Thomas W. Price

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Education

Ph.D. in Computer Science — North Carolina State University — 2018
Thesis: *iSnap: Data-driven Support for Novice Programming Informed by Evaluations of Hint Quality and Investigations of Student Help-seeking Behavior*
Committee: Dr. Tiffany Barnes (advisor), Dr. James Lester, Dr. Sarah Heckman, Dr. Roger Azevedo

M.S. in Computer Science — North Carolina State University — 2015

B.S. in Computer Science — Elon University — 2013
Thesis: *Engineering on the Go: Designing a Game Maker on the Android Platform*

Professional History

Assistant Professor — North Carolina State University — 2018 – Present
Graduate Research Assistant — North Carolina State University — 2013 – 2018

Awards and Honors

Best Paper Awards: Best Research Paper (SIGCSE'23), Best Experience Report Paper (SIGCSE'22), Best Full Paper (EDM'21), Best Student Paper (EDM'19), Exemplary CS Research Paper (SIGCSE'17), Exemplary Paper (EDM'16).

1st Place (Adaptive Experimentation Accelerator Team), XPRIZE Digital Learning Challenge: $1M IES-funded competition to revolutionize the way experiments are conducted in classrooms.

2022, 2023 Nominee Goodnight Early Career Innovators Award, NCSU: Nominators for this award that supports early career faculty excellence and promotes retention of tenure-track assistant professors whose scholarship is in STEM or STEM education.

2021-2022 Person of Exceptional Performance Award, NCSU CSC Department: recognizes faculty or staff who have exhibited truly outstanding performance, contributing significantly to the department's success as role models for what it means to 'think and do the extraordinary'.

2022 Carla Savage "Awesome" Award for Assistant Professor, NCSU CSC Department: recognizes outstanding achievement and special people within the department.

2018 Doctoral Scholar of the Year, North Carolina State University College of Engineering: recognizes a student's overall achievements in research, teaching, outreach and leadership.

2016 Outstanding Student Leader, recognized by the national STARS Computing Corps, recognizes leadership in efforts to broaden participation in computing.

Research and Funding

Research Interests

- Computing Education Research (CER)
- Educational Data Mining (EDM)
- Advanced Learning Technologies (ALT)
- CS-Education-specific approaches for Educational Data Mining (CSEDM)

Research Grants (Total $4.21M):

NSF: EHR Core Research ($525K (NCSU)) (2023 - Present)
#2300612: Using Fine-grained Programming Trace Data to Inform Disciplinary Models of Self-Regulated Learning in Computing Education **Role**: PI

NSF: CISE Community Research Infrastructure (CCRI) ($461K (NCSU)) (2022 - Present)
#2213792: An Infrastructure for Sustainable Innovation and Research in Computer Science Education **Role**: PI

NSF: Improving Undergraduate STEM Education ($300K) (2022 - Present)
#2141923: Improving Software Testing Education through Lightweight Explicit Testing Strategies and Feedback **Role**: Co-PI

NSF: Improving Undergraduate STEM Education ($2.0M) (2020 - Present)
#2013502: Generalizing Data-Driven Technologies to Improve Individualized STEM Instruction by Intelligent Tutors **Role**: Co-PI

NSF: Improving Undergraduate STEM Education ($175K (NCSU)) (2020 - 2023)
#1917885: Analysis of a Simple, Low-cost Intervention's Impact on Retention of Women in Computer Science **Role**: Co-PI

NSF: Cyberlearning & Future Learning Technologies ($750K) (2019 - Present)
#1917885: Intelligent Support for Creative, Open-ended Programming Projects **Role**: PI

Publications

Notes: On the following publications, symbols indicate which authors are from Dr. Price's lab:

- ◈ indicates Dr. Price's current or former Ph.D. student.
- ◊ indicates Dr. Price's current or former M.S. student.
- ▸ indicates Dr. Price's current or former undergraduate research advisee.

Book Chapters

B1. Y. Mao, ◈S. Marwan, P. Shabrina, ◈Y. Shi, **T.W. Price**, Chi, M., & Barnes, T. Continuous student modeling for programming in the classroom: challenges, methods, and evaluation. Handbook of Artificial Intelligence in Education, 287. 2023.

Peer-Reviewed Publications in Academic Journals

J5. ★[1] ◈S. Marwan and **T.W. Price**. iSnap: Evolution and Evaluation of a Data-Driven Hint System for Block-based Programming. *IEEE Transactions on Learning Technologies*. 2023. https://doi.org/10.1109/tlt.2022.3223577.

J4. ★ ◈S. Marwan, B. Akram, T. Barnes, and **T.W. Price**. Adaptive Immediate Feedback for Block-Based Programming: *Design and Evaluation. IEEE Transactions on Learning Technologies*. 15(3). 2022. https://doi.org/10.1109/tlt.2022.3180984.

