

Bitakram

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Professional Experience

2022 – Current	Assistant Research Professor , Department of Computer Science, North Carolina State University
2019 – 2022	Assistant Teaching Professor , Department of Computer Science, North Carolina State University
2017 – 2019	Research Assistant , Center for Educational Informatics, North Carolina State University
2016 – 2017	Research Assistant , Friday Institute for Educational Innovation, North Carolina State University
2015 – 2016	Research Assistant , Department of Teacher Education and Learning Sciences, North Carolina State University
2014 – 2015	Research Assistant , Visualization and Graphics Group, University of Calgary

Education

August 2019	Ph.D. , Computer Science, <i>North Carolina State University</i> Thesis Title: Stealth Assessment of Students' Computer Science Focal Knowledge, Skills, and Abilities in Game-Based Learning Environments (Committee: James Lester (Advisor), Eric Wiebe (Co-advisor), Min Chi, Thomas Price)
August 2015	M.Sc. , Computer Science, <i>University of Calgary</i> , Canada Thesis Title: CINAPACT-splines: A Family of Infinitely Smooth, Accurate, and Compactly Supported Splines (Advisor: Osman Alim, Co-advisor: Faramarz Samavati)
May 2013	B.Sc. , Computer Engineering, <i>Sharif University of Technology</i> , Iran Thesis Title: Enhancement of Mammography Images Including Contrast Enhancing and Noise Reduction using Diffusion Filters and Wavelet Transform (Advisor: Mohammad Manzouri)

Research Interests

Advanced Learning Technologies: Utilization of AI and machine learning to design and develop advanced learning technologies for personalized learning [4][8].

Learning Analytics: Utilizing educational data mining for data-driven educational discoveries and cognitive, meta-cognitive, and affective student modelling [5][6].

Computer Science Education Research: Design, implementation, and evaluation of innovative computer science curricula and technology for a diverse range of students [2][3].

Equity and Diversity in STEM Education: Improving equity and diversity in STEM education through evidence-based pedagogical, psychological, and sociological interventions [1][7].

Highlighted Publications:

1. **Akram B.**, Fisk S., Yoder S., Hunt C., Price T., Battestilli L., and Barnes, T. (2022). Increasing Students' Persistence in Computer Science through a Lightweight Scalable Intervention. In *Proceedings of the 27th Annual conference on Innovation and Technology in Computer Science Education (ITiCSE)*, pp 526-532.
2. **Akram, B.**, Yoder, S., Tatar, C., Boorugu, S., Aderemi, I., and Jiang, S. (2022). Towards an AI-infused Interdisciplinary Curriculum for Middle-grade Classrooms. In *Proceedings of the Twelfth AAAI Symposium on Educational Advances in Artificial Intelligence (EAAI)*, pp. 12681-12688.
3. Wang, W., Bobbadi, B., Meur, A., **Akram, B.**, Barnes, T., Martens C., and, Price, T. (2022). Exploring Design Choices to Support Novices' Example Use During Creative Open-Ended Programming. In *Proceedings of the 52nd ACM SIGCSE Technical Symposium on Computer Science Education (SIGCSE)*. pp. 619-625. **(Best Paper Award)**.
4. Marwan, S., **Akram, B.**, Barnes, T., and Price, W. (2022). Adaptive Immediate Feedback for Block-Based Programming: Design and Evaluation. To appear in *IEEE Transactions on Learning Technologies (TLT)*.
5. Yoder, S., Hoq M., Brusilovski, P., **Akram, B.** (2022) Exploring Sequential Code Embeddings for Predicting Student Success in an Introductory Programming Course. In *Proceedings of the Zenodo 6th Computer Science Educational Data Mining Workshop at 15th educational data mining conference (CSEDM@EDM)*.
6. Marsden, J., Yoder, S., **Akram, B.** (2022). Predicting Student Performance with Control Flow Graph Embeddings. In *Proceedings of the Zenodo 6th Computer Science Educational Data Mining Workshop at 15th educational data mining conference (CSEDM@EDM)*.
7. Hunt C., Yoder S., Comment T., Price T., **Akram B.**, Battestilli, L., Barnes, T., and Fisk S. (2022). Gender, Self-Assessment, and Persistence in Computing: How gender differences in self-assessed ability reduce women's persistence in computer science. In *Proceedings of the 18th ACM Conference on International Computing Education Research (ICER)*, pp. 73-83.
8. **Akram, B.**, Min, W., Wiebe, E., Mott, B., Boyer, K., and Lester. J. (2018). Improving Stealth Assessment in Game-based Learning with LSTM-based Analytics. In *Proceedings of the 11th International Conference on Educational Data Mining (EDM)*, pp. 208–218.

