DAVISAI
Institute for Artificial Intelligence

2022-23 Annual Report

Members of the Colby College SureStart AI+entrepreneurship program summer 2023

Everyone is a participant in an increasingly AI-driven sociotechnical system.
Therefore, everyone should be enabled to be
an informed and critical consumer of AI,
an AI tool user, or
an AI tool builder in the context of their own expertise.

The Davis Institute for Artificial Intelligence, a first such institute at a liberal arts college, is made possible by the tremendous generosity of the Davis family and trustee of its charitable foundation Andrew Davis '85, LL.D. '15.

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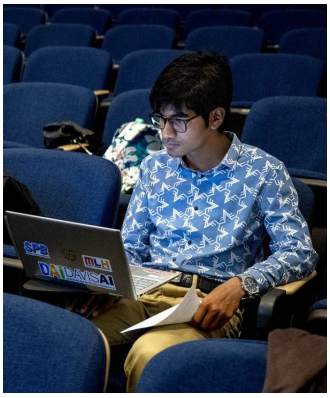
I. About the Davis Institute for Artificial Intelligence

Why AI? AI is second only to global warming in shaping our physical, social and individual lived experiences. AI is everywhere and affects all of us. Members of "generation AI" are used to AI as an assistant and enabler... They are also, not coincidentally, the first generation to be surveilled by technology almost from birth.

In this context, what organizations and society need are AI-informed, AI-critical subject matter experts:

- AI tool users - product managers, scientists, artists, historians who know how and when AI works
- AI tool builders - technologists with broad backgrounds & critical thinking skills who ask good questions



SureStart student Nafis Saadiq Bhuiyan '26

Mission and Values

To establish Colby as a nationally recognized center of excellence in interdisciplinary human-centered AI teaching and research.

Our values are:

- Examine and improve the social and ethical implications of artificial intelligence and machine learning
- Collaborate across fields to help solve the world's most pressing problems
- Set the standard with faculty who conduct research and teach students to be tool builders and users
- Use artificial intelligence as a means to improve the human condition

Stakeholders and Key Performance Indicators

Influential	Participatory
• Colby faculty • Colby students • Colby alumni	• Colby teaching and research partners • Colby corporate partners • Local, regional and global government and nonprofits
• Number/satisfaction of Institute core, involved and informed faculty, students and alumni • Number/success of affiliated graduates • Number of interested faculty/student candidates	• Institute-affiliated scholarly outputs • Institute-affiliated entrepreneurial outputs • External funding • Opportunities we say no to on values grounds

Target Five Year Outcomes

- 100% of Colby faculty and students are enabled to interact meaningfully with the Institute / AI at least once a year; 200 Colby alumni each year interact meaningfully with the Institute
- 25% of Colby faculty, across 80% of departments, are actively involved in interdisciplinary X+AI scholarship (research, pedagogy, partnerships)
- 25% of Colby graduates, across 80% of departments, have pursued an AI curricular pathway by the time of graduation
- Institute scholarly outputs (e.g. model curricula, white papers) used in 10+ other programs worldwide
- 5 X+AI Colby-affiliated startups; 25+ X+AI Colby partnerships

As of summer 2023, at least 22% of Colby faculty, across 70% of departments, are involved in interdisciplinary AI scholarship or teaching.

As of summer 2023, there are at least 3 AI-related startups with Colby student co-founders; 4 additional startups were pitched in August.

Who Are We?

Amanda Stent is the director of the Institute. She is an expert in natural language processing (NLP). This year, she is looking forward to building deeper relationships between Davis AI and Colby alumni.

Michael Yankoski is the 2023-24 Davis AI postdoctoral scholar. His research uses AI techniques to study strategic peacebuilding. He will teach computing ethics.

Alejandra Geiger-Ortiz (Environmental Studies) uses AI to research climate change impacts in small island nations. She is a 2022-23 Davis AI faculty hire.

