%

Male

- Graduate Assistantships
- Graduate Computing Scholars
- SoC Undergraduate Research Experiences (SURE)
- AmericaView Research Experiences
- Faculty Fellow Awards



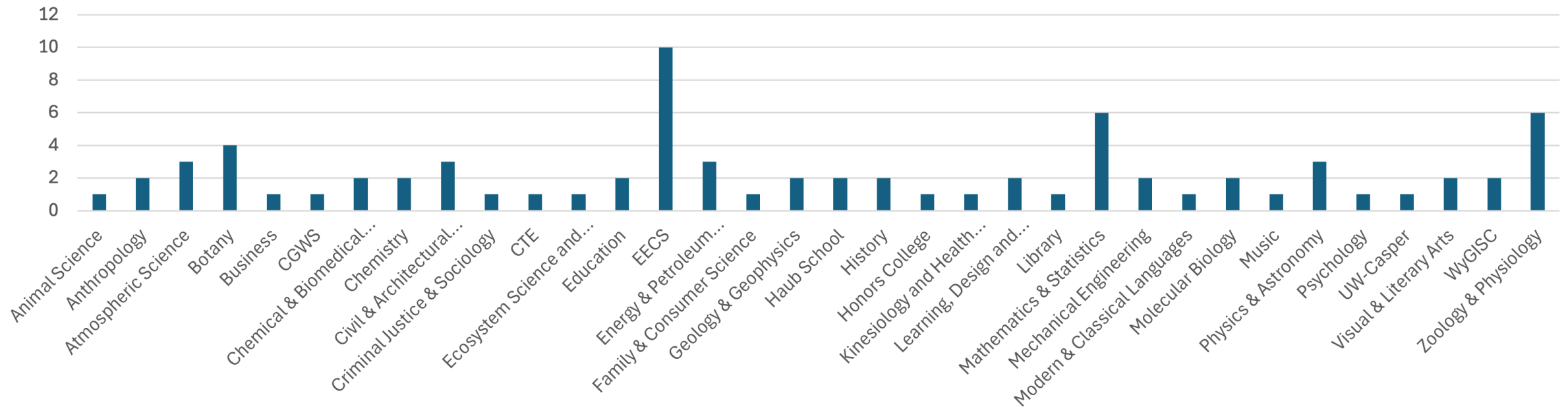
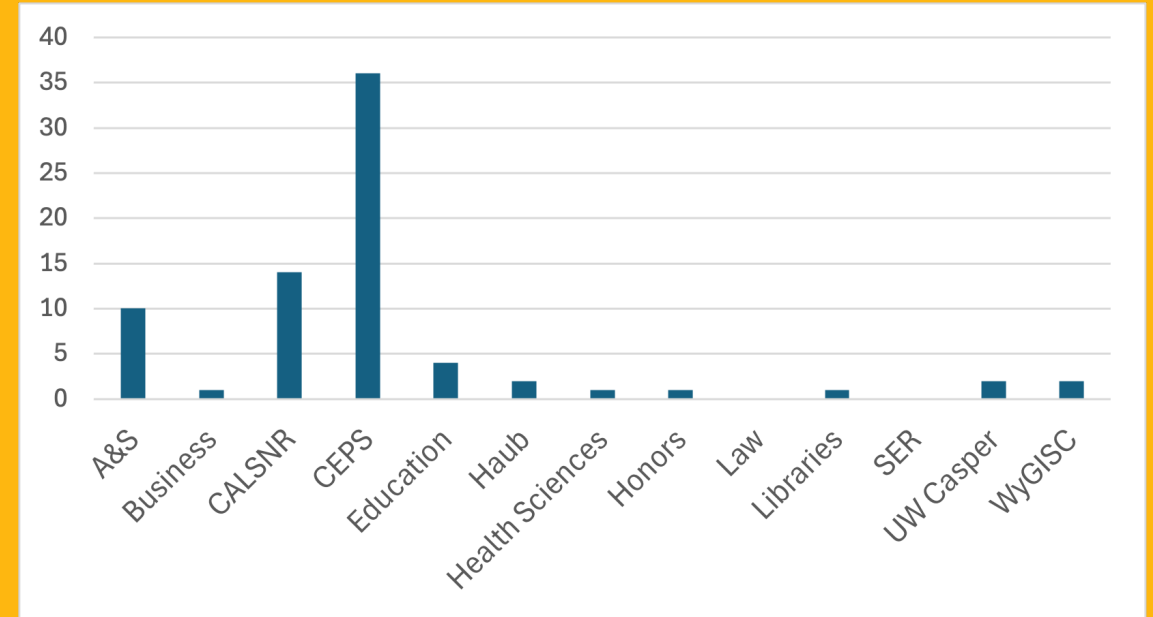
Building SoC Community & Foundation



