

# Dr. Sandeep Kaur Kuttal

Associate Professor

Director, **Human Factors + Experience Engineering (HFXE) Group**  
(*Discovering and Inventing for Human-Centered SE and AI*)

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## A. Professional Preparation

- Ph.D. Computer Science, University of Nebraska, Lincoln, Nebraska, 2014.
- M.Tech. Computer Science and Engineering (**with Distinction**), Punjab Technical University, Jalandhar, India, 2007.
- B.Tech. Computer Science and Engineering, Punjab Technical University, Jalandhar, India, 2001.

## B. Appointments

- Associate Professor, Computer Science, North Carolina State University, Raleigh, North Carolina (Fall 2022 to Present).
- Visiting Scholar, Tandy School of Computer Science, University of Tulsa, Tulsa, Oklahoma (Fall 2022 to Fall 2024).
- Assistant Professor, Tandy School of Computer Science, University of Tulsa, Tulsa, Oklahoma (Fall 2015 to Summer 2022).
- Visiting Faculty Member, Human-AI Collaboration Group, IBM T.J. Watson Research Center, Yorktown Heights, New York (June 2019).
- Postdoctoral Scholar, Department of Electrical Engineering and Computer Science, Oregon State University, Corvallis, Oregon (Fall 2014 to Summer 2015).
- Graduate Teaching Assistant, Department of Computer Science and Engineering, University of Nebraska, Lincoln, Nebraska (Fall 2010 to Fall 2013).
- Graduate Research Assistant, Department of Computer Science and Engineering, University of Nebraska, Lincoln, Nebraska (Spring 2009 to Summer 2014).
- Senior Lecturer, Department of Computer Science and Engineering, Baba Banda Singh Bahadur Engineering College, Fatehgarh Sahib, India (Fall 2007 to Fall 2009).
- Lecturer, Department of Computer Science and Engineering, Baba Banda Singh Bahadur Engineering College, Fatehgarh Sahib, India (Fall 2001 to Spring 2007).

## C. Awards

- Carla Savage Award, North Carolina State University, 2025.
  - For outstanding research in the NCSU Computer Science department.
- National Science Foundation CAREER Award (IIS HCC Directorate), 2021.
  - A highly selective early-career award with an estimated ~15% acceptance rate in the Division of Information and Intelligent Systems (IIS) under Human-Centered Computing (HCC) directorate.
- Young Investigator Program (YIP) Award from AFOSR (Air Force Office of Scientific Research), 2021.
  - One of 36 awardees selected nationwide for this prestigious early-career honor, spanning all science and engineering disciplines.
  - Uniquely funded through the Computational Cognition & Machine Intelligence Program, recognizing the work's interdisciplinary impact.
- Honorable Mention, International Conference on Human Factors in Computing Systems (CHI), 2021.

- Best Paper, International Conference on Human Factors in Computing Systems (CHI), 2016.
- Best Paper, International Conference on Global Software Engineering (ICGSE), 2016.
- First Prize for User-Centered Design, Global User Experience Career Summit, 2014.

## D. Research

My research advances human-centered software engineering by uncovering how problem-solving professionals interact with technology and by inventing intelligent, inclusive solutions—including tools, methods, and frameworks—at the intersection of software engineering, human-computer interaction, and artificial intelligence. I study diverse individuals across solo, team-based, and human–AI programming contexts, producing actionable insights and systems that bridge human intent and machine execution.

### D1. Refereed Journal Publications

- [J1] Shandler Mason, Sandeep K. Kuttal, Diversity's Double-Edged Sword: Analyzing Race's Effect on Remote Pair Programming Interactions, *ACM Transactions on Software Engineering and Methodology*, vol. 32, no. 1, article 24, pp. 1-45, 2024. **(Journal-First; Presented at ICSE)**
- [J2] Abim Sedhain, Vaishvi Diwanji, Helen Solomon, Leon Shahnewaz, Riley Raasch, Sandeep Kaur Kuttal, Developers' Information Seeking in Question & Answer Websites through a Gender Lens, *Journal of Computer Languages*, vol. 79, pp. 1-17, 2024. **(Journal-First; Presented at VL/HCC)**
- [J3] Peter Robe, Sandeep Kaur Kuttal, Designing PairBuddy – A conversational agent for pair programming, *ACM Transactions on Computer-Human Interaction*, vol. 29, issue 4, article 34, pp. 1-44, 2021. **(Journal-First; Presented at CHI)**
- [J4] Sandeep Kaur Kuttal, Xiaofan Chen, Zhendong Wang, Sogol Balali, Anita Sarma, Visual Resume: Exploring developers' online contributions for hiring, *Information and Software Technology*, vol. 138, pp. 1-14, 2021. **(Journal-First; Presented at SARNER)**
- [J5] Sandeep Kaur Kuttal, Se Yeon Kim, Carlos Martos, Alexandra Bejarano, How do end-user programmers forage in online repositories? An information foraging perspective, *Journal of Computer Languages*, vol. 62, pp. 1-15, 2020. **(Journal-First; Presented at VL/HCC)**
- [J6] Sandeep Kaur Kuttal, Akash Ghosh, Source code comments: Overlooked in the realm of code clone detection, *International Journal of Computer Science and Information Security*, vol. 18, no. 11, pp. 11-22, 2020.
- [J7] Sandeep Kaur Kuttal, Mike Sun, Akash Ghosh, Rajesh Sharma, Birds of a feather flock together? A study of developers' flocking and migration behavior in GitHub and Stack Overflow, *International Journal of Computer Science and Information Security*, vol. 18, no. 6, pp. 1-12, 2020.
- [J8] Sandeep Kaur Kuttal, Yiting Bai, Ezequiel Scott, Rajesh Sharma, Tug of perspectives: Mobile app users versus developers, *International Journal of Computer Science and Information Security*, vol. 18, no. 6, pp. 83-94, 2020.
- [J9] Sandeep Kaur Kuttal, Margaret Burnett, Anita Sarma, Gregg Rothermel, Ian Koepp, Brooke Shepherd, How end-user programmers debug visual web-based programs: An information foraging theory perspective, *Journal of Visual Languages and Computing*, vol. 53, pp. 22-37, 2019.
- [J10] Sandeep Kaur Kuttal, Anita Sarma, Gregg Rothermel, and Zhendong Wang, What happened to my application? Helping end users comprehend evolution through variation management, *Information and Software Technology*, vol. 103, pp. 55-74, 2018.
- [J11] William Jernigan, Amber Horvath, Michael Lee, Margaret Burnett, Taylor Culty, Sandeep Kaur Kuttal, Anicia Peters, Irwin Kwan, Faezeh Bahmani, Amy Ko, Christopher J. Mendez, Alannah Oleson, General principles for a generalized Idea Garden, *Journal of*

