FALL 2024 NEWSLETTER

University of Colorado **Boulder**

INSTITUTE OF COGNITIVE SCIENCE

Tamara Sumner, ICS Director

FROM THE DIRECTOR

Friends,

What a glorious fall we are having! And, as we learned at the KickOff last month, we have a lot going on! Yet there is more in the works than we could cover in that session……

New Research Initiatives. As you heard at the KickOff, there are several new interdisciplinary research initiatives being launched that ICS is proud to support.

These will bring exciting new opportunities for our research faculty and graduate students. ICS is a founding member of the consortium supporting the launch of the new Center for Healthy Mind and Mood, led by ICS Fellow Rosi Kaiser, along with Theodora Chaspari (ICS/CS) and Naomi Friedman (IBG/PSYC). Our partners in this endeavor are the Department of Psychology and Neuroscience, the Renee Crown Institute, and RIO. I am sure you can learn more about this initiative in this newsletter! We have also made progress since the KickOff on establishing a formal framework supporting collaboration with the Center for National Security Initiatives (NSI), specifically new ICS Fellow Chad Tossell. We have arranged for Chad to have research space with us at CINC and we have an MOU between ICS and NSI in place to guide future grant collaborations.

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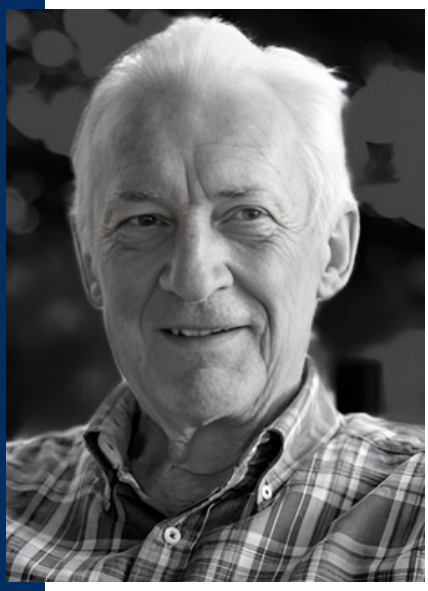
Space. I am delighted to announce that we have received modest but much appreciated additional funding from RIO to support some much needed upgrades to our space at CINC. Over the coming year, we are going to revitalize the upstairs iSAT suite to hopefully make it more welcoming as well as better suited for new and emerging needs. We are also taking baby steps to create a 'student hub' area in the open plan space downstairs. One goal for this hub area is to encourage graduate students from different labs and disciplines to mix and build interdisciplinary bridges across projects and faculty, as opposed to the traditional model where students are housed in silos based on their faculty advisor.

Research Career Ladders. Our research career ladders have proven to be an indispensable tool for ensuring compliance with new Colorado state law and for creating transparency and openness around research jobs and pathways to promotion. I am thrilled with how many of you are actively using them to plan your professional development and career trajectories. Last year, we added a new strand to our ladders: Program Directors. These are folks whose position blends traditional research with innovative research translation, often at scale, helping us to broaden our reach and impact. This year, we need to fill in a key missing strand in our ladders and lay out expectations for our Research Professor series (Assistant, Associate, and Full). We will be working closely with our Executive Committee and RIO in this endeavor.

Undergraduate Cognitive Science Course. We launched this version of our popular undergraduate course in 2019. Since then, we have offered it once or twice a year, always to a full house (and a long waitlist!). It has also been taught continuously three times a year as part of the Online Computer Science Post-Baccalaureate program. And, I just learned today that it will be taught in Gunnison Colorado this spring through a partnership between the College of Engineering and Western Colorado University. In short, our *single* undergraduate course has impacted hundreds if not thousands of students in the past 5 years across multiple modalities. Clearly this approach of having high-quality common instructional materials and curriculum that can be adapted across modalities has legs. After this 5 year run, it is now time to start thinking about a major course update as a lot has changed (artificial intelligence, for one). Alba and I are putting on our thinking caps, and our shoe leather, to try to drum up support (time, energy, money) for this major revision. We will be reaching out to many of you to hear your ideas about what cognitive science topics that next course should cover as well as cool ways to feature our research.

Cheers, and looking forward to seeing you all at upcoming colloquia,
Tammy

Walter Kintsch



With great sadness, we announced the death of Walter Kintsch on March 24, 2023. Walter was a Distinguished Emeritus Professor of Psychology at the University of Colorado Boulder. Walter was a towering figure in the fields of Psychology and Cognitive Science. His work on the representation of meaning in language and the nature of discourse structure shaped our understanding of human text comprehension as well as computational models of language comprehension. As a Professor of Psychology, Walter served as a beloved mentor for dozens of graduate students and postdoctoral scholars, many of whom carry on his legacy of research around the world today.

As a Professor of Psychology, Walter served as a beloved mentor for dozens of graduate students and postdoctoral scholars, many of whom carry on his legacy of research around the world today. In addition to his role as Professor, Walter served as the longtime director of the Institute of Cognitive Science (ICS) at CU. Under his inspired leadership, ICS became one of the premier cognitive science institutes in the world, bringing together scholars from Computer Science, Linguistics, Philosophy, Education and Psychology in an endeavor to understand the human mind. While we mourn Walter's loss, we recognize the ongoing legacy of his work as a mentor, leader and researcher.

Message from Walter's Family

Throughout his career, Walter was a prolific writer: – author of five books several edited volumes, numerous journal articles and book chapters. In addition to his role as Director of ICS, Walter's research and work as journal editor and member of governing boards were acknowledged by awards for distinguished scientific contributions, including a doctor honoris causa from the Humboldt University in Berlin.

At their annual conference this summer, the Society for Text and Discourse honored Walter's legacy with two symposia devoted to personal remembrances and to his lasting influence on the field.

In addition, ST&D will publish a special issue of the Discourse Processes journal in his honor.

Walter's family would like to express their gratitude to the many people who contacted us: colleagues, former students, and post docs, who all became our friends. It was a joy to read the memories captured by their letters, emails and photos. And we extend our thanks as well to Jim Martin and to all the friends who contributed to Walter's Celebration of Life last summer.

-Eileen Kintsch

Eileen and Walter in Alaska. Walter had titled this photo "Good Life."

Marie Banich

Named University of Colorado Distinguished Professor

Prof. Marie Banich, Ph.D., Department of Psychology and Neuroscience and the Institute of Cognitive Science, College of Arts & Sciences, University of Colorado Boulder was named a **Distinguished Professor - congratulations!**

Prof. Banich is a cognitive neuroscientist whose research specializes in using brain imaging techniques to understand the neural systems that allow us to direct our attention and our actions so that we can prioritize, organize, and target our behavior in a goal-oriented manner, abilities often referred to as executive function.

She is a pioneer in the use of functional magnetic resonance imaging (fMRI). This technique measures spatiotemporal changes in blood oxygenation, as opposed to MRI, which is most commonly used to provide a static snapshot of the body's interior structures. Prof. Banich was among the first cohort of investigators to use fMRI to investigate the function of areas of the brain.

More recently, Prof. Banich has developed groundbreaking methodological approaches that allow scientists to begin to understand the brain circuits that may be involved in supplanting unwanted thoughts, which commonly occur in individuals with psychological challenges. These novel techniques, many now standards in the field, involve complex integration of neural, physiological, behavioral and computational principles and tools in ways that provide insights into the linkage between certain types of brain function and human behaviors.

Prof. Banich's popular textbook Cognitive Neuroscience (Cambridge Press) is in its fifth edition. Beyond being a thought leader in the field of cognitive neuroscience, Prof. Banich is a highly knowledgeable, passionate and rigorous teacher and mentor. A member of the CU Boulder community since 2000, her service achievements include serving as director of the Institute of Cognitive Science (2004-16) and being the founding and current executive director of the Intermountain Neuroimaging Consortium, CU Boulder's research facility for neuroimaging, since 2010.