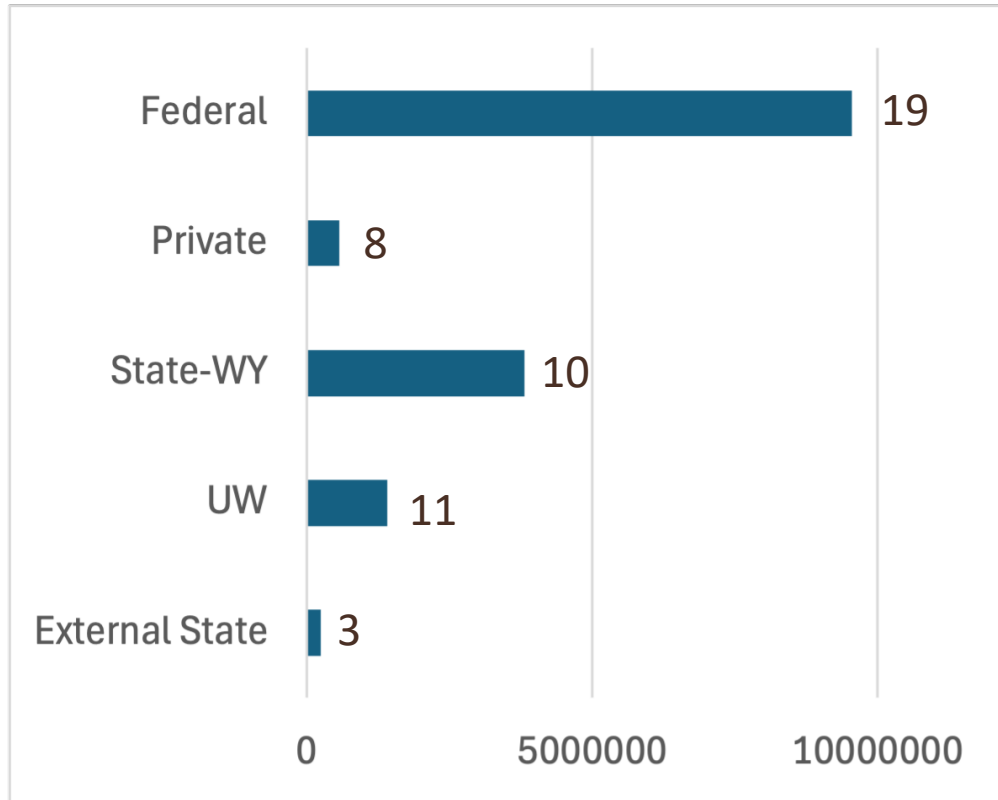
UW Faculty Engagement

127+ Engagements
76 Unique Faculty
34 Departments

Adjuncts, Fellows, Derecho, Advisory Board, Student Mentors



Research Funding



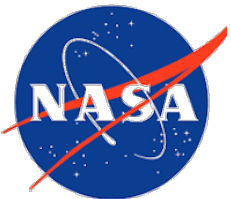
Year 5 (2027) target: \$300K/fac/yr

14 researchers (PI/Co-PI)

Total funded: \$15.7M

\$/yr/fac: \$740K

\$7.8M pending!

