Srinjita Bhaduri, Ph.D.

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Research Interests

Human-Centered Computing (HCC), Learning Sciences, STEM Education, Educational Technology, 3D Printing and Modeling, and Augmented Reality

Professional Experience

Aug 2021 – Present
Research Scientist - Institute of Cognitive Science
University of Colorado Boulder
- Develop curricula to integrate programmable sensor technologies, 3D printing, and computational thinking in middle-school and used qualitative research methods to study the effectiveness of the curriculum. Organize and lead professional learning workshops for ~200 teachers and stakeholders on classroom technology usage.
- Lead cross-functional teams to design, pilot, and execute ways to create equitable learning environments for 3000+ middle-school youth, particularly focusing on underrepresented populations and career pathways.
- Refine and implement research data collection and analysis instruments. Conducted over 150 user interviews, supervised multiple field studies, and administered surveys to participants, i.e., students, teachers, and stakeholders.
- Deliver research findings to teams through presentations and publications and identify ways to enhance youth experiences with educational technologies.
- Responsible for expanding involvement of community stakeholders, including parents, small businesses, teachers, educators, and research institutes, to make them knowledgeable of emerging technologies and develop STEM pathways for underserved youth.

2017 – Present
Lab Manager, Sumner Lab
- Oversee weekly meetings and research endeavors, involving the PI, Research Associates, Graduate and Undergraduate student researchers.
- Recruit and supervise Graduate, Undergraduate, and high-school students on Computer Science projects.

Dec 2013 – June 2014
Software Engineer
Cognizant Technology Solutions, Levi Strauss project
- Researched and identified challenges the Support team encountered in day-to-day activities, like sending daily reminders and updating emails at allocated times to international clients.
- Improved team's workflow by designing and developing an automation tool for day-to-day activities.
- Reduced overall cost of hiring new employees and paying employees' overtime.

Education

2021 | Dual Ph.D. in Computer Science and Cognitive Science
University of Colorado Boulder
Dissertation topic - Teach3D: A Toolkit for Effective Teaching of 3D Modeling and Spatial Thinking Skills in Middle School
Committee: Tamara Sumner (chair), Shaun Kane, Ellen Do, Tom Yeh, William Penuel

2016 | M.S., Computer Science
University of Colorado Boulder
Advisor: Tom Yeh

2013 | Bachelor of Technology, Computer Science and Engineering
West Bengal University of Technology, India

Research Experience

Jan 2020 – July 2021 | Graduate Research Assistant supervised by Dr. Tamara Sumner, CU, Boulder
Collaborative Research: STEM Career Connections: A Model for Preparing Economically-Disadvantaged Rural Youth for the Future Workforce
Researching ways to create rich learning experiences for middle school students in rural mountain school district in Colorado, i.e., Eagle County Schools (ECS) with 3D modeling and printing technologies to prepare economically-disadvantaged rural youth for the future workforce. Responsible for all aspects of developing tools, designing research instruments for data collection, and research data analysis. These activities also extend to recruiting participants, writing IRB documents, and collaborating with partners to provide formative feedback based on students, teachers, and other stakeholders.
3 peer-reviewed first-author articles, 1 demo

Jan 2016 – Aug 2019 | Graduate Research Assistant supervised by Dr. Tamara Sumner, CU, Boulder
Engineering experiences: Research on student competency, motivation and persistence in STEM for underserved youth
Worked on creating out-of-school time learning experiences for youth in middle and high school using Unmanned Aerial Vehicles (UAVs) and 3D modeling and printing technologies to introduce and engage undeserved youth in engineering during out-of-school time and foster long-term interest and pathways into the field. Responsible for all aspects of developing tools, designing research instruments for data collection, and research data analysis. These activities also extend to recruiting participants, writing IRB documents, and collaborating with partners to provide formative feedback based on participant behavior.
4 peer-reviewed first-author articles, 1 first-author book chapter, 3 posters

