

Assistant Professor of Instruction
Department of Computer Science
CS + LS Affiliated Faculty Member
Northwestern University

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Technological Institute
2145 Sheridan Rd., Rm. L374
Evanston, IL 60208

EDUCATION

Northwestern University, Evanston, Illinois

Ph.D. in Computer Science and Learning Sciences, September 2021

Advisor: Dr. Uri Wilensky

Dissertation: Empowering Teachers to CT-ify the Science Classroom

M.S. in Computer Science, September 2021

Thesis: Teaching CS: Identifying Unique Aspects of the Role of a CS Teacher in the Classroom

University of South Carolina Honors College, Columbia, South Carolina

B.S.C.S. in Computer Science, May 2015, *summa cum laude*

B.S. in Mathematics, Minor in Music, May 2015, *summa cum laude*

with Leadership Distinction in Civic & Professional Engagement

RESEARCH INTERESTS

The world is becoming increasingly computational and computing skills are now a necessity. Yet we are not teaching them effectively or equitably. My research seeks to understand how to support learners in developing authentic computational thinking skills across all disciplines. There are three major avenues to this research: designing meaningful activities for learners, supporting teachers in increasingly computer-focused classrooms, and analyzing, computationally and otherwise, student work in order to measure learning gains.

Keywords: Computational Thinking & Computational Literacy; Computing Pedagogy; Broadening Participation in Computing; Learning Analytics; Teacher Education; Computer Science Communication

HONORS AND AWARDS

NUIT Canvas Hall of Fame - Most Innovative Course Site, 2024 for COMP_SCI 110

NUIT Canvas Hall of Fame - Best Use of Video (Finalist), 2023 for COMP_SCI 111

Associated Student Government Faculty Honor Roll, 2021-2022

McCormick School of Engineering George H. and D. G. Martin Fellowship, Fall 2020

Presidential Scholar Finalist, Northwestern University, Spring 2018

National Science Foundation Graduate Research Fellowship, Spring 2015

Algernon Sydney Sullivan Award, Spring 2015

University of South Carolina's highest honor awarded to two graduating students each year

Barry M. Goldwater Scholar, Spring 2014

Phi Beta Kappa, Spring 2014

Udall Scholar Honorable Mention, Spring 2013

Carolina Leadership Initiative Award, 2012 - 2013

Expanding Scientific Leadership through Carolina Science Outreach; Advisor: Dr. Munn Sanchez

TEACHING (*Course Evaluations Available by Request*)

COMP_SCI 110 - Intro to Computer Programming in Python **W/S 2022, W/S 2023, W/S 2024**

Instructor - Northwestern University - Avg. Class Size: 185 – Total Students: 1220

COMP_SCI 111 - Fundamentals of Computer Programming I **Fall 2021, 2022, 2023, 2024**

Instructor - Northwestern University - Avg. Class Size: 396 – Total Students: 1589

COMP_SCI 396 - Communicating Computer Science **Winter/Spring 2022, Spring 2023, 2024**

Course Designer & Instructor - Northwestern University - Avg. Class Size: 36 – Total Students: 129

COMP SCI 212 - Mathematical Foundations of Computer Science
Instructor - Northwestern University – Total Students: 125

Fall 2022

SESP 310 - Introduction to Statistical Causal Inference
Designer & Instructor - Northwestern University

Spring 2020

SESP 210 - Intro. to Statistics and Research **Winter/Fall 2016, Winter/Fall 2017, Winter 2019**
Recitation Instructor & Guest Lecturer - Northwestern University

OTHER TEACHING EXPERIENCES

Searle Fellow, Searle Center at Northwestern University **Fall 2023 - Spring 2024**

Computational Thinking Summer Institute 2.0 at Northwestern University **Summer 2020**
Co-designer & Lead Instructor - *Mathematics Track*

Computational Thinking Summer Institute at Northwestern University **Summer 2019**
Co-designer & Lead Instructor - *Physics Track*

Searle Center Teaching Certificate Program at Northwestern University **Sept. 2017 - June 2018**
Course Design Project: *An Introduction to Computational Thinking for Undergraduates*

Wolfram Language Certified Instructor **as of July 2017**

YouthDigital (now Apex Learning) **March 2015 - August 2015**
Instructor - *Course: Modding Minecraft - An Introduction to Java*

Richland County Public Library Summer Programs **Summer 2012**
Instructor - *Course: Web Design for All*

STUDENTS MENTORED

Jack Carroll (NU CS BS) - *CS Education Research - NU SURG* **May 2024 - September 2024**

Maryam Hedayati (NU CS+LS PhD) - *Graduate CS Teaching Mentee* **Winter 2023**

CONFERENCE PROCEEDINGS

Wu, S., Peel, A., Bain, C., Horn, M., & Wilensky, U. (June, 2021). Different Paths, Same Direction: How Teachers Learn Computational Thinking in STEM Practices through Professional Development. CoolThink@ JC, 92. In the proceedings of the International Conference on Computational Thinking Education. Hong Kong, Hong Kong.