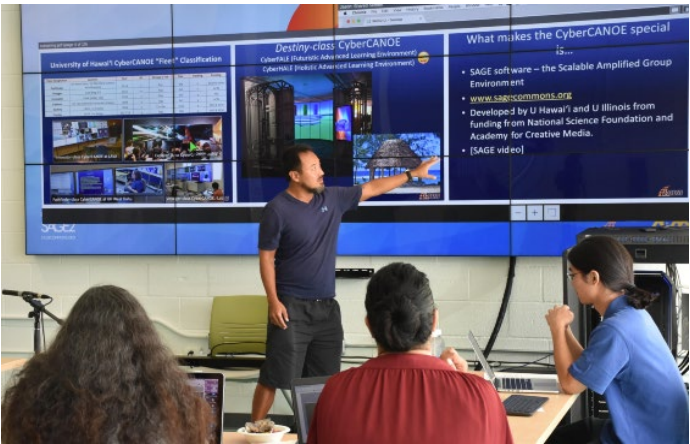
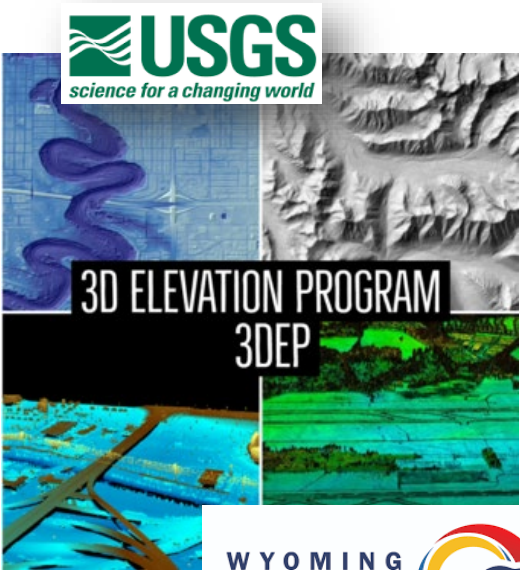
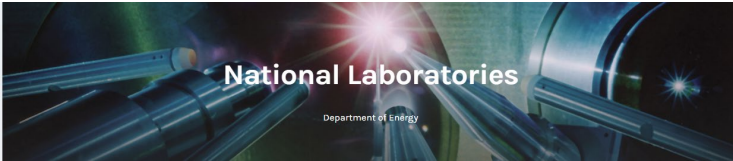


U.S. DEPARTMENT OF
ENERGY



SoC Research Accomplishments

Other synergistic research activities



\$4M NSF Award for AI

CDSE Program

Platform for students in expansion of CEPS CDSE program

Regional Leadership

- Colorado State University
- Rocky Mountain Advanced Computing Consortium

Industry Partnerships

Potential for e.g. SAFRAN



ANL Lighthouse

Pathway to National Exascale Computing

Applications & Collaboration

13 UW departments involved!

- Agriculture
- Environment
- Society
- Energy
- Digital Twins
- Exascale HPC
- Big Data/Models

UW Computing Partnership

- SoC/EECS
- ARCC
- UW Faculty Dir. For Computing
- Energy
- Resources/REDD
- Libraries
- INBRE
- 3D Viz Center

UW Explore

- Digital Twins
- Decision Making
- Hybrid Teaching



School of Computing

PI: Andrew Kirby (SoC)

Co-PIs: Gabrielle Allen (SoC/Math), Suresh Muknahallipatna (EECS), Michael Killeen (ARCC), Michael

UW Explore Initiative

building collaborative data science and science communication capacity

Leveraging NSF-supported SAGE3 platform, managed by Univ. of Hawaii



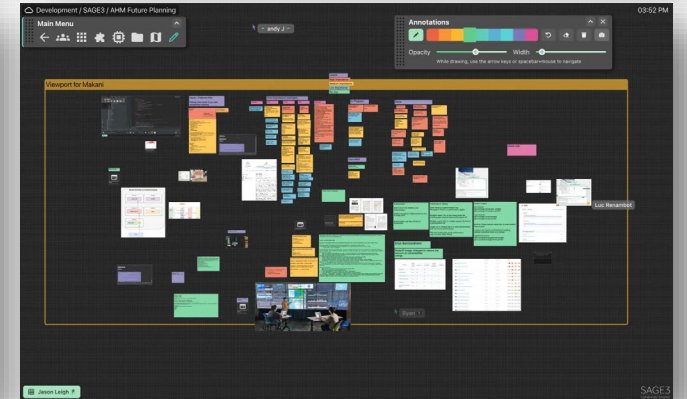
- Innovative hybrid learning
- Collaborative research
- Decision-making support

