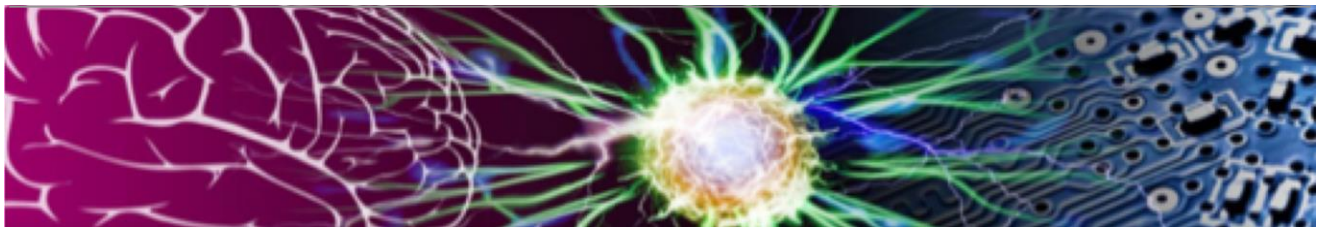
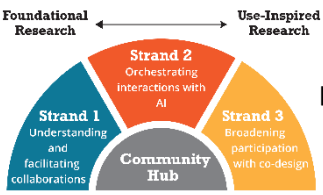
INSTITUTE OF COGNITIVE SCIENCE

Newsletter | Fall Edition | 2020



ICS to House NSF National Institute for Student-AI Teaming



Exploration and development of the role that artificial intelligence (AI) may play in the future of education and workforce development is a priority to NSF and the nation. ICS will lead a team of nine universities as one of seven AI Institutes and will aim "to reimagine the role of AI in education from one-on-one student-technology interactions and personalized learning to facilitating collaborations. In our case, that means students, AI and teachers working together. Collaboration in the classroom improves learning effectiveness, yet teachers are challenged to facilitate all of the student interactions in the classroom. The research team will focus on how AI "partners", the pairing of students. Teachers, and AI tool, may improve collaboration and effective interactions in the classroom." according to Sidney D'Mello, associate professor at ICS and the Department of Computer Science, and Principal Investigator of the AI Institute. A particular focus of the ICS hosted AI Institute is to provide new learning opportunities for students from historically underrepresented populations in Colorado and beyond the state.

The 5-year project will bring together researchers from across the CU Boulder campus, including the Institute of Cognitive Science, College of Engineering and Applied Science (CEAS), College of Arts and Sciences (CAS), and the School of Education. Teams of researchers from nine universities from across the country in a close collaboration with two public school districts, private companies and community leaders will join the research efforts

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IN THIS ISSUE

FROM THE DIRECTOR

"It was the best of times, it was the worst of times, it was the age of wisdom, it was the age of foolishness, it was the epoch of belief, it was the epoch of incredulity, it was the season of Light, it was the season of Darkness, it was the spring of hope, it was the winter of despair, we had everything before us, we had nothing before us, we were all going direct to Heaven, we were all going direct the other way—in short, the period was so far like the present period, that some of its noisiest authorities insisted on its being received, for good or for evil, in the superlative degree of comparison only."

Friends,

As 2020 draws to a close, Charles Dickens' immortal opening line from *A Tale of Two Cities* seems as applicable to our current situation as it was to the French revolution in 1775. Certainly, within ICS, we have experienced both the best of times and the worst of times over this past year. I know that many of us have suffered: mentally, physically, and financially. We have been separated from each other, and our families and friends, for the better part of a year. Many of our families have lost loved ones due to COVID, including mine. Yet, despite the forces of the universe conspiring against us, somehow our research and our community has managed to grow and to flourish! Reflecting on these "best of times" for our Institute, there are a mixture of traditional academic accomplishments coupled with wonderful examples of industriousness, purpose, and agility:

- **Research expenditures are strong, and almost tracking last year - our highest year in contemporary records!** And this is despite a complete shutdown of our research data collection for nearly an entire quarter this spring due to COVID. Why does this matter? In addition to advancing knowledge and broader impacts, our research expenditures create jobs, and provide financial security and exciting intellectual opportunities to our broad community of scholars, ranging from students to post-docs to research faculty. This impressive level of productivity didn't just accidentally happen: it came about through the hard work and ingenuity of our members, who devised creative (and safe) ways to "catch back up" on postponed data collection protocols once we were able to resume research.

- **We are ROCKING on large awards this year, and these awards are going to provide exciting opportunities to our community of scholars for years to come.** These new large awards include the Adolescent Brain Cognitive Development study (NIH, seven years, $11 million), the National AI Institute for Student-AI Teaming (NSF, five years, $20 million), and one more to be announced in the next week or so. You heard me right! There is another…. Not only do these large awards provide outstanding research and leadership opportunities, they are helping to knit our interdisciplinary, far-flung, and now remote community members together in new and exciting ways.

- **We are vigorously working towards a more just, inclusive, and diverse Institute, and engaging in difficult, challenging, but necessary conversations.** We did not launch a committee: the strength of our Inclusion, Diversity, and Equity Committee is that it coalesced from the ground up, to include a broad swath of our community members across different disciplines, positions, cultures, ethnicities, and gender identities. IDEC has quickly become a compelling, agentic and authentic voice for promoting awareness and taking action, and it has become a "go to" source on campus for other units looking to do the same.

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FROM THE DIRECTOR cont.

- **We kept each other safe.** None of this other good stuff would have happened if we had not all agreed to take the often-cumbersome steps - temperature checks, self-attestations, zone configurations, protective gear, etc. - necessary to re-open our facilities and minimize ongoing risk to our study participants and ourselves. As a direct result, in the past seven months of CINC operations, only one of our team members (that had been at CINC) was diagnosed with COVID and there was no spread from that event. Furthermore, we did not have a single case where a study participant infected one of our team members, which was a hugely concerning factor as we contemplated our return-to-research operations. I deeply appreciate the leadership and graciousness of our CINC Zone leaders, who maintained good humor while I badgered them about managing density, bathroom and hallway access, equipment sanitation, and all sorts of things that we never had to think about before. And of course, this entire scheme worked because of the unflinchingly responsible actions of our CINC team members.

I have no idea how 2021 will unfold, but let's try to put the "winter of despair" quickly behind us and move on to the "spring of hope". We have done everything in our power, given the circumstances, to put our community in a very strong position to continue to succeed and thrive in the coming year. So, THANK YOU ALL.

Tammy
Director, Institute of Cognitive Science

AI-INSTITUTE cont.

Researchers will address three main challenges, referred to as 'Strands': first, work to develop new advancements in fundamental science of how machines process human language, gestures, and emotions (Strand 1). CO-PI and Strand 1 co-leader Martha Palmer states: "I am absolutely thrilled to have the opportunity to work with this world-class team of experts on such a very challenging issue - enabling real-time, productive communication between students and an AI Partner. It pushes the boundaries of everything Computational Linguistics has been able to accomplish, and is only possible because of the carefully crafted team infrastructure that will provide input from the Strand 2 experts and allow beta testing and field-testing in classrooms. There is nothing I'd rather be doing."

Next, the team will strive to better understand how students, AI and teachers can collaborate effectively in both classrooms and remote learning contexts (Strand 2). CO-PI and Strand 2 co-leader Leanne Hirshfield shared that "One of the most exciting and impactful parts of our strand's research is how we bridge the gap between the technical AI work being done by Martha's strand 1 team with the extensive knowledge gleaned from actual teachers and students, as explored by Bill and Tammy's strand 3 team. For the AI to select appropriate ways to interact with the students, it's important to not only understand what students say, and what they do, but what they're thinking and feeling. And no one understands these delicate intricacies better than the actual teachers and students. I believe that our greatest impact to AI and education will be how we carefully and purposefully take the knowledge gleaned from teachers and students and directly build that knowledge into the architecture of our AI systems."

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Visit the AI-Institute Website

https://www.colorado.edu/research/ai-institute/

AI-INSTITUTE cont.

Last, researchers will go to classrooms in Denver Public Schools and other educational partners—virtually, due to the pandemic—to work hand-in-hand with students and teachers to think up new technologies (Strand 3). CO-PIs and Strand 3 co-leads Tamara Sumner and Bill Penuel adds “Community members must be included from the very beginning when it comes to designing and developing technology that will be deployed in schools—this includes involving students, teachers, parents and other community leaders” according to Tamara. Bill adds, “Students need to understand how AI functions in the world now, including its potential role in building a ‘surveillance economy,’ and how it can help communities design together for a more just future. To do that, we are going to engage a diverse group of stakeholders from the community and from schools to help us set goals for co-designing curricula for middle and high school students."