Publications

Peer-Reviewed Publications in Journals (3)

1. Marwan, S., **Akram, B.**, Barnes, T., and Price, T. (2022). Adaptive Immediate Feedback for Block-Based Programming: Design and Evaluation, *IEEE Transactions on Learning Technologies*, vol. 15, Iss. 3, pp. 406-420.

2. Rachmatullah, A., **Akram, B.**, Boulden, D., Mott, B., Boyer, K., Lester, J., & Wiebe, E. (2020). Development and Validation of the Middle Grades Computer Science Concept Inventory (MG-CSCI) assessment. *EURASIA Journal of Mathematics, Science and Technology Education*: Vol. 16, Iss. 5, pp. 1–11.
3. Boulden, D., Wiebe, E., **Akram, B.**, Buffum, P., Aksit, O., Mott, B., Boyer, K., and Lester, J. (2018). Computational Thinking Integration into Middle Grades Science Classrooms: Strategies for Meeting the Challenges. *Middle Grades Review*: Vol. 4: Iss. 3, pp. 1–16.

Peer-Reviewed Papers in Conference Proceedings (11 Accepted)

4. Harred, R., Barnes, T., Fisk, S., **Akram, B.**, Price, T., Yoder S. (2023). Do Intentions to Persist Predict Short Term Computing Course Enrollments? A scale development, validation, and reliability analysis. To Appear in *Proceedings of the 53rd Technical Symposium on Computer Science Education (SIGCSE)*. (**Best Paper Award**).
5. Wang, W., Bobbadi, B., Meur, A., **Akram, B.**, Barnes, T., Martens C., and, Price, T. (2022). Exploring Design Choices to Support Novices' Example Use During Creative Open-Ended Programming. In *Proceedings of the 52nd ACM SIGCSE Technical Symposium on Computer Science Education (SIGCSE)*. pp. 619-625. (**Best Paper Award**).
6. Hunt C., Yoder S., Comment T., Price T., **Akram B.**, Battestilli, L., Barnes, T., and Fisk S. (2022). Gender, Self-Assessment, and Persistence in Computing: How gender differences in self-assessed ability reduce women's persistence in computer science. In *Proceedings of the 18th ACM Conference on International Computing Education Research (ICER)*, pp. 73-83.
7. **Akram B.**, Fisk S., Yoder S., Hunt C., Price T., Battestilli L., and Barnes, T. (2022). Increasing Students' Persistence in Computer Science through a Lightweight Scalable Intervention. In *Proceedings of the 27th Annual conference on Innovation and Technology in Computer Science Education (ITiCSE)*, pp 526-532.
8. **Akram, B.**, Yoder, S., Tatar, C., Boorugu, S., Aderemi, I., and Jiang, S. (2022). Towards an AI-infused Interdisciplinary Curriculum for Middle-grade Classrooms. In *Proceedings of the Twelfth AAAI Symposium on Educational Advances in Artificial Intelligence (EAAI)*, pp. 12681-12688.
9. Jiang, S., et. Al. (2022). Agents, Models, and Ethics: Importance of Interdisciplinary Explorations in AI Education. To appear In *Proceedings of the 16th International Conference of the Learning Sciences (ICLS)*.
10. Min, W., Mott, B., Park, K., Taylor, S., **Akram, B.**, Wiebe, E., & Lester, J. (2020). Promoting computer science learning with block-based programming and narrative-centered gameplay. In *Proceedings of the 2nd IEEE Conference on Games (CoG)*, pp. 654-657.
11. **Akram, B.**, Azizolsoltani, H., Min, W., Navied, A., Wiebe, E., Mott, B., Boyer, K., and Lester, J. (2020). Automated Assessment of Computer Science Competencies from Student Programs with Gaussian Process Regression. In *Proceedings of the 13th International Conference on Educational Data Mining (EDM)*, pp. 555-560.
12. Lytle, N., Cateté, V., Dong, Y., Boulden, D., **Akram, B.**, Houchins, J., Barnes, T. and Wiebe, E., (2019). CEO: A Triangulated Evaluation of a Modeling-Based CT-Infused CS Activity for Non-CS Middle Grade Students. In *Proceedings of the 1st ACM Conference on Global Computing Education (CompEd)*, pp. 58–64.
13. **Akram, B.**, Min, W., Wiebe, E., Mott, B., Boyer, K., and Lester, J. (2018). Improving Stealth Assessment in Game-based Learning with LSTM-based Analytics. In *Proceedings of the 11th International Conference on Educational Data Mining (EDM)*, pp. 208–218.
14. **Akram, B.**, Alim, U., and Samavati, F. (2015). CINAPACT-splines: A family of infinitely smooth, accurate and compactly supported splines. In *Proceedings of the 10th International Symposium on Visual Computing (IS)*, pp. 819–829.