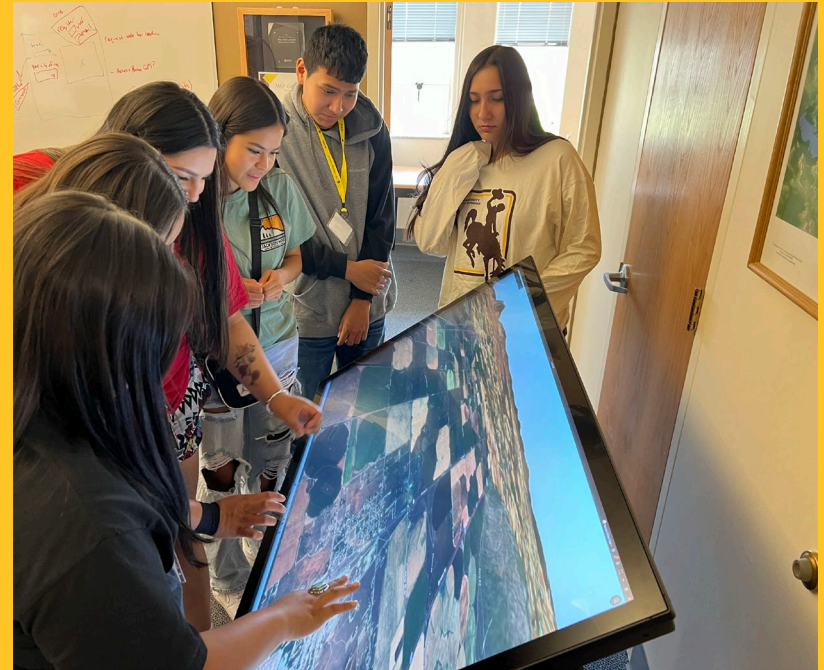
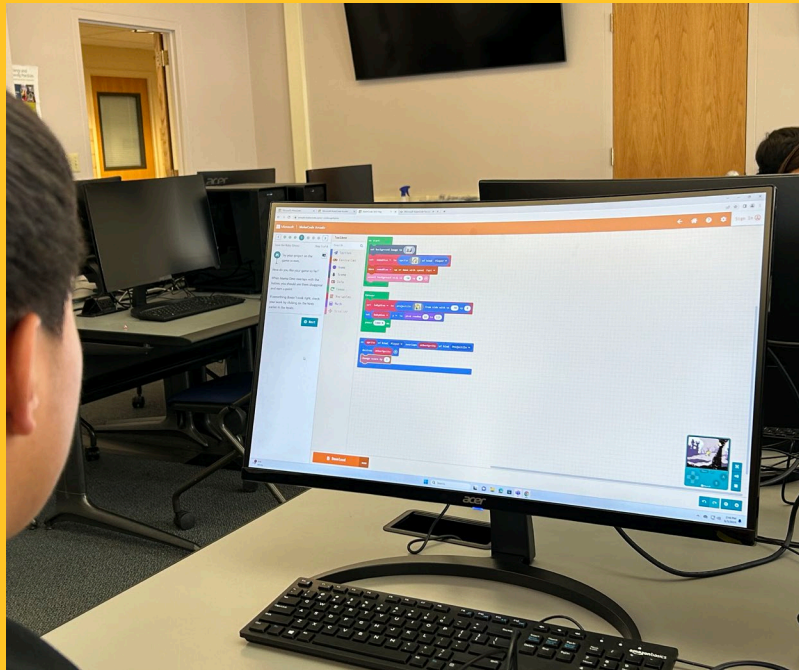
Partners

- SER 3D Viz Center
- UW Science Institute
- Central Wyoming College
- UW-Casper



School of Computing





SoC is Part of a National Trend

Computing Research Association (CRA) Deans Council provides leadership and community to emerging and established colleges of computing and information schools - 40 institutions