An all-collaborator retreat focusing on Innovating Equitable Futures occurred in November to solidify the research and shared values, and a Project Manager and Communications & Outreach Coordinator have joined the team.

Meet Project Manager Candace Cyrus and Communications & Outreach Coordinator Alayne Benson on page 9.

Media Interest in the AI Institute

CBS News featured the Institute and the Research + Practice Partnership in a story about Denver Public Schools.

Watch the report on CBSlocal.com

RE-APPOINTMENTS

The following faculty were re-appointed unanimously as ICS Research Professors.
Congratulations!

Peter Foltz
Sarel Van Vuuren
Christine Yoshinaga-Itano

PUBLICATION HIGHLIGHTS

Faculty/Fellows/Research Assistants

Shadmehr R., **Ahmed, A.A**., Vigor: Neuroeconomics of Movement Control, MIT Press, 2020. https://mitpress.mit.edu/books/vigor

L. Cinnamon Bidwell, J.M. Ellingson, H.C. Karoly, et al. (2020) Association of Naturalistic Administration of Cannabis Flower and Concentrates with Intoxication and Impairment. JAMA Psychiatry 2020;77(8):787-796.

H. Vrzakova, M.J. Amon, M. Rees, M. Faber, **S. DMello** Looking for a Deal? Social Visual Attention during Negotiations via Mixed Media Videoconferencing in CSCW 2020

R. Southwell, J. Gregg, R. Bixler, **S. DMello** What Eye Movements Reveal about Comprehension during Naturalistic Reading of Long, Connected in Cognitive Science. 2020 Oct;44(10):e12905

S.K. Subburaj, A. E.B. Stewart, A.R. Rao, **S. DMello** Multimodal, Multiparty Modeling of Collaborative Problem Solving Performance in ICMI 2020.

Cheng, S., Cohen, A. S., Holmlund, T. B., **Foltz, P. W**., Cheng, J., Bernstein, J. C., Rosenfeld, E. P., & Elvev\aag, B. (2020). A Dynamic Method, Analysis, and Model of Short-Term Memory for Serial Order with Clinical Applications. Psychiatry Research, 113494.

Clarke, N., **Foltz, P**., & Garrard, P. (2020). How to do things with (thousands of) words: Computational approaches to discourse analysis in Alzheimer’s disease. Cortex.

Hellman, S., Murray, W. R., Wiemerslage, A., Rosenstein, M., **Foltz, P.,** Becker, L., & Derr, M. (2020). Multiple Instance Learning for Content Feedback Localization without Annotation. Proceedings of the Fifteenth Workshop on Innovative Use of NLP for Building Educational Applications, 30–40.

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INCLUSION, DIVERSITY, & EQUITY COMMITTEE

IDEC's mission is to help ICS create an organization where everyone, regardless of visible and invisible differences, can thrive in their learning, research, teaching, and professional development through feeling safe, respected, welcomed, and supported.

IDEC is:

- an action-oriented group and a solidary-support space comprised of Black Indigenous and People of Color (BIPOC) and white allies with a wide range of self-identities
- working to create more equity, inclusion, diversity, sense of community at ICS, and to eliminate racism, discrimination, and oppression of all kinds
- a welcoming, supportive, and affirming space for all
- collaborating with CU's other Institutes and units to amplify our efforts

ARPAC PROMISE

Nearly a third of the ARPAC report's recommendations for ICS address inclusion, diversity, and community climate concerns. In a critical step to address the concerns, the Executive Committee as approved the

ICS IDE Statements and Land Acknowledgement Statement

Continued on page 8…

JOIN IDEC

All are welcome to join our weekly meetings, currently occurring on Wednesdays at 4:30 pm.

Email ics_idec@colorado.edu for the meeting links.

Next Meetings December 30 and January 6
4:30pm
https://cuboulder.zoom.us/j/6562883816

2020-2021 ICS EXECUTIVE COMMITTEE

Welcome new ICS Executive Committee Members!

- **Albert Kim**
  Associate Professor - ICS/Psych & NeuroSci
- **McKell Carston**
  Assistant Professor - ICS/Psych & NeuroSci
- **Quentin Biddy**
  Research Associate - ICS

In a separate process, the graduate students selected their outstanding Executive Committee Representative.

- **Abhijit Suresh**
  PhD Student - CS/NeuroSci/ICS

We are grateful for the following members who will continue to serve on the Executive Committee for the second year:

- **Leanne Hirshfield**
  Associate Research Professor - ICS
- **David Quigley**
  RA/Instructor - ICS/CS

Ex Officio members who will continue to serve, thank you for your leadership:

- **Donna Caccamise** ICS Associate Director
- **Matt Jones** CRT Director
- **Nicole Speer** INC Director of Operations
- **Cinnamon Bidwell** CU REACH Director
- **Tamara Sumner** ICS Director

Thank you to the following members who gave ICS their service and are stepping down. We are grateful for your dedication and participation.

- **James Martin**
  Professor - ICS/CS
- **Chenhao Tan**
  CS – ICS Fellow
- **Norielle Adricula**
  PhD Student Linguistics/ICS

FACILITY UPDATES

- MUEN (Muenzinger central campus) offices and classrooms remain closed.
  However, the administrative staff is working as usual from remote locations and can be reached via email.

- CINC (Center for Innovation and Creativity East campus location) and Craft Lab continues operating under CU's Return-to-Research Phase 2 protocols of < 50% Density, approved personnel only - follow campus process to apply, zone configuration, new card readers on entrances, new air filters installed and HEPA filters in some spaces

- CINC Remodel
  - After a few years of planning and working to acquire budget support from the Provost and RIO, we have finally kicked off the remodel of the CINC space 193. This is the old MRI bay location on the northwest corner of the CINC building
  - The 2700 sq. ft. space is the future home of Cinnamon Bidwell and her lab. An important feature of this space is the ready access to loading areas that can accommodate the Mobile Pharmacology Laboratory. This renovation, supported by ICS, RIO, and the Provost, is a core part of Cinnamon's start-up package. She and her team have been exceptionally patient as we worked through the processes to gain approval and financing.
  - This fall we engaged in a competitive process to hire a great Architectural firm and are in the early design phase. There are many steps to this process, but if the timeline holds, actual construction will begin in the April/May timeframe. We are hoping to have this new space completed by August in time for the new school year. Stay tuned for a ribbon cutting ceremony after that!

PANDEMIC PIVOTS TO RESEARCH PROCESSES

When CU halted research mid-March due to the COVID-19 pandemic, millions of dollars in research projects were at risk of catastrophic data loss. Every member of the Intermountain Neuroimaging Consortium (INC) team sprang into action to figure out how to conduct human research safely during a pandemic. The team spent three months gathering information from experts, creating new operating procedures, redesigning the INC's space, tracking down PPE and safety materials, and educating research teams. The INC was one of the first MRI research facilities in the 22-site ABCD study consortium to reopen for data collection in the spring and has been continually collecting data since June 15.

The secret to INC's success was involving all voices in its reopening process: Executive Committee members, Principal Investigators, research assistants, MRI technologists, INC staff, and student workers. By keeping communication frequent and open to identify and address safety concerns, INC created an environment in which research teams and participants were safe and well trained to operate during this pandemic.

Thanks to everyone's cooperation and hard work, all studies currently running at the INC facility have now made up for the data they lost during INC's three-month shutdown and three studies were able to complete data collection. Nicole Speer and her team at INC led this successful pivot. Continued on page 13

CONGRATULATIONS TO FACULTY & FELLOWS

Congratulations William (Bill) Penuel, ICS faculty, for being named a CU system-wide Distinguished Professor. The title is the highest honor the University bestows on its faculty members.

This title recognizes the outstanding contributions of tenured faculty members to their academic disciplines. Candidates nominated for a distinguished professorship must demonstrate accomplishments in accordance with university-wide criteria. As of fall 2019, only 106 University of Colorado professors held the title of Distinguished Professor.