- Visual Languages and Computing*, vol. 39, pp. 5-65, 2017.
- [J12] Sandeep Kaur Kuttal, Anita Sarma, Gregg Rothmel, On the benefits of providing versioning support for end users: An empirical study, *ACM Transactions on Computer-Human Interaction*, vol. 21, no. 2, pp. 9:1-9:43, 2014. **(Journal-First; Presented at CHI)**

## **D2. Rigorously Reviewed Conference Publications**

- [C1] Sandeep Sthapit, Nour Mahmoud, Sandeep Kuttal, Patterns of Group Metacognition in High- and Low-Performing Remote Software Teams: A Qualitative Study, at 28th HCI International Conference (HCII), Montreal, Canada, 2026.
- [C2] Shahnewaz Leon, Abhishek Ravindra Desai, Sachin Kanth, Nour Mahmoud, Sandeep Kuttal, What Teams Seek and How They Seek It: Understanding Foraging Diets in Collaborative Software Debugging, at 28th HCI International Conference (HCII), Montreal, Canada, 2026.
- [C3] Sandeep Sthapit, Sandeep Kuttal, Beyond the Code: Teaching Collaborative Soft Skills in Computer Science through Research-Based Modules, at 28th HCI International Conference (HCII), Montreal, Canada, 2026.
- [C4] Manali Teke, Maarjani Sanghavi, Raj Madhu, Sandeep Kuttal, Gender at Play: How an Inclusive Collaboration Tool Shapes Remote Pair Programming, at 28th HCI International Conference (HCII), Montreal, Canada, 2026.
- [C5] Shandler Mason, Natalie Meuser, Audrey Si, Sandeep Sthapit, Shahnewaz Leon, Manali Teke, Sandeep Kuttal, Who's Left Out? A Case Study on Promoting Equitable Participation in Remote Collaboration Software, at 28th HCI International Conference (HCII), Montreal, Canada, 2026.
- [C6] Sandeep Kuttal, Sandeep Sthapit, Shahnewaz Leon, Ronnie Phillips, Philip Rahal, From Artifacts to Strategies: A Gendered Lens on Web Information Foraging, at 28th HCI International Conference (HCII), Montreal, Canada, 2026.
- [C7] Sandeep Kuttal, Sandeep Sthapit, Ronnie Phillips, Philip Rahal, A Needle in a Haystack: Developers' Information Foraging on the Wild Web, at 28th HCI International Conference (HCII), Montreal, Canada, 2026.
- [C8] Shahnewaz Leon, Zhengdong Zhang, Prasad Tadepalli, Sandeep Kuttal, Learning to Navigate (L2N): A Human-Centered Framework for Local Code Search, at 28th HCI International Conference (HCII), Montreal, Canada, 2026.
- [C9] Shandler A. Mason, Hank Lenham, Sandeep Kaur Kuttal, Breaking the Silos: An Actionable Framework for Recruiting Diverse Participants in SE, *IEEE/ACM 47th International Conference on Software Engineering: Software Engineering in Society (ICSE-SEIS)* Ottawa, Canada, pp. 25-36, 2025.
- [C10] Sandeep Sthapit, Sylbi Bae, Hank Lenham, Sandeep Kaur Kuttal, Leadership Styles, Knowledge Transfer, and Interruptions: Unpacking Critical Dynamics in Remote Software Teams, HCI in Business, Government and Organizations: Thematic Area, Held as Part of the 27th HCI International Conference (HCII), Gothenburg, Sweden, pp. 236-255, 2025.
- [C11] Abim Sedhain, Sruti Ragavan, Brett McKinney, Shahnewaz Leon, Sandeep Kaur Kuttal, Predicting Information Foraging on Q&A Websites, Social Computing and Social Media: Thematic Area, Held as Part of the 27th HCI International Conference (HCII), Gothenburg, Sweden, pp. 322-342, 2025.
- [C12] Sandeep Kaur Kuttal, Jacob Hart, Marcus Ensley, Shandler Mason, Pair Programming in the Lab vs. Wild: A Qualitative Analysis of Creativity Strategies and Dialogue Styles for Agent Training Data, Artificial Intelligence in HCI: Thematic Area, Held as Part of the 27th HCI International Conference (HCII), Gothenburg, Sweden, pp. 198-218, 2025.
- [C13] Shandler Mason, Sanket Nain, Sandeep Kaur Kuttal, Bridging Perspectives: Unveiling Racial Dynamics in Remote Pair Programming Communication, Human-Computer Interaction: Thematic Area, Held as Part of the 26th HCI International Conference (HCII), Washington, DC, USA, pp. 275-291, 2024.

