iSAT Snapshot

NSF AI INSTITUTE FOR STUDENT-AI TEAMING

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Member Spotlight

Learn more about our members!

Meet Dr. Sahana Puntambekar, one of iSAT's Strand 2 co-leads and professor in University of Wisconsin-Madison's Educational Psychology department. Dr. Puntambekar's research is in the field of design and use of technology enriched interactive environments in education.

Q: What is the coolest thing about your research?

A: It's hard to find one thing because there's so much joy in discovering new ways to support students and teachers. But the most rewarding thing has been seeing students learn science and discuss science and listening to the discussions as students use our technology and instructional materials. It is truly amazing to watch 11- and 12- year old students discuss variables, data from experiments, and make sense of what the data mean.

Q: What excites you most about iSAT?

A: The most exciting thing for me is to be able to work with so many researchers and students from various disciplines and backgrounds, and to be able to work on designing innovative experiences for students and teachers!

Q: What's your favorite band or genre of music?

A: I am a student of Indian classical music so that's my favorite genre.

Q: If you could live anywhere in the world, where would it be?

A: Close to my grandkids!

Julie Harrison is a graduate student in Georgia Tech's Systems Psychology Laboratory and is a researcher for Strand 2. Her research interests include interactive team cognition and simulation design and evaluation.

Q: What excites you most about iSAT?

A: The researchers at iSAT are asking the important questions about AI, not only regarding the technological aspects, but also about the ethical implications of AI. Having conversations about how to build an equitable agent in a classroom setting has excited me the most so far.

Q: What gets you out of bed in the morning?

A: Learning more and more every day, really about anything, but specifically about how humans interact with each other and their environments energizes me each day. I am also motivated by the amount of creativity that is inherent in a career as a researcher. Thinking outside the box is an asset to a research career and something I have always enjoyed pushing myself to do.

Q: Are you a dog or cat person?

A: I'm a chicken person! We have two backyard hens.

Q: If you could meet any one person (from history or currently alive), who would it be?

A: I would love to meet Buckminster Fuller—maybe during one of his visits to Black Mountain College.

From the PI

When I reflect on iSAT, I immediately think of the proverb, *If you want to go fast, go alone. If you want to go far, go together.* From our frantic proposal submission, the stressful reverse site visit, the exciting launch of iSAT, the incredible retreat, the development of our Strategic & Implementation Plan, and now, the end of our second quarter—I'm overjoyed and proud of what we have accomplished so quickly, all during a pandemic. And we are only beginning. Looking into Q3, our research groups are chugging away, papers are being submitted, data collection plans are ongoing, team members are being onboarded, meetings have a cadence, exciting community events are imminent, and much, much more. Simply put, the institute is taking a life of its own, and all because of our amazing team. To end with another proverb, *it takes a village*, so THANK YOU!

Justice Reimagined

iSAT's First Retreat

> "I will remember that technologies I design are not aimed at data points, probabilities, or patterns, but at human beings."

—Virginia Eubanks

Participants kicked off iSAT's three-day virtual retreat—Innovating Equitable Futures—with taking up Virginia Eubanks' "Oath of Non-Harm for an Age of Big Data." This oath, and the principles behind it, shaped this November retreat and continues to shape our work today.

iSAT's first retreat included faculty, postdocs, research associates, students, and school and community partners across the Institute and focused on three goals spread across three days designed the retreat to focus on the ethical dimensions of iSAT's work. The workshop was designed by faculty members in Strand 3, Drs. Arturo Cortez, Bill Penuel, Tamara Sumner, Tiera Tanksley, and Thomas Philip, with assistance from Dr. James Pustejovsky (Strand 1) and Dr. Mike Tissenbaum (Strand 2)

The first day's goal was to explore how our different experiences shape how we see the learning potential of AI for justice, with a particular focus on the lens of race. Dr. Tiera Tanksley, a scholar of critical race and Black feminist technology studies, opened the retreat by showcasing examples of racist technology, guiding the team to think critically about the socio-political and academic consequences of our work.

To prepare for the next day's goal—building community and understanding of potential cross-strand, cross-project connections—participants annotated a video clip for homework of a small group of students working together on a math task.