Peer-Reviewed Posters and Workshops in Conference Proceedings (3)

15. Lina Battestilli, Susan Fisk, Cynthia Hunt, **Akram, B.**, Spencer Yoder, Thomas Price and Tiffany Barnes (2022). Automating Personalized Feedback to Improve Students' Persistence in Computing. In *Proceedings of the 53rd ACM Technical Symposium on Computer Science Education (SIGCSE)*, pp.1197-1197.

16. **Akram, B.**, Min, W., Wiebe, E., Navied, A., Mott, B., Boyer, K. E., & Lester, J. (2020). A conceptual assessment framework for K-12 computer science rubric design. In *Proceedings of the 51st ACM Technical Symposium on Computer Science Education (SIGCSE)*, pp. 1328-1328.
17. **Akram, B.**, Min, W., Wiebe, E., Mott, B., Boyer, K.E. and Lester, J. (2019). Assessing Middle School Students' Computational Thinking Through Programming Trajectory Analysis. In *Proceedings of the 50th ACM Technical Symposium on Computer Science Education (SIGCSE)*, pp. 1269–1269.

Peer-Reviewed Publications in Workshops (6)

18. Yoder, S., Hoq M., Brusilovski, P., **Akram, B.** (2022) Exploring Sequential Code Embeddings for Predicting Student Success in an Introductory Programming Course. In *Proceedings of the Zenodo 6th Computer Science Educational Data Mining Workshop at 15th educational data mining conference (CSEDM@EDM)*.
19. Marsden, J., Yoder, S., **Akram, B.** (2022). Predicting Student Performance with Control Flow Graph Embeddings. In *Proceedings of the Zenodo 6th Computer Science Educational Data Mining Workshop at 15th educational data mining conference (CSEDM@EDM)*.
20. Hoq, M., Brusilovski, P., **Akram, B.** (2022). SANN: A Subtree-based Attention Neural Network Model for Student Success Prediction Through Source Code Analysis. In *Proceedings of the Zenodo 6th Computer Science Educational Data Mining Workshop at 15th educational data mining conference (CSEDM@EDM)*.
21. Yoder, S., Tatar, C., Aderemi, I., Boorugu, S., Jiang, S., and **Akram, B.** (2021). Gaining Insight into Effective Teaching of AI Problem-Solving Through CSEDM: A Case Study. In *CEUR Proceedings of the 3rd Computer Science Educational Data Mining Workshop at 14th educational data mining conference (CSEDM@EDM)*.
22. **Akram, B.**, Azizolsoltani, H., Min, W., Wiebe, E., Navied, A., Mott, B., Boyer, K., & Lester, J. (2020). A Data-Driven Approach to Automatically Assessing Concept-Level CS Competencies Based on Student Programs. To appear in *CEUR Workshop Proceedings of the 4st Computer Science Educational Data Mining Workshop at 13th educational data mining conference (CSEDM@EDM)*.
23. Catete, V., Lytle, N., Dong, Y., Boulden, D., **Akram, B.**, Houchins, J., Barnes, T., Wiebe, E., Lester, J., Mott, B., Boyer, K. (2018). Infusing Computational Thinking into Middle Grade Science Classrooms: Lessons Learned. In *Proceedings of the 13th Workshop in Primary and Secondary Computing Education*, pp. 1–6.