- [C14] Jacob Hart, Jake AuBuchon, Alexander McAuliffe, Shandler Mason, Sandeep Kaur Kuttal, Navigating NLU Challenges in Pair Programming Agents: A Study on Data Size, Gender, Language, & Domain Effects, *Artificial Intelligence in HCI: Thematic Area, Held as Part of the 26th HCI International Conference(HCII)*, Washington, DC, USA, pp. 356–375, 2024.
- [C15] Abim Sedhain, Leon Shahnewaz, Riley Raasch, Sandeep Kaur Kuttal, Developers foraging behavior in code hosting sites: A gender perspective, *Artificial Intelligence in HCI: Thematic Area, Held as Part of the 26th HCI International Conference (HCII)*, Copenhagen, Denmark, pp. 245–260, 2023.
- [C16] Peter Robe, Sandeep K. Kuttal, Jake AuBuchon, Jacob Hart, Pair Programming Conversations with Agents vs. Developers: Challenges & Opportunities for SE Community, *Proceedings of the 30th ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE)*, Singapore, pp. 319-331, 2022.
- [C17] Caroline Lott, Alexander McAuliffe, Sandeep Kaur Kuttal, Remote Pair Collaborations of CS Students: Leaving Women Behind?, *IEEE Symposium on Visual Languages and Human-Centric Computing (VL/HCC)*, pp. 1-11, 2021.
- [C18] Sandeep Kaur Kuttal, Abim Sedhain, Jacob AuBuchon, Designing a Gender-Inclusive Conversational Agent For Pair Programming: An Empirical Investigation. *Artificial Intelligence in HCI: Thematic Area, Held as Part of the 23rd HCI International Conference (HCII)*, Virtual Event, pp. 59-75, 2021.
- [C19] Sandeep Kaur Kuttal, Bali Ong, Kate Kwasny, Peter Robe, Trade-offs for substituting a human with an agent in a pair programming context: The good, the bad and the ugly, *Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems (CHI)*, Yokohama, Japan, pp. 1-20, 2021 (**Honorable Mention Award**)
- [C20] Sandeep Kaur Kuttal, Jarow Myers, Sam Gurka, David Magar, David Piorkowski and Rachel Bellamy, Towards designing conversational agents for pair programming: Accounting for creativity strategies and conversational styles, *IEEE Symposium on Visual Languages and Human-Centric Computing (VL/HCC)*, Dunedin, New Zealand, pp. 1-11, 2020.
- [C21] Peter Robe, Sandeep Kaur Kuttal, Yunfeng Zhang, Rachel Bellamy, Can machine learning facilitate remote pair programming? Challenges, insights and implications, *IEEE Symposium on Visual Languages and Human-Centric Computing (VL/HCC)*, Dunedin, New Zealand, pp. 1-11, 2020.
- [C22] Sandeep Kaur Kuttal, Kevin Gerstner, Alexandra Bejarano, Remote pair programming in online computer science education: Investigating through a gender lens, *IEEE Symposium on Visual Languages and Human-Centric Computing*, pp. 75-85, 2019.
- [C23] Sruti Srinivasa Ragavan, Bhargav Pandya, David Piorkowski, Charles Hill, Sandeep Kaur Kuttal, Anita Sarma, Margaret Burnett, PFIS-V: Modeling foraging behavior in the presence of variants, *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems (CHI)*, Denver, Colorado, USA, pp. 6232-6244, 2017.
- [C24] Sruti Srinivasa Ragavan, Sandeep Kaur Kuttal, Charles Hill, Anita Sarma, David Piorkowski, Margaret Burnett, Foraging among an overabundance of similar variants, *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems (CHI)*, San Jose, California, USA, pp. 3509-3521, 2016. (**Best Paper Award**)
- [C25] Anita Sarma, Xiaofan Chen, Sandeep Kuttal, Laura Dabbish, Zhendong Wang, Hiring in the global stage: Profiles of online contributions, *IEEE 11th International Conference on Global Software Engineering (ICGSE)*, pp. 1-10, 2016. (**Best Paper Award**)
- [C26] William Jernigan, Amber Horvath, Taylor Culty, Margaret Burnett, Michael Lee, Sandeep Kaur Kuttal, Anicia Peters, Irwin Kwan, Faezeh Bahmani, Amy Ko, Principles of Idea Garden hints for end-user programmers, *IEEE Symposium on Visual Languages and Human-Centric Computing (VL/HCC)*, Atlanta, United States, pp. 235-243, 2015.

- [C27] Sandeep Kaur Kuttal, Anita Sarma, Gregg Rothermel, Predator behavior in the wild web world of bugs: An information foraging theory perspective, *IEEE Symposium on Visual Languages and Human-Centric Computing (VL/HCC)*, San Jose, California, United States, pp. 59-66, 2013.
- [C28] Sandeep Kaur Kuttal, Anita Sarma, Gregg Rothermel, Debugging support for end-user mashup programming, *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI)*, Paris, France, pp. 1609-1618, 2013.
- [C29] Sandeep Kaur Kuttal, Anita Sarma, Amanda Swearngin, Gregg Rothermel, Versioning for mashups – An exploratory study, in *End-User Development*, Springer Berlin Heidelberg, Berlin, Heidelberg, pp. 25-41, 2011.

### **D3. Peer Reviewed Conference Papers (Short)**

- [S1] Shandler A. Mason, Sandeep Kaur Kuttal, The Hidden Burden: Insights Into Women's Lived Experiences In Computing, *IEEE Symposium on Visual Languages and Human-Centric Computing (VL/HCC)*, Raleigh, USA, pp. 1-6, 2025.
- [S2] Carlos Martos, Se Yeon Kim, Sandeep Kaur Kuttal, Reuse of variants in online repositories: Foraging for the fittest, *IEEE Symposium on Visual Languages and Human-Centric Computing (VL/HCC)*, Cambridge, UK, pp. 124-128, 2016.
- [S3] S. Kuttal, A. Sarma and G. Rothermel, History repeats itself more easily when you log it: Versioning for mashups, *Proceedings of the IEEE Symposium on Visual Languages and Human-Centric Computing (VL/HCC)*, Pittsburgh, Pennsylvania, United States, pp. 69-72, 2011.

### **D4. Peer Reviewed Workshop Papers**

- [W1] Shandler A. Mason, Sandeep Kaur Kuttal, Analyzing Gender-Based Dynamics in Remote Pair Programming Interactions, *IEEE/ACM Sixth Workshop on Gender Equality, Diversity, and Inclusion in Software Engineering (GEICSE)*, pp. 41–44, 2025.
- [W2] S. Kuttal, Variation support for end users, *Proceedings of the IEEE Symposium on Visual Languages and Human-Centric Computing (VL/HCC)*, San Jose, California, United States, pp. 183-184, 2013.