Additionally, Bill received the 2020 Outstanding Postdoc Mentor Award in October. This award "recognizes a tenure-track faculty member or Adjoint Professor who provides exemplary mentoring, training, and leadership to postdoctoral scholars at CU Boulder. Mentors must have completed at least 3 months of postdoctoral mentoring at CU Boulder at the time of nomination, and cannot have received an Outstanding Mentor Award in the past." According to Postdoctoral Affairs.

Bill was nominated by Dr. Kerri Wingert who according to Terri Fiez, Vice Chancellor for Research and Innovation, "praised your welcoming, supportive and collegial demeanor. This year's applicant pool for Outstanding Postdoc Mentor Award was highly competitive and I hope you take pride in this recognition."

ICS Research Professor Christine Yoshinaga-Itano received the American Speech-Language-Hearing Association ASHA Honors of the Association 2020 award.

This award is the highest honor bestowed by ASHA—recognize members for their distinguished contributions to the discipline of communication sciences and disorders. Honors recipients are well known throughout the nation and the world for a lifetime of innovative clinical practice, insightful and rigorous research, creative administration, effective legislative activity, outstanding teaching, or other distinguished professional contributions. Congratulations!

Find out more on the ASHA website and watch a video summary of her body of work.

Congratulations Professor Emerita Alice Healy, who received the APA Division 3 Lifetime Achievement Award for 2021!

The Society for Experimental and Cognitive Science (Division 3 of the American Psychological Association) honors an individual who has made long-lasting and distinguished theoretical and/or empirical contributions to basic research in experimental psychology and/or cognitive science.

APA Division 3 Awards Chair, Audrey Parrish stated, “Considering your long-lasting and distinguished contributions to basic and applied experimental psychology as well as your extraordinary service to the Division and the field, Division 3 enthusiastically and unanimously supported your nomination as the 2021 recipient of the Lifetime Achievement Award. Congratulations!”

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Institute of Cognitive Science
UNIVERSITY OF COLORADO **BOULDER**

IDEC cont.

Winter Break Community Building Gatherings

December 30, Wednesday 4:30 – 5:45ish

Latkes, year-bridging noodles, stolen, maamoul, mazoa, jalebi – what family foods put you in a celebratory mood? Share recipes and stories, cook and show us your creations, or a photo of your special foods. Bonus: is music part of feasting and celebrating in your family? If so, let us hear your songs.

January 6, Wednesday 4:30 – 5:45ish

Let's welcome 2021 together by musing upon, and speaking our hopes and intentions for this new year. Are there family traditions around the arrival of the New Year? We will also laugh in the year together with interactive games led by Veronica Koral.

Join Zoom Meeting
https://cuboulder.zoom.us/j/652883816

Coming in Spring Semester

- Diversity section of the ICS website
- ICS Community survey results
- More IDEC Colloquia and community building times
- Becoming Anti-Racist Institute Challenge
- Anonymous ICS internal discrimination reporting system
- BIPOC affinity groups

For more information:
Email ics_idec@colorado.edu

On page 21, see the range of diversities represented in IDEC.

CONGRATULATIONS cont.

Marta Ceko has been promoted to ICS Assistant Research Professor! Marta studies brain mechanisms of negative affect in health and disease through the use of evoked pain, fMRI, physiological responses combined with machine learning.

Congratulations.

The Flagship FabLearn conference was held recently and two of Prof. Mike Eisenberg's former graduate students - Profs. Leah Buechley and Joo Oh - organized a lovely "Remembering Mike Eisenberg" tribute panel to celebrate Mike's life and contributions to the field. Thanks to Ann for sharing this panel video with our community!

Peter Foltz served on a National Institute of Statistical Sciences panel advising on the release of National Assessment for Educational Process (NAEP) process data to researchers. NAEP has since released a data set of student grade 8 math responses.

Matt Jones wins an AB Nexus award: The AB Nexus Research Collaboration Grant program announced its inaugural round of grants for novel research projects integrating expertise from the CU Anschutz and CU Boulder campuses.

Danielle Szafir receives 'Best Information Visualization Paper Award Honorable Mention, IEEE VIS' for "A Design Space of Vision Science Methods for Visualization Research".

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AI-INSTITUTE cont.

Meet the Project Manager and Communications & Outreach Coordinator for the AI Institute

Candace Cyrus, Project Manager

ICS: What is your background?

I've worked in a couple different areas of my career but mostly health care and higher education. Prior to working at ICS, I was a Project Manager for the Procurement Service Center at CU System Administration. Before that, I worked for CU Boulder, Office of Contracts and Grants, focusing on service agreements.

ICS: What are your hopes in this position?

My hope for this position is to support my PI and Institute leadership in research and development of project. Supporting all elements of the project, through its lifecycle and phases, and communicating the progress to team and our sponsor. I want to do my very best to mitigate challenges for smooth operations and focus my energy on those challenges as an opportunity for improvement and building strong relationships.

Alayne Benson, Communications & Outreach Coordinator

ICS: What is your background?

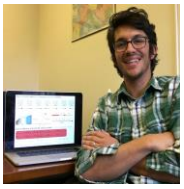
Like many of you, I've worn different hats during my journey to the Institute. Prior to working at ICS, I developed content and pedagogical strategies for K–12 educational programs at Houghton Mifflin Harcourt. Before that I worked as a Communications Specialist at Ball Aerospace and as the Communications and Development Manager for the Albin Polasek Museum.

ICS: What are your hopes in this position

My hope is to connect the AI Institute's awesome work to diverse communities in Colorado and beyond. I hope to build communication strategies that will further strengthen our team dynamics and help bring to life this important and wonderfully ambitious project for teachers and students.

CONGRATULATIONS cont.

Congratulations to Teryn Wilkes for his appointment to the position of Chair of the Global Relations and Safety Board for the International Society of Magnetic Resonance in Medicine/Society for MR Radiographers and Technologists. This is a big honor as this international organization is the biggest professional group for MRI techs in the world, and this the safety board recommends safety policy for around the world.



Zachary Kilpatrick was awarded a BRAIN Initiative grant from the Theories, Models, & Methods for Analysis of Complex Data from the Brain Program project entitled "Connecting neural circuit architecture and experience-driven probabilistic computations". Zach has been incredibly busy throughout the months of the Pandemic. His productivity along with his students' is mind-boggling. ICS would like to recognize his contributions to cognitive science by enumerating the complete list of his recent body of work since May.

ICS Fellows Promoted

Congratulations for your promotion to Associate Professor!

Naomi Friedman Psychology and Neuroscience & Institute of Behavioral Genetics

June Gruber Psychology and Neuroscience

Zachary Kilpatrick Applied Mathematics

Tam Vu Computer Science

ARPAC FINAL REPORT: RECOMMENDATIONS FROM CU

After a long pandemic-related delay, ICS received the reviewed and approved final ARPAC report in late October. Tammy provides an overview on the website. This article enumerates the recommendations for ICS to consider in the coming years, by category of concern.

Student concerns:

- Clarify ICS' role in undergraduate education
- Clarify how the required courses for the certificate are paid for and how TAs, administrative support and course size will be allocated

Faculty/instructor concerns:

- Generate an agreement with participating departments to provide equal credit to faculty who teach these classes.
- Increase clear and consistent communication to departments about ICS course offerings and research opportunities, including both affiliated departments and departments that have not historically partnered with ICS.
- Collaborate with the vice chancellor for research and innovation and departments to clarify expectations for institute-department relations (e.g., outlining faculty teaching rules, communication about programs, TA allocation), especially with the psychology and neuroscience and computer science departments.
- Fill open and approved faculty positions with the assistance of the Research and Innovation Office.
- Collaborate with the vice chancellor for research and innovation and associated departments to make a case to replace recent faculty vacancies and develop and execute the ICS faculty growth plan, with at least one computational cognitive science hire.
- Establish a formal mentoring program for research faculty

Organization concerns:

- Partner with the Office of Advancement and their evolving plan for fundraising to address needs such as increased student scholarships and space improvements.
- Make a case with the Research and Innovation Office and the executive vice provost for academic resource management for short-term and long-term improvements to space including the possibility of a move toward co-location for ICS.