Dale Kocevski (Physics and Astronomy) researches the development of actively growing black holes. He is a 2023-24 Davis AI faculty fellow.

Hong Zhang (East Asian Studies) researches sociocultural changes in Chinese society over time. She is a 2023-24 Davis AI faculty fellow.

David Istrati '26 is the Davis AI cloud engineer. He is majoring in CS: AI and mathematics. He is passionate about democratizing data science.

Max Jacobs '24 is a 2022-23 Davis AI software engineer working on NLP. He is majoring in CS: AI and photography. He is passionate about soccer. He will join Deloitte after graduation.

Amy Poulin is the associate director of the Institute. A native of Maine, she has almost seventeen years of experience at Colby. She is pursuing a certificate in applied data science from the University of Michigan.

Tahiya Chowdhury is the 2022-24 Davis AI postdoctoral scholar. Her research uses AI to model dynamically changing physical and social environments. She teaches computer vision.

Veronica Romero (Psychology) researches the dynamics that arise when people work together to complete tasks. She is a 2022-23 Davis AI faculty fellow.

Ben Baker (Philosophy) works at the intersection of Philosophy of Mind, Neuroscience, Cognitive Science, and AI. He is a 2022-23 Davis AI faculty hire.

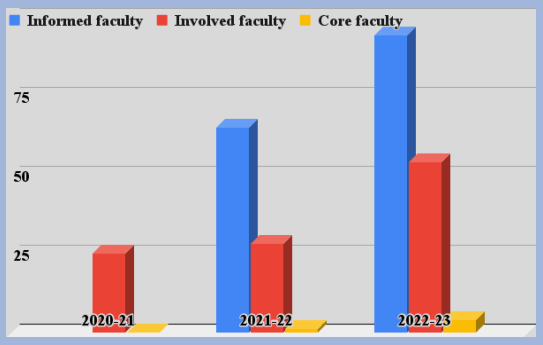
Kara Kugelmeyer (Data Services Librarian) teaches in the STS department and with Davis AI. She is a 2023-24 Davis AI faculty fellow.

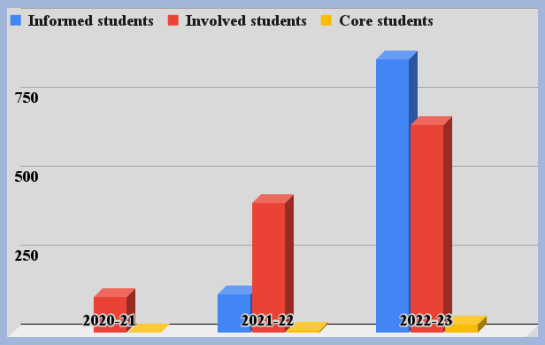
Elsa Grant '25 is the Davis AI communications lead. She is majoring in Psychology. She is passionate about digital design and community building.

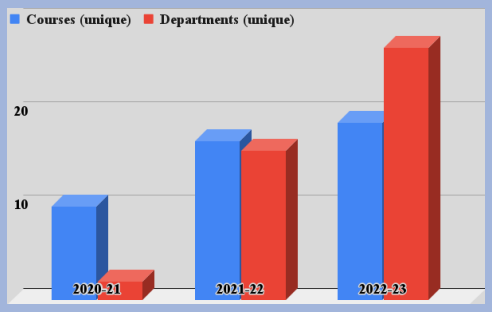
Ray Wang '26 is a Davis AI RA working on computer vision for environmental applications. He is majoring in CS: AI and mathematics. He is passionate about real-world challenges.