Est. 2024

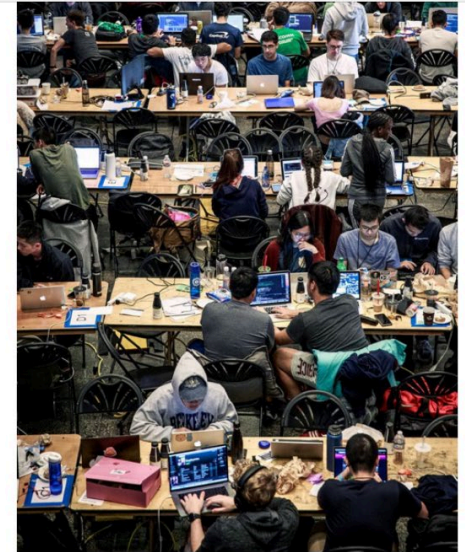


Benchmark Tier 1 Institutions (US News Graduate Eng. Rank: 2014)

School	Ranking
California—Berkeley	3
Illinois—Champaign-Urbana	5
Georgia Tech	5
Purdue	8
Michigan	9

School	Ranking
Texas—Austin	11
Texas A & M	11
UCLA	16
Wisconsin—Madison	18
Washington	25

The Atlantic



Max Whittaker / The New York Times / Redux

TECHNOLOGY

UNIVERSITIES HAVE A COMPUTER-SCIENCE PROBLEM

The case for teaching coders to speak French

By Ian Bogost

MARCH 19, 2024

Updated at 5:37 p.m. ET on March 22, 2024

Last year, 18 percent of Stanford University seniors graduated with a degree in computer science, more than double the proportion of just a decade earlier. Over the same period at MIT, that rate went up from 23 percent to 42 percent.

2nd WYOMING COMPUTING SYMPOSIUM

Computer vision will
transform our ability to
understand and quantify
the natural world



Student Meet & Greet Event @ Washakie

 UNIVERSITY OF WYOMING | School of Computing

OPEN HOUSE
MEET & GREET
FOR STUDENTS

THUR 9/5 4:30PM

WASHAKIE BASEMENT SHOSHONE ROOM

Network with the School of Computing faculty & staff and to discover how you can upgrade your major with computing.

FREE FOOD & MERCH

Assistant Professor Beth Alvord applying a bird sensor.



Thank You!



On Schedule!



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Core Faculty

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Affiliate Faculty

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Derecho
Professors

105+6

Enrolled Students

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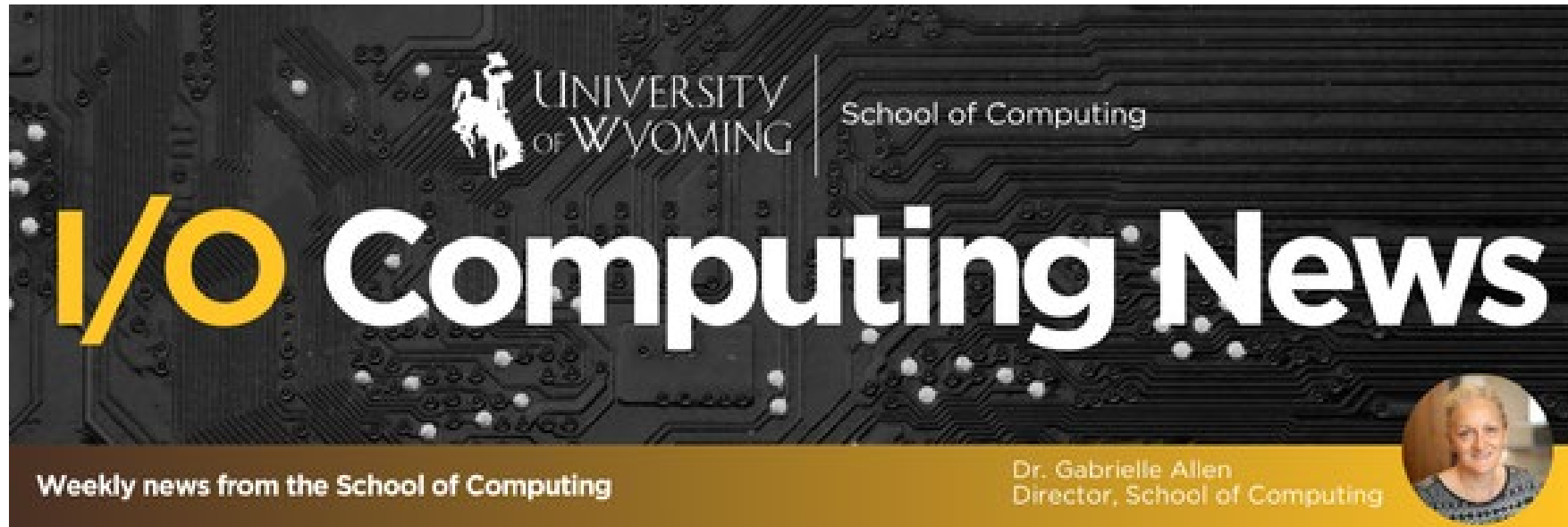
6