Inclusion, diversity, and equity and community climate concerns:

- Design and implement plans for recruiting graduate students from underrepresented groups in collaboration with faculty from affiliated departments, RIO and the Colorado Diversity Initiative (https://www.colorado.edu/initiative/cdi/) that supports recruiting diverse graduate students in STEM fields. Target a portion of future funding proposals towards retention and support efforts for underrepresented populations.
- Develop and implement a concrete plan to improve diversity among tenure-track faculty members that lives up to CU Boulder's inclusive excellence standards. This should include, but not be limited to, consulting with the Office of Diversity, Equity and Community Engagement and Department of Human Resources' Diversity and Inclusive Excellence division.
- Continue ongoing efforts to improve the climate for faculty, students, and staff members, including developing and implementing the means to strengthen a sense of community among program faculty members and between graduate students.
- Continue laudable recent efforts to study and address potential inclusive excellence issues as raised in the self-study.
- Complete and submit an inclusive excellence narrative to the Office of Diversity, Equity and Community Engagement

Note: ARPAC stands for Academic Review and Planning Advisory Committee, which is responsible for evaluating academic units every seven years. ICS completed the self-evaluation in 2018 and received the final report in 2020 after receiving Provost review and approval.

PUBLICATION HIGHLIGHTS cont.

Faculty/Fellows/RA

Kole, J. A., Barshi, I., **Healy, A. F.,** Schneider, V. I., & Buck-Gengler, C. J. Comparison of astronauts and undergraduates on simple motor and complex memory tasks. Paper presented at the 61st Annual Meeting of the Psychonomic Society, Austin, Texas, November 19, 2020 (virtual).

Kole, J. A., **Healy, A. F.,** Schneider, V. I., & Barshi, I. (2021). Training principles for declarative and procedural tasks (pp. 131-149). In L. B. Landon, K. J. Slack, & E. Salas (Eds.), Psychology and human performance in space programs: Research at the Frontier. Abingdon, UK: Taylor & Francis.

Wohldmann, E. L., & **Healy, A. F.** Learning and transfer of calorie information. Paper presented at the 61st Annual Meeting of the Psychonomic Society, Austin, Texas, November 21, 2020 (virtual).

Anhad Mohananey*, **Katharina Kann*** and Samuel R. Bowman. Self-Training for Unsupervised Parsing with PRPN. In Proceedings of the 16th International Conference on Parsing Technologies, online, July 2020.

Assaf Singer and Katharina Kann. The NYU-CUBoulder Systems for SIGMORPHON 2020 Task 0 and Task 2. In Proceedings of the 17th SIGMORPHON Workshop on Computational Research in Phonetics, Phonology, and Morphology, online, July 2020.

Huiming Jin, Liwei Cai, Yihui Peng, Chen Xia, Arya McCarthy and Katharina Kann. Unsupervised Morphological Paradigm Completion. In Proceedings of the 58th Annual Meeting of the Association for Computational Linguistics, online, July 2020.

Jason Phang*, Iacer Calixto*, Phu Mon Htut, Yada Pruksachatkun, Haokun Liu, Clara Vania, Katharina Kann and Samuel R. Bowman. English Intermediate-Task Training Improves Zero-Shot Cross-Lingual Transfer Too. In Proceedings of the 1st Conference of the Asia-Pacific Chapter of the Association for Computational Linguistics and the 9th International Joint Conference on Natural Language Processing, online, December 2020 (to appear).

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RESEARCH & TEACHING

Al Kim is offering a new cognitive science course, spring 2021. “Digital Signal Processing Methods for Cognitive Science” will teach material that is valuable for students with interests in neurophysiological recordings (of all kinds) and neuroscience, speech sciences, and machine learning.

The course will be an undergrad/grad level course enroll able as PSYC-4541-004 (undergrad students) or PSYC-5541-001 (graduate students). Enrollment is capped at 50 total students.

Kerri Wingert created the ‘Equitable Instruction Group’ for the inquiryHub research program. She was inspired to start this group because “inquiryHub is a research-practice partnership comprising grants that support education and equity, and our materials are in use in over 30 states as well as internationally. Over the past 15 years, we have intentionally sought out projects and staff that make equitable teaching and learning central to our work, and we intentionally design learning environments that put diversity and justice at the center.” The curricular and professional learning development team recognizes the needs to continuously work toward improving the instruction, and to frequently evaluate whether the "Commitments to Diversity & Underserved Populations” is being met.

The Equitable Instruction Group is an innovative and revolutionary approach to examining a research group’s inclusion of a lens of race and oppression in the assessments on not only products but also internal operations and processes.

Learn more in Kerri’s interview on the ICS website.

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WELCOME TO THE ICS COMMUNITY

New Research Associates at ICS – welcome Melanie and Meg!

Melanie Peffer came to CU Boulder this year as a research associate at MCDB and ICS. She specializes in interdisciplinary research as it relates to educational technologies and science education. Melanie recently published *Biology Everywhere: How the science of life matters to everyday life*, which focuses on where we see applications of biology as part of our everyday experience. She is garnering widespread attention and acclaim for her ability to connect science and research subjects to the public. She exemplifies ICS' goals to bring research in to real life. Learn more about her dissemination activities on page 16.

Meg Gestos joins CU REACH and CUChange Lab as Lab Manager. She replaces Renée Martin-Willett who is pursuing her PhD in the Department of Psychology and Neuroscience Clinical Psychology. Meg answered some questions for ICS on the website. Meg's photo is from the "Halloween 'best dressed' competition with everyone posting their pictures on our lab Slack channel throughout the day. The winner was voted by everyone and nominated via 'reactions' with emojis to their photo submission. The winner was Meg Gestos (Lab Manager) who dressed as Rosie the Riveter, because if there's ever a time we need encouragement that "We Can Do It", it is 2020!

Two new Fellows joined ICS this fall. Welcome Katharina and Lei!

Katharina Kann is an assistant professor in the Department of Computer Science, and is a part of the new National AI Institute. The main focus of her research lies on deep learning for natural language processing. In particular, she is interested in transfer learning, approaches for low-resource languages, and computational morphology. Her new lab is called NALA. Three PhD students joined the lab in August: Stephane Aroca-Ouellette (co-advised by Alessandro Roncone), Abteen Ebrahimi, and Ananya Ganesh (co-advised by Martha Palmer).

Lei Yuan is an assistant professor in the Department of Psychology and Neuroscience. Lei's research goal is to better understand human learning by characterizing the structure of input data in children's early learning environment, the processes and mechanisms through which children learn from this data, and how this learning creates hidden deficits or competencies for later school learning. To that end, her lab combines large-scale cross-sectional and longitudinal studies, training experiments, computational modeling, high-density behavioral data collection (e.g., eye tracking), and translational research in schools.

Alessandro Roncone (Computer Science) is leading the new Interdisciplinary Research Themes (IRT) at the College of Engineering and Applied Science to develop interdisciplinary teams across a variety of departments, units, and areas of study. His initiative 'The Engineering Education and AI-augmented learning IRT' investigates "combining research in engineering and computing education and assessment with artificial intelligence, machine learning, natural language processing and robotics" and will collaborate with ICS's new NSF National AI Institute for Student-AI Teaming.

PANDEMIC PIVOTS cont.

Prior to COVID-19, inquiryHub project's professional learning (PL) model was a face-to-face model. Schools or districts would contract for our services and a trainer would travel to their location to conduct workshops with teachers. To help teachers learn successfully in a virtual environment tools from the Google suite were used to complement the virtual workshops in Zoom. For example, an interactive home page for participants was created. Finding ways for participants to collaborate in large groups, small breakout groups, and chat features, through shared workspaces in Google docs and Jamboard, and using the comments feature to provide peer feedback were strategies used to engage teachers. The PL goal was to facilitate as much of the interaction that happens in a face-to-face workshop as possible given the constraints of the virtual environment.

While it was important to make sure teachers received as much exposure to and practice with the routines in the instructional model as possible, it was understood that teaching virtually would create some anxiety for teachers working with their own students. To provide extra support, as many examples of tools and strategies that the teachers could use with their students were woven into the workshop so they could participate as learners by, for example, developing initial models collaboratively and doing a virtual gallery walk to provide feedback to peers.

Over 10 weeks in the summer, 261 teachers from 17 states participated in inquiryHub PL, making the Pandemic Pivot a very successful endeavor, largely due to the extraordinary efforts led by Kate Henson.

FEATURED RESEARCH: FELLOWS

Launching a new four-year grant, 'Biotyping Mood Health in Late Adolescence: Neurocognitive Dimensions and Stress Pathways', Rosi Kaiser and her lab team are "enthusiastic to use the results of this study to inform clinical preventive interventions: that is, based on biotype, we hope to improve our ability to deliver the right treatment, to the right person, and the right time."