J3. ★ **T.W. Price**, Y. Dong, ◈R. Zhi, B. Paaßen, N. Lytle, V. Cateté, T. Barnes. "A Comparison of the Quality of Data-driven Programming Hint Generation Algorithms." *International Journal of Artificial Intelligence in Education*. 2019. https://doi.org/10.1007/s40593-019-00177-z.

[1] ★ Indicates a representative paper

J2. Paaßen, B., B. Hammer, **T.W. Price**, T. Barnes, S. Gross and N. Pinkwart. "The Continuous Hint Factory - Providing Hints in Continuous and Infinite Spaces." *Journal of Educational Data Mining*. 2018. https://doi.org/10.5281/zenodo.3554697.

J1. Cardona-Rivera, R.*, **T.W. Price**,* D. Winer* and R. M. Young. "Question Answering in the Context of Stories Generated by Computers." *Advances in Cognitive Systems*. 2016.
** The first three authors are considered co-first authors on this publication.*

Edited Journal Issues and Workshop Proceedings

E7. **T.W. Price**, S. I Han Hsiao, B. Akram, P. Brusilovsky, J. Leinonen. JEDM Special Issue on Computer Science Education and Educational Data Mining (CSEDM). *International Journal of Educational Data Mining*. 15(1). 2023. https://doi.org/10.5281/zenodo.7728208.

E6. B. Akram, **T.W. Price**, ◈Y. Shi, P. Brusilovsky, S. I Han Hsiao, J. Leinonen. Proceedings of the 7th Workshop on Educational Data Mining in Computer Science Education @ EDM'23. 2023. https://zenodo.org/communities/csedm23/.

E5. B. Akram, **T.W. Price**, ◈Y. Shi, P. Brusilovsky, S. I Han Hsiao. Proceedings of the 6th Workshop on Educational Data Mining in Computer Science Education @ EDM'22. 2022. https://zenodo.org/communities/csedm22/.

E4. B. Akram, **T.W. Price**, ◈Y. Shi, P. Brusilovsky, S. I Han Hsiao. Proceedings of the 5th Workshop on Educational Data Mining in Computer Science Education @ EDM'21. 2021. https://ceur-ws.org/Vol-3051/.

E3. **T.W. Price**, P. Brusilovsky, S. I Han Hsiao, K.R. Koedinger, ◈Y. Shi. Proceedings of the 4th Workshop on Educational Data Mining in Computer Science Education @ EDM'20. 2020. https://ceur-ws.org/Vol-2734/.

E2. D. Azcona, Y. Vance Paredes and S. I Han Hsiao and **T.W. Price**. Proceedings of the 3rd Workshop on Educational Data Mining in Computer Science Education @ AIED'19. 2019.

E1. D. Azcona, Y. Vance Paredes and S. I Han Hsiao and **T.W. Price**. Proceedings of the 2nd Workshop on Educational Data Mining in Computer Science Education @ LAK'19. 2019.

Peer-Reviewed Publications in Conference Proceedings[2]

C54. ◈Y. Shi, R. Schmucker, M. Chi, T. Barnes and **T.W. Price**. KC-Finder: Automated Knowledge Component Discovery for Programming Problems. Proceedings of the International Conference on Educational Data Mining. 2023 (accepted as full paper).

C53. ◈W. Wang, ◊Y. Rao, ◊A. Kwatra, A. Milliken, Y. Dong, ▸N. Gomes, S. Martin, V. Catete, A. Isvik, T. Barnes, C. Martens and **T.W. Price**. A Case Study on When and How Novices Use Code Examples in Open-Ended Programming. Proceedings of the ACM Innovation and Technology in Computer Science Education (ITiCSE) Conference. 2023 (27% acceptance rate; 81/299 full papers).

C52. G.R. Bai, S. Sthapit, S. Heckman, **T.W. Price** and K.T. Stolee. An Experience Report on Introducing Explicit Strategies into Testing Checklists for Advanced Beginners. Proceedings of the ACM Innovation and Technology in Computer Science Education (ITiCSE) Conference. 2023. (27% acceptance rate; 81/299 full papers).

C51. R. Harred, T. Barnes, S. Fisk, B. Akram, **T.W. Price** and S. Yoder. Do Intentions to Persist Predict Short-Term Computing Course Enrollments? A Scale Development, Validation, and Reliability Analysis. Proceedings of the ACM SIGCSE Technical Symposium. 2023.

[2] Top-tier conferences in CS Education, Educational Data Mining and AI in Education are selective venues for archival research, often exceeding journals in their selectivity, visibility and impact. Their acceptance rates, often between 20-30%, are listed for each publication.

https://doi.org/10.1145/3545945.3569875. (35% acceptance rate; 165/474 full papers; **Best Computing Education Research Paper Award.**)

C50. ◈J. Skripchuk, ▸N. Bennett, ▸J. Zheng, ▸E. Li and **T.W. Price**. Analysis of Novices' Web-Based Help-Seeking Behavior While Programming. Proceedings of the ACM SIGCSE Technical Symposium. 2023. DOI: https://doi.org/10.1145/3545945.3569852 (35% acceptance rate; 165/474 full papers.)