III. 2022-23

By the Numbers







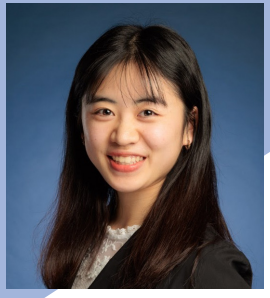
Scholarship and Summer Programs

- Visiting Artist and Lunder Institute Senior Fellow Oscar Santillán worked with Marlon Grandy ‘24 and Hyeon-Seung Yu ‘23 on AI-infused art related to The Island Project: Point of Departure.
- Davis AI postdoc Tahiya Chowdhury worked with Saki Imai ‘24 and Ashley Ren ‘24 on an AI project related to analyzing video recordings of conversations.
- Davis AI postdoc Tahiya Chowdhury worked with Ray Wang ‘26 on AI projects related to analyzing image data for environmental monitoring.
- The first SureStart AI & Entrepreneurship Cohort at Colby College featured 9 Colby students, 4 Lincoln Unversity Students and a Colby near-peer mentor.
- Davis AI postdoc Tahiya Chowdhury and faculty fellow Veronica Romero co-organized two workshops at major international research conferences.
- Davis AI director Amanda Stent gave invited talks at George Fox University and at the Isleboro forum, and participated in an invited panel conversation at the College of the Atlantic Summer Institute.
- Davis AI director Amanda Stent collaborated with the Roux Institute on the first State of AI in Maine report, and gave a keynote at the event in January 2023 (https://ai.northeastern.edu/ai-events/the-state-of-ai-in-maine/).

Curricular Pathways

As of September 2023, 28 students had declared the new Computer Science major with a concentration in AI.

In 2023 a new first year interdisciplinary studies cluster “360 Degrees of AI” was approved. This cluster, to be offered by Thom Klepach (STS), Kara Kugelmeyer (Libraries) and Amanda Stent (Davis AI), is fully enrolled for fall 2023.



Davis AI summer 2023 student researchers Saki Imai ‘24 (left) and Ashley Ren ‘24 (right). Saki is majoring in CS and mathematical sciences, Ashley in CS and statistics. Both are both doing AI honors theses and plan to go to graduate school in AI.

2022-23 Theme: AI and the Lived Environment

One of the most critical issues of our time is climate change. Faculty at Colby and Colby partners are contributing valuable scholarship to the assessment and tracking of climate change, and Colby itself is one of the first sustainable campuses in the country. In 2022-23 we ask, How can AI contribute to our understanding of nature, our relationship to it, and our impact on it?

Courses and Events

AI-Related Courses	Events
• AY265: AI and Inequality • BI229/ST229: Consciousness from the Biomolecular to the Artificial • BI374: Advanced Neurobiology • CH442: Computational Chemistry • CS251/2: Data Analysis and Visualization • CS310: Creating Future Worlds: Computing, Ethics, and Society • CS343: Neural Networks • CS436: Seminar: Artificial Intelligence Table Reads • CS443: Bio-Inspired Machine Learning • EC393: Econometrics • EC473: Data Analysis and Forecasting • EC477: Financial Technology • EN120H: Language, Thought, and Writing: Animal/Human/Machine • ES238: Renewable Energy Systems • MU244: Borrowing Sound, Sampling Culture • MU297B: Soundscape and Sonic Narratives • SC324: ST112: Science and Technology Studies • ST485: Technology Matters • JP297D: Hands-on AI with Computer Vision • JP197B: Hands-on AI with NLP • JP246: Ocean Forecasting	• Claire Monteleoni, *AI Research for Climate Change and Environmental Sustainability* • Ruha Benjamin, *Viral Justice: Pandamics, Police Violence & Public Bioethics* • Felipe Tovar-Henao, in conversation with Jose Martinez • Sölen Kiralti, in conversation with Hannen Wolfe • Oscar Santillán, *Art & AI: Panel Discussion* • Sorelle Friedler, *Blueprint for an AI Bill of Rights: Protecting People and Innovation* • Davis AI panel on AI REUs and internships • Davis AI panel on AI graduate programs • Davis AI faculty/staff summer training workshops (open to researchers across Maine): Data Carpentries Python for Ecological Scientists, R for Social Scientists; Constellate Introduction to NLP 