CUConnections Staff. (2024, November 9). *Six faculty members named CU Distinguished Professors: Title recognizes outstanding contributions in research, education and service.* CUConnections. **https://connections.cu.edu/spotlights/six-faculty-members-named-cu-distinguished-professors**

Meet Our New ICS Fellow

Chad Tossell, Ph.D.
Principal Research Associate, Human and Sociotechnical Systems Research (HSSR) Program, Center for National Security Initiatives (NSI)

Dr. Tossell (Lt Col, Retired) earned his B.A. in Psychology from the University of California, Berkeley, an M.S. in Applied Psychology from Arizona State University, and a Ph.D. in Human Factors/Human-Computer Interaction from Rice University. Before joining the University of Colorado, Dr. Tossell taught courses in psychology, human factors, human-computer interaction, and systems engineering at the United States Air Force Academy (USAFA), where he was recognized with the Outstanding Academy Educator Award in 2023. His research in human-AI teaming, autonomous driving, social robotics, education and training, and the will to fight has led to numerous publications, multiple research awards, and media coverage in outlets such as The Economist. Previous to his faculty role at USAFA, Dr. Tossell served as a Behavioral Scientist and Developmental Engineer in various technical and leadership positions worldwide. He deployed to Afghanistan in 2014-2015 and was awarded the Bronze Star Medal for his leadership in combat.

ICS Administration and Staff

ICS Director Tamara Sumner
Associate Director Alba Tuninetti

Administrative, Organization, and Academic Team (AO&A)

Jean Bowen, AO&A Manager (Through December), ***Danielle Franklin** (Starting January)
Yvette Cullum, Administrative Assistant II promoted to Administrative Assistant III
***James Dods**, Administrative Assistant II
***Avery Stewart**, Student Assistant

Finance Team

Catherine (Cat) Latzer, Finance Director
Lakshmi Muralidharan, Senior Grant Manager
Kim Sandoval, Grant Manager
Grant Krick, Grant Manger

*Joined us less than a year ago

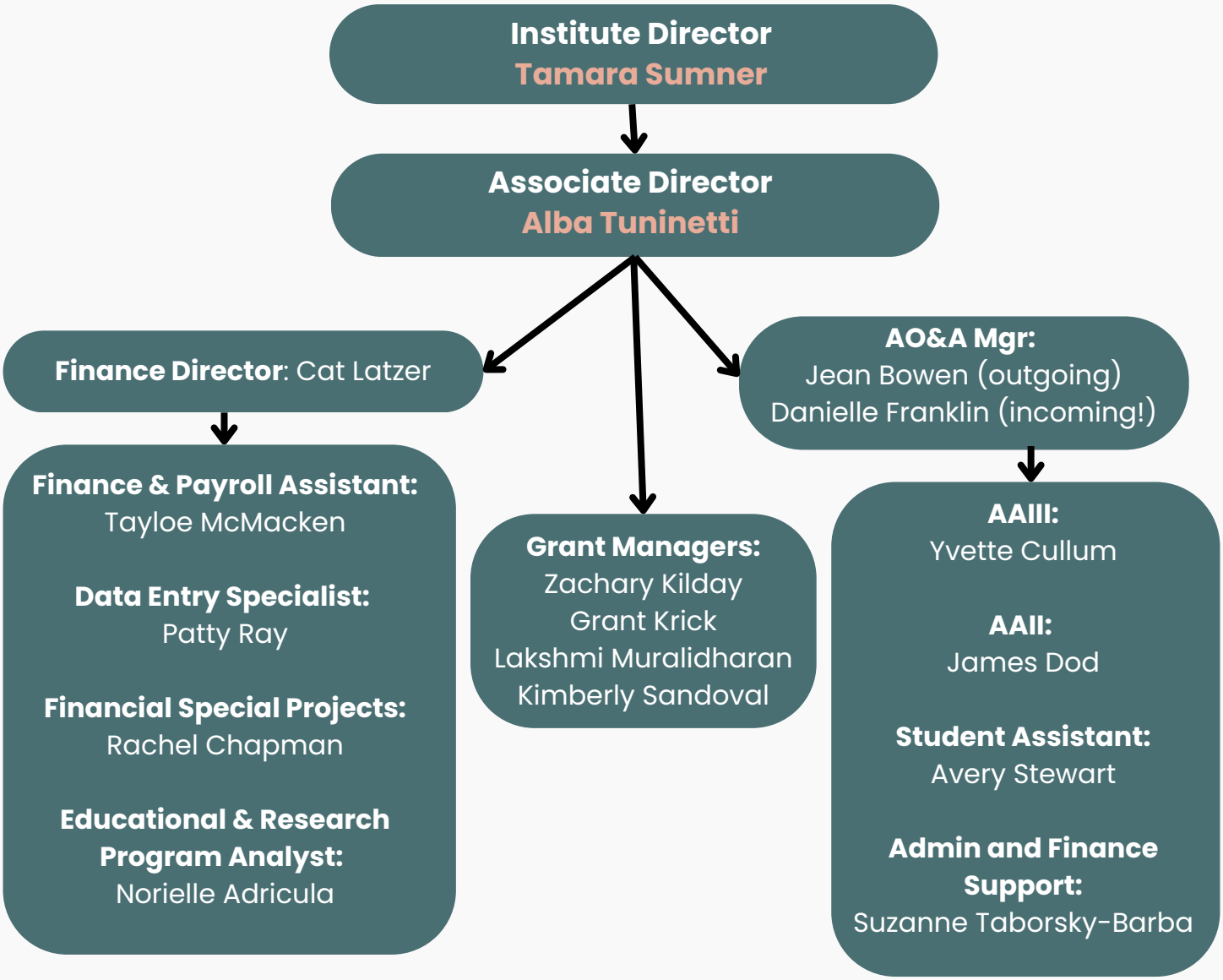
Zachary Kilday, Finance and Payroll Associate (moving to Grant Manager!)
***Tayloe McMacken**, Finance & Payroll Assistant
***Patty Ray,** Data Entry Specialist

Part-Time Support

***Norielle Adricula**, Educational and Research Program Analyst
Rachel Chapman, Financial Special Projects
***Suzanne Taborsky-Barba**, Admin and Finance Support

*Joined us less than a year ago

Administration and Staff Organizational Chart



Introducing the HUBBS Lab

Theodora Chaspari, Associate Professor, ICS and Department of Computer Science - Office Location: CINC 182

She is the Principal Investigator of the Human Bio-Behavioral Signals (HUBBS) Lab, a computational research lab that also performs studies involving human participants. It comprises a diverse team of graduate and undergraduate researchers, including computer scientists, data scientists, and domain experts from health sciences, social sciences, and learning sciences, working in a collaborative environment with access to shared resources and tools that support their interdisciplinary research efforts. The goal of the HUBBS Lab is to make fundamental algorithmic contributions to human-centered machine intelligence (ML) and to promote scientific advancement in trustworthy artificial intelligence (AI). Researchers at the HUBBS Lab focus on pressing challenges related to trustworthy and responsible AI, including privacy-preservation, explainability, fairness, and AI-supported decision-making.

Seeking Research Posters to Display!

Do you have a current research poster you would like displayed at Muenzinger or CINC? We are updating the posters in our hallways to reflect the latest ICS research!

If interested, please stop by the ICS Office or email:
Jean Bowen: Jean.Bowen@colorado. edu
Danielle Franklin: Danielle.Franklin-1@colorado.edu

Research in the Spotlight

Faculty

Sidney D'Mello; **ICS, Computer Science, Psychology and Neuroscience**

- *Daily Camera* Article, "AI in admissions: CU Boulder study creates tool to read college essays"
- *Chalkbeat* Article, "How researchers see AI helping university admissions officers comb through college essays"
- *Coloradan Alumni Magazine* Article, "A New Way of Learning in the Classroom"

Peter Foltz; **ICS**

- The *Dallas Morning News* Article Titled, "Computers scoring Texas students' STAAR essay answers, state officials say"
- *Scripps News* in Segment Titled, "TOP TECH STORIES FOR 2023: A.I. DOMINATES INDUSTRY AS GROWTH CONTINUES TO IMPRESS"
- *Time Magazine* Article, "Can AI Chatbots Ever Replace Human Therapists?"