Rosi wrote, "A significant challenge for this project is maintaining a longitudinal research schedule during a global pandemic that is causing disruption to so many aspects of academic research.

The lab team, photo taken pre-pandemic.

We are very fortunate to be working with the stellar team at INC, especially Nicole Speer, Teryn Wilkes, and Lena Sherbakov; without them, this research study would not be feasible."

Abstract: Adolescence is a developmental period marked by interconnected changes in cognitive and neurobiological functioning, including reorganization of large-scale functional networks and improved ability to regulate attention and pursue rewards. Adolescence is also a period characterized by heightened stress and increased symptoms of mood disorders (MD), which are in turn associated with neurocognitive abnormalities in the same brain networks and cognitive domains that are highly plastic in adolescence. These developmental convergences suggest a model in which abnormalities in key neurocognitive dimensions predispose teens to MD, possibly because neurocognitive impairment impedes healthy stress coping behavior. However, shared risk factors and similarities in early-stage symptomatology of various MD have made it challenging to determine the specific pathways by which neurocognitive abnormalities contribute to MD.

Continued on page 14

FELLOWS RESEARCH cont.

The proposed study will address these challenges with a multi-modal, longitudinal evaluation of risk "biotypes", stress responses, and MD symptoms in adolescence. In this study, we aim to first use biotypes defined by abnormalities in cognitive regulation (CR) and reward sensitivity (RS) to predict stress-reactive behavior and mood symptoms over a two-year follow-up (**Aim 1**), and to second, provide a more precise understanding of neurocognitive subdimensions – focusing on RS subdimensions - that best carve the mood symptom space (**Aim 2**). We hope this work will be a step towards the translational goal of using neurocognitive biotypes to differentially diagnose and predict MD.

CURRICULUM PILOT

The inquiryHub team launched a national pilot study this fall with 40 teachers, of its open source educational resource curriculum for high school chemistry. The first units focus on the design questions, "How should we search for life beyond Earth?" and "Why aren't we using hydrogen to fuel our cars?" This new curriculum is being tested in fully remote, hybrid, and in-person classrooms due to the COVID-19 pandemic and full public release of these units is expected by July 2020. States, districts, and schools are eager for the release of the curriculum.

FALL KICK-OFF SUCCESS

The August 28, 2020 Kick-off meeting was a resounding success, with a record number of attendees (101) participating in the virtual meeting.

One positive impact of pivoting to virtual colloquia is that attendance has exceeded the fire code limit of the ICS meeting room for each and every colloquium, and community members from all over the country have participated. The ICS colloquium room has a capacity of 46, and our Zoom colloquia have had 75 and 125 attendees each. We are grateful for this enthusiastic support of our presenters.

Recordings are available of most of the colloquia.

8/28 Kick-off meeting

10/9 Jacob Whitehill

10/23 Clara Wilkins

10/30 Elizabeth Schotter

11/6 Eric Schwitzgebel

11/13 Marilyn Walker

RESEARCH & TEACHING

McKell Carter hopes to make artificial neural networks more understand-able (and in some cases less biased) by isolating parts of the network and removing them. The approach is similar to the study of psychological function by neuropsychologists who study the effects of brain lesions. A paper titled 'Understanding internal representations of convolutional neural networks using ablations', primary author Abhijit Suresh is under review for publication.

NEWSLETTER ARCHIVE

Newsletters published since spring of 2016 are available on the ICS website.
Look for the black and gold box on the right sidebar of the About Us page.

DISSEMINATION ACTIVITIES

Cinnamon Bidwell was hosted by the Metropolitan State University of Denver as the 2020 Shane Marie Morrow Guest Lecturer “Cannabis, Health, & Harm-Reduction: Building the Evidence Base with Innovative Research Designs”

She also participated in 'Panel 1' of the FDA Office of Women’s Health Public Meeting "CBD and Other Cannabinoids: Sex and Gender Differences in Use and Responses".

June Gruber’s outreach & dissemination efforts have focused on research applied to families managing the pandemic. 'Flattening the mental health curve is the next big coronavirus challenge' directly addressed the escalating mental health crisis American adults are facing as a direct result of the COVID-19 pandemic. In feature articles in the Southern Maryland Chronicle and Times Union, June provided practical ways for health care to "help flatten the rising mental health curve" based on expertise gained as psychologists researching the depression epidemic and the nature of positive emotions.

She and a panel presented a webinar to the public on COVID-19’s effect on the mental health of children, families, and college students, and June also presented a session on "The Science of Happiness and Student Well-being During the Coronavirus Pandemic" at the virtual Summit.

Zachary Kilpatrick’s article in Physical Review Letters focused on how diversity in networks of decision-making agents can increase decision efficiency via more deliberate agent’s observation of the split of hasty observers’ decisions.

This work is of relevance to the propagation of social information on social media, especially for binary decisions like voting in two-party systems. His study was recently featured both in an article on CU Boulder Today and on the 6pm Denver 7 TV news.

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A WAY TO DISSEMINATE RESEARCH TO THE PUBLIC

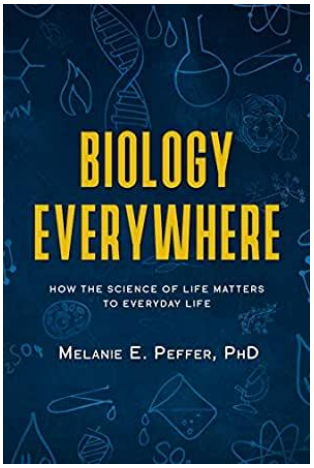
One way to share-out research to a larger audience is to contribute to a science blog. Some advantages to this method of disseminating information are that it is a great way to get research out there to a much wider audience, and hone skill sets in communicating research findings to a wide audience clearly and succinctly.

Melanie Peffer is searching for researchers to reach outside of academia to communicate the impactful work they do. Check out the blog. She is looking for content that would be of broad interest, particularly topics that cross the researcher-practitioner divide. Email Melanie for more information.

DISSEMINATION ACTIVITIES cont.

From podcasts to a mention during CU President Kennedy's video chat on the strength of CU research, Melanie Peffer's Biology Every book and her efforts to make science accessible to the public are garnering attention. ICS talked with Melanie about the extraordinary dissemination and impact of her book and outreach efforts.

ICS: Why did you write Biology Everywhere?
MP: I wrote Biology Everywhere because I believe in the underlying message that the key to improving science literacy is by empowering people to engage in biology by presenting it in an accessible relatable manner - namely through the lens of our shared daily experiences. In addition, it's informed by both my research on how people learn biology and understand the nature of science knowledge in addition to my classroom experience.



ICS: How popular is your book right now?
MP: The book has hit multiple best seller lists, including best seller list on Amazon this fall -It's top 100 of ALL kindle books! I think the mix of it being research and experience informed, in addition to me feeling passionate about what I was doing is why the book is very popular.

Find out more about Melanie's dissemination efforts on the ICS website.

Melanie is offering an ICS members discount code for 20% off, valid for orders placed through www.biologyeverywhere.com. An eBook is also available on Kindle.

----------STUDENT HIGHLIGHTS AT ICS----------

DISSERTATION SPOTLIGHT

Integrating Computational Thinking into Middle Science Curriculum Using Programmable Sensor Technologies

Alexandra (Alex) Gendreau Chakarov
Advisor: Tamara Sumner

Alex Chakarov received her PhD in Computer Science and Cognitive Science during the pandemic. Her research interest is in how physical computing can engage students traditionally underrepresented in STEM and applying instructional design techniques from science education to teach computer science concepts.

With the increasing ubiquity of computing in the world, there has been push to increase the amount of experiences that K-12 students have with computer science and computational thinking. Strategies to achieve this include out of school programs, computer science and STEM specific courses, and the integration of the computational thinking into other subject areas. Science is one such subject area as it is increasingly relying on computational methods and tools. A goal of science education is to give students experiences that more closely mimic the work of real scientists.

SchoolWide Labs is an approach to integrating computational thinking into science classes using programmable sensor technologies. Students use the sensors to explore and gather information about the world around them {much like real scientist) and engage in CT in order to make sense of scientific phenomena.

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DISSERTATION cont.

SchoolWide Labs involves the creation of programmable sensor technology, professional development workshops to support teachers' implementation of units integrated with computational thinking, and tools for both the professional development workshops and classroom implementation.