C49. ◈W. Wang, G. Fraser, ▸M. Bobbadi, B.T. Tabarsi, T. Barnes, C. Martens, S. Jiao and **T.W. Price**. Pinpoint: A Record, Replay, and Extract System to Support Code Comprehension and Reuse. Proceedings of the IEEE Symposium on Visual Languages and Human-Centric Computing (VL/HCC). 2022. https://10.1109/VL/HCC53370.2022.9833105. (29% acceptance rate; 12/41 full papers.)

C48. C. Hunt, S. Yoder, T. Comment, **T.W. Price**, B. Akram, L. Battestilli, T. Barnes and S. Fisk. Gender, Self-Assessment, and Persistence in Computing: How gender differences in self-assessed ability reduce women's persistence in computer science. Proceedings of the International Computing Education Research Conference (ICER). 2022. (**17% acceptance rate**; 25/151 full papers.)

C47. ◈Y. Shi, M. Chi, T. Barnes, and **T.W. Price**. Code-DKT: A Code-based Knowledge Tracing Model for Programming Tasks. Proceedings of the International Conference on Educational Data Mining, 50-61, 2022. https://doi.org/10.5281/zenodo.6853105 (29% acceptance rate; 26/91 full papers.)

C46. A. Limke, A. Milliken, V. Cateté, I. Gransbury, A. Isvik, **T.W. Price**, C. Martens, and T. Barnes. Case Studies on the Use of Storyboarding by Novice Programmers. Proceedings of the 27th ACM Conference on Innovation and Technology in Computer Science Education. 2022. (29% acceptance rate; 29/276 full papers.)

C45. G.R. Bai, K. Presler-Marshall, **T.W. Price**, K.T. Stolee. Check It Off: Exploring the Impact of a Checklist Intervention on the Quality of Student-authored Unit Tests. Proceedings of the 27th ACM Conference on Innovation and Technology in Computer Science Education. 2022. (29% acceptance rate; 29/276 full papers.)

C44. B. Akram, S. Fisk, S. Yoder, C. Hunt, **T.W. Price**, L. Battestilli, and T. Barnes. Increasing Students' Persistence in Computer Science through a Lightweight Scalable Intervention. Proceedings of the 27th ACM Conference on Innovation and Technology in Computer Science Education. 2022. (29% acceptance rate; 29/276 full papers.)

C43. ◈J. Skripchuk, ◈Y. Shi, **T.W. Price**. Identifying Common Errors in Open-Ended Machine Learning Projects. Proceedings of the ACM Technical Symposium on Computer Science Education. 2022. https://doi.org/10.1145/3478431.3499397. (29% acceptance rate; 144/516 full papers.)

C42. ◈W. Wang, ▸A. Le Meur, ▸M. Bobbadi, B. Akram, T. Barnes, C. Martens, **T.W. Price**. Exploring Design Choices to Support Novices ' Example Use During Creative Open-Ended Programming. Proceedings of the ACM Technical Symposium on Computer Science Education. 2022. https://doi.org/10.1145/3478431.3499374. (29% acceptance rate; 144/516 full papers; **Best Experience Report Paper Award**.)

C41. Y. Mao, F. Khoshnevisan, **T.W. Price**, T. Barnes, and M. Chi. Cross-Lingual Adversarial Domain Adaptation for Novice Programming. Proceedings of the AAAI Conference on Artificial Intelligence. 2022. https://doi.org/10.1609/aaai.v36i7.20735. (**15% acceptance rate**.)

C40. A. Card, ◈W. Wang, C. Martens, **T.W. Price**. Scaffolding Game Design: Towards Tool Support for Planning Open-Ended Projects in an Introductory Game Design Class. Proceedings of the IEEE Symposium on Visual Languages and Human-Centric Computing (VL/HCC), 1–5. 2021. https://doi.org/10.1109/vl/hcc51201.2021.9576209. (short paper.)

C39. ◆S. Marwan, P. Shabrina, A. Milliken, I. Menezes, V. Catete, **T.W. Price**, T. Barnes. Promoting Students' Progress-Monitoring Behavior during Block-Based Programming. Proceedings of the Koli Calling International Conference on Computing Education Research, 1–10. 2021. (26% acceptance rate; 20/76 full papers.)

C38. ★ ◆S. Marwan, ◆Y. Shi, I. Menezes, M. Chi, T. Barnes, **T.W. Price**, "Just a Few Expert Constraints Can Help: Humanizing Data-Driven Subgoal Detection for Novice Programming". Proceedings of the International Conference on Educational Data Mining (EDM), 68-80. 2021. (Acceptance Rate 22.0%, 22/100 Full Papers, **Best Full Paper Award**).