Media Coverage 2022-23

- Amanda Stent Named One of 2023's Mainers of the Year, *Maine Magazine*, Nov. 2022
- AI Experts On The Mystery Of Predicting AI Decisions, *Forbes*, July 2023
- Colby College Centers AI With Summer Program, Curricular Integration, *Government Technology,* Sep. 2023

Colby News Stories 2022-23

- AI Datathon Aims to Aid in Browntail Moth Invasion, Oct. 2022
- AI Artwork on Display, Nov. 2022
- A Colby Grad Gets Noticed for Her Research in Machine Learning, Nov. 2022
- The Second Act of Josh Kim, March 2023
- A Vital Element of AI? Empathy, March 2023
- Colby Debates a Blueprint for an AI Bill of Rights, April 2023
- Getting a Head Start on AI, Aug. 2023

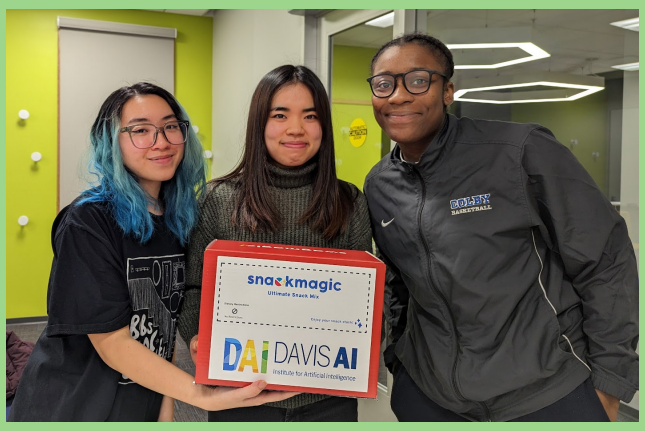
Recent AI-Related Publications from Colby

- Al Madi, Naser. "How readable is model-generated code? examining readability and visual inspection of github copilot." *Proceedings of the 37th IEEE/ACM International Conference on Automated Software Engineering*. 2022.
- Chowdhury, Tahiya, Verónica Romero, and Amanda Stent. "Interactional coordination between conversation partners with autism using non-verbal cues in dialogues." *Proceedings of the First Workshop on Connecting Multiple Disciplines to AI Techniques in Interaction-centric Autism Research and Diagnosis* (ICARD 2023). 2023.
- Chowdhury, Tahiya, Veronica Romero, and Amanda Stent. "Parameter Selection for Analyzing Conversations with Autism Spectrum Disorder." *Proceedings of INTERSPEECH*. 2023.
- Coane, Jennifer H., et al. "Lay Definitions of Intelligence, Knowledge, and Memory: Inter-and Independence of Constructs." *Journal of Intelligence* 11.5 (2023): 84.
- Good, Aidan, et al. "Recall distortion in neural network pruning and the undecayed pruning algorithm." *Advances in Neural Information Processing Systems* 35 (2022): 32762-32776.
- Maus, Natalie, and Oliver W. Layton. "Estimating heading from optic flow: Comparing deep learning network and human performance." *Neural Networks* 154 (2022): 383-396.
- Paxton, Alexandra, Tahiya Chowdhury, and Veronica Romero. "Language in the Time of COVID: Sensitivity of Linguistic Alignment to Conversation Type and Communication Modality." *Proceedings of the Annual Meeting of the Cognitive Science Society*. Vol. 45. No. 45. 2023.
- Raczaszek-Leonardi, Joanna, et al. "Putting interaction center-stage for the study of knowledge structures and processes." *Proceedings of the Annual Meeting of the Cognitive Science Society*. Vol. 45. No. 45. 2023.

At the 2023 Colby Liberal Arts Symposium, 38 presentations directly addressed AI or used AI methods.

At the 2023 Colby Undergraduate Symposium for Summer Research, 25% of student presentations directly addressed AI or used AI methods.