Cinnamon Bidwell; ICS and Psychology and Neuroscience

- *Daily Camera* Article, "CU Boulder study says CBD can quell anxiety"
- *CU Boulder Today*'s Article, "CBD shown to ease anxiety without the risks that can come with THC"
- *The Mirage* Article, "NIST Tests New Method to Detect Cannabis in Breath"

Bill Penuel; ICS Distinguished Professor and School of Education

- *CPR News* Article About How Open-Source Science Curriculum Has Students Learning Through Real-World Situations and Puzzles
- *CU Boulder Today* Article, "Student curiosity drives new open-source science curricula"

Theodora Chaspari; ICS and Computer Science

- NASA Website Article, "NASA Funds Studies to Support Crew Performance on Long-Duration Missions"
- *CU Boulder Today* Article, "AI for mental health screening may carry biases based on gender, race"

Tamara Sumner; ICS Director and Computer Science

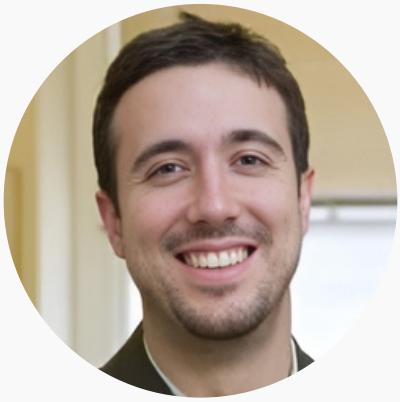
- Talks AI and Its Role in Schools in *The Economist* Article, "Will artifical intelligence transform school?"

Leanne Hirshfield; ICS

Leanne, a Member of Katya Arquilla's Team, was Featured in NASA Website Article, "NASA Funds Studies to Support Crew Performance on Long-Duration Missions"

Jennifer Jacobs; ICS

- *EdSurge* Article, "Will Teachers Listen to Feedback From AI? Researchers Are Betting on It"



Tor Wager; **ICS Faculty Alum**

- *AARP* Article, "Your Best Bet for Managing Chronic Pain May Be a Well-Coordinated Strategy"

Fellows

Alaa Ahmed; Mechanical Engineering

- *Medical News Today* Article, "Why do people move slower as they get older?"
- *PLOS Computational Biology* Article, "Disentangling the effects of metabolic cost and accuracy on movement speed"
- *Yahoo Lifestyle Canada* Article, "What are the best exercises for seniors? 5 simple workouts from chair exercises, balance training, stretching and more to lead a healthy life"

Angela Bryan; Psychology and Neuroscience

- *Science Friday*'s Podcast Episode, "Using A Lab On Wheels To Study Weed From Dispensaries"
- *Science Friday* Article, "Federal Law Makes Weed Research Complicated. Can A Van Help?"
- *CU Boulder Today*'s Article, "Study: Cannabis can make workouts more fun, but it's no performance enhancer"

June Gruber; Psychology and Neuroscience

- Met remotely with White House Office of Science and Technology to provide feedback on the government's current policy on sexual harassment.

- *Colorado Arts and Sciences Magazine* Article "Studying the best of humanity, even our darkest parts" highlighting Gruber's podcast interview on "The Ampersand"

Stephen Voida; Information Science

- *WAFB 9* Segment, "YOUR HEALTH: Building a smarter bionic pancreas for Type 1 diabetes"

- *News4JAX* Segment, "Building a smarter bionic pancreas for type 1 diabetes"

- *WNDU 16 News Now* Article, "Medical Moment: Monitoring glucose levels using a bionic pancreas"

Iskra Fileva; Philosophy

- "The Shadow Self: When the private becomes hidden" in *Psychology Today*

- "Is it hubris to think we matter?" in *Colorado Arts and Sciences Magazine*

Leaf Van Boven; Department Chair, Psychology and Neuroscience

- *The Current* Article, "Leveraging Social Psychology to Overcome Barriers to Climate Action"

- *Colorado Arts and Sciences Magazine* Article, "You're (very likely) not going to win, so why play?"

Robin Burke; Information Science

- CU Boulder's College of Media, Communication and Information Article, "Is it Times for limits on A.I. and the news?"

Philip Fernbach; Leeds School of Business

- *Oregon News* Article, "New UO study shows marketing a brand's simplicity can backfire"

Zack Kilpatrick; Chair, Graduate Program; Applied Mathematics

- *CU Boulder Today* Article, "Those with the biggest biases choose first, according to new math study"

Michael Klymkowsky; MCD Biology

- *Colorado Arts and Sciences Magazine* Article, "Scientists help students vanquish research-experience Catch-22"

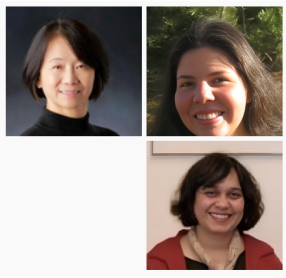
Ellen Do; Director, ATLAS Partnerships & Innovation

- CU Boulder's The ATLAS Institute Article, "Public-private partnership drives attention for ATLAS research in augmented and mixed reality"

Christine Brennan; SLHS

- CU Boulder's Office for Public and Community-Engaged Scholarship Lists Brennan 4th Outreach Award for ongoing project, Empowering Economically Disadvantaged Adolescents with Complex Communication Needs

ICS Fellow & Faculty Awards



ICS Fellows: Pui Fong Kan, SLHS; Eliana Colunga, Psychology and Neuroscience; and Bhuvana Narasimhan, Linguistics, received a Social Science Divisional Grant! Congratulations!

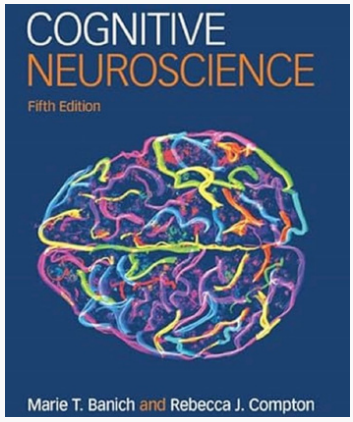
ICS Fellow Angela Bryan, Psychology and Neuroscience, won the 2024 Hazel Barnes Prize! This prize is the largest and most prestigious single faculty award funded by CU Boulder. It was established to recognize "the enriching interrelationship between teaching and research." Congratulations!

ICS Fellows: Naomi Friedman; Psychology & Neuroscience; Katharina Kann, Computer Science; Zachary Kilpatrick, Applied Mathematics; and Julia Staffel, Philosophy, recognized by CU Boulder's Graduate School as ICS Outstanding Mentors! Congratulations!

ICS Fellow Martha Palmer, Computer Science and Linguistics, Martha Palmer was presented with the Association for Computational Linguistics' (ACL) 2023 Lifetime Achievement award for her contributions to the field over the past 50 years! Palmer was previously president of the ACL in 2005 and was recognized as an ACL fellow in 2014. Her focus has been on natural language processing and understanding, often called NLP. Congratulations!

ICS Distinguished Professor, School of Education, received a 2022 AERA Outstanding Reviewer Award! Limited in the number of selections, AERA journal editors named 60 scholars as outstanding reviewers for 2022, honoring individuals who rendered outstanding professional service to the journals, to AERA, and to education research. Each year, the editor(s) of AERA's six serial journals may designate up to 10 individuals who have performed numerous remarkable reviews for the journal. Congratulations!