C37. Y. Mao, ◆Y. Shi, ◆S. Marwan, **T.W. Price**, T. Barnes and M. Chi, "Knowing both when and where: Temporal-ASTNN for Early Prediction of Student Success in Novice Programming Tasks". Proceedings of the International Conference on Educational Data Mining (EDM), 172-182. 2021. (Acceptance Rate 22.0%, 22/100 Full Papers).

C36. ◆Y. Shi, Y. Mao, T. Barnes, M. Chi and **T.W. Price**, "More With Less: Exploring How to Use Deep Learning Effectively through Semi-supervised Learning for Automatic Bug Detection in Student Code". Proceedings of the International Conference on Educational Data Mining (EDM), 446-453. 2021. (Combined Acceptance Rate 27.2%, 44/162 Short Papers).

C35. Y. Dong, ◆S. Marwan, P. Shabrina, T. Barnes and **T.W. Price**, "Using Student Trace Logs To Determine Meaningful Progress and Struggle During Programming Problem Solving". Proceedings of the International Conference on Educational Data Mining (EDM), 439-445. 2021. (Combined Acceptance Rate 27.2%, 44/162 Short Papers).

C34. ◆W. Wang, C. Zhang, A. Stahlbauer, G. Fraser, **T.W. Price**, "SnapCheck: Automated Testing for Snap! Programs". ITiCSE'21 – Proceedings of the 2021 ACM Conference on Innovation and Technology in Computer Science Education, to appear. 2021. https://doi.org/10.1145/3430665.3456367. (31% acceptance rate; 84/275 full papers.)

C33. ◆W. Wang, A. Kwatra, ◆J. Skripchuk, ▸N. Gomes, A. Milliken, C. Martens, T. Barnes, **T.W. Price**, "Novices' Learning Barriers When Using Code Examples in Open-Ended Programming". ITiCSE'21 – Proceedings of the 2021 ACM Conference on Innovation and Technology in Computer Science Education. 2021. https://doi.org/10.1145/3430665.3456370. (31% acceptance rate; 84/275 full papers.)

C32. **T.W. Price**, ◆S. Marwan, and J.J. Williams. (2021). Exploring Design Choices in Data-driven Hints for Python Programming Homework. Proceedings of the ACM Conference on Learning@ Scale, 283–286. 2021. https://doi.org/10.1145/3430895.3460159. (short paper).

C31. ◆Y. Shi, ◊K. Shah, ◆W. Wang, ◆S. Marwan, ◊P. Penmetsa, **T.W. Price**, "Toward Semi-Automatic Misconception Discovery Using Code Embeddings". International Conference on Learning Analytics and Knowledge (LAK), 606-612, 2021. https://doi.org/10.1145/3448139.3448205. (short paper; 31.6% acceptance rate).

C30. A. Milliken, ◆W. Wang, V. Cateté, S. Martin, ▸N. Gomes, Y. Dong, R. Harred, A. Isvik, T. Barnes, **T.W.. Price**, C. Martens. "PlanIT! A new integrated tool to help novices design for open-ended projects". In Proceedings of the ACM SIGCSE Technical Symposium on Computer Science Education. 2021. https://doi.org/10.1145/3408877.3432552.

C29. ◆G. Gao, ◆S. Marwan, and **T.W. Price**. "Early Performance Prediction using Interpretable Patterns in Programming Process Data". In Proceedings of the ACM SIGCSE Technical Symposium on Computer Science Education. 2021. https://doi.org/10.1145/3408877.3432439.

C28. ◆S. Marwan, ◆G. Gao, S. Fisk, **T.W. Price**, and T. Barnes. "Adaptive Immediate Feedback Can Improve Novice Programming Engagement and Intention to Persist in Computer Science". In the sixteenth annual ACM International Computing Education Research (ICER), 2020. (22.7% acceptance rate; 27/119 full papers)

C27. **T.W. Price**, ◈S. Marwan, M. Winters, J.J. Williams, "An Evaluation of Data-driven Programming Hints in a Classroom Setting." International Conference on Artificial Intelligence in Education (AIED). 2020. https://doi.org/10.1007/978-3-030-52240-7_45. (short paper; 30.8% acceptance rate; 66/214 short papers)

C26. Y. Mao, ◈S. Marwan, **T.W. Price**, T. Barnes, M. Chi, "What Time is It? Student Modeling Needs to Know." Proceedings of the International Conference on Educational Data Mining (EDM) 2020.

C25. ◈S. Marwan, A. Dombe, **T.W. Price**, "Unproductive Help-seeking in Programming: What it is and How to Address it" ITiCSE'20 – Proceedings of the 2020 ACM Conference on Innovation and Technology in Computer Science Education. 2020.