Research
Infrastructures

10

Industry
Partners

Thank you!





Advanced Infrastructure to Accelerate Impact of AI through Applications & Innovation for WYoming



System Details

Grace Hopper GPUs

- 24 NVIDIA GH200
- 400 Terabytes Storage

Investigators

Andrew C. Kirby, SoC (PI)
 Gabrielle Allen, SoC
 Suresh Muknahallipatna, EECS
 Michael Killeen, ARCC
 Michael Kirby, DSRI at CSU



**\$3.9
Million**



**13 UW
Departments**



**33+
Institutions**

Award Details

- NSF Track 2 MRI (23-519)
- EPSCoR Co-Funding
- NSF Award #: 2407756

Equipment	3.25M
Personnel	340K
Total	\$3.894M

Project Objective

Acquire state-of-the-art HPC system for advancing the application and innovation of Artificial Intelligence and Computational Science across the University of Wyoming and the Rocky Mountain Region.

Grand Challenge Areas

- Artificial Intelligence
- Digital Twins
- Exascale HPC
- Big Data & Modeling



School of Computing



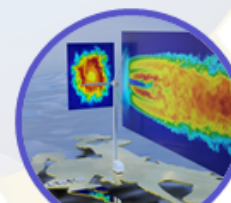
Agriculture



Environment



Society



Energy

RESEARCH

Maybe Slides

Budget

Industry Partners

Info Slides

COURSES DEVELOPED FOR SOC	APPROVED	SEMESTER TAUGHT (ENROLLMENT)	Minor Computing	BS Applied Software Development	BS Applied Computing	BS Data Science	BS GIST
COMP 2000 - Computing and Society	AY 22-23	F24 (5)	X	X	X	X	X
COMP 3000 - Basic Computing	AY 22-23	F24 (4)	X		X		X
COMP 3500 - Advanced Computing	AY 22-23	F26	X				X
COMP 4000 - Practicum I	AY 22-23	Sp26	X	X	X		
COMP 4790 - Special Topics in Computing	AY23-24	F24 (1)	X		X	X	X
COMP 4950 - Undergraduate Research	AY23-24	as needed	X		X	X	
COMP 4975 - Independent Study	AY23-24	as needed					
GIST 1001 - GIST Orientation and Portfolio	AY 22-23	F23 (6), Sp24 (6), F24 (3)					X
GIST 2110 - Techniques in Cartography	AY 22-23	Sp24 (24)					X
GIST 3050 - Spatial Database Design and Management	AY 22-23	Sp25	X		X	X	X
GIST 4780 - Capstone in GIS&T	AY 22-23	Sp25	X				X