Titles From ICS Members



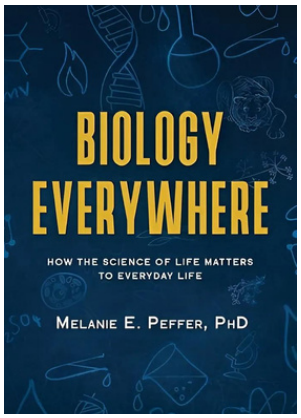
Cognitive Neuroscience, 5th edition

Distinguished Professor Marie Banich
ICS and Psychology and Neuroscience

Now in its fifth edition, this accessible and comprehensive text highlights the most important theoretical, conceptual and methodological issues in cognitive neuroscience. Written by two experienced researchers who excel at teaching, the consistent narrative ensures that concepts are linked across chapters, and

the careful selection of topics enables readers to grasp the big picture without getting distracted by details. Clinical applications such as developmental disorders, brain injuries and dementias are highlighted. In addition, the analogies and examples, opening case studies, and 'In Focus' boxes both engage and demonstrate the relevance of the material to real-world concerns. Revised for even greater clarity, the fifth edition features new and updated artwork, 'Key Questions' to review concepts, and 'Thought Questions' which develop the critical thinking skills needed to evaluate future developments in this fast-moving field. An expanded set of online resources is also available.

Cognitive Neuroscience 5th Edition. (n.d). Amazon.com. Retrieved September 5, 2024, from **https://www.amazon.com/Cognitive-Neuroscience-Marie-T-Banich/dp/110892638X**



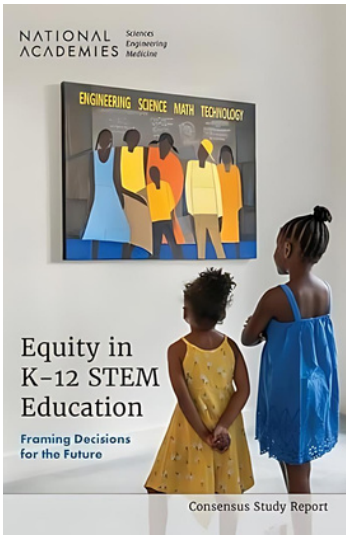
BIOLOGY EVERYWHERE: HOW THE SCIENCE OF LIFE MATTERS TO EVERYDAY LIFE

Melanie E. Peffer, Research Scientist Level II

ICS

This book is intended to bridge the gap between traditional biology classes and the practical biology knowledge needed in the real world. In each chapter, a different biological concept is examined and related to some real-world issue or experience in an effort to demonstrate why the science of life matters to your everyday experience.This book is intended to bridge the gap between traditional biology classes and the practical biology knowledge needed in the real world. In each chapter, a different biological concept is examined and related to some real-world issue or experience in an effort to demonstrate why the science of life matters to your everyday experience. This book is specifically designed either for those who already love biology and biology education, or for those who have had prior poor experiences with biology learning and are willing to give it another try. Where have you experienced biology today? Dive in and take a look. What you find may surprise you!

WHERE HAVE YOU EXPERIENCED BIOLOGY TODAY? (n.d.). BIOLOGY EVERYWHERE. Retrieved September 5, 2024, from 5, 2024, from **www.biologyeverywhere.com/**



Equity in K-12 STEM Education: Framing Decisions for the Future

Distinguished Professor Bill Penuel
ICS and Education

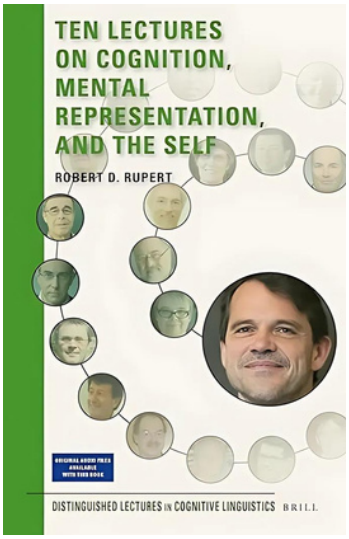
Prof. Penuel was a member of the committee that developed this consensus study report.

Science, technology, engineering, and mathematics (STEM) live in the American imagination as promising tools for solving pressing global challenges and enhancing quality of life.

Despite the importance of the STEM disciplines in the landscape of U.S. political, economic, and social priorities, STEM learning opportunities are unevenly distributed, and the experiences an individual has in STEM education are likely to vary tremendously based on their race, ethnicity, socio-economic class, gender, and a myriad of other factors.

Equity in K-12 STEM Education: Framing Decisions for the Future approaches equity in STEM education not as a singular goal but as an ongoing process that requires intentional decision-making and action toward addressing and disrupting existing inequities and envisioning a more just future. Stakeholders at all levels of the education system - including state, district, and school leaders and classroom teachers - have roles as decision-makers who can advance equity. This consensus study report provides five equity frames as a guide to help decision-makers articulate short- and long-term goals for equity and make decisions about policy and practice.

Equity in K-12 STEM education: Framing Decisions for the Future. (n.d.). The National Academies Press. Retrieved September 5, 2024, from **nap.nationalacademies.org/catalog/26859/equity-in-k-12-stem-education-framing-decisions-for-the**



Ten Lectures on Cognition, Mental Representation, and the Self

Robert Rupert
ICS Fellow and Department Chair, Philosophy; Professor

These ten lectures articulate a distinctive vision of the structure and workings of the human mind, drawing from research on embodied cognition as well as from historically more entrenched approaches to the study of human thought. Ot explained by processes taking place in an autonomous mental arena – those in the conscious mind or occurring at the so -called personal level.

Rather, human behavior issues from a widely varied, though nevertheless integrated, collection of states and mechanisms, the integrated nature of which is determined by a form of clustering in the components' contributions to the production of intelligent behavior. This package of resources, the cognitive system, is the human self. Among its elements, the cognitive system includes a vast number of representations, many subsets of which share their content. On the author's view, redundancy of content itself constitutes an important explanatory quantity; the greater the extent of content-redundancy among representations that co-contribute to the production of an instance of behavior, the more fluid the behavior. In the course of developing and applying these views, the author addresses questions about the content of mental representations, extended cognition, the value of knowledge, and group minds.

Ten lectures on cognition, mental representation, and the self. (n.d.). Brill. Retrieved September 5, 2024, from **https://brill.com/display/title/61913?language=en**.

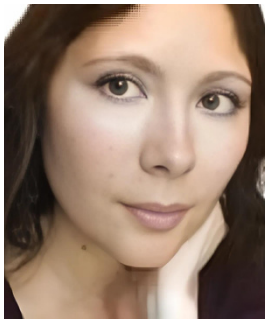
ICS Promotions & Re-appointments

CONGRATULATIONS!

Cinnamon Bidwell, Assistant Professor, promoted to Associate Professor

Jeff Bush, Research Scientist II, promoted to Assistant Research Professor

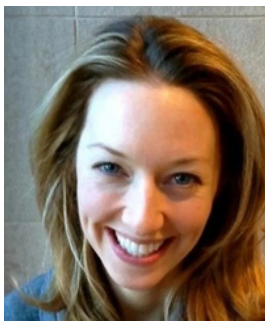
Marta Čeko re-appointed to her position as Assistant Research Professor



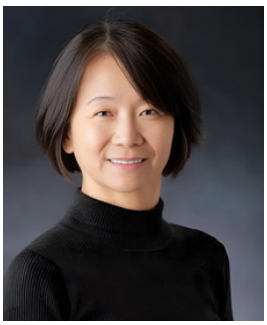
Iskra Fileva , ICS Fellow, promoted to Associate Professor in the Department of Philosophy

Rafael Frongillo , ICS Fellow, promoted to Associate Professor in the Department of Computer Science

Kate Henson, Research Scientist Level II, promoted to Program Director Level III (Director of K-12 STEM teaching and learning at inquiryHub)



Rosi Kaiser, ICS Fellow, promoted to Associate Professor in the Department of Psychology and Neuroscience



Pui Fong Kan, ICS Fellow, promoted to full Professor and Chair in the Department of Speech, Language, and Hearing Sciences

Mon-Lin (Monica) Ko, Research Scientist II, promoted to Assistant Research Professor

Alexis Palmer, ICS Fellow, promoted to Associate Professor in the Department of Linguistics

Julia Staffel, ICS Fellow, promoted to Associate Professor in the Department of Philosophy

Stephen Voida, ICS Fellow, promoted to Associate Professor in the Departments of Computer Science and Information Science and ATLAS

Sarel van Vuuren re-appointed to his position as Associate Research Professor

ICS Retirements

Mike Moser - Farewell to ICS Professor Moser, Faculty Member of ICS from 1987 to 2024

A message from Mike: I joined Google Brain in 2018, which was assimilated into the DeepMind collective last year. I sit in the fancy and sparsely occupied new showpiece research building in Mountain View, behind a glass wall, on display as the second oldest living specimen of a neural network researcher.