Publications

Peer Reviewed Journal Articles

[j.1] **S. Bhaduri**, Q. Biddy, C. H. Elliott, J. Jacobs, M. Rummel, J. Ristvey, T. Sumner, and M. Recker. (2022). Co-designing a rural research practice partnership to design and support STEM pathways for rural youth. *Theory Practice in Rural Education*, 12(2), 45-70. PDF

Peer Reviewed Conference Papers

[p.14] **S. Bhaduri**, C. H. Elliot, and Q. Biddy. (2023) Local Mentors' Role in Rural STEM Pathways: Precarities and Possibilities. Paper accepted for presentation at *American Educational Research Association* (AERA). PDF

[p.13] Q. Biddy, **S. Bhaduri**, J. Bush, C. H. Elliot, M. Recker, and T. Sumner. (2022) Co-designing Opportunities for Rural Middle School Youth to Engage with STEM Careers and Career Pathways. Paper presented at *American Educational Research Association* (AERA). PDF

[p.12] **S. Bhaduri**, Q. Biddy, J. Bush, A. Suresh, and T. Sumner. 2021. 3DnST: A Framework Towards Understanding Children's Interaction with Tinkercad and Enhancing Spatial Thinking Skills. In *Interaction Design and Children, IDC* (pp. 257-267). PDF

[p.11] **S. Bhaduri**, Q. Biddy, M. Rummel, J. Bush, , J. Jacobs, M. Recker, J. Ristvey, and T. Sumner. 2021. Integrating Professional Mentorship with a 3D Printing Curriculum to Help Rural Youth Forge STEM Career Connections. Accepted for *2021 ASEE Annual Conference Exposition*. ASEE Conferences, Long Beach, California. PDF

[p.10] **S. Bhaduri**, P. Gyory, and T. Sumner. 2020. 3DARVisualizer: Debugging 3D models using Augmented Reality. Demo presented at the *FabLearn Flagship conference*, NYC 2020 (organized virtually). PDF

[p.9] **S. Bhaduri***, H. Hedayati*, T. Sumner, D. Szafir, and M. D. Gross. 2019. HugBot: A soft robot designed to give human-like hugs. In *Proceedings of the 18th ACM Conference on Interaction Design and Children* (IDC '19). PDF
**Both authors contributed equally*

[p.8] **S. Bhaduri**, K. V. Horne, and T. Sumner. Designing an Informal Learning Curriculum to Develop 3D Modeling Knowledge and Improve Spatial Thinking Skills. 2019. In *Proceedings of the 2019 CHI Conference Extended Abstracts on Human Factors in Computing Systems* (ACM). PDF

[p.7] P. Chilana, N. Hudson, **S. Bhaduri**, P. Shashikumar, and S. K. Kane. (2018). Supporting Remote Real-time Expert Help: Opportunities and Challenges for Novice 3D Modelers. In *Proceedings of the IEEE Symposium on Visual Languages and Human-Centric Computing* (VL/HCC '18). PDF

[p.6] **S. Bhaduri**, K. V. Horne, J. Ristvey, R. Russell, and T. Sumner. (2018). Learning Engineering Practices Through Drones: Iterative design of an informal learning curriculum. In *Proceedings of the 13th International Conference of the Learning Sciences* (ICLS). PDF

[p.5] **S. Bhaduri**, K. V. Horne, J. Ristvey, R. Russell, and T. Sumner (2018). From toys to tools: UAVs in middle-school engineering education (RTP). In *2018 ASEE Annual Conference Exposition, Salt Lake City, Utah*. PDF

[p.4] **S. Bhaduri**, P. Gyory, and T. Sumner. (2018). "Enhancing 3D Modeling with Augmented Reality in an after-school engineering program". In *2018 ASEE Annual Conference Exposition, Salt Lake City, Utah*. PDF