Clockwise from bottom left: students at the fall 2022 Dataiku hackathon; two students' exhibits at the fall 2022 AI generated art contest; students at the spring 2023 VoiceXD designathon. Sardor Nodirov '26 (bottom left, center) has an AI startup that develops chatbots from organizations' intranets.



IV. 2023-24

2023-24 Theme: PLAY!

'Play' is a term that spans a gamut of endeavors in the liberal arts without resolving the tensions. Bounding and bouncing across diverse histories and geographies, play connects action and rest, pleasure and exhaustion, young and old, human and nonhuman, and intellect and whimsy. The Davis AI 2023-2024 theme, in collaboration with the Center for the Arts and Humanities, will explore the relationships between AI and PLAY, both lighthearted and serious.

Scholarship and Technical Infrastructure

As our strength in AI grows we want to maintain a strong community and resources for all. In 2023-24 we will offer:

- Weekly Lab sessions for AI-related faculty and students across the college (and beyond) to collaborate
- Cloud compute for AI research via tech grants
- Updated AI resource sheets for broad classes of AI task and technology
- Training workshops for scholars and their students in the humanities, social sciences and natural sciences

The Institute will focus our core research agenda on:

- AI approaches to mis- and disinformation
- AI approaches to mining and sustaining archives
- AI approaches to interaction modeling

We will also conduct collaborative research with Institute faculty scholars.

Courses and Events

AI-Related Courses	Events
• 360 Degrees of AI (first year IS cluster) • AI Conversations across Disciplines (seminar) • Generative AI for fun and usefulness (JanPlan) • Computational Thinking: Natural Language Processing • Computational Thinking: Computer Vision • Black Digital Cultures • Surveillance Culture • AI and Inequality • Advanced Neurobiology • Neural Networks and Bio-Inspired Machine Learning • Econometrics • Data Analysis and Forecasting • Financial Technology • Concepts and Methods of Political Science Research • Borrowing Sound, Sampling Culture • Advanced Quantitative Analysis of Psychological Data • Statistical Modeling • Statistical Learning in Data Science	• Distinguished speaker series: Naomi Fitter, Lindsay D. Grace, Fatimah Tuggar, Alexandra Grant (with the Center for Arts and Humanities and the Lunder Institute) • Multi-day event on AI and mis-disinformation and democracy (with the Goldfarb Center for Public Policy) • AI careers sessions: internships and REUs in AI; graduate school in AI; jobs in AI (with Davis Connects) • Hackathon with Iteris; datafest with Statistics • Faculty/staff/student training workshops (Data Carpentries, Constellate) 

Faculty Hiring

In 2023-24 we will hire two Davis AI faculty (in Government and in Computer Science) as well as a new Davis AI post-doctoral scholar.

Curricular Pathways

In 2023-24 we will propose additional AI-related curricular pathways at Colby, focusing first on Economics.

AI Across the Liberal Arts, Across the Country

In 2023-24 we will collect and analyze data from a survey of faculty using AI in their scholarship or teaching at primarily undergraduate institutions across the country.

Meredith Green '24 demonstrating a game with a purpose: a Davis AI-trained model for deception detection, with associated discussion topics around the ethical issues potentially arising from its use. Meredith is majoring in CS and mathematical sciences. She will go to a machine learning role at Microsoft after graduation.

Collaborations

AI should develop through the enthusiastic leadership of subject matter experts. We thank the Lunder Institute for American Art, Davis Connects, the Goldfarb Center for Public Policy, the Public Humanistic Inquiry Lab, the Halloran Lab for Entrepreneurship, Dataiku, VoiceXD, SureStart, the Carpentries, Constellate, the University of Maine, the Roux Institute, our Advisory Board and alumni mentors, and faculty in many departments for productive collaborations.

SureStart participants collaborating on the 'marshmallow challenge'. David Roberts '26 (left) is now majoring in CS. Peggy Jones '26 (center) is now majoring in environmental computation with a focus on AI for reducing the climate and social impacts of mining in her native country of Ghana. Cathy Fan '26 (right) is now majoring in CS: AI.