C24. **T.W. Price** et al. "ProgSnap2: A Flexible Format for Programming Process Data." Proceedings of the 2020 ACM Conference on Innovation and Technology in Computer Science Education. 2020. https://doi.org/10.1145/3341525.3387373. (27.6% acceptance rate; 72/261 full papers)

C23. ◈W. Wang, ◊Y. Rao, ◈R. Zhi, ◈S. Marwan, ◈G. Gao, **T.W. Price**, "Step Tutor: Supporting Students through Step-by-Step Example-Based Feedback." Proceedings of the 2020 ACM Conference on Innovation and Technology in Computer Science Education. 2020. https://doi.org/10.1145/3341525.3387411.

C22. ★ **T.W. Price**, J.J. Williams, J. Solyst, ◈S. Marwan, "Engaging Students with Instructor Solutions in Online Programming Homework." Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems. 2020. https://doi.org/10.1145/3313831.3376857. (24.3% acceptance rate; 760/3126 papers)

C21. ◈W. Wang, ◈R. Zhi, A. Milliken, N. Lytle, **T.W. Price**, "Crescendo: Engaging Students to Self-Paced Programming Practices." ACM Special Interest Group on Computer Science Education (SIGCSE). 2020. https://doi.org/10.1145/3328778.3366919.

C20. ★◈S. Marwan, J. J. Williams, **T.W. Price**. "An Evaluation of the Impact of Automated Programming Hints on Performance and Learning." International Computing Education Research Conference (ICER). 2019. https://doi.org/10.1145/3291279.3339420. (20.4% acceptance rate; 28/137 full papers)

C19. ◈R. Zhi, M. Chi, T. Barnes, T.W. Price. "Evaluating the Effectiveness of Parsons Problems for Block-based Programming." International Computing Education Research Conference (ICER). 2019. https://doi.org/10.1145/3291279.3339419. (20.4% acceptance rate; 28/137 full papers)

C18. ◈R. Zhi**,** ◈S. Marwan**,** Y. Dong, N. Lytle, **T.W. Price**, T. Barnes. "Toward Data-Driven Example Feedback for Novice Programming." Proceedings of the International Conference on Educational Data Mining (EDM). 2019. (22.5% acceptance rate for full papers)

C17. Y. Mao, ◈R. Zhi, F. Khoshnevisan, **T.W. Price**, T. Barnes, M. Chi. " One minute is enough: Early Prediction of Student Success and Event-level Difficulty during a Novice Programming Task." Proceedings of the International Conference on Educational Data Mining (EDM). 2019. (22.5% acceptance rate for full papers; **Best Student Paper Award**).

C16. ◈S. Marwan, N. Lytle, J. J. Williams and **T.W. Price**. "The Impact of Adding Textual Explanations to Next-step Hints in a Novice Programming Environment." Proceedings of the Annual Conference on Innovation and Technology in Computer Science Education (ITiCSE). 2019. https://doi.org/10.1145/3304221.3319759. (28% acceptance rate; 67/243 full papers).

C15. ◈R. Zhi, **T.W. Price**, ◈S. Marwan, A. Milliken, T. Barnes and M. Chi. "Exploring the Impact of Worked Examples in a Novice Programming Environment." ACM Special Interest Group on Computer Science Education (SIGCSE). 2019. https://doi.org/10.1145/3287324.3287385. (32% acceptance rate; 169/526 full papers)

C14. Y. Dong, ◈S. Marwan, V. Cateté, T. Barnes and **T.W. Price**. "Defining Tinkering Behavior in Open-ended Block-based Programming Assignments." ACM Special Interest Group on Computer Science Education (SIGCSE). 2019. https://doi.org/10.1145/3287324.3287437. (32% acceptance rate; 169/526 full papers)

C13. **T.W. Price,** ◈R. Zhi, Y.Dong, N. Lytle and T. Barnes. "The Impact of Data Quantity and Source on the Quality of Data-driven Hints for Programming." *International Conference on Artificial Intelligence in Education*. 2018. https://doi.org/10.1007/978-3-319-93843-1_35. (25% acceptance rate)

C12. ◈R. Zhi, N. Lytle, **T.W. Price**. "Exploring Instructional Support in an Educational Game for K-12 Computing Education." ACM Special Interest Group on Computer Science Education (SIGCSE). 2018. https://doi.org/10.1145/3159450.3159519. (37% acceptance rate; 82/221 full CS Education Research papers).

C11. ★ **T.W. Price,** Z. Liu, V. Cateté and T. Barnes. "Factors Influencing Students' Help-Seeking Behavior while Programming with Human and Computer Tutors." *International Computing Education Research (ICER) Conference*. 2017. https://doi.org/10.1145/3105726.3106179. (27% acceptance rate; 29/108 full papers)

C10. **T.W. Price**, ◈R. Zhi and T. Barnes. "Hint Generation Under Uncertainty: The Effect of Hint Quality on Help-Seeking Behavior." *International Conference on Artificial Intelligence in Education*. 2017. https://doi.org/10.1007/978-3-319-61425-0_26. (30% acceptance rate; 36/121 full papers)