[p.3] M. Skirpan, N. Beard, **S. Bhaduri**, C. Fiesler, and T. Yeh (2018). Ethics Education in Context: A Case Study of Novel Ethics Activities for the CS Classroom. In *Proceedings of the SIGCSE technical symposium on Computer science education (SIGCSE'18)*, **Third Best Paper in the Track: Experience Reports and Tools**. PDF

[p.2] **S. Bhaduri**, J. G. O. Tovar, and S. K. Kane. (2017). Fabrication Games: Using 3D Printers to Explore New Interactions for Tabletop Games. In *Proceedings of the 2017 ACM SIGCHI Conference on Creativity and Cognition*. Singapore. PDF

[p.1] **S. Bhaduri**. (2017). Using 3D Modeling and Prediction as a Lens into Student Design Processes. In *Proceedings of the 2017 ACM SIGCHI Conference on Creativity and Cognition*. Singapore. PDF

BOOK CHAPTERS

[b.1] **S. Bhaduri**, A. Gendreau, V. S. Koushik, T. Sumner, J. Ristvey, and R. Russell. (2018). Promoting Middle School Students' Motivation and Persistence in an After-School Engineering Program (J. Barnes-Johnson and J. M. Johnson, Eds.). In *STEM21: Equity in teaching and learning to meet global challenges of standards, engagement and transformation*. DOI

POSTERS PRESENTED

[a.3] **S. Bhaduri** (2019). Supporting Spatial Thinking Skills in Novice 3D Modelers Through 3D Modeling and Augmented Reality. Poster presented at *Computing Research Association for Women,*

CRA-W, Chicago.

[a.2] **S. Bhaduri**, K. V. Horne, P. Gyory, H. N. Ngo, and T. Sumner. (2018) Enhancing 3D Modeling with Augmented Reality in an after-school engineering program. Poster presented at *ASEE Zone IV Conference 2018*.

[a.1] **S. Bhaduri**, J. Ristvey, R. Russell, and T. Sumner. (2017). Promoting Middle School Students Motivation, Persistence, and Career Awareness in an After-school Program. Poster presented at the *annual STELAR ITEST PI and Evaluator Summit, Washington D.C*.

Invited Talks

2022	Teach3D: Toolkit for Effective Teaching of 3D Modeling and Spatial Thinking Skills in Middle School, Digital Learning Lab, University of California, Irvine | February 18
2020	Supporting Spatial Thinking Skills in Youth through 3DARVisualizer thriveWISE, DevPulseCon 2020 | Hosted virtually on October 6
2019	Supporting Spatial Thinking Skills in Novice 3D Modelers through 3D Modeling and Augmented Reality University of Colorado Boulder, ATLAS Institute | March 12
2018	User Centered Design (CSCI 5839) | Guest Speaker Discussed different approaches to Hardware and Rapid Prototyping University of Colorado Boulder | October 2018
2014	Designing Tactile Pictures with Craft Materials for 3D Printing Co-presented talk at Teen's Science Cafe Denver, CO | March 14

Teaching Experience

Department of Computer Science, University of Colorado Boulder

Teaching Assistant	**Software Methods and Tools** Fall 2019, Summer 2016, Fall 2015, Summer 2015, Fall 2014 25-30 students, 1-2 sections **Intro to Programming - Level II** Spring 2015 30 students, 2 sections
Grader	**Human Centered Computing and Development** Summer 2017 **Intro to Programming** Fall 2014, Summer 2020

CU Science Discovery

Summer Camp Facilitator	3D Printing & Wearable Electronics Academy with high-school students | 2018 3D Printing summer camp with elementary-school students | 2015