Bain, C., Anton, G., Horn, M., & Wilensky, U. (June, 2021). From “Authentic Tools” to Authenticity: Using CT to Enable Exploration in Statistics Classrooms. Poster presented at the 2021 International Conference of the Learning Sciences.

Bain, C., HersHKovitz, A., Dabholkar, S., Horn, M., & Wilensky, U. (April, 2021). Identifying Evidence of Student Engagement in CT via Automated Response Analysis. Submitted to the 2021 Annual Meeting of the National Association of Research in Science Teaching.

HersHKovitz, A., Bain, C., Kelter, J., Horn, M. & Wilensky, U. (April, 2021). Teachers’ Perceptions of the Contribution of Computational Thinking to Science and Math Classrooms. Submitted to the 2021 Annual Meeting of the National Association of Research in Science Teaching (NARST).

Bain, C., Dabholkar, S., & Wilensky, U. (2020). Confronting Frame Alignment in CT Infused STEM Classrooms. CoolThink@ JC, 91. In the proceedings of the International Conference on Computational Thinking Education. Hong Kong, Hong Kong.

Wu, S.P., Peel, A., Bain, C., Anton, G., Horn, M., & Wilensky, U. (2020). Workshops and Co-design Can Help Teachers Integrate Computational Thinking into Their K-12 STEM Classes. CoolThink@ JC, 63. In the proceedings of the International Conference on Computational Thinking Education. Hong Kong, Hong Kong.

Bain, C., Anton, G., Horn, M., & Wilensky, U. (2020). Back to Computational Transparency: Co-design with Teachers to Integrate Computational Thinking in Science Classrooms. Proceedings of the International

Conference for the Learning Sciences (ICLS 2020), Nashville, U.S.A.

Martin, K., Bain, C., Swanson, H., Horn, M., Wilensky, U. (2020). Building Blocks: Kids Designing Scientific, Domain-specific, Block-based, Agent-based Microworlds. Proceedings of the International Conference for the Learning Sciences (ICLS 2020), Nashville, USA: ISLS.

Kelter, J., Peel, A., Bain, C., Anton, G., Dabholkar, S., Aslan, U., Horn, M., & Wilensky, U. (2020, May). Seeds of (r)Evolution: Constructionist Co-Design with High School Science Teachers. Proceedings of the International Constructionism Conference. Dublin, Ireland.

Bain, C. & Wilensky, U. (2020, March). Vectors of CT-ification: Integrating Computational Activities in STEM Classrooms. Proceedings of the Special Interest Group on Computer Science Education. Portland, Oregon, U.S.A.

Wu, S., Anton, G., Bain, C., Peel, A., Horn, M., & Wilensky, U. (2020, March). Engage Teachers as Active Co-Designers to Integrate Computational Thinking in STEM Classes. Proceedings of the National Association of Research on Science Teaching. Portland, Oregon, U.S.A.

Bain, C., Anton, G., Horn, M., & Wilensky, U. (2019, October). Building Blocks for Agent-based Modeling Can Scaffold Computational Thinking Engagement in STEM Classrooms. Proceedings of Blocks and Beyond, a VL/HCC Workshop 2019. Memphis, Tennessee, U.S.A.

Martin, K., Wang, E. Q., Bain, C., & Worsley, M. (2019, October). Computationally Augmented Ethnography: Emotion Tracking and Learning in Museum Games. Proceedings of the International Conference on Quantitative Ethnography (pp. 141-153). Springer, Cham. (*Nominated for Best Paper*)

Bain, C. & Wilensky U. (2019). Sorting Out Algorithms: Learning about Complexity through Participatory Simulations. Proceedings of the ACM Special Interest Group on Computer Science Education. Minneapolis, Minnesota, U.S.A.

Martin, K., Wang, E., & Bain, C. (2018). On a method of computational ethnography for museum exhibit engagement analysis. Presented at the Multi-Modal Data Analytics in Education Conference 2018 Conference, Chicago, Illinois. U.S.A.