C9. **T.W. Price**, ◈R. Zhi and T. Barnes. "Evaluation of a Data-driven Feedback Algorithm for Open-ended Programming." *International Conference on Educational Data Mining*. 2017. (42% acceptance rate; 32 short papers)

C8. ★ **T.W. Price**, Y. Dong and D. Lipovac. "iSnap: Towards Intelligent Tutoring in Novice Programming Environments." *ACM Special Interest Group on Computer Science Education (SIGCSE)*. 2017. https://doi.org/10.1145/3017680.3017762. (**Exemplary CS Research Paper Award**; 30% acceptance rate; 105/350 full papers)

C7. **T.W. Price**, N.C.C. Brown, D. Lipovac, T. Barnes and M. Kölling. "Evaluation of a Frame-based Programming Editor." *International Computing Education Research (ICER) Conference*. 2016. https://doi.org/10.1145/2960310.2960319. (25.5% acceptance rate; 26/102 full papers)

C6. ★ **T.W. Price**, Dong, T. and Barnes, T. "Generating Data-driven Hints for Open-ended Programming." *International Conference on Educational Data Mining*. 2016. (**Exemplary Paper Award**; 27.5% acceptance rate; 30/105 full papers)

C5. G. Zhou, C.F. Lynch, **T.W. Price**, T. Barnes, M. Chi. "The Impact of Granularity on the Effectiveness of Students' Pedagogical Decision." *Annual Meeting of the Cognitive Science Society (CogSci)*. 2016. (34% acceptance rate; 222/656 full papers)

C4. **T.W. Price**, V. Cateté, J. Albert, T. Barnes and D. Garcia. "Lessons Learned from "BJC" CS Principles Professional Development." *ACM Special Interest Group on Computer Science Education (SIGCSE)*. 2016. https://doi.org/10.1145/2839509.2844625. (35.4% acceptance rate; 105/297 full papers)

C3. **T.W. Price**, J. Albert, V. Cateté and T. Barnes. "BJC in Action: Comparison of Student Perceptions of a Computer Science Principles Course." *Research in Equity and Sustained Participation in Engineering, Computing, and Technology (RESPECT) Conference*. 2015. (44.4% acceptance rate; 8/18 short papers)

C2. ★ **T.W. Price** and T. Barnes. "Comparing Textual and Block Interfaces in a Novice Programming Environment." *International Computing Education Research (ICER) Conference*. 2015. https://doi.org/10.1145/2787622.2787712. (26% acceptance rate; 25/96 full papers)

C1. G. Zhou, **T.W. Price**, C. Lynch, T. Barnes and M. Chi. "The Impact of Granularity on Worked Examples and Problem Solving." *Annual Meeting of the Cognitive Science Society (CogSci)*. 2015. (28% acceptance rate; 187/666 full papers)

Peer-Reviewed Publications in Workshops

W13. B. Tabarsi, A. Limke, H. Reichert, R. Qualls, **T.W. Price**, C. Martens and T. Barnes. How to Catch Novice Programmers' Struggle: Detecting Moments of Struggle in Open-Ended Block-Based Programming Projects using Trace Log Data. *Proceedings of the 6th Workshop on Educational Data Mining in Computer Science Education (CSEDM) at EDM'22*.

W12. H. Reichert, A. Limke, B. Tabarsi, **T.W. Price**, C. Martens and T. Barnes. How, when, and why do novices struggle in programming? Exploring the experiences and perceptions of common programming moments in block-based environments. *Proceedings of the 6th Workshop on Educational Data Mining in Computer Science Education (CSEDM) at EDM'22*.

W11. ◈W. Wang, G. Fraser, C. Martens, **T.W. Price**. (2021). Execution-Trace-Based Feature Engineering To Enable Formative Feedback on Visual, Interactive Programs. *Proceedings of the 5th Workshop on Educational Data Mining in Computer Science Education (CSEDM) at EDM'21*, 1–10.

W10. ◈S. Marwan, **T.W. Price**, Chi, M., & Barnes, T. (2020). Immediate Data-Driven Positive Feedback Increases Engagement on Programming Homework for Novices. Proceedings of the 4th Workshop on Educational Data Mining in Computer Science Education (CSEDM) at EDM'20.

W9. P. Shabrina, ◈S. Marwan, Chi, M., Barnes, T., & **T.W. Price** (2020). The Impact of Data-driven Positive Programming Feedback: When it Helps, What Happens when it Goes Wrong, and How Students Respond. Proceedings of the 4th Workshop on Educational Data Mining in Computer Science Education (CSEDM) at EDM'20.

W8. ◈W. Wang, ◊Y. Rao, ◈Y. Shi, A. Milliken, C. Martens, T. Barnes and **T.W. Price**, ''Comparing Feature Engineering Approaches to PredictComplex Programming Behaviors.“ Educational Data Mining in Computer Science Education (CSEDM) Workshop @ EDM'20

W7. **T.W. Price**, D. Hovemeyer, K. Rivers, A. C. Bart, A. Petersen, B. A. Becker and J. Lefever. "ProgSnap2: A Flexible Format for Programming Process Data." *2nd Educational Data Mining in Computer Science Education (CSEDM) Workshop at the International Conference on Learning Analytics and Knowledge (LAK)*. 2019.