The oldest is Jay McClelland who sits next to me. Also sitting with us is Katherine Hermann, who was a student in Rob Rupert and my cognitive science course a long time ago. (There are many other CU-affiliated folks nearby. Clayton Lewis's son Owen is in the building, and we were lucky to have Matt Jones visiting us for a year.) We have a solid cogsci group, so if you're in the area and have something interesting to say about foundational models, stop by. Regardless, come by for lunch on Google. My CU email still works but am not a fan of the outlook mail server, so use mcmozer@gmail.com.

Jean Bowen - Retiring in January as ICS Administration, Organization, and Academic Manager

Jean Bowen has been with ICS for over 20 years. In that time, she has truly become the 'face' of the Institute. Through countless changes and upheavals, Jean has been a guiding and friendly face to all of the ICS membership. Her 'we-can-fix-anything' attitude has truly driven ICS research and management forward, especially during times of exceptional growth and change.

In her retirement, apart from enjoying time with family and loved ones (and missing us!), Jean plans to continue using her organizational acumen and culinary background to volunteer with No Kid Hungry, a non-profit dedicated to ending child hunger in the US. We wish Jean all the best and hope to see her around campus and ICS in the future!

*A message from Jean***:** *I feel so privileged to have worked at ICS. It's tough to leave this interesting and thriving organization. I've enjoyed working with each of you as we worked to support the study of cognitive science. I'm sure you'll all support Danielle Franklin as she takes on this role. I'll be leaving this position at the end of the year.*

ICS Centers' Updates

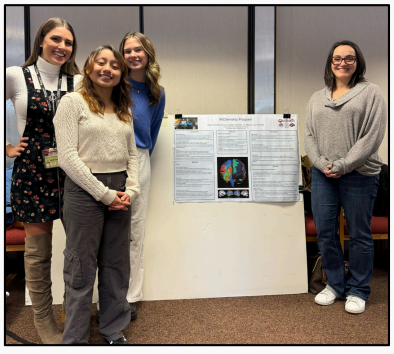
INC (Intermountain Neuroimaging Consortium)

We have helped several new studies start up at our facility in recent months and we are excited to begin working on data collection with both new and existing research teams. Thanks to Dr. Marta Ceko and Dr. Leanne Hirshfield, we successfully installed and have begun piloting a state-of-the-art NIRx Borealis functional near-infrared spectroscopy (fNIRS) system for taking concurrent fNIRS and functional magnetic resonance imaging (fMRI) measurements at our scanner. We are one of only a few installations of this equipment in the world. One of our partnerships with an industry client also expanded this year, when they chose our facility as a national training site for their clients.

In the past year, our Data and Analysis team at INC successfully transitioned all neuroimaging studies to a F-A-I-R compliant data management platform, Flywheel.io, meeting NIH's new data sharing and management standards. This transition enabled us to support data storage and data analysis needs for 17 active projects (600 data collection sessions),10 publications, and 3 awarded grant proposals in the past year. INC staff have also worked to acquire additional funding sources to offset the cost of this new platform for research teams, including a grant from the Research and Innovation Office last year. Our staff continues to work closely with both CU's Research Computing and Flywheel.io to improve the user experience.

Since 2023, we have implemented several significant updates to our INCternship program. These include the introduction of a Data and Analysis rotation and various internal improvements to accommodate our expanding cohort. We are pleased to welcome six new INCterns for the 2024-2025 academic year: Kimberly Vargas, Philippa Zolla, Estrella Ordaz Portillo, Franco Devecchi, Marissa Khan, and Katie Li, who join our continuing INCterns to form the largest group of INCterns we have supported concurrently. Lastly, we bid a heartfelt farewell to our graduating seniors: Gabby Kraemer, Alexa Gonzalez, and Adriona Salgado. While we are sad to see them go, we eagerly anticipate their bright futures.

INC's Senior Send-Off! The INC staff recognized Gabby Kraemer, Adriona Salgado, and Alexa Munoz Gonzalez for their years of hard work and dedication!



INC Director of Operations Nicole Speer presenting an INCternship Program Poster at an ICS Poster Session with her team!

CRT (Center for Research on Training)

Current research in the CRT is focused on machine learning, including algorithms for neural network optimization and methods to give them more human-like inductive biases. Some papers from the past year:

- Jones, M., Chang, P. G., Murphy, K. P. (2024). Bayesian online natural gradient. Advances in Neural Information Processing (NeurIPS24), arXiv:2405.19681
- Yang, Y., Jones, M., Mozer, M. C., Ren, M. (2024). Reawakening knowledge: Anticipatory recovery from catastrophic interference via structured training. Advances in Neural Information Processing (NeurIPS24), arXiv:2403.09613
- Durán-Martín, G., Altamirano, M., Shestopaloff, A., Sánchez-Betancourt, L., Knoblauch, J., Jones, M., Briol, F-X., Murphy, K. P. (2024). Outlier-robust Kalman filtering through generalised Bayes. International Conference on Machine Learning (ICML24). arXiv:2405.05646
- Jones, M., Scott, T. R., & Mozer, M. C. (2024). Human-like Learning in Temporally Structured Environments. Proceedings of the AAAI Symposium Series 3 (1), 553-553
- Warmuth, M., Kotłowski, W., Jones, M., & Amid, E. Noise misleads rotation invariant algorithms on sparse targets. arXiv:2403.02697
- Shaier, S., Pereira, F., von der Wense, K., Hunter, L., & Jones, M. (under review). More Experts Than Galaxies: Conditionally-Overlapping Experts with Biologically-Inspired Fixed Routing.

We also continue to apply computational models of learning to psychiatric disorders. Some papers in this area over the past year:

- Cheng, Z., Moser, A. D., Jones, M., & Kaiser, R. H. (2024). Reinforcement learning and working memory in mood disorders: A computational analysis in a developmental transdiagnostic sample. Journal of Affective Disorders, 344, 423-431.
- Haller, S. P., Stoddard, J. S., Cardenas, S. I., Dombek, K., MacGillivray, C., Zapp, C., Bui, H., Stavish, C. M., Kircanski, K., Jones, M., & Brotman, M. A. (2024). Differentiating neural sensitivity and bias during face-emotion processing in youth: A computational approach. Social Cognitive and Affective Neuroscience, 19, nsae034.
- Stoddard, J., Haller, S. P., Costa, V., Brotman, M. A., & Jones, M. (2023). A computational model reveals learning dynamics during interpretation bias training with clinical applications. Biological Psychiatry: Cognitive Neuroscience and Neuroimaging, 8, 1033-1040.

CUChange (Center for Health & Science, Genes & Environment)

CUChange launched the Spanish translation of our Myths vs. Facts webpage, a public outreach campaign to educate the public about common cannabis-related myths. Elicia Azua and the rest of our DEI team spearheaded the translation and publication. Check it out here!

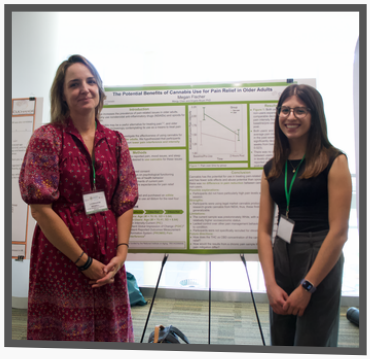
Grad Student Samantha Natal was awarded a supplemental award to support three years of her graduate training on the LOTUS project. Grad student Luiza Rosa was awarded an Emerging Scientist Award from the Institute of Cannabis Research.