### **D5. Peer Reviewed Posters/Abstracts**

- [P1] Sandeep Sthapit, Jess Moorefield, Sandeep Kaur Kuttal, Metacognition in Software Teams: Investigating Individual Expertise in Cognitive Knowledge and Regulation, HCI 2025, Held as Part of the *27th HCI International Conference (HCII)*, Gothenburg, Sweden, pp. 90 - 101, 2025.
- [P2] Abim Sedhain, Sruti Srinivasa Ragavan, Brett McKinney, Shahnewaz Leon, Sandeep Kaur Kuttal, Unveiling Value-Cost Dynamics in StackOverflow with IFT-Enhanced Clustering, in *HCI International 2025 Posters (HCII)*, C. Stephanidis, M. Antona, S. Ntoa, and G. Salvendy, Eds. Cham: Springer, Gothenburg, Sweden, pp. 355 - 364, 2025.
- [P3] Leon Shahnewaz, Mahzabin Tamanna, Sandeep Kaur Kuttal, Comparing Foraging Behavior Across Code Hosting and Q&A Platforms through a Gender Lens, *IEEE Symposium on Visual Languages and Human-Centric Computing (VL/HCC)*, Washington, DC, USA, pp. 235 - 238, 2023.
- [P4] Shandler A. Mason, Sandeep Kaur Kuttal, Investigating Interracial Pair Coordination During Remote Pair Programming, *IEEE Symposium on Visual Languages and Human-Centric Computing (VL/HCC)*, Washington, DC, USA, pp. 260 - 262, 2023.
- [P5] Jacob C. Hart, Marcus Ensley, Sandeep Kaur Kuttal, Gender Effects on Creativity When Pair Programming with a Human vs. an Agent, in *HCI International 2023 Posters (HCII)*,

- edited by Constantine Stephanidis, Margherita Antona, Stavroula Ntoa, and Gavriel Salvendy, Springer Nature Switzerland, Cham, Copenhagen, Denmark, pp. 594 - 602, 2023.
- [P6] Abim Sedhain, Yao Wang, Brett McKinney, Sandeep Kaur Kuttal, Modeling Foraging Behavior in GitHub, in *HCI International 2023 Posters (HCII)*, edited by Constantine Stephanidis, Margherita Antona, Stavroula Ntoa, and Gavriel Salvendy, Springer Nature Switzerland, Cham, Copenhagen, Denmark, pp. 149 - 155, 2023.
  - [P7] Jacob Hart, Jake AuBuchon, Sandeep Kaur Kuttal, Feasibility of using YouTube Conversations for Pair Programming Intent Classification, *IEEE Symposium on Visual Languages and Human-Centric Computing (VL/HCC)*, Roma, Italy, pp. 1 - 4, 2022.
  - [P8] Alexander McAuliffe, Jacob Hart, Sandeep Kaur Kuttal, Evaluating Gender Effects in Pair Programming Conversations, *IEEE Symposium on Visual Languages and Human-Centric Computing (VL/HCC)*, Roma, Italy, pp. 1 - 4, 2022.
  - [P9] Abim Sedhain, Sruti S. Ragavan, Brett McKinney, Sandeep Kaur Kuttal, Estimating Foraging Values and Costs in Stack Overflow, *IEEE Symposium on Visual Languages and Human-Centric Computing (VL/HCC)*, Roma, Italy, pp. 1 - 4, 2022.
  - [P10] Abim Sedhain, Sandeep Kaur Kuttal, Information Seeking Behavior for Bugs on GitHub: An Information Foraging Perspective, *IEEE Symposium on Visual Languages and Human-Centric Computing (VL/HCC)*, Roma, Italy, pp. 1 - 3, 2022.
  - [P11] Vaishvi Diwanji, Abim Sedhain, Grey Bodi, Sandeep Kaur Kuttal, Developers' Foraging Behavior on Stack Overflow, *IEEE Symposium on Visual Languages and Human-Centric Computing (VL/HCC)*, Roma, Italy, pp. 1 - 3, 2022.
  - [P12] Cheng Zhou, Sandeep Kaur Kuttal, Iftekhar Ahmed, What makes a good developer? An empirical study of developers' technical and social competencies, *IEEE Symposium on Visual Languages and Human-Centric Computing (VL/HCC)*, Lisbon, Portugal, pp. 319 - 321, 2018.
  - [P13] Akash Ghosh, Sandeep Kaur Kuttal, Semantic clone detection: Can source code comments help?, *IEEE Symposium on Visual Languages and Human-Centric Computing (VL/HCC)*, Lisbon, Portugal, pp. 315-317, 2018.

## D6. Book Chapters

- [B1] Sandeep Kaur Kuttal, Abim Sedhain, Benjamin Riethmeier, How do web-active end-user programmers forage? *Coding Theory – Recent Advances, New Perspectives and Applications*, S. Radhakrishnan (Ed.), IntechOpen, London, United Kingdom, Chapter 4, 2021.

## D7. Keynotes

- [1] Software Engineering Dynamics: Linking Technical and Human-Centric Factors, *International Conference on Human Computer Interaction and Cognitive Computing*, India, Jan 2024.
- [2] Towards Seamless Collaboration: Redefining Human-AI Interaction in Programming at the *ACM Tech Talk*, December 2023.
- [3] IDEs as the Bridge: Connecting Humans and Code at the IEEE International Working Conference on *Source Code Analysis & Manipulation (SCAM)* and on *Software Visualization (VISOFT)* Bogotá, Colombia, October 2023.
- [4] Bridging the Gap: Crafting Inclusive Pair Programming Conversational Agents for Human Collaboration at the *Recent Advancements in Communication, Computing, and Artificial Intelligence*, Mohali, India, October 2023.
- [5] Testing software: Challenges and hardships of non-traditional testers, presented at the *International Workshop on User Interface Test Automation and Testing Techniques for*