W6. **T.W. Price**, J. J. Williams, ◈S. Marwan. "A Comparison of Two Designs for Automated Programming Hints." *2nd Educational Data Mining in Computer Science Education (CSEDM) Workshop at the International Conference on Learning Analytics and Knowledge (LAK)*. 2019.

W5. ◈R. Zhi, **T.W. Price**, N. Lytle, Y. Dong and T. Barnes. "Reducing the State Space of Programming Problems through Data-Driven Feature Detection." *Educational Data Mining in Computer Science Education (CSEDM) Workshop at the International Conference on Educational Data Mining (EDM)*. 2018.

W4. **T.W. Price** and T. Barnes. "Position Paper: Block-based Programming Should Offer Intelligent Support for Learners." *Blocks and Beyond Workshop at the IEEE Symposium on Visual Languages and Human-Centric Computing (VL/HCC)*. 2017.

W3. C. Lynch, **T.W. Price**, M. Chi and T. Barnes. "Using the Hint Factory to Compare Model-based Tutoring Systems." *Workshop on Graph-based Educational Data Mining at the International Conference on Educational Data Mining (EDM)*. 2015.

W2. **T.W. Price** and T. Barnes. "An Exploration of Data-Driven Hint Generation in an Open-Ended Programming Problem." *Workshop on Graph-based Educational Data Mining at the International Conference on Educational Data Mining (EDM)*. 2015.

W1. **T.W. Price** and R. M. Young. "Towards an Extended Declarative Representation for Camera Planning." *Workshop on Intelligent Cinematography and Editing (WICED) at the 28th AAAI Conference on Artificial Intelligence*. 2014.

Extended Abstracts, Posters, Demos and Discussions in Conference Proceedings

A9. S. Fisk, C. Hunt, L. Battestilli, B. Akram, T. Barnes, **T.W. Price**, S. Yoder. Automating Personalized Feedback to Improve Students' Persistence in Computing. Proceedings of the 53rd ACM Technical Symposium on Computer Science Education. 2022.

A8. **T.W. Price** "iSnap: Automatic Hints and Feedback for Block-based Programming." *ACM Special Interest Group on Computer Science Education (SIGCSE)*. 2018.

A7. **T.W. Price** and T. Barnes. "Showpiece: iSnap Demonstration." IEEE Symposium on Visual Languages and Human-Centric Computing (VL/HCC). 2017.

A6. **T.W. Price**, N. C. C. Brown, C. Piech and K. Rivers. "Sharing and Using Programming Log Data." *ACM Special Interest Group on Computer Science Education (SIGCSE)*. 2017.

A5. S. Duval, D. Eagle, R. Narcisse, **T.W. Price**. "Clashroom: A Game to Enhance the Classroom Experience." *ACM Special Interest Group on Computer Science Education (SIGCSE)*. 2016.

A4. **T.W. Price**, V. Cateté, J. Albert and T. Barnes. "Determining the Impact of Teacher Professional Development on Perceived Ability to Teach a Computer Science Principles Course." *International Computing Education Research (ICER) Conference*. 2015.

A3. **T.W. Price** "Integrating Intelligent Feedback into Block Programming Environments." *Doctoral Consortium at the International Computing Education Research Conference (ICER)*. 2015.

A2. **T.W. Price** and T. Barnes. "Creating Data-driven Feedback for Novices in Goal-driven Programming Projects." *Doctoral Consortium at the International Conference on Artificial Intelligence in Education (AIED)*. 2015.

A1. **T.W. Price**, Lynch, C., T. Barnes and M. Chi. "An Improved Data-Driven Hint Selection Algorithm for Probability Tutors." *International Conference on Educational Data Mining (EDM)*. 2015.

Teaching Experience

CSC110: Computer Science Principles — NC State University — 2019-Present

- Taught Falls 2019-2022
- Co-designed the course as a new introduction to computational thinking for non-majors
- Course features novice-friendly programming, creative projects, and societal applications

CSC422: Automated Learning and Data Analysis — NC State University — 2018-Present

- Taught Springs 2019-2022
- Undergraduate data mining and machine learning course, featuring a large, collaborative course project designed to apply machine learning to solve a meaningful problem

CSC522: Automated learning and Data Analysis — NC State University — 2018-Present

- Taught Springs 2019-2023
- Graduate data mining and machine learning course, covering advanced concepts including deep learning, support vector machines and association rule mining

Research Mentoring

Ph.D. Chair or Co-Chair, Completed:

1. (Emma) Wengran Wang, chair (2023)
2. Samiha Marwan, chair (2021)
3. Rui Zhi, co-chair (2019)

Current Ph.D. Advisees:

1. Yang Shi (2019 - Present)
2. James Skripchuk (2020 - Present)
3. J. Thomas Bacher (2022 - Present)
4. Keith Tran (2022 - Present)

M.S. Students Advised:

1. Poorvaja Penmetsa Sp. 2020 – Su. 2021
2. Archit Kwatra Su. 2020 – Fa. 2020
3. Krupal Shah Su. 2020 – Fa. 2020
4. Rajat Narang Fa. 2018 – Fa. 2019
5. Shreya More Fa. 2018 – Fa. 2019
6. Yudong Rao Fa. 2018 – Su. 2019
7. Anusha Manur Sp. 2019

Undergraduate Students Advised:

1. Camille Jones, Fa. 2022
2. Jeff Zheng, Su. 2022
3. Neil Bennet, Su. 2022
4. Bryan Wilson, Su. 2022
5. Mahesh Bobbadi, Su. 2021 – Sp. 2022
6. Audrey Le Meur, Su. 2021
7. Eric Li, Fa. 2021 – Sp. 2022
8. Neeloy Gomes, Fa. 2019 – Sp. 2021
9. Anthony Hansen, Su. 2020
10. Kiran Ruff, Su. 2020
11. Sichen (David) Liu, Sp. 2020
12. Joshitha Muthukrishnan, Fa. 2019
13. Carl Klier, Fa. 2019
14. Oliver Fowler, Sp. 2019 – Fa. 2019
15. Gray Dougherty, Sp. 2019 – Fa. 2019
16. Anay Dombe, Su. 2019 – Fa. 2019
17. Josh Sosa, Su. 2019
18. Sarah Lester, Su. 2019
19. Austin Lalicker, Sp. 2019
20. Neetya Shah, Sp. 2019
21. Rohak Rastogi, Sp. 2019
22. Dylan Jordan, Sp. 2019
23. Haoyu Jing, Fa. 2018 – Sp. 2019

Professional Service and Memberships

Organization of Conferences and Workshops:

Workshops Co-Chair, International Educational Data Mining Conference 2021

Organizer, Educational Data Mining in Computer Science Education (CSEDM) Workshop 2018-23

Organizer, SPLICE Workshops for Computing Education Research Infrastructure:

- "CS Education Research Technology and Data Infrastructure Community Meeting" 2023
- “Building an Infrastructure for CS Education Research and Practice at Scale” 2020
- “Computing Science Education Infrastructure: From Tools to Data” 2019

Publications Chair, Research in Equity and Sustained Participation in Engineering, Computing, and Technology (RESPECT) Conference 2015

Leader, CS-SPLICE Working Group on Code Snapshot representation 2021-Present

Conference and Workshop Program Committees:

International Conference on Educational Data-Mining (EDM)	PC: 2016-20, 22-23 Workshops Chair: 2021
ACM Technical Symposium on Computer Science Education (SIGCSE)	PC: 2017-19, APC: 2020-23
International Conference on AI in Education (AIED)	PC: 2020-21; SPC 2022-23
International Computing Education Research Conference (ICER)	PC: 2021-23
Educational Data Mining in Computer Science Education (CSEDM) Workshop	PC: 2018-23
ACM CHI Conference on Human Factors in Computing Systems (CHI)	Rev: 2018-21
Conference on Innovation and Technology in Computer Science Education (ITiCSE)	PC: 2017-21
BLOCKS+ Workshop	PC: 2018

Journal Reviewing:

Journal of Educational Data Mining (JEDM)	2021
International Journal of Artificial Intelligence in Education (IJAIED)	2020
Transactions on Computer-Human Interaction (TOCHI)	2020
Journal of Engineering Education (JEE)	2020
ACM Transactions on Computing Education (TOCE)	2017-20
Computer Science Education (CSE)	2019-20
IEEE Transactions on Learning Technologies (TLT)	2017-19
Computers and Education (C&E)	2018
IEEE Transactions on Emerging Topics in Computing (TETC)	2017

Invited Talks:

Invited Speaker, AAAI Spring Symposium: AI for K-12 Education	2021
Keynote Speaker, Fourth Alice Symposium, Duke University	2017

Memberships:

Association for Computing Machinery (ACM)	since 2017
ACM Special Interest Group on Computer Science Education (SIGCSE)	since 2017
International Educational Data Mining Society	since 2016
International AI in Education Society	since 2019
Society for Learning Analytics Research (SoLAR)	since 2018
Phi Beta Kappa, national honors society for the liberal arts and sciences	since 2014

Departmental Service

Co-leader, NCSU CSC Taskforce on Promoting Diversity and Inclusivity Discussions and Community: Proposed departmental policies informed by surveys and listening sessions with students of color to address systemic barriers to success and wellbeing (2020-2022).

Leader, NCSU CSC Handbook Taskforce: The taskforce has put together a collection of resources to support faculty and staff by explaining departmental policies, requirements and best-practices.