Postdoc Carillon Skrzynski was awarded a 5-year mentored research training grant (K01) from NIH and promoted to Assistant Research Professor.

PRAs Austin Drake and Elicia Azua were both accepted into master's programs.

Co-Director Angela Bryan won the Hazel Barnes Prize, awarded each year to a CU Boulder faculty member who most consistently demonstrated a strong, enriching relationship between their teaching and research, and whose work has had a significant impact on students, faculty, colleagues, and the University.

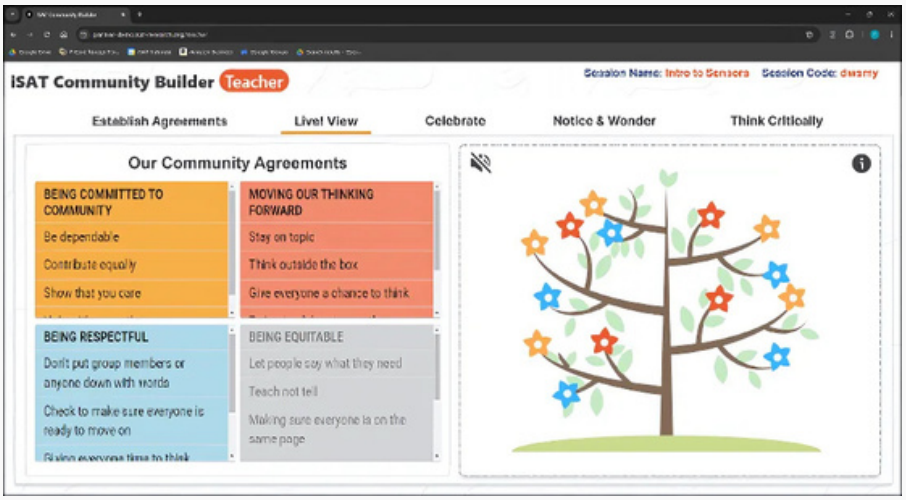
Finished and closed out two projects and published numerous research papers with the data. Check out our publications on our website:
https://www.colorado.edu/center/cuchange/research/research-findings



iSAT (NSF National AI Institute for Student-AI Teaming)

Now entering its fifth year, the Institute for Student-AI Teaming is on a mission to develop the theories and know-how for next-generation collaborative learning environments powered by AI technologies, grow a diverse workforce of future AI researchers and practitioners, and serve as a national nexus point for empowering diverse stakeholders—researchers, K-12 educators, community members, and industry affiliates—to envision and work towards a future where AI technologies are viewed as a social, collaborative partners that help students and teachers make learning more effective, engaging, and equitable.

During the 2024-2025 fiscal year, iSAT research teams made significant advances in the development and refinement of two AI technologies—the Community Builder AI Partner (CoBi) and the Jigsaw Interactive Agent (JIA)—and their adoption into three collaborative learning curricula, two of which having only been created this past year (Self-Driving Cars and Moderation Unit). CoBi scaffolds student groups to define "community agreements" or norms of behavior (e.g., being equitable, respectful, moving thinking forward) during classroom collaborations in coordination with the teacher. CoBi identifies examples of these agreements based on fully automated analysis of small group collaborative discourse. It aggregates measurements across student groups (to preserve privacy) and uses innovative visualizations to facilitate teachers and students' reflection and sense-making about their adherence to their agreements. Over the past year, the team focused on enhancing CoBi by incorporating advances in child automatic speech recognition (ASR), discourse classification to improve robustness to ASR errors, algorithms for selecting noticings, and creative visualizations, all supported by iSAT's mature technical architecture. We designed quasi-experimental field trials in middle-school classrooms and an experimental study in the iSAT lab to evaluate the extent to which CoBi promotes collaboration skills and whether it is associated with enhanced learning gains. Preliminary findings indicate positive associations of growth in students' collaborative problem-solving skills with multiple uses of CoBi, providing important preliminary evidence to warrant more efficacy testing of CoBi.



Elements of the CoBi interface, including the color-coded agreement categories and the tree version of the visualization.

JIA is a student-facing interactive AI partner web application designed to scaffold knowledge sharing discussions and improve engagement and social cohesion. It is built as a web interface with a text-based chatbot to support student discussions and brainstorming for project planning.

Visual of JIA interface with text-based chatbot.

JIA's discourse policy detects stages of collaboration pertaining to who is talking, how much, if it is on/off topic, and whether students exhibit collaborative problem-solving skills. Additionally, over the past year our team has added new natural language processing (NLP) features including Concept-Spotting, Abstract Meaning Representations, Dependency Dialogue Acts, and LLM-based Response Generation. We have been testing the JIA architecture, UI, and Discourse Policy in lab studies, and we are ready to test a pilot version in middle school classrooms.

Alongside our AI partner development, we developed a generalized collaborative problem-solving model (GCM) and framework through the theoretical lens of team cognition (i.e., how people decide, plan, think, and act interdependently in real time toward a shared goal). We posit that interactive states are a focal point of collaborative learning because they simultaneously point in two directions: toward student perceptions of collaboration and toward its assessment by third party observers (e.g., researchers, educators). Where traditional team cognition metrics are limited to aggregation across individual knowledge states to approximate the team level, the dynamical nature of our framework localizes team cognition in real-time interactions that index variety and creativity in student problem-solving processes. Further, our metrics are designed to harness the multimodal nature of collaborative learning by combining communicative, eye gaze, and (in the future) gestures. We have shown that one of our key team cognition measures—communicative influence—predicts CPS task success, retrospective ratings of collaboration, and communication style and content, thus highlighting the potential for this measure to be embedded in AI Partners to help the teacher to facilitate equitable student interactions in classrooms.

iHUB (inquiryHub)

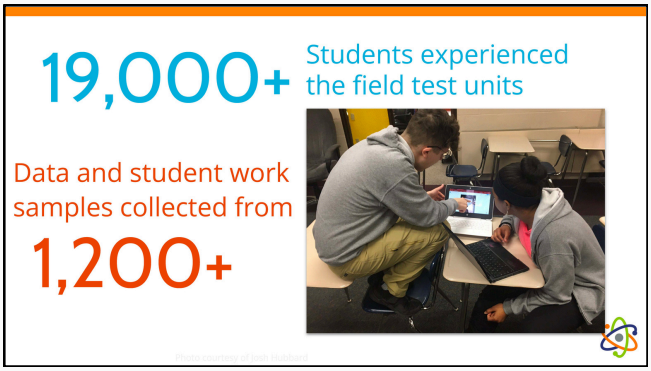
The inquiryHub team has been busy this year! We completed the development of our three course high school science program with OpenSciEd, all of which earned the highest ratings in external review by a group at WestEd, the NGSS Design Badge. The program anchors units and real-world phenomena and supports equitable participation though prioritizing on students interests and community priorities.

We also had an Open Access paper published about our strategies for developing materials that both align to standards and connect to students' interests, experiences and identities:

- Penuel, W. R., Henson, K., Bracey, Z. B., Vlck, N., & Rivet, A. E. (2024). Strategies for designing standards-aligned instructional materials that connect to students' interests and community priorities. The Science Teacher, 91(5), 62-70. Full article text here!