## **D8. Invited Lectures/Talks**

- [1] Minds & Machines: The New Era of Collaborative Software Engineering, *Northeastern University in Silicon Valley*, San Jose, California, USA, August 2025.
- [2] From Solo to Synergy: Transforming Software Engineering with AI and Human Collaboration, *Simula Research Lab*, Oslo, Norway, June 2025.
- [3] IDEs as the Bridge: Connecting Humans and Code, *Imperial College London*, London, U.K., September 2024.
- [4] Developers' Information Seeking in Question & Answer Websites through a Gender Lens, *IEEE Symposium on Visual Languages and Human-Centric Computing*, Liverpool, UK, September 2024.
- [5] IDEs as the Bridge: Connecting Humans and Code, *Pontifical Catholic University of Rio de Janeiro*, Brazil, July 2024.
- [6] IDEs as the Bridge: Connecting Humans and Code, *Universidade Federal do Amazonas*, Manaus, Brazil, July 2024.
- [7] IDEs as the Bridge: Connecting Humans and Code, *Universitat Politecnica de Valencia*, Spain and *Open University*, Netherlands, April 2024.
- [8] Agents-Programmers Collaboration: Opportunities and Challenges at “Panel: Is life going to change with ChatGPT? Opportunities and Challenges of Large Language Models,” *HCI International conference*, Copenhagen, Denmark, July 2023.
- [9] Bridging Programmers' Collaboration Gaps with Intelligent Programmer-Centric Systems, *Johannes Kepler University*, Linz, Austria, May 2023.
- [10] Bridging Programmers' Collaboration Gaps with Intelligent Programmer-Centric Systems, *University of Sydney*, Sydney Australia, May 2023.
- [11] Designing PairBuddy — A Conversational Agent for Pair Programming, *International Conference on Human Factors in Computing Systems*, Hamburg, Germany, April 2023.
- [12] Bridging Programmers' Collaboration Gaps with Intelligent Programmer-Centric Systems, *Wake Forest University*, Winston-Salem, October 2022.
- [13] Inclusive Pair-Programming Conversational Agent meets Co-Pilot, *GitHub Next* and *Microsoft Research Lab*, April 2022.
- [14] Bridging Programmers' Collaboration Gaps with Intelligent Programmer-Centric Systems, *North Carolina State University*, Raleigh, March 2022.
- [15] Visual Resume: Exploring developers' online contributions for hiring, *IEEE International Conference on Software Analysis, Evolution and Reengineering*, Honolulu, Hawaii, March 2022.
- [16] Bridging Programmers' Collaboration Gaps with Intelligent Programmer-Centric Systems, *University of Maryland*, Baltimore County, Feb 2022.
- [17] Bridging Programmers' Collaboration Gaps with Intelligent Programmer-Centric Systems, *Colorado State University*, Colorado, Feb 2022.
- [18] Human-centric software engineering: Fostering effective collaborations, *Indian Institute of Technology*, Ropar, India, October 2021.
- [19] How do end-user programmers forage in online repositories? An information foraging perspective, *IEEE Symposium on Visual Languages and Human-Centric Computing*, St. Louis, USA, October 2021.
- [20] Designing conversational agents for programmers, *Punjabi University*, Patiala, India, October 2021.
- [21] Characterizing brain neural response in the same and mixed genders pairs, *Laureate Institute for Brain Research*, Tulsa, Oklahoma, December 2020.

- [22] Towards designing conversational agents for pair programming, Human-AI Collaboration Group, T.J. Watson Research Center, Yorktown Heights, New York, June 2019.
- [23] On the benefits of providing versioning support for end users: An empirical study, *International Conference on Human Factors in Computing Systems*, Seoul, Korea, April 2015.
- [24] Variation management to enhance end users' programming experience, *University of Memphis*, Memphis, Tennessee, February 2015.
- [25] Variation management to enhance end users' programming experience, *University of Tulsa*, Tulsa, Oklahoma, February 2015.

## **D9. Conference Organizer**

- [1] IEEE Symposium on Visual Languages and Human-Centric Computing, Raleigh, October 2025.

## **D10. Workshop Organizer**

- [1] Designing for Everyone: Advancing User Experience Through Human-Centric Design Methodologies, IEEE Symposium on Visual Languages and Human-Centric Computing, Raleigh, North Carolina, USA, October 2025.
- [2] Designing for Inclusivity, Advancing User Experience Through Inclusive Design Methodologies, HCI International Conference, Sweden, June 2025.

## **D11. Discussion Panels/Invited Seminars**

- [1] Theory of Programming, *Dagstuhl Seminar*, Germany, June 2022.
- [2] Career in Industry vs Academia, *IEEE Education Society Kerala Chapter*, India, May 2022.
- [3] Is Metaverse a Real Deal?, *Bangkok University Life Talk*, Thailand, March 2022.

## **D12. Extramural Funding (Total: \$7,685,427)**

- [1] Designing an Interactive Partner to Support Pair Programming (PI), CAREER Grant, National Science Foundation, 2021 (\$572,522 over five years).
- [2] Supporting Information Foraging by Utilizing Agents' Collective Foraging Behavior (PI), Young Investigator Program Grant, U.S. Air Force Office of Scientific Research, 2021 (\$468,754 over three years).
- [3] Effective and Equitable Technical Interviews in Software Engineering (PI), 2023, (\$316,000 over 2 years).
- [4] NSF Student and Early-Career Faculty Travel Grant for the 2018 IEEE International Conference on Software Engineering (PI), National Science Foundation, 2018 (\$25,175 over one year).
- [5] University of Tulsa Cyber Corps Initiative -- Training the Next Generation of MacGyvers (Co-PI), National Science Foundation, 2021 (\$6,302,976 over five years)-Retracted funds due to change of institutes.

## **D13. Intramural Funding (Total: \$67,970)**

- [1] Brain-Brain Interactions and Gender Differences in Knowledge-Work Collaboration (PI), Interdisciplinary Project Grant, University of Tulsa, 2020, (\$19,200)
- [2] Supporting Information Foraging by Utilizing Agents' Collective Foraging Behavior (PI), Faculty Development Summer Fellowship Program, University of Tulsa, 2020 (\$10,945 over summer 2020).



- [3] Developing Intelligent Pair-Programming Agents to Facilitate Programming (PI), Shark Tank Kick-Start Grant, University of Tulsa, 2019 (\$4,990 over one year).
- [4] Pair-Buddy: Prototype of Intelligent Agents to Broaden Accessibility of Programming (PI), Faculty Development Summer Fellowship Program, University of Tulsa, 2018 (\$10,945 over summer 2018).
- [5] Improving API Learning (PI), Faculty Development Summer Fellowship Program, University of Tulsa, 2017 (\$10,945 over summer 2017).
- [6] Human-Centered Online Repositories to Support Opportunistic Reuse (PI), Faculty Development Summer Fellowship Program, University of Tulsa, 2016 (\$10,945 over summer 2016).

## **D14. Mentorship and Student Training<sup>1</sup>**

As Director of the Human Factors + Experience Engineering (HFXE) Group, I mentor Ph.D., M.S., and undergraduate students conducting research at the intersection of human-centered software engineering and AI. My mentorship approach emphasizes inclusion, interdisciplinary inquiry, and student-driven innovation. My students have co-authored numerous peer-reviewed publications and presented their work at premier venues such as CHI, FSE, TOCHI, and VL/HCC. I actively recruit undergraduate students through REUs and independent studies; they contribute substantively to research and frequently co-author peer-reviewed papers. Two of my undergraduate women researchers co-authored a paper that received an Honorable Mention at ACM CHI. My lab also collaborates with academic and industry partners, including IBM Research, Microsoft Research, and Oregon State University, to expand research impact and enrich student training.