Edited Volumes (2 Journals, 3 Workshops)

24. **Akram, B.**, Price, T., Shi, Y., Brusilovsky, P., and I-Han, S. (2023). To be published in the *Proceedings of the Workshop on Computer Science Educational Data Mining at the 13th International Conference on Learning Analytics and Knowledge (CSEDM@LAK)*.
25. Price, T., I-Han, S., Brusilovsky, P., **Akram, B.**, and Leinonen J. (2023). To be published as *Proceedings of the JEDM Special issue on CSEDM: Educational Data Mining for Computing Education*.
26. Norouzi, N., **Akram, B.** (2023). To be published as *Proceedings of the EngageCSEdu Special Issue on AI, Data Science, and ML*.
27. **Akram, B.**, Price, T., Shi, Y., Brusilovsky, P., and I-Han, S. (2022). *Proceedings of the Workshop on Computer Science Educational Data Mining at the 15th International Conference on Educational Data Mining (CSEDM@EDM)*. ([see here](#))
28. **Akram, B.**, Price, T., Shi, Y., Brusilovsky, P., and I-Han, S. (2021). *Proceedings of the Workshop on Computer Science Educational Data Mining at the 14th International Conference on Educational Data Mining (CSEDM@EDM)*. ([see here](#))

Conference Presentations (7)

1. Wiebe, E., Rachmatullah, A., **Akram, B.**, Mott, B., Boyer, K., and Lester, J. (2020). Measurement of Computational Thinking and CS Conceptual Understanding in Middle Grades Classrooms. Presented at the 2020 *American Educational Research Association (AERA) Annual Meeting*, San Francisco, California.
2. Boulden, D., Houchins, j., Rachmatullah, A., Vandenberg, j., **Akram, B.**, Catete, V., Lytle, N., Barnes, T., Wiebe, E. (2020). A Situated Professional Development Approach to Build Teacher Efficacy for Computational Modeling. Presented at the 2020 *American Educational Research Association (AERA) Annual Meeting*, San Francisco, California.

3. Houchins, j., Boulden, D., Rachmatullah, A., **Akram, B.**, Wiebe, E, Lytle, N., Catete, V., Barnes, T. (2020). Scaffolding Use, Modify, Create: Facilitating the Progression to Computational Thinking in Middle Grades Science. Presented at the 2020 *American Educational Research Association (AERA) Annual Meeting*, San Francisco, California.
4. Rachmatullah, A., Wiebe, E., Boulden, D., Houchins, j., **Akram, B.**, Mott, B., Boyer, K., Lester, J. (2020). The Impact of Prior Programming Experiences and Attitudes on Computer Science Concepts Learning. Presented at the 2020 *American Educational Research Association (AERA) Annual Meeting*, San Francisco, California.
5. **Akram, B.**, Min, W., Wiebe, E., Mott, B., Boyer, K., and Lester. J. (2019). Toward a Semi-Automated Evidence-Centered Dashboard Framework for Computer Science Teachers. Presented at the 3rd Computer Science Educational Data Mining Workshop at the 20th International Conference on Artificial Intelligence in Education (CSEDM@AIED), Chicago, Illinois.
6. Boulden, D., Houchins, J., **Akram, B.**, Wiebe, E., Catet, V., Dong, Y., Lytle, N., Milliken, A., Barnes, T., Lester, J., Mott, B., and Boyer, K. (2019). Designing a Computational Modeling Unit for Middle Grades Science Classrooms: Grounding Decisions in Practice. Presented at the 2019 *National Association for Research in Science Teaching (NARST)*, Toronto, Canada.
7. **Akram, B.**, Smith, A., Smith, C., Aksit, O., Wiebe, E., and Lester. J. (2017). Computationally-Enabled Modeling Environments: Simulating Epidemic Diseases in Science Classrooms using Block-based Programming. Presented at the 2017 *National Association for Research in Science Teaching (NARST)*, San Antonio, USA.

Thesis

1. **Akram, B.**, (2019). *Assessment of Students' Computer Science Focal Knowledge, Skills, and Abilities in Game-Based Learning Environments*. North Carolina State University, Raleigh, NC, USA.
2. **Akram, B.**, (2015). *CINAPACT-splines: A Family of Infinitely Smooth, Accurate and Compactly Supported Splines*. University of Calgary, Calgary, Canada.

Research Grants

Pending (\$1,999,637)

Under Review

NSF: Improving Undergraduate STEM Education (IUSE).
Project: Collaborative Research: Transforming Introductory Computer Science Instruction with an AI-Driven Classroom Assistant
Role: Principal Investigator.