Mentoring Experience

Spring 2020	**Ketan Kamat** Undergraduate in Aerospace Engineering University of Colorado Boulder Modification of *3DARVisualizer* app for debugging 3D models
Fall 2019 Spring 2021	**Ayush Shekhar, Julietta Rozin** High-school students from Peak-to-Peak Charter School Supporting 3D modeling experiences with Augmented Reality (Secured first place in Science Research Symposium in Boulder district for the Computer Science and Math category)
Spring 2019	**Kellen Kennedy** Undergraduate in Biological and Chemical Engineering University of Colorado Boulder Approaches to design 3D modeling user studies
Fall 2017 Spring 2018	**Peter Gyory** PhD student in ATLAS Institute Designing Augmented Reality debugging app to support 3D modeling **Hannie Ngo**, Discovery Learning Apprentice Undergraduate in Computer Science University of Colorado Boulder Interaction Design & data mining in engineering education
Fall 2016 Spring 2017	**Jesus Ortiz Tovar**, Discovery Learning Apprentice Undergraduate in Computer Science, University of Colorado Boulder Using 3D Printers to Explore New Interactions for Tabletop Games
Summer 2015	**Lindsey Welch, Chantelle Humphries** 3D Printed braille **Dinah Bowman, Nueka Lo**, Post-processing Techniques to Enhance Tactile Textures Summer Research Mentor Program (REM) for high school students through CU Science Discovery. (Results were invited and presented at the White House)

Outreach Activities

2018	CU Science Ambassador, University of Colorado Boulder

Awards and Honors

2021	**Graduate Research Excellence – Outstanding Research Assistant** University of Colorado Boulder **Nominated for Outstanding Dissertation Award (Computer Science)** College of Engineering and Applied Sciences, University of Colorado Boulder
2018	**Outstanding Service Award** Department of Computer Science, University of Colorado Boulder
2016	**Early Career Professional Development Award** Department of Computer Science, University of Colorado Boulder
2015	**Outstanding Teaching Assistant Award** Department of Computer Science, University of Colorado Boulder **Best User Interaction** HackCU organized by University of Colorado Boulder

Service

Board Member	EcosySTEM ARTS | 2020 - Present Mentor engineering teams to bring STEM education to children in hospitals
Student Rep	Graduate Student Advisory Board | 2017-2019 College of Engineering and Applied Science (CEAS) University of Colorado Boulder
	TA Recruitment | 2019 Department of Computer Science University of Colorado Boulder
Founding Member	CS Graduate Student Association (CSGSA) | 2017-2019 University of Colorado Boulder
Participant	Selected for the Computing Research Association CRA-W(omen) Grad Cohort | 2019
Invited Reviewer	For over 75 manuscripts for CHI (2019-Present), ICRA (2020), SIGCSE (2020-Present), ASEE (2018-Present), Human-Computer Interaction Journal (2018), IDC (2019-Present), International Journal for Child-Computer Interaction (2022-Present), Journal for Theory and Practice in Rural Education (2022-Present)
Volunteer	IDC 2020, CHI 2019, C&C 2017

Grants

External Grants

Under Review	Co-PI, NSF EDU Racial Equity - Pertenecemos en STEM: A Transformative STEM Partnership Centering Latinx Families Full grant amount: $3,217,444

Internal Grants, University of Colorado Boulder

2022	NSF National AI Institute for Student-AI teaming, Trainee Grant | $2500 with Layne Jackson Hubbard and Santiago Ojeda Ramirez (University of California, Irvine)
2021	CARTSS Graduate Student Award, CU, Boulder | $1500
2020	Beverly Sears Graduate Student Grant | $1000 Department of Computer Science Travel Grant | $400
2019	Department of Computer Science Travel Grant | $1000 Institute of Cognitive Science (ICS) Travel Grant | $700
2018	Institute of Cognitive Science (ICS) Travel Grant | $500

Skills

Programming	Python, C/C++, Java, JavaScript, HTML5/CSS, C#, R, three.js, Node.js
Fabrication	3D Modeling (TinkerCAD, SketchUp, Open(J)SCAD), 3D Printing, Sketching/Wireframing (Sketch), Laser Cutting, Unity game design
Research Techniques	User studies, Qualitative and Quantitative research, Survey design (Qualtrics)
Other	Microsoft Office tools including PowerPoint, Excel, Keynote, G-suite