On day two, Dr. Thomas Philip, an expert on how teachers make sense of power and hierarchy in classrooms, schools, and society, presented research on the practice of teacher "noticing" to help the participants make sense of their homework. The members then broke into cross-strand groups to co-view the same video, helping build cross-strand community and understanding.

The third day of the retreat focused on how to identify ways that our projects will seek to embody the ethics and elements of the responsible innovation framework. This framework, designed to protect the future from harm by emphasizing a stewardship of science and innovation, guides all of iSAT's work. Philip helped the group add a focus on racial equity and power to the framework to ensure we not only protect the future, but also help design a more just one.

"The retreat was really about justice reimagined," said Dr. Arturo Cortez of Strand 3, and one of the retreat planners. "Seeing how powerful it was for people coming to AI through a justice lens probably excited me the most about the retreat."

This lens of justice came inspired the idea of the Learning Futures Workshops. These workshops—which we've begun planning in Q2—will team our researchers with a diverse group of K–12 participants to broaden participation in STEM and AI and disrupt forms of systemic inequality.

Co-facilitators Cortez and Penuel penned a report synthesizing the discussions, conclusions, and next steps of the retreat.The retreat and report helped iSAT build a framework for raising the voices of historically marginalized communities through community co-design. We cannot wait to report on the progress we've made on this important work in our next newsletter.

Dr. Arturo Cortez
Strand 3

Dr. Bill Penuel
Strand 3

Dr. Tiera Tanksley
Strand 3

Dr. Thomas Philip
Strand 3

Dr. Tamara Sumner
Strand 3

Student Scene

Meet our awesome students and postdocs!

Ananya Ganesh
Strand 1

Name of advisors: Katharina Kann, Martha Palmer

Research focus: Natural language processing

What are you working on?
I am working on problems in natural language understanding and generation as applied to discourse in an educational setting. This involves adapting and extending state-of-the-art NLP models for tasks such as dialogue understanding in the context of classroom discourse.

How will your work contribute to iSAT?
My work is applicable to the goals of student-AI teaming and collaborative learning that iSAT is focused on. One of the goals of my research is to develop models that can guide students towards having productive discussions that promote learning. For this purpose, our system should be able to generate dialogue that is content-specific and engages students.

Upcoming publications/submissions:
My advisors and I have submitted a paper to ACL that's currently under review.

Awards: Summer research fellowship for 2021 from CU Boulder's CS department.

Layne Hubbard
Strand 2

Name of advisor: Tom Yeh

Program: PhD student in computer science, cognitive science, and neuroscience

Research focus: child-robot interaction, metacognitive reflection, creativity

What are you working on?
I recently completed a remote Wizard of Oz child-robot interaction study with 33 children ages 4–5 years old and their parents across 10 U.S. states. I'm now exploring ways to analyze the conversational data and answer my research questions. I'm using the resulting insights to iterate on our child-robot interaction designs and prototypes.

Any upcoming publications/submissions?
I submitted papers to the ACM Conference on Creativity and Cognition and the ACM Conference on Conversational User Interfaces.

How will your work contribute to iSAT?

I'm fascinated by embodied cognitive science and how the choices we make to situate and embody our AI agent will impact the middle schoolers' perceptions and interactions. I'm conducting a literature review on child-agent communication and exploring ways that the AI agent's characteristics might support student agency and metacognition in the interaction.

Awards
2018: OpenIDEO Early Childhood Innovation
2017–2020: National Science Foundation Graduate Research Fellowship
2015–2017: Chancellor's Fellowship

Other Student Recognition
2019: LEGO® Idea Conference Cohort
2018: Catalyze CU Venture Accelerator Program Cohort
2018: DEF CON Hacking Conference, Women in Security and Privacy Scholarship
2018: BizWest 'Innovation Quotient' IQ Award in Education

Q2 Wrap Up

iSAT spent Q2 kicking off our cross-strand research teams focusing on engaging embodied AI agents, effective AI-student learning environments, and equitable AI co-design curricula.

During Q2, we welcomed our Project Manager, Candace Cyrus, and Communications and Outreach Coordinator, Alayne Benson, to the team. Their support helps us focus on our research goals and foster meaningful connections with diverse communities.

Candace Cyrus (left) and Alayne Benson (right)

We also submitted our External Advisory Board recommendations to the National Science Foundation (NSF). This team will provide guidance, advice and oversight for all of iSAT's activities.