Swanson, H., Arastoopour Irgens, G., Bain, C., Hall, K., Woods, P., Rogge, C., Horn, M., Wilensky, U. (2018). Characterizing Computational Thinking in high school science. In Kay, J. & Luckin, R. (Eds.), Rethinking Learning in the Digital Age. Making the Learning Sciences Count: Proceedings of the 13th International Conference of the Learning Sciences Vol. 2, 871-878.

Swanson, H., Anton, G., Bain, C., Horn, M., & Wilensky, U. (July 2017). Computational Thinking in the Science Classroom. In Kong, S. C., Sheldon, J., & Li, K. Y. (Eds.), In the proceedings of the *International Conference on Computational Thinking Education 2017*. Vol. 1, 17-22. Hong Kong: The Education University of Hong Kong.

Weintrop, D., Bain, C., & Wilensky, U. (2017). Blocking Progress? Transitioning from Blocks-based to Text-based Programming. Paper presented at AERA 2017. San Antonio, Texas, U.S.A.

Bain, C., Vermeer, W., Anton, G., & Wilensky, U. (2016). The Hackable Name Tag: Recording Interaction Data in Classroom Activities and Beyond. Paper presented at aWEAR 2016: Wearable technologies, knowledge development, and learning, Stanford, California, U.S.A.

Bain, C., Dey, S., Nelakuditi, S., & Choudhury, R. R. (June 2013). "Mitigating Distractions from Smartphones," *Mobile Computing and Communications Review*. Vol. 17 (1), pp. 19-20.

Bain, C. (2013). "The Need for Computer Science Outreach," *ACM: XRDS*. Vol. 20 (2), p. 10.

JOURNAL ARTICLES AND CHAPTERS

Hershkovitz, A., Bain, C., Kelter, J., Peel, A., Wu, S., Horn, M.S., & Wilensky, U. (2023). Contribution of computational thinking to STEM education: High school teachers' perceptions after a professional development program. *Journal of Computers in Mathematics and Science Teaching*, 42(1), 35-65.

Kelter, J., Peel, A., Bain, C., Anton, G., Dabholkar, S., Horn M., & Wilensky, U. (2021). Constructionist Co-design: A Dual Approach to Curriculum and Professional Development. *British Journal of Educational Technology*, 52.3: 1043-1059.

Arastoopour Irgens, G., Dabholkar, S., Bain, C. et al. Modeling and Measuring High School Students' Computational Thinking Practices in Science. *Journal of Science Education and Technology* 29, 137-161 (2020). <https://doi.org/10.1007/s10956-020-09811-1>

Swanson, H., Anton, G., Bain, C., Horn, M., & Wilensky, U. (2019). Introducing and Assessing Computational Thinking in the High School Science Classroom. Chapter in Abelson, H. & Kong, S. (Eds.), *Computational Thinking Education*. Singapore: Springer International Publishing AG.

CONFERENCE PRESENTATIONS

Wu, S.P., Anton, G., Bain, C., Peel, A.N., Horn, M., & Wilensky, U. (2021). Tools and Resources for Integrating Computational Thinking into Your Science Classes. NSTA National Conference 2021, Chicago, Illinois, U.S.A.

Gibson, Z., Anton, G., Vermeer, W., Gomez-Zara, D., Bain, C., Brady, C., DeChurch, L.A., Wilensky, U., & Contractor, N. (2017). Cultivating the conference culture: The role of diversity in interdisciplinary meetings. Presented at the First North American Social Networks (NASN) Conference, Washington, D.C., July 26 - July 30.

Gomez-Zara, D., Vermeer, W., Gibson, Z., Bain, C., Anton, G., Brady, C., DeChurch, L.A., Wilensky, U., & Contractor, N. (2017). The role of brokers in academic network building. Presented at the First North American Social Networks (NASN) Conference, Washington, D.C, U.S.A., July 26 - July 30.

Bain, C., Dey, S., Nelakuditi, S., & Choudhury, R. R. (2013). "YogiPhone: Mitigating Digital Distractions," poster presentation, *ACM HotMobile* at Jekyll Island, Georgia, USA.

CONFERENCE WORKSHOPS

Bain, C. & Anton, G. "Integrating Agent-based Modeling in STEM Classes: From Blocks to Text and Back?" Workshop at ACM Special interest Group on Computer Science Education. Minneapolis, Minnesota, U.S.A. February, 2019.