### **Current Students at NCSU**

#### ***Graduate (6)***

- 1. Shandler Mason (Computer Science Ph.D., Fall 2022 - Present) [\[J1,C1,C5,C4,C6,S1,W1,P4\]](#)
- 2. Shahnewaz Leon (Computer Science Ph.D., Spring 2023 - Present) [\[J2,C3,C7,P2,P3\]](#)
- 3. Sandeep Sthapit (Computer Science Ph.D., Spring 2024 - Present) [\[C2,P1\]](#)
- 4. Manali Teke (Computer Science Ph.D., Summer 2025 - Present)
- 5. Bruno Lobo (Computer Science Ph.D., Fall 2025 - Present)
- 6. Saba Khanmohammadi (Computer Science M.S., Summer 2025 - Present)

#### ***Current Undergraduate (3)***

- 1. Nour Mahmoud (Summer 2025, NCSU REU Fall 2025)
- 2. Katelyn Gamble (Summer 2025, NCSU REU Fall 2025)
- 3. Nicole Tan (Fall 2025 - Present)

#### ***Prior Graduate (3)***

- 1. Manali Teke (Computer Science M.S., Graduated 2025) [\[Thesis\]](#)
- 2. Jess Moorefield (Computer Science Ph.D., Independent Study) [\[P1\]](#)
- 3. Mahzabin Tamanna (Computer Science Ph.D., Independent Study) [\[P3\]](#)

#### ***Prior High Schoolers (3)***

- 1. Vishwak Velamuri (Summer 2024)
- 2. Brendan Swanson (Summer 2023)
- 3. Taquan Dewberry (Summer 2023)

#### ***Prior Undergraduate (20)***

- 1. Hank Lenham (NSF REU Summer 2024-Spring2025) [\[C1,C2\]](#)

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<sup>1</sup> For each student, publications we've co-authored are listed in square brackets. [\[\]](#)

2. Sylbi Bae (NCSU REU Summer 2024-Spring 2025) [C2]
3. Ava Miller (Summer 2025)
4. Brennen Farrell (NCSU REU, Fall 2023, Spring 2024)
5. Sanket Nain (NCSU REU, Fall 2023, Spring 2024) [C5]
6. Karel Vrabec (Independent Study, Fall 2023)
7. Natalie Meuser (NSF REU, Summer 2023)
8. Faris Soliman (NSF REU, Summer 2023)
9. Sarah Musa (NSF REU, Summer 2023)
10. Rafael Phillips (Summer 2023)
11. Zhendong Zhang (GEARS<sup>2</sup> program, Summer 2023)
12. Li Jiayi (GEARS program, Summer 2023)
13. Hongzhe Bi (GEARS program, Summer 2023)
14. Lixing Cheng (GEARS program, Summer 2023)
15. Marcus Kim (REU, Fall 2022 and Spring 2023)
16. Helen Solomon (REU, Fall 2022 and Independent Studies, Spring 2023) [J2]
17. Audrey Si (Independent Studies, Spring 2023)
18. Hannah Estes (Fall 2022 and Spring 2023)
19. Afnan Idries (Independent Study, Fall 2022)
20. Mollie Jordan (Independent Study, Fall 2022)

***Dissertation Committee Member (18)***

1. James Skripchuk (Graduated)
2. Md Rayhanur Rahman (Graduated)
3. Isabella Gransbury (Graduated)
4. Kewen Peng (Graduated)
5. Lorenzo Niel (Graduated)
6. Vaibhav Garg (Graduated)
7. Andre Lustosa Cabral De Paula Motta (Graduated)
8. Maryam Riahi (Graduated)
9. Erfan Al-Hossami at UNC Charlotte (Graduated)
10. Maryam Riahi (Graduated)
11. Seoyeong Park (Graduated)
12. Taufiq Islam Protick (Graduated)
13. Salerno de Castro at University of Melbourne, Australia
14. Amy Isvik
15. Bahare Riahi
16. Aafaq Sabir
17. Arjun Madhusudan
18. M M Abid Naziri

***Master's Committee Member (1)***

1. Muhammet Mustafa Olmez (Thesis Committee member)

**Former Students at the University of Tulsa**

***Graduate (4)***

1. Abim Sedhain (Computer Science M.S., 2022) [J2,C3,C7,C10,P2,P6,P9,P10,P11,B1]
2. Peter Robe (Computer Science M.S., Graduated 2021) [J3,C8,C11,C13]
3. Akash Ghosh (Computer Science M.S., Graduated 2019) [J6,J7,P13]
4. Jacob Hart (Computer Science M.S.) [C4,C6,C8,P5,P7,P8]

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<sup>2</sup> GEARS is an academic, research and cultural exchange program that enables academically gifted domestic and international university students to experience academic research at universities across North Carolina.