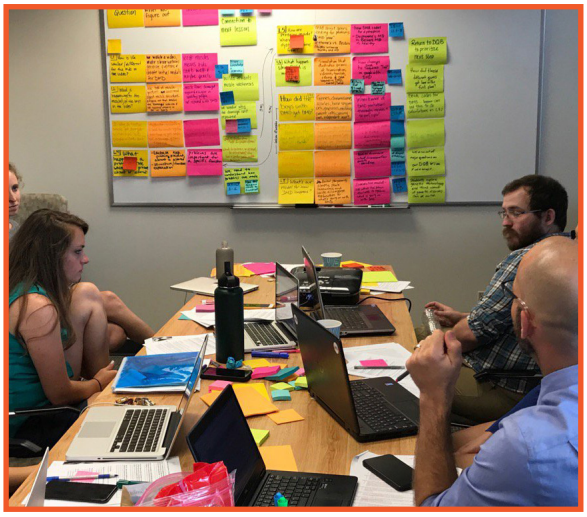
Our researchers gave a variety of talks and updates on iSAT at different events throughout the quarter. One highlight from these talks was the creation of the Learning Futures Workshop (LFW) working group with the goal of broadening participation in STEM and AI.

The LFW epitomizes the vision of iSAT to disrupt forms of systemic inequality by including and amplifying the voices of historically marginalized communities. In addition, many of our members are taking part in the Racial Equity Challenge for Institutes 2021 as contributors and discussion facilitators to learn more about how we can be anti-racist when developing our work.

Our Strands have been busy hitting their goals for Q2. Strand 1, which develops new advancements in how machines process human language, gestures, and emotions, have made strides in the content analysis work through improving methodology for abstract meaning representation (AMR) generation to reflect real-world performance. They also improved their predictions of a teacher's next talk move and annotated data for training language models on children's speech.

Strand 2, which works toward better understanding how students, AI, and teachers can collaborate effectively in both classrooms and remote learning contexts, made promising progress in designing in-person and virtual AI-based Conversational Learning Environments (AICL), and they're working with Strand 1 to determine how to embed sensors (such as cameras) in these learning environments. They've also worked closely with Strand 3 to determine the initial roles of the AI partner and on embedding engaging curriculum for the AICL.

Strand 3, which works hand-in-hand with students and teachers to co-design our new AI technologies, made meaningful developments in plans to conduct our Learning Futures Workshops (LFW) with a diverse pool of K–12 students. Their work on planning and researching AI co-design curricula shapes the efforts of Strands 1 and 2 and will help support the agency of participants and centers justice in design.



iSAT researchers held a teacher workshop with our school partners to help shape our co-design curricula work.

This progress in Q2 makes for an exciting third quarter for iSAT! We'll hold our LFWs, plan a virtual summer camp, develop the first version of our AI-partner, and more!

Our (pandemic-friendly) Outreach

Spreading the word, not the virus.

At iSAT, we're all about making meaningful connections to better our research. Founding a nation-wide institute during the era of COVID-19 presented some unique challenges, but we rose to the occasion and created safe and effective ways to spread the word.

We've established a website and Twitter so you can become part of our meaningful connections by subscribing online here: https://www.colorado.edu/research/ai-institute/content/subscribe and following us on Twitter @NSF_iSAT.

We've also created an outreach webpage on CU Boulder's Outreach and Engagement website: https://outreach.colorado.edu/?post_type=program&p=12479. This page and our website contains co-design, education, and professional development opportunities and will be updated frequently.

To reach educators, scientists, students, and researchers, our members gave a variety of talks and updates on iSAT's work at different events, including three keynotes. Our Principal Investigator, Sidney D'Mello, also presented the institute's vision to a team of program officers at the Bill & Melinda Gates Foundation in a talk titled AI in ED: Where we are and the next frontier.

iSAT also made the evening news this quarter! Our partnership with a local school district was featured on CBS4 News and Fox 31 News in Denver.

We're ramping up our virtual outreach efforts in Q3 and post-COVID-19 efforts in the year ahead! We hope you'll be a part of it all.

Get Involved

Our vision is to broaden community contribution to the development of an AI-literate workforce.

Email, subscribe, and follow us to learn how you can partner with research and educational activities and learn more about our latest projects and research and upcoming community events!

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

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