Brady, C, Weintrop, D., & Bain, C. "Hacking the Conference Badge". Workshop at the 2nd Annual International Conference on Computational Social Science. Evanston, Illinois. U.S.A. June, 2016

SERVICE

Member of School of Engineering Academic Standing Committee	Fall 2023 - present
Member of School of Engineering Academic Appeals Committee	Fall 2023 - present
Member of CS Department Awards Committee	Fall 2022 - present
Member of CS Department Teaching Track Hiring Committee	2023, 2024
Point of Contact for High Schoolers interested in CS Research at NU	Fall 2022 - present
Willard Residential College , Faculty Fellow Northwestern University	September 2021 - present
Reviewer for Communications of the ACM	2022
Reviewer for the Journal of Teaching and Teacher Education	2022
Reviewer for the ACM Special Interest Group on Computer Science Education	2021, 2020, 2019
Reviewer for FabLearn	2020
Submissions Committee for the Learning Sciences Graduate Student Conference	2019
Teaching Consultant at Northwestern University Searle Center for Teaching and Learning	Fall 2018 - Spring 2021
Willard Residential College , Assistant Faculty Chair Northwestern University	June 2018 - August 2021
Reviewer for the ACM Interaction Design and Children Conference	2018
Reviewer for the International Conference on the Learning Sciences	2018
Computational Thinking Initiative Volunteer at Wolfram Research	August 2017 - August 2019

Wolfram Language Mentor	August 2017 - June 2021
Wolfram Summer Camp Volunteer	Summer 2017
Finding a Home for CS Education in Schools of Education <i>Invited Summit Participant</i>	Winter 2017
International Conference on Computational Social Science <i>Electronic Registration Co-coordinator</i>	June 2016
NetLogo Models Library Managing Editor	June 2016 - September 2021
Carolina Science Outreach at USC <i>Director</i>	August 2010 - May 2015

SOFTWARE & CURRICULA

- Mickelson, J., Mills, J., Anton, G., Bain, C., Horn, M., Wilensky, U. (2020). Sampling Distributions. [Curricular Unit] Evanston, IL: Center for Connected Learning and Computer-Based Modeling, Northwestern University.
- Anton, G., Bain, C., Stone, D., Horn, M., & Wilensky, U. (2020). Analyzing a Global Pandemic with Data Science. [Curricular Unit] Evanston, IL: Center for Connected Learning and Computer-Based Modeling, Northwestern University.
- Bain, C. & Bertsche, J. (2017). *Baby Behavior Space*: A NetLogo Web Module for Structured Experiments Center for Connected Learning and Computer-Based Modeling. Northwestern, University, Evanston, IL.
- Dabholkar, S., Hall, K., Woods, P., & Bain, C. (2017). From Ecosystems to Speciation (curriculum). Adapted from Novak, M., Horn, M., Brady, C., Wagh, A., & Wilensky, U.: ModelSim - Enabling Modeling and Simulation-Based Science in the Classroom. Center for Connected Learning and Computer-Based Modeling. Northwestern University, Evanston, IL.
- Bain, C. and Wilensky, U. (2017). NetLogo GenJam - Duple model. Center for Connected Learning and Computer-Based Modeling, Northwestern University, Evanston, IL.
- Dabholkar, S., Bain, C. & Wilensky, U. (2016). NetLogo GenEvo 1 Genetic Switch model. Center for Connected Learning and Computer-Based Modeling, Northwestern University, Evanston, IL.
- Brockmann, D., Bain, C., Hjorth, A. & Wilensky, U. (2016). NetLogo Kicked Rotator model. Center for Connected Learning and Computer-Based Modeling, Northwestern University, Evanston, IL.
- Brockmann, D., Bain, C. & Wilensky, U. (2016). NetLogo Kicked Rotators LevelSpace model. Center for Connected Learning and Computer-Based Modeling, Northwestern University, Evanston, IL.
- Bain, C. (2016). Parallax E-Badge Conference Registration, Management, Survey, and Visualization Tool. Center for Connected Learning and Computer-Based Modeling. Northwestern University, Evanston, IL.
- Bain, C. (2016). *Sorting Out Algorithms*: Learning about Complexity through Participatory Simulations (curriculum). Center for Connected Learning and Computer-Based Modeling, Northwestern University, Evanston, IL.

PROFESSIONAL SOCIETY MEMBERSHIPS

- Association for Computing Machinery
- Institute of Electrical and Electronics Engineers (IEEE)
- Omicron Delta Kappa National Leadership Honor Society
- Upsilon Pi Epsilon Computing Honors Society
- Pi Mu Epsilon Mathematics Honorary Society