### ***UnderGraduate (35)***

1. Jacob AuBuchon (REU 2021, TURC<sup>3</sup> 2021, Computer Science UG) [C6,C8,C10,P7]
2. Alex McAuliffe (REU 2021, TURC 2021, Computer Science UG) [C6,C9,P8]
3. Philip Rahal (TURC 2022, Computer Science UG)
4. Ronnie Phillips (TURC 2022, Computer Science UG)
5. Issa Al Rubaye (TURC 2022, Computer Science UG)
6. Marcus Ensley (TURC 2022, Computer Science UG) [C4,P5]
7. Riley Raash (TURC 2022, Computer Science UG) [J2,C7]
8. Yao Wang (TURC 2022, Computer Science UG) [P6]
9. Noura Elnahrawy (Computer Science UG)
10. Vaishvi Diwanji (Computer Science UG) [J2,P11]
11. Grey Bodi (Computer Science UG) [P11]
12. Jeff Luong (Computer Science UG)
13. Devin Pattison (TURC 2021, Computer Science UG)
14. Ben Riethmeier (TURC 2021, Computer Science UG) [B1]
15. Bali Ong (TURC 2020, Computer Gaming and Simulation UG) [C11]
16. Katherine Kwasny (TURC 2020, Computer Gaming and Simulation UG) [C11]
17. Jarrow Myers (TURC 2019, Computer Science UG) [C12]
18. Sam Gurka (TURC 2019, Computer Science UG) [C12]
19. Yingze Chen (TURC 2019, Computer Science UG)
20. Kevin Gerestner (Computer Science/Computer Gaming and Simulation UG) [C14]
21. Alexandra Bejarano (Computer Science UG, currently Ph.D. student at Colorado School of Mines) [J5,C14]
22. Caroline Lott (Psychology UG) [C9]
23. Danny Tapp (Mechanical Engineering UG)
24. Van Nguyen (Computer Science UG)
25. Yiting Bai (Computer Science UG) [J8]
26. David Magar (Information Technology UG) [C12]
27. Michael Sun (Computer Science UG, currently M.S. student at University of California, at Irvine) [J7]
28. Brooke Shepherd (TURC 2018, Computer Science UG) [J9]
29. Jiayi Lu (Computer Science UG)
30. Philip Gibson (Computer Science UG)
31. Cheng Zhou (TURC 2018, Computer Science UG) [P12]
32. Se Yeon Kim (TURC 2016, Computer Science UG) [J5,S2]
33. Carlos Martos (Computer Science UG) [J5,S2]
34. Steven Alfonso Hernandez (Computer Science UG)
35. Cao Huynh (Computer Science UG)

### ***Dissertation Committee Member (4)***

1. Sami Abuhaimed (Ph.D. 2022)
2. Saeid Samadidana (Ph.D. 2019)
3. Zenefa Rahaman (Ph.D. 2018)
4. Osman Yusel (Ph.D. 2017)

## **E. Teaching**

I teach courses aligned with my research in human-computer interaction and software engineering, specifically designed for novice programmers. My teaching emphasizes design thinking, creativity, collaboration, and problem-solving through hands-on projects, inclusive pedagogy, and active

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<sup>3</sup> TURC Tulsa Undergraduate Research Challenge is an innovative program that enables undergraduates to conduct advanced research with the guidance of top University of Tulsa professors in Summer.

learning techniques such as pair and share. This approach effectively builds student confidence and prepares them to excel in real-world software development.

#### **Courses at NC State**

- CSC 454/554/791 - Human-Computer Interaction (Spring 2024, 2025, 2026)
- CSC 491 - Human-AI Interaction (Fall 2026)
- CSC 591-002/791-002: Special Topics: Programmer Centered Design and Research (Fall 2022, 2024, 2025)
- CSC 326 - Software Engineering (Spring 2023)

#### **Courses at TU**

I have taught eight courses at TU, including four newly developed offerings in human-computer interaction and software engineering. My undergraduate and graduate courses integrate industry perspectives—featuring guest experts who discuss real-world practices and lessons from both successful and failed projects—to prepare students for professional success. My teaching has been recognized with a 2021 nomination for the TU Outstanding Teaching Award and as a 2018 finalist for the Linda J. Lacey Award for Mentoring Excellence.

- CS 4053/CS 6863: Interaction Design (Spring 2016-2020, Fall 2020-2021)
- CS 4503: Senior Software Projects I (Fall 2016-2021)
- CS 4513: Senior Software Projects II (Spring 2020-2022)
- CS 5863/CS 7863: User-Centered Design and Research (Fall 2015, 2019; Spring 2021, 2022)
- CS 2003: Fundamentals of Algorithm and Computer Applications (Spring 2017-2019)
- CS 4863/CS 6863: Empirical Software Engineering (Spring 2016)
- CS 7863: Advanced Software Engineering (Fall 2016)
- CS 1003: Code@TU (Summer 2017)

## **F. Synergistic Activities**

### **F1. International Research Community Activities**

I am actively engaged in the human-computer interaction and software engineering research communities, contributing to key meetings that shape the future of these fields. I review approximately 50 research papers annually and received Excellent Reviewer recognition at CHI 2017. Additionally, I serve as an organizing member for over five conferences each year.

- Conference Chair: *IEEE Symposium on Visual Languages and Human-Centric Computing* (2025).
- Member of Editorial Board: *Journal of Computer Language* (2021- till now).
- Advisory Committee Member: *HCI International*, focus *Artificial Intelligence in Human-Computer Interactions* (2020-2026) and *International Conference on Applications of Artificial Intelligence and Machine Learning* (2021).
- Steering Committee Member: *IEEE Symposium on Visual Languages and Human-Centric Computing* (2019-2023, 2024-2028).
- Vice-Chair Steering Committee Member: *IEEE Symposium on Visual Languages and Human-Centric Computing* (2019-2023, 2025-present)
- Member of Board of Distinguished Reviewers: *ACM Transaction of Software engineering and Methodology* (2024-till now)..
- Associate Chair: *International Conference on Human Factors in Computing Systems*, focus *User Experience and Usability* (2022), *Interacting with Devices: Interaction Techniques & Modalities* (2024, 2025), and *Specific Applications Areas* (2026).
- Member of Awards Committee: *International Conference on Human Factors in*