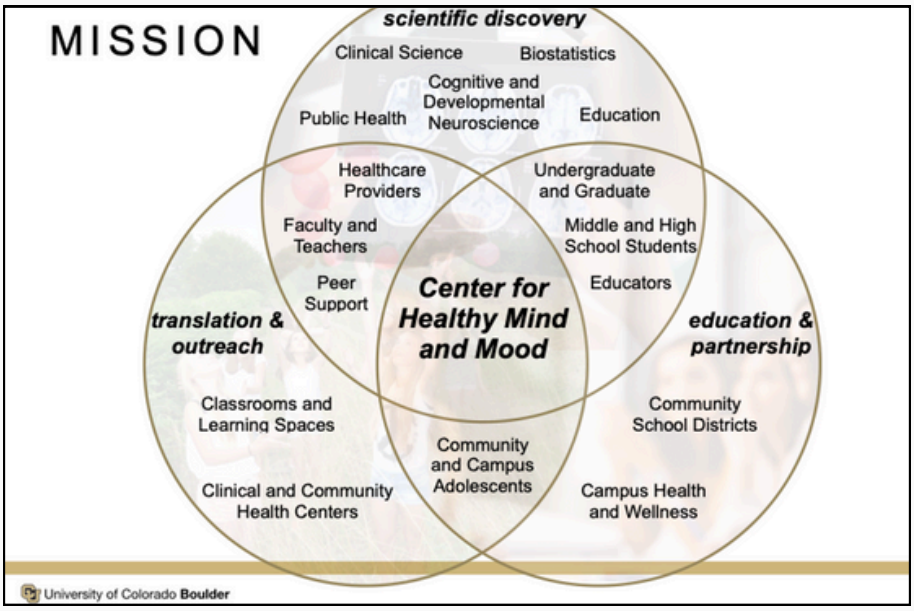
Recently minted Dr. Melissa Campanella has joined our assessment team and is focusing on supporting school systems with assessment development, designing and leading professional development, and curating, adapting, and developing model assessments for use in teacher learning sessions. She is especially interested in how to embed justice dimensions into assessments and select phenomena that prioritize the interests and priorities of students who are owed an education debt.

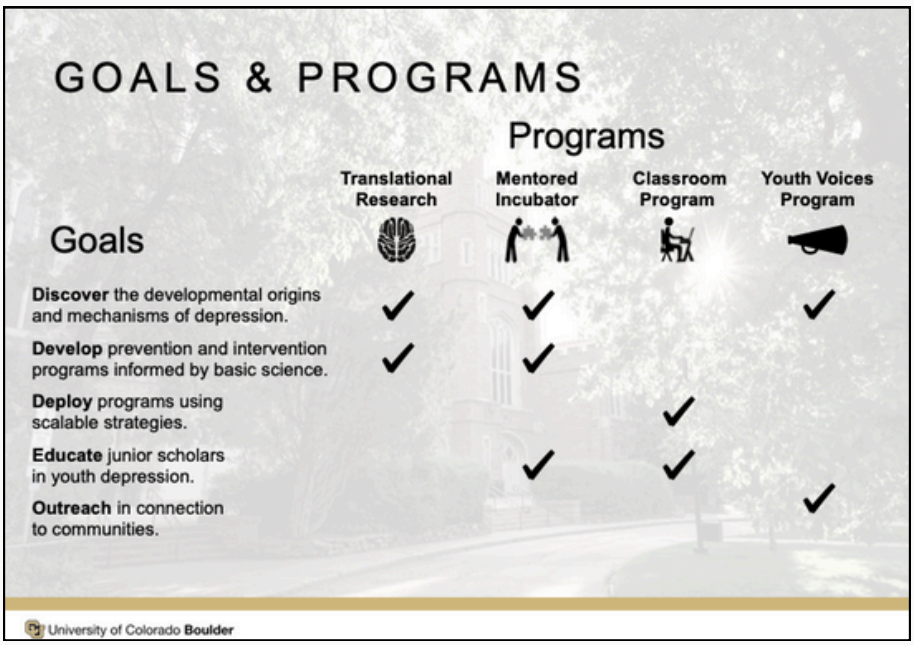
We have also received two CS for All NSF grants this year. One entitled Creating Young Innovators in partnership with Aurora Public Schools and Colorado School of Mines will focus on developing high quality co-designed units for elementary students in Colorado's most diverse district. PI Greg Benedis-Grab will be leading two summers of co-design with Alex Chakarov (former lab member) now at Mines. Co-PIs Tammy Sumner and Bill Penuel will be advising on this important new Research Practice Partnership.



New Center Incoming!

The **Center for Healthy Mind and Mood** is pioneering a transformative approach that shifts the paradigm of depression science to foster healthy mood in young people. The Center will launch in Spring 2025 and focuses on the transdisciplinary discovery of the nature, prevention and treatment of youth depression, achieved by a team of diverse scientists, students, educators, campus leaders, and community stakeholders working together to produce integrative research with significant public health impact. Our three initiatives focus on (1) scientific discovery, (2) research translation to practice, and (3) education & outreach. The Center is led by Dr. Roselinde Kaiser, a clinical psychologist, neuroscientist, and national leader in the field of mood disorders and mental health. If you are interested in joining our listserv or partnering with Center initiatives, please reach out to alicia.sepulveda@colorado.edu.





ICS Operations Update

Associate Director Alba Tuninetti

We have had quite the operational year(s) since our last newsletter!

On the **AO&A** side, we have welcomed two administrative assistants in the past years: **Yvette Cullum** and **James Dods**! We're thoroughly enjoying getting to know them on our team; please stop by to say hi whenever you're at CINC or MUEN! You may also see our new student assistant, **Avery Stewart**, at one of our locations - welcome, Avery! And this team is greatly supported by our part-time support, **Suzanne Taborsky-Barba**, who works behind the scenes to help support both our AO&A and Finance teams!

On the **Finance** team side, we welcomed **Grant Krick** and **Kim Sandoval** last year as two of our new grant managers and **Zach Kilday** has started to train to become our fourth grant manager! We also celebrated as **Lakshmi Muralidharan** was promoted to Senior Grant Manager on our team after many splendid years with us. We have also welcomed **Patty Ray** as our new Data Entry Specialist as Hayley Bender departed to continue growing her career at OCG, and **Tayloe McMacken** is our new Payroll & Finance Assistant to take on Zach's role. And, of course, we wouldn't be able to do all we do without our dedicated part-time support behind the scenes: thank you to **Norielle Adricula** and **Rachel Chapman** for their tireless work in making sure we run smoothly. Finally, a well-deserved (and probably overdue!) promotion for **Cat Latzer** took place recently, who is now officially our ICS Finance Director! Congratulations, Cat!

Finally, the biggest news is **Jean Bowen**'s upcoming retirement - while we are excited for her to have a VERY well-deserved retirement, we will greatly miss Jean. We are happy to welcome **Danielle Franklin** to our team, where she will overlap with Jean to take on Jean's role of ICS Operations Manager.

We're thrilled to have such dedicated teams with us and look forward to another dynamic and vibrant year with you at ICS!

The ICS staff enjoying a summer afternoon at Top Golf!

On a personal note from me, a VERY special thank you to Yvette Cullum, without whom this newsletter would not have come together. THANK YOU YVETTE!!

ICS Website: Forms' Update

MAKE SURE TO CHECK OUT THE UPDATED FORMS ON THE WEBSITE: ALL MEMBERS CAN ACCESS P-CARD RECEIPTS AND ICS TRAVEL REQUEST FORMS THROUGH THE FORMS SECTION OF THE WEBSITE.

QUESTIONS ABOUT THE FORMS CAN BE DIRECTED TO YOUR PORTFOLIO MANAGER.

ICS Colloquia Update

Please join us in person or over Zoom to hear from visiting researchers and our own! Snacks are provided!

- **Find our current colloquia schedule here and on the left side of the homepage on the ICS website.**
- **Past colloquia recordings are archived for your viewing here on the ICS website.**

Zoom: https://cuboulder.zoom.us/j/97257445365
Meeting ID: 972 5744 5365

ICS DEI Efforts

ICS is part of the new Inter-Institute DEI (I-IDEI) group spearheaded by RIO's new Director of DEI. Across all institutes, we are working to have concrete and tangible frameworks to address DEI issues, support DEI efforts, and celebrate DEI victories. Please keep an eye out over the next year for more information and events.

Be sure to bookmark RIO's Diversity landing page. It features a campus-wide calendar of events for diversity, inclusion, and equity activities.

Alumni Spotlight

Emily Jensen, Assistant Professor
Summer 2024 Graduate; Combined PhD, Computer Science

Since July, I have been an Assistant Professor of Computer Science at Franklin & Marshall College, teaching introductory courses and developing a machine learning class.