This dissertation describes the evolution of computational thinking and programmable sensor technology in the SchoolWide Labs project over three year-long design cycles. I highlight lessons learned from the first two design cycles and discuss how they influenced major changes to the third design cycle with the development of an introductory sensor immersion experience and a change in the approach to how computational thinking is integrated.

Alex would like to thank her committee members, advisor ICS Director Tamara Sumner (chair), ICS Fellow Benjamin Shapiro, Eliana Colunga, and Clayton Lewis, as well as ICS Faculty William Penuel.

After receiving her PhD, Alex joined the ICS SchoolWide Labs project as a research associate. Congratulations!

WELCOME INFO STUDENTS

Our academic programs are growing. The Information Sciences faculty have voted to fully participate in our undergraduate and graduate certificate programs as well as our combined PhD program. To this end, their faculty have curated a series of courses for both the undergraduate and graduate programs.

For the undergraduate certificate, these course selections will make up the advanced skills component in the field of Information Science, and offer another option for undergraduate certificate students to follow.

INFO has also cross-listed our required undergraduate core course that introduces students to the inherently interdisciplinary study of cognitive science.

At the graduate level, our catalog of approved electives has expanded to include curated INFO course that our student may choose as part of their individualized study plan to achieve the course credit requirements for our graduate certificate and the combined PhD programs. ICS welcomes the INFO students!

ICS Associate Director, Donna Caccamise

STUDENT RESEARCH SPOTLIGHT

Ali Raza, along with his advisors Tammy Sumner, Bill Penuel, and industry partner Curve10 have designed and developed a visual learning analytics tool- Student Electronic Exit Ticket for supporting equity in science classrooms. This tool provides students' experience to teachers for each lesson and over time for creating equitable and just learning environments.

This tool is used in partnership with the Advancing Coherent and Equitable Systems of Science Education (ACESSE) project. Currently, more than two hundred middle school science teachers across various states have shown interest in using the system to understand the student experience of lessons. The images below show a few of the data visualizations of the student experience from the system, created from a made-up dataset.

ICS Program Completion

There were no known undergraduate or graduate program completions in the fall semester.

STUDENTS RECOGNITIONS

Chelsea Chandler received the inaugural Nelson A. Prager Family and James H. Martin Endowed Graduate Fellowship 2020. This is a new award established to recognize a computer science graduate student studying Natural Language Processing. She is a PhD student in Computer Science.

Chris Hill was featured in Computer Science Undergraduate Research for his pursuit of reimagining human sensation gathering and the way sense the world around us. Affiliated with ICS as an undergraduate student through his work with the Craft Tech Lab, Chris is now pursuing his PhD at ATLAS.

Shirley Huang ICS PhD student from the Department of Speech Language Hearing Science Receives Student Research Grant in Early Childhood Language Development Award from the American Speech-Language-Hearing Foundation. The grant "is intended to support studies that focus on children at the preschool or earliest school developmental level". (ASHFoundation) Shirley stated, “The ICS small grant (that I received) helped me move my dissertation forward so that I can be more competitive for these bigger grants. Thank you.”

ICS GRADUATE & CERTIFICATE PROGRAMS

ICS offers graduate and undergraduate certificate programs and combined PhD programs.

Find out more about the programs on the website.

Graduate Programs

Undergraduate Programs

STUDENT TRAVEL & RESEARCH AWARDS

Fall 2020 Awardees

Congratulations to the following recipients of the ICS Student Travel & Research Awards:

Dianna Radpour (INFO), research grant for $500

Steve Sommer (EDU), research grant for $500

Janghee Cho (INFO), travel grant for $120

Sarah Moeller (LING), research grant for $500

ICS graduate students can apply for awards three times (cycles) a year for:

- Up to $500 a year to support ongoing research
- Up to $500 a cycle to support travel to present at or attend a conference ($700 a year maximum)
- Lifetime maximum of $3500 for travel and $2500 for research
- Due to COVID-19 restrictions, travel awards can be used to attend virtual conferences, workshops, and other events
- Applications are reviewed by student departmental representatives for academic merit, whether it is interdisciplinary and project alignment with the mission of ICS

Student Awards Committee

Thank you all for volunteering your time on the committee.

CS - Layne.Hubbard@colorado.edu
EDU - Spencer.Dudley@colorado.edu
INFO - Janghee.Cho@colorado.edu
LING - Norielle.Adricula@colorado.edu (chair)
PHIL - Lisa.Thomassmith@colorado.edu
PSYC - Shannon.Mcknight@colorado.edu
SLHS - Carly.Schimmel@colorado.edu

Find details on the application process on ICS website’s Student Travel & Research Awards page.

ICS OFFICE & ADMINISTRATION NEWS

Thank you Alan Dale for your many years of dedicated service to ICS and its membership. Alan starts his next phase of retirement-life starting the new year.

The staff as well as all who have come to depend on his calm demeanor, problem-solving mind and fast resolution of issues will miss him greatly.

ICS: When did you start working at CU Boulder?
AD: May 2001, as a Program Assistant in the School of Education then the BUENO Center before coming to ICS as a Research Administrator in July 2006.

ICS: What will you miss most about ICS?
AD: Working with so many great people across the Institute.

ICS: What do you look forward to most about retirement?
AD: Traveling and visiting out of state family.

Have great time Alan, and drop by ICS to say 'Hi'!

BEHIND THE SCENES HEROES of ICS

The growth of ICS during the challenges of a pandemic was possible because of the committed, skilled, and high level teamwork and support given to the Institute, Director and researchers by the Associate Director, Donna Caccamise and staff of the Institute. THANK YOU ALL!

Donna Caccamise

Jean Bowen

Alan Dale

Cat Latzer

Ellen MacKenzie

Anna Redman

Tracey Parnaby

Yasko Endo

NEW ORGANIZATIONAL STRUCTURE & STAFF

With the recent growth of ICS and Alan's retirement, the administrative services are undergoing reorganization to serve the changing needs of the Institute.

Highlights of the upcoming changes:

- Jean will assume all office duty functions for both Muenzinger and CINC. She will supervise the existing support staff, Anna, Tracey, and ICS student employees, and will administer all ICS undergraduate and graduate student programs. In addition to managing Portfolio #1, Jean ensures the diverse and detailed daily business ICS and questions and needs concerning ICS are answered and addressed on a timely basis
- Cat will continue to manage overall finances and oversee the highest-level grant administration with Donna. She will train and mentor the new grants managers to take on direct PI interactions regarding proposal budgets, post award budget updates, budget scenario planning, and the needs of procurement, travel, and hiring
- Ellen will be dedicated to payroll actions
- Yasko will continue to serve the communications needs of ICS
- Two new grants managers are coming onboard January 4, 2021

All of the staff report directly to Donna, Associate Director of ICS.

SUMMARY OF THE NEW GRANT MANAGERS Note: Since the role of Grant Manager is new to ICS, all descriptions below are subject to change. Thank you everyone for your patience and understanding as ICS creates the most effective and efficient ways to service all of our PIs and projects.	
What is the role of the grant manager (GM)?	GMs will interface directly with PIs from proposal to closeout. They will help with pre-award, all the functions during post award, including procurement, travel, hiring, payroll, etc. and grant closeout. They will also manage all of the ICS internal processes involving other members of the staff, freeing up PIs and projects from this often burdensome and confusing work.
Who are the new GMs?	Lakshmi Muralidharan and Rachel Chapman join ICS on January 4. Both have previous experience at CU and are highly qualified for the position.
Who will be my GM?	Each GM will serve a defined Portfolio of projects. There are two grant Portfolios, and one ICS administrative work Portfolio. The initial PI Portfolio assignments are below. These may change as we initiate the new structure and organization. Patience is appreciate if Portfolio assignments change over time.

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NEW ORG STRUCTURE cont.