New Courses

In Development

	EXPECTED APPROVAL	1st SEMESTER OFFERED	Minor Computing	BS Applied Software Development	BS Applied Computing	BS Data Science	BS GIST
COURSES IN PROGRESS							
COMP 2500 - Foundations of Applied Programming	AY 24-25	F25	X		X		X
COMP 2750 - Probability and Practice 1	AY 24-25	F25	X		X		X
COMP 2775 - Applied Database Systems 1	AY 24-25	F26	X		X		X
COMP 3725 - Storytelling with Data	AY 24-25	Sp26	X		X	X	X
COMP 3750 - Probability and Practice 2	AY 24-25	Sp26	X		X		X
COMP 3775 - Applied Database Systems 2	AY 24-25	Sp27	X		X	X	X
COMP 4051 - Computing Seminar	AY 24-25	F25	X		X	X	X
SDEV 2030 - Data Structures	AY 24-25	Sp26		X			
SDEV 3000 - Foundations of Software Systems	AY 24-25	F25		X			
SDEV 3011 - Introduction to Software Design	AY 24-25	Sp26		X			
SDEV 3020 - Applied Algorithms	AY 24-25	F26		X			
SDEV 3100 - User Design Experience	AY 24-25	Sp26		X			
SDEV 3500 - Performance and Testing	AY 24-25	F26		X			
SDEV 3765 - Computer Security	AY 24-25	F25		X			
SDEV 4000 - Advanced Programming for Developers	AY 24-25	Sp27		X			
SDEV 4730 - Mobile Application Programming	AY 24-25	F26		X			
SDEV 4840 - Software Engineering Environment	AY 24-25	Sp27		X			

The Win-Win!

- Eight new joint faculty
 - 4.1 SoC FTE
- Teach core computing classes for SoC
- Teach key electives or new computing classes in joint unit

SoC Joint Faculty	Joint Unit	Courses Taught	Semester
Aikens, Ellen	<u>Haub</u> School of ENR	ENR 5890 Data Driven Storytelling	Sp24
		ENR 4890 Foundations of Data Science for the Environment	F24
<u>Barille</u> , Gabe	Zoology & Physiology	ZOO 4400 Population Ecology (2 sections)	F24
Hawes, Jake	<u>Haub</u> School of ENR	Initial teaching semester = F26	
Joyce, Meridith	Physics & Astronomy	Initial teaching semester = Sp25	
Koger, Ben	Zoology & Physiology	ZOO 5890 ST: Foundations of Biological Programming	Sp24
		COMP 3000 Basic Computing	F24
Field, Sean	Anthropology	ANTH 4155/ 5155 Applied Computing for Archaeologists	Sp24
		ANTH 4160/5160 Mapping Culture Intro GIS	F24
Rahimi, Stefan	Atmospheric Science	ATSC 5014 Dynamic Meteorology	F23
		ATSC 5014 Dynamic Meteorology	F24
Taylor, Dane	Mathematics and Statistics	MATH/COSC 4340 Numerical Methods for Differential Equations	Sp24



**Plan normalized for first
SoC faculty hires starting
Fall 2023**



**Need a solid
foundation**

- SoC faculty for curricula work, student supervision,
- Students/research scientists for capacity



React to opportunities and needs

- WyGISC merger Summer 2023
- BS Applied Software Development
- MS AI, MS QISE
- Interdisciplinary CSE
- BS Data Science



**REDD Industry &
Engagement Office**



**Space
planning**

- Bureau of Mines
- Legacy Engineering Building
- Crane Hall



School of Computing

RESEARCH-RELATED STORY

- MRI
- UW Explore

Computational & Data Enabled Science & Engineering (CDSE)

- Request for Authorization earmarked \$500K for CEPS collaboration in faculty hiring
- New EECS Head Fall 2024!
- Administration of existing Computational Science minors moved to SoC in XXXX, CDSE committee being established across CEPS Fall 2024 (Bryan Shader, Michael Stoellinger are co-chairing)

TIER 1 Engineering Plan, 2013: Goal 4: UW will undertake major undergraduate curricular innovation ... by infusing computational science into the core Engineering Science courses in the college of engineering.

Computational & Data Enabled Science & Engineering (CDSE)

- Annual report to Provost on \$500K/yr by SoC Director/CEPS Dean
- FY23 and FY24: All CEPS units supported
 - Research training for 20 graduate students and 5 undergraduate students
 - Funding for 12 faculty research or curriculum development projects
 - Computing infrastructure including GPUs, visualization, student workstations
 - Joint faculty and research scientist support
- Return on Investment
 - Provided seed funding for new research, pilot funding for more competitive external proposals
 - Develops partnerships for SoC (e.g. DOE Computational Math, NSF MRI, ...)