I'm setting up my research group, learning about campus projects, and building a network of collaborators. My role focuses on guiding undergraduates in a liberal arts environment that values both technical skills and responsible knowledge application.

I'm excited to enhance F&M's cognitive science program by integrating computational perspectives. My research will combine Virtual Reality and gamification to create automated training systems.

I'm grateful for my time with ICS. Special thanks to my practicum class, Prof. Bill Penuel, and Tammy Sumner for their impact on my development as an interdisciplinary researcher.

Ali Raza, Assistant Professor
Spring 2023 Graduate; Combined PhD, Computer Science

I am an Assistant Professor of Computing at Grand Valley State University, teaching Software Engineering and Human-Computer Interaction this fall and developing an educational technology lab with students.

I am an Assistant Professor of Computing at Grand Valley State University, teaching Software Engineering and Human-Computer Interaction this fall and developing an educational technology lab with students. I'm excited to co-lead the creation of Human-Centered Design programs starting in fall 2025.

My future plans include rigorous research with students, fostering an inclusive community passionate about educational technology, and partnering with local educators to design new tools. I cherish my ICS memories, such as the insightful Sumner Lab meetings, Monday research sessions with Prof. Bill Penuel, and the impactful Tech & Young class with Prof. Mike Eisenberg. Passing Folsom/Arapahoe with my family is also memorable. Go Buffs!

Michael Hoefer, Assistant Professor
Summer 2024 Graduate; Combined PhD, Computer Science

As an Assistant Professor of Computer and Information Sciences at the University of St. Thomas, I'm teaching two courses this fall: an introductory Python programming class and a database design course, each with around 25 students. This smaller class size will give me the opportunity to connect with students on a more personal level. Alongside teaching, I'm focused on finalizing manuscripts based on my dissertation and applying for research grants. I'm also excited to collaborate with a Philosophy professor who has similar research interests. My wife and I are looking forward to settling into St. Paul and exploring the diverse offerings of Minnesota.

Some of my favorite memories are from my practicum course that helped me become a better researcher and make good friends! I also have fond memories of meeting Tammy and Ali in person after a semester of online meetings.

ICS Student Programs

Let friends and colleagues know about our programs at ICS!

We encourage all Undergraduate and Graduate students to APPLY if interested in the ICS certificate and degree program(s).

Step-by-step process is outlined in the online links:

- Graduate Programs
- Undergraduate Programs

All CU students are welcome to apply!

Please email if you have questions:
Email: ICSPrograms@colorado.edu

ICS New Graduates

Fall 2023

Interdisciplinary Graduate Certificate in Cognitive Science
Alyssa Strickler - Linguistics

Combined PhD
Abhidip Bhattacharyya - Computer Science
Skatje Myers - Computer Science

Spring 2024

Interdisciplinary Undergraduate Certificate in Cognitive Science
Nicholas Lanier - Information Science
Rain Michael - Psychology & Music
Koa Rashidi - Psychology & Neuroscience
Streck Salmon - Computer Science
Gavin Sparling - Psychology & Neuroscience
Jianzhen (Osborne) Weng - Psychology & Neuroscience
Braxton Wynne - Computer Science

Interdisciplinary Graduate Certificate in Cognitive Science
Anushri Kartik Narayan - Linguistics

HLT Certificate
Peyton Cameron - Linguistics
Jacob Allen Harrell - Linguistics
Anushri Kartik Narayan - Linguistics

Triple PhD
Torin Hopkins - Psychology & Neuroscience, ATLAS

Summer 2024

Combined PhD
Norielle Adricula - Linguistics
Michael Hoefer - Computer Science
Emily Jensen - Computer Science

CONGRATULATIONS,
GRADUATES!

ICS Student Awards and Special Mentions

Lydia Rader - ICS Graduate Student

- Winner of the 2024 Sean Hudson Leadership Award! This award recognizes a student who has made exemplary service and/or leadership contributions to the Psychology and Neuroscience Department, University of Colorado Boulder, or to the field.
- Won the 2024 Dosier/Muenzinger Award! This award recognizes outstanding contribution to translational research.
- Winner of the Rowe Award for best poster at 2023 BGA conference.
- Selected by the American Psychology Association to be the Biopsychology graduate student representative for the 2023-2025 term.

Raquel Yupanqui - Graduate Student in Computer Science and Professor Theodora Chaspari's Lab

- Raquel was awarded a 2024 NSF GRFP fellowship! This is a very competitive and highly sought-after fellowship at the graduate level.

Michael Schneider - ICS Graduate Student

- Michael was awarded the 2023 Ralph J. Slutz Student Excellence Award in Computer Science. This award annually recognizes students in Computer Science who have established a record of academic excellence and/or technical research and innovation.

ICS Student Research and Travel Awards

Research

Kathryn Conger
Summer 2024, SLHS
Research Awards: $800 to fund her dissertation research on *Decomposing Idiomaticity: An Evaluation of Characteristics That Define the Mental Category 'Idiom' and Their Impact on Perceived Idiomaticity*.

Michael Hoefer
Spring 2024, CS
Research Award: $800 to fund his dissertation research on *Lifestyle Recommender Systems: AI-Augmented Reflection on Time Use and Values*.

Travel

Emily Doherty
Fall 2023, CS
Travel Award: $700 to present her paper on *Using Speech Patterns to Model the Dimensions of Teamness in Human-Agent Teams* at the International Conference on Multimodal Interaction.

Torin Hopkins
Fall 2023, ATLAS
Research Awards: $700 to demonstrate and present his poster and paper on *Networking AI-Driven Virtual Musicians in Extended Reality, Spatially Sharing Selves, Effects of Field of View on Musical Collaboration* at the IEEE International Symposium on Mixed and Augmented Reality (ISMAR).

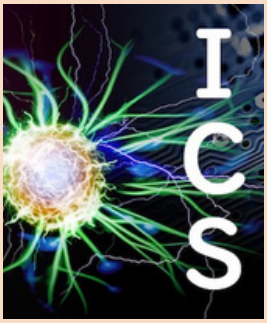
Chelsea Brown
Summer 2024, PSYC
Travel Award: $1000 to present her paper on *Co-Designing an AI Tool to Support Discourse Based Math Instruction in a High-Dosage Tutoring Context* at the following conference: International Society of the Learning Sciences: Computer Supported Collaborative Learning track.

Tyler Grimes
Spring 2024, Critical Media Practices
Travel Award: $1000 to present his paper *Mediated Mentation: Mindfulness in Immersivity* at the Politics of Machines: Lifelikeness & Beyond Conference.

Min-Chun (Allen) Hsiao
Summer 2024, LING
Travel Award: $1000 to present his paper on *Anchor Verb Theory at work: A distributional semantics approach to the V+NP+PP[into] pattern* at the CLANA1 Inaugural Conference.

Sophia Mehizadeh
Summer 2024, ATLAS
Travel Award: $1000 to present her paper on *Emotional Music Modulates Episodic Memory During Recollection and Induces False Traces* at the Music Perception and Cognition Conference.

Andrew Mertens
Summer 2024, PSYC
Travel Award: $1000 to present his paper on *Labels aid in the more difficult of two category learning tasks: Implications for the relative diagnosticity of perceptual dimensions in selective attention tasks* at the Annual Meeting of the Cognitive Science Society Conference.



Jennifer Weber
Summer 2024, PSYC
Travel Award: $1000 to present her poster on *Evaluating LLMs as Tools to Support Early Vocabulary Learning* and her paper on *How Should We Represent Bilingual Vocabulary Knowledge?* at the Annual Meeting of the Cognitive Science Society Conference.

Lydia Rader
Spring 2024, PSYC
Travel Award: $675 to present her paper *Knowing Neurons: a nonprofit organization dedicated to neuroscience communication and outreach* at the National Science Policy Symposium.

Summer 2024
Travel Award: $1000 to present her paper on Do chronic pain polygenic scores derived in older adults in the U.K. biobank (UKB) predict adolescent pain reports in the Adolescent Brain at the Behavior Genetics Association Annual Conference.