Portfolio #1 Assigned to: Jean Bowen Catchall portfolio for anything outside the GM portfolios.
1. All ICS genera funds 2. All funds related to personnel not considered an ICS PI

Portfolio #2 Assigned to: Lakshmi Muralidharan All funds associated with the below PI's are included (ICR, etc.)	
1. Sidney D'Mello 2. Tamara Sumner 3. Leanne Hirshfield 4. William Penuel 5. Jennifer Jacobs 6. Donna Caccamise	7. Melanie Peffer 8. Jim Martin 9. Martha Palmer 10. Kerri Wingert 11. Wayne Ward 12. Peter Foltz

Portfolio #3 Assigned to: Rachel Chapman All funds associated with the below PI's are included (ICR, etc.)	
1. Marie Banich 2. Cinnamon Bidwell 3. McKell Carston 4. Marta Ceko 5. Ann Eisenberg 6. Naomi Friedman (related to Ceko) 7. Phillip Gilley 8. Rosalinde Kaiser 9. Shaw Ketels	10. Albert Kim 11. Michael Mozer 12. Catherine Spann 13. Sarel VanVuuren 14. Mallene Wiggin 15. Erik Willcutt (related to Banich) 16. Christine Yoshinaga-Itano 17. Any new PIs not directly associated with people in Portfolio #2

IDEC IDENTITIES

NEW GRANTS AWARDED TO ICS

ICS was awarded 25 new grants between December 2019 and December 2020, totaling just over $42 million. Congratulations ICS researchers!

The following list of grants were awarded to ICS between June 1 and December 1, 2020 in whole or in part, ranging from a year to five years in duration, totaling nearly $24 million.			
PI Name (in CAPS) ICS researcher in **bold**	**Sponsor**	**Title of Project**	**# of Years**
CEKO D'Mello/Hirshfield	RIO	Modeling Deep-brain Activity from Functional Near-infrared Spectroscopy (fNIRS) Data	1
D'MELLO	IARPA-Notre Dame	A Comprehensive Approach to Modeling Job Performance via Unobtrusive, Continuous, Multimodal Sensing (Phase 2)	1
D'MELLO	NSF	RAPID: Longitudinal Modeling of Teams and Teamwork during the COVID-19 Crisis	1
D'MELLO **Sumner**/Palmer/Beveridge/ Putambekar	NSF	National AI Institute: Institute for Student-AI Teaming	5
HUTCHISON **Bidwell**/Bryan	NIH	Novel Approaches to Opiate Use Reduction	5
KAISER Friedman	NIH	Biotyping Mood Health in Late Adolescence: Neurocognitive Dimensions and Stress Pathways	4
KIM Gilley	NSF	Direct Impacts of Executive Functions on Language Comprehension: Evidence from Eye Movements and Electrophysiology	3
PENUEL Henson	NSF	Collaborative Research: EMBEDS: Exploring the Mathematics of Biological Ecosystems with Data Science	2
SHANEEN **Ketels**/Hunter	NSF	RET Site: Authentic Research Experiences for Teachers (ARETe): Connecting Community College Faculty and Students to University Engineering and Computer Science Labs	3
BIDWELL	NIH-UCD	Novel Approaches to Assessing Cannabis Impaired Driving	5
The following list of grants were shared in the Spring 2020 Newsletter, representing new grants awarded to ICS between December 1, 2019 and June 1, 2020.			
BANICH Kaiser, Friedman, Corley	NIH	14/21 ABCD-USA Consortium: Research Project at CU Boulder	7
BANICH	NIH	ABCD-USA Consortium: Twin Research Project-Supplement (2nd)	1

NEW GRANTS AWARDED TO ICS cont.

PI Name (BOLD)	Sponsor	Title of Project	# of Years
D'MELLO	DOD	A Comprehensive Approach to Modeling Job Performance via Unobtrusive, Continuous, Multimodal Sensing	1
D'MELLO	DOD	A Comprehensive Approach to Modeling Job Performance via Unobtrusive, Continuous, Multimodal Sensing	1
HUTCHISON Bidwell, Bryan	NIH	Novel Approaches to Opiate Use Reduction	0.8
KETELS Yowell, Shaheen	NSF	RET Site: Authentic Research Experiences for Teachers (ARETe): Connecting Community College Faculty and Students to University Engineering and Computer Science Labs	3
PEFFER	NSF	Enhancing Biology Education Research by Bridging Disciplinary Boundaries between Discipline-based Education Research in Biology and Learning Sciences	1
PENUEL	Gates Foundation	ACESSE - Council of Science State Supervisors	1.8
PENUEL	NCCI	Open SciEd Developers Consortium: Field Test Data Collection, Analysis, and Reporting	1
PENUEL Wingert	NSF	Preparing Teachers to Design Tasks to Support, Engage, and Assess Science Learning in Rural Schools	4
PENUEL	NSF	The Advancing Coherent and Equitable Systems of Science Education (ACESSE) Project	5
SEDEY	NIH	Universal Newborn Hearing Screening and Intervention	1
SUMNER Penuel, Biddy, Jacobs	JSMF	Developing a model of Teacher Learning to support Computationally Rich Communications in Science classrooms	5
SUMNER Biddy	NSF	Collaborative Research: DTI: STEM Career Connections: A model for preparing economically disadvantaged rural youth for the future workforce	3
YOSHINAGA-ITANO	WHO	Systematic Review of Universal Newborn Hearing Screening Outcomes for WHO	0.16

Institute of Cognitive Science
UNIVERSITY OF COLORADO **BOULDER**

PUBLICATIONS HIGHLIGHTS Cont. **Faculty/Fellows/RAs**

Katharina Kann*, Arya D. McCarthy*, Garrett Nicolai and Mans Hulden. The SIGMORPHON 2020 Shared Task on Unsupervised Morphological Paradigm Completion. In Proceedings of the 17th SIGMORPHON Workshop on Computational Research in Phonetics, Phonology, and Morphology, online, July 2020.

Manuel Mager and **Katharina Kann**. The IMS–CU Boulder System for the SIGMORPHON 2020 Shared Task on Unsupervised Morphological Paradigm Completion. In Proceedings of the 17th SIGMORPHON Workshop on Computational Research in Phonetics, Phonology, and Morphology, online, July 2020.

Manuel Mager, Özlem Çetinoğlu and **Katharina Kann**. Tackling the Low-resource Challenge for Canonical Segmentation. In Proceedings of the 2020 Conference on Empirical Methods in Natural Language Processing, online, November 2020 (to appear).

Nikhil Prabhu and **Katharina Kann**. Frustratingly Easy Multilingual Grapheme-to-Phoneme Conversion. In Proceedings of the 17th SIGMORPHON Workshop on Computational Research in Phonetics, Phonology, and Morphology, online, July 2020.

Nikhil Prabhu and **Katharina Kann**. Making a Point: Pointer-Generator Transformers for Disjoint Vocabularies. In Proceedings of the 1st Conference of the Asia-Pacific Chapter of the Association for Computational Linguistics and the 9th International Joint Conference on Natural Language Processing Student Research Workshop, online, December 2020 (to appear).

Rajat Agarwal and **Katharina Kann**. Acrostic Poem Generation. In Proceedings of the 2020 Conference on Empirical Methods in Natural Language Processing, online, November 2020 (to appear).

Sarah Moeller, Ling Liu, Changbing Yang, **Katharina Kann** and Mans Hulden. IGT2P: From Interlinear Glossed Texts to Paradigms. In Proceedings of the 2020 Conference on Empirical Methods in Natural Language Processing, online, November 2020 (to appear).

Yada Pruksachatkun*, Jason Phang*, Haokun Liu*, Phu Mon Htut*, Xiaoyi Zhang, Richard Yuanzhe Pang, Clara Vania, **Katharina Kann** and Samuel R. Bowman. Intermediate-Task Transfer Learning with Pretrained Language Models: When and Why Does It Work? In Proceedings of the 58th Annual Meeting of the Association for Computational Linguistics, online, July 2020.

B. Karamched, M. Stickler, W. Ott, B. Lindner, **Z.P. Kilpatrick*,** & K. Josic*, Heterogeneity improves speed and accuracy in social networks, Phys. Rev. Lett. (2020) in press.

B. Karamched, S. Stolarczyk, **Z.P. Kilpatrick*** & K. Josic*, Bayesian evidence accumulation on social networks, SIAM J Appl. Dyn. Syst. 19 (2020) pp. 1884-1919.

Hagen, Linda, Kosuke Uetake, Nathan Yang, Bryan Bollinger, Allison Chaney, Daria Dzyabura, Jordan Etkin, Avi Goldfarb, **Liu Liu**, K. Sudhir, Yanwen Wang, James Wright, and Ying Zhu, "How Can Machine Learning Aid Behavioral Marketing Research?" Marketing Letters 31, no. 4 (2020): 361-370

Liu, Liu, Daria Dzyabura, and Natalie Mizik. "Visual listening in: Extracting brand image portrayed on social media." Marketing Science 39, no. 4 (2020): 669-686.