- Computing Systems, focus User Experience and Usability (2022), Interacting with Devices: Interaction Techniques & Modalities (2024).*
- Sponsor Chair: *International Conference on Software Testing, Verification and Validation (2022).*
  - Most Influential Paper Chair: *IEEE Symposium on Visual Languages and Human-Centric Computing (2022 and 2023)*
  - Artifact Evaluation Chair: *ACM Symposium on the Foundations of Software Engineering (2024).*
  - Workshop Chair: *IEEE Symposium on Visual Languages and Human-Centric Computing (2024)*
  - Doctoral Consortium Organizer: *IEEE Symposium on Visual Languages and Human-Centric Computing (2021).*
  - Journal First Chair: *IEEE Symposium on Visual Languages and Human-Centric Computing (2020).*
  - Travel Grants Chair: *International Conference on Software Engineering (2020).*
  - Student Competition Chair: *ACM Symposium on the Foundations of Software Engineering (2019).*
  - Conference Finance Chair: *IEEE Symposium on Visual Languages and Human-Centric Computing (2019).*
  - Poster and Showpiece Chair: *IEEE Symposium on Visual Languages and Human-Centric Computing (2018).*
  - NSF Scholarship Chair: *International Conference on Software Engineering (2018).*
  - Showpiece and Poster Chair: *IEEE Symposium on Visual Languages and Human-Centric Computing (2017 and 2019).*
  - Session Chair: *International Conference on Software Engineering (2019), IEEE International Conference on Software Maintenance and Evolution (2020), International Conference on Cooperative and Human Aspects of Software Engineering (2021), International Conference on Artificial Intelligence in Human-Computer Interactions (2021), IEEE Symposium on Visual Languages and Human-Centric Computing (2021, 2024), International Conference on Human Factors in Computing Systems (2022), The ACM Joint European Software Engineering Conference, and Symposium on the Foundations of Software Engineering (2022).*
  - Program Committee Member: *IEEE/ACM International Conference on Automated Software Engineering (2024, 2025), International Conference on Artificial Intelligence in Human-Computer Interactions (2020-2025), IEEE Visual Languages and Human-Centric Computing (2016-2023), Software Engineering in Society at ACM/IEEE International Conference on Software Engineering (2022), Third Workshop on Gender Equality, Diversity, and Inclusion in Software Engineering (2022), ACM Symposium on User Interface Software and Technology (2021), New Ideas and Emerging Results Track of IEEE International Conference on Software Maintenance and Evolution (2021), Artifact evaluations of IEEE/ACM Automated Software Engineering (2021), IEEE Cooperative and Human Aspects of Software Engineering (2016-2021), IEEE International Conference on Software Maintenance and Evolution (2021), ACM/IEEE International Conference on Program Comprehension (2021), IEEE Doctoral Consortium at International Conference on Software Maintenance and Evolution (2020), Poster session at ACM/IEEE International Conference on Software Engineering (2020), ACM Student Research Competition at International Conference on Software Engineering (2020), ACM International Conference on Intelligent User Interfaces (2015, 2016, 2019), New Ideas and Emerging Results at ACM Symposium on the Foundations of Software Engineering (2019), ACM/IEEE International Conference on Software Engineering (2017, 2018, 2019), IEEE International Conference on Humanized Computing and Communication (2019), New Ideas and Emerging Results at International Conference on Software Engineering (2019), and ACS/IEEE International Conference on Computer Systems and*

- *Applications* (2018).
- Journal and Conferences Paper Reviewer: Reviewer of papers submitted to journals and international conferences on human-computer interaction and software engineering such as *ACM Transactions on Software Engineering and Methodology* (2023-2025), *IEEE Transactions on Software Engineering* (2024, 2025), *Proceedings of the International Conference on Human Factors in Computing Systems* (2015-2026), *IEEE Visual Languages and Human-Centric Computing* (2016-2025), *International Conference on Artificial Intelligence in Human-Computer Interactions* (2020-2025), *Journal of Computer Languages* (2022-2025), *Computer Science Education Taylor & Francis* (2022), *Third Workshop on Gender Equality, Diversity, and Inclusion in Software Engineering* (2022), *Cooperative and Human Aspects of Software Engineering* (2016-2021), *Journal of Computer Language* (2021-2024), *ACM Symposium on User Interface Software and Technology* (2021), *New Ideas and Emerging Results Track of IEEE International Conference on Software Maintenance and Evolution* (2021), *Artifact evaluations of IEEE/ACM Automated Software Engineering* (2021), *IEEE International Conference on Software Maintenance and Evolution* (2021), *ACM/IEEE International Conference on Program Comprehension* (2021), *IEEE Doctoral Consortium at International Conference on Software Maintenance and Evolution* (2020), *Poster session at ACM/IEEE International Conference on Software Engineering* (2020), *ACM Student Research Competition at International Conference on Software Engineering* (2020), *Journal of Information and Software Technology* (2019), *Journal of Systems and Software* (2019), *ACM Conference on Computer-Supported Cooperative Work and Social Computing* (2016, 2018, 2019), *ACM International Conference on Intelligent User Interfaces* (2015, 2016, 2019), *New Ideas and Emerging Results at ACM Symposium on the Foundations of Software Engineering* (2019), *ACM/IEEE International Conference on Software Engineering* (2017, 2018, 2019), *IEEE International Conference on Humanized Computing and Communication* (2019), *New Ideas and Emerging Results at International Conference on Software Engineering* (2019), *IEEE/ACM International Workshop on Gender Equality in Software Engineering* (2019), *ACS/IEEE International Conference on Computer Systems and Applications* (2018), *Peer Journal* (2017), *IEEE Transactions on Software Engineering* (2014, 2016), and *International Symposium on End-User Development* (2013).
- Proposal Panel Reviewer: *Mitacs Accelerate Research Proposals* (2020), *NSF Division of Information and Intelligent Systems* (2017,2025), and *NSF Division of Computing and Communication Foundations* (2017).

## **F2. University Activities**

- Member, College of Engineering AI Advisory Team (2024-Present).
- Co-Faculty Advisor, UI UX Tech Club at NCSU (2024-Present).
- Member, COE Teaching and Advising Award Committee (2023-Present).
- Member, CS Undergraduate Award Committee (2025-Present).
- Member, Software Engineering Faculty Recruitment Committee (2022-2023).
- Leader, Computer Science Department New Faculty Lunches (2022-2024).
- TU Chapter Faculty Advisor, Society of Women Engineers (2016 to 2022).
- TU Chapter Faculty Advisor, National Center for Women and Information Technology (2017 to 2022).
- Faculty Advisor, University of Tulsa Young Professionals (2016 to 2019).
- Judge, Annual Research Colloquium (2018 and 2019).
- Judge, Oklahoma Young Entrepreneur Award (2017 and 2018).

## **F3. Community Activities**

- Vice President of Outreach, Tulsa/North-Eastern Oklahoma Society of Women Engineers

- (2019 to 2022).
- Vice President of Professional Development, Tulsa/North-Eastern Oklahoma Society of Women Engineers (2021 to 2022).
  - Volunteer at Introduce a Girl to Engineering Day (2021).
  - Volunteer at Clarehouse Hospice (2016 to 2022).
  - Volunteer at Neighbors Along the Line – STEM Summit (2018).
  - Mentor at Oklahoma Women in Tech (2017 to 2022).
  - Presenter on STEM career opportunities at Tulsa-Area K-12 Schools (2017 to 2022).