Funded (\$319,983)

Summer 2020 – Present

NSF: Improving Undergraduate STEM Education (IUSE).
Project: Collaborative Research: Analysis of a Simple, Low-cost Intervention's Impact on Retention of Women in Computer Science
Role: Principal Investigator.

Spring 2020 – Spring 2021

Friday Institute for Educational Innovation, NCSU
Project: Multimodal AI literacy: Supporting the Learning of Artificial Intelligence (AI) through Multimodal Narrative Creation
Role: Principal Investigator.

Fall 2021 – Spring 2022

Data Science Academy, NCSU

Project: Promoting Youth Critical Data Literacy through Computing and Community Storytelling with Data

Role: Co-Principal Investigator.

Teaching Experience

Instructor Experience (4 Courses, 11 Sections, 552 Students):

- **Introduction to Artificial Intelligence, CSC520 (3 semesters, 179 students)**, North Carolina State University, an introduction to artificial intelligence for undergraduate and graduate students.
- **Introduction to Artificial Intelligence, CSC 411 (2 semesters, 122 students)**, North Carolina State University, an introduction to artificial intelligence for undergraduate and graduate students.
- **Computer Science Principles - The Beauty and Joy of Computing (2 Semesters, 118 students)**, North Carolina State University, an introductory programming course for non-CS students.
- **Introduction to Computing- Java (4 semesters, 133 students)**, North Carolina State University, an introductory programming course for CS students.

Advising

- Current Ph.D. Committee chair - 3 (4 accepted conference papers, 4 accepted workshop paper, 2 under-review conference papers)
- Current Ph.D. Committee co-chair - 1
- Ph.D. Committee member - 2
- Graduate-level independent research - 6
- Undergraduate-level independent research - 4

K-12 Teaching Experience

- Developed and taught CS-infused STEM curricula for middle-grade science classrooms.
- Developed, organized, and facilitated multiple professional development workshops for K-12 teachers to facilitate the design and teaching of CS curricula in K-12 classrooms during summers and the academic year.
- Developed and taught CS curricula to K-12 students during multiday summer workshops, elective CS classrooms, and after-school programs.

Inclusion and Diversity Efforts

- **K-12 Outreach:** Engaging K-12 teachers and students with accessible, engaging, and relevant CS and CT-infused STEM curriculum. Innovative technology design and development for effective delivery of the curriculum. Assessment design for assessing students' knowledge and understanding of foundational CS and CT concepts.
- **Undergraduate Underrepresented Students' Outreach:** Collaborate in adaptation and implementation of an early research course to engage freshman and sophomore underrepresented students at NC State University with computer science research (CSC295/298).

Honors & Awards:

- Best Paper Award, SIGCSE, 2022.
- Friday Institute Graduate Student Fellows Award, 2018.

- Graduate Student Fellowship, University of Calgary, 2013-2014.

Professional Service and Memberships

Conference and Workshop Reviewing:

- Program Committee Member, Educational Data Mining (EDM)
- Program Committee Member, Artificial Intelligence in Education (AIED)
- Program Committee Member, Innovation and Technology in Computer Science Education (ITiCSE)
- Program Committee Member, ACM SIGCSE Technical Symposium on Computer Science Education
- Program Committee Member, Computer Science Educational Data Mining (CSEDM) Workshop at Educational Data mining Conference (EDM)
- Program Committee Member, Computer Science Educational Data Mining (CSEDM) Workshop at Educational Data mining Conference (LAK)
- Program Committee Member, Research in Equity and Sustained Participation in Engineering, Computing, and Technology (RESPECT)
- Program Committee Member, Educational Advances in Artificial Intelligence (EAAI)

Grant Proposal Reviewing:

- National Science Foundation Research Proposal Ad-Hoc Reviewer (1 proposal, 2020)

Workshop Chair:

- Computer Science Educational Data Mining (CSEDM) workshop at the Learning Analytics and Knowledge (LAK) Conference (2023)
- Computer Science Educational Data Mining (CSEDM) workshop at the Educational Data Mining (EDM) Conference (2021, 2022)

Professional Associations:

- Association for Computing Machinery (ACM)
- ACM Special Interest Group on Computer Science Education (SIGCSE)
- National Center for Women & Information Technology (NCWIT)
- International Educational Data Mining Society
- International AI in Education Society
- Society for Learning Analytics Research (SoLAR)