Quigley, D., Caccamise, D., Weatherley, J., & **Foltz, P.** (2020). Exploring Video Engagement in an Intelligent Tutoring System. International Conference on Human-Computer Interaction, 519–530.

Parker, Jeffrey R., Iman Paul, and **Nicholas Reinholtz** (2020),"Perceived Momentum Influences Responsibility Judgments," Journal of Experimental Psychology: General, 149(3), 482-489.

Reinholtz, Nicholas, **Philip M. Fernbach,** and Bart de Langhe (forthcoming),"Do People Understand the Benefit of Diversification?," Management Science.

Spiller, Stephen A., **Nicholas Reinholtz**, and Sam J. Maglio (2020),"Judgments Based on Stocks and Flows: Different Presentations of the Same Data Can Lead to Opposing Inferences," Management Science, 66(5), 2213-2231.

K. Reda & **D. Albers Szafir**. "Rainbows Revisited: Modeling Effective Colormap Design for Graphical Inference." IEEE Transactions on Visualization & Computer Graphics (TVCG), 2021. Part of the Proceedings of IEEE VIS 2020

M. Elliott, C. Xiong, C. Nothelfer, & **D. Albers Szafir.** "A Design Space of Vision Science Methods for Visualization Research." IEEE Transactions on Visualization & Computer Graphics (TVCG), 2021. Part of the Proceedings of IEEE VIS 2020.

M. Whitlock, **D. Albers Szafir**, & K. Gruchalla. "HydrogenAR: Interactive Data-Driven Storytelling for Dispenser Reliability." In the Proceedings of the International Symposium on Mixed and Augmented Reality (ISMAR), 2020.

M. Whitlock, J. Mitchell, N. Pfeufer, B. Arnot, R. Craig, B. Wilson, B. Chung, & **D. Albers Szafir**. "MRCAT: In Situ Prototyping of Interactive AR Environments." International Conference on Virtual and Mixed Reality (VAMR), 2020

Continued on page 24

PUBLICATIONS HIGHLIGHTS Cont.

Faculty/Fellows/RA/Students

Jordt, H., Wiggins, B., & **Wingert, K.** (2020). Less text, more learning: An instructional strategy supporting language-minoritized biology students. Journal of College Science Teaching.

Wingert, K. (June 2020). Surveillance and re-mediation in an environmental justice partnership. In poster, Partnering for Equity: Examining Research Practice Partnerships as Part of Community Histories, (K. Stamatis, chair). Poster at the International Conference of the Learning Sciences, Nashville, TN. (Conference held online.)

STUDENT PUBLICATIONS

C Chandler, **PW Foltz**, J Cheng, AS Cohen, TB Holmlund, B Elvevåg (2020) Predicting Self-Reported Affect from Speech Acoustics and Language. In Proceedings of the LREC 2020 Workshop on: Resources and Processing of Linguistic, Para-linguistic and Extra-linguistic Data from People with Various Forms of Cognitive/Psychiatric/Developmental Impairments (RaPID-3)

Chandler, C., **Foltz, P. W.**, Cohen, A. S., Holmlund, T. B., Cheng, J., Bernstein, J. C., Rosenfeld, E. P., & Elvevåg, B. (2020). Machine learning for ambulatory applications of neuropsychological testing. Intelligence-Based Medicine, 1, 100006.

Janghee Cho (INFO PhD Student) and Emilee Rader (Michigan State University) had a paper accepted to CSCW 2020. The paper, entitled "The Role of Conversational Grounding in Supporting Symbiosis Between People and Digital Assistants" presented virtually in October 2020.

Janghee Cho (INFO PhD Student) and Rick Wash (Michigan State University) had a paper entitled "How Potential New Members Approach an Online Community" accepted to Computer Supported Cooperative Work (CSCW): The Journal of Collaborative Computing and Work Practices.

Janghee Cho (INFO PhD Student) and Stephen Voida (ICS Faculty Fellow) had a workshop paper entitled "Envisioning New Productivity Tools for Domestic Information Work Environments" accepted to Microsoft New Future of Work Symposium, it was presented virtually in August 2020. (a related link - https://www.microsoft.com/en-us/research/publication/envisioning-new-productivity-tools-for-domestic-information-work-environments/)

L.P. Gibson, **L.N. Hitchock**, A.D. Bryan. (2020) Experience of migraine, its severity, and perceived efficacy of treatments among cannabis users. Complementary Therapies in Medicine, Vol 56.

A. Raza, **W.R. Penuel**, **T. Sumner**. (2020). Designing Visual Learning Analytics for Supporting Equity in STEM Classrooms. Poster presented at IEEE Visualization conference (VIS'20)

Polman, J.L, Graville, C., **Sommer, S**. (2020). Data Literacy for Social Justice; How Positioning Youth as Data Journalist Affords and Constrains a Justice Orientation; In Gresalfi, M. and Horn, I. S. (Eds.), The Interdisciplinarity of the Learning Sciences, 14th International Conference of the Learning Sciences (ICLS) 2020, Volume 1 (pp. 343-349). Nashville, Tennessee: International Society of the Learning Sciences.

Sommer, S. & Polman, J. (2020). Iterative Participant and Activity Structures in a Peer Supported Science Infographic Curriculum. In Gresalfi, M. and Horn, I. S. (Eds.), The Interdisciplinarity of the Learning Sciences, 14th International Conference of the Learning Sciences (ICLS) 2020, Volume 3 (pp. 1789-1790). Nashville, Tennessee: International Society of the Learning Sciences

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HAVE QUESTIONS? NEED HELP?

NOTE: physical offices are currently closed due to COVID-19 campus closures, until further notice.

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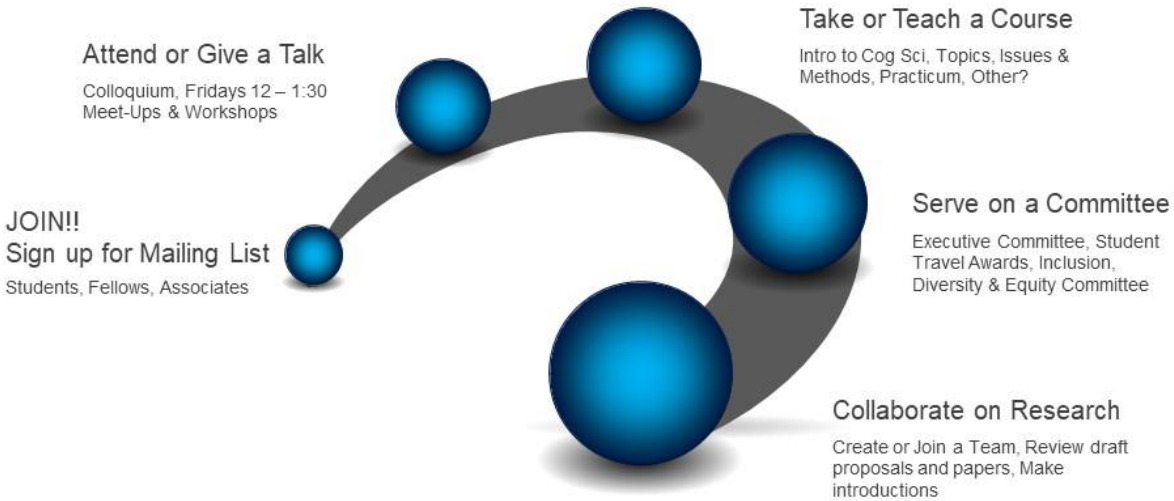
WAYS TO GET INVOLVED WITH ICS



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Your donations are particularly helpful in supporting critical pilot studies that build into larger scale research, graduate students, and early career scholars.

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Our mission is to identify and address key questions in cognitive science. Through interdisciplinary research and education, we explore the nexus of humans and machines as we seek to understand and extend human cognition, machine intelligence, and fruitful collaborations between the two. Our research builds on artificial intelligence, cognitive neuroscience, human learning, and emotional processing to tackle some of society's most pressing challenges: understanding brain health and wellness, developing personalized therapies and interventions, enhancing and deepening human learning, and optimizing complex cognitive processes to improve human performance and collaboration

VISION

- Be a campus leader in innovative, interdisciplinary research
- Be a campus leader in inclusiveness, diversity, and equity
- Reimagine our interdisciplinary educational programs
- Develop a robust resource engine to support future growth

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