Connor Bain, Ph.D. - connor.bain@northwestern.edu

Assistant Professor of Instruction
Department of Computer Science
Computer Science + Learning Sciences Program
Affiliated Faculty Member
Northwestern University

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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 and how those skills affect the way learners think in other contexts. 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

NUCS - Excellence in Teaching Award, 2024 - 2025

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 22, W/S 23, W/S 24, W 25**
Instructor - Northwestern University - Avg. Class Size: 195 – Total Students: 1470

COMP_SCI 111 - *Fundamentals of Computer Programming I* **F 21, F 22, F 23, F 24**
Instructor - Northwestern University - Avg. Class Size: 396 – Total Students: 1589

COMP_SCI 396 - *Communicating Computer Science* **W/S 22, S 23, S 24**
Course Designer & Instructor - Northwestern University - Avg. Class Size: 36 – Total Students: 129

COMP_SCI 396 / 496 - *Pedagogical Design in Computer Science* **S 25**
Course Designer & Instructor - Northwestern University

COMP_SCI 212 - *Mathematical Foundations of Computer Science* **Fall 2022**
Instructor - Northwestern University – Total Students: 125

SESP 310 - *Introduction to Statistical Causal Inference* **Spring 2020**
Course Designer & Instructor - Northwestern University

SESP 210 - *Intro. to Statistics and Research* **W/F 16, W/F 17, W 19**
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 204**

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

Willard Residential College, Faculty Chair — **September 2025 - present**
Northwestern University

Faculty Advisor FutureDev, Northwestern University — **Fall 2024 - present**

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 — **September 2021 - August 2025**
Northwestern University

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 — **Fall 2018 - Spring 2021**
Searle Center for Teaching and Learning

Willard Residential College, Assistant Faculty Chair — **June 2018 - August 2021**
Northwestern University

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 — **Winter 2017**
Invited Summit Participant

International Conference on Computational Social Science — **June 2016**
Electronic Registration Co-coordinator

NetLogo Models Library Managing Editor — **June 2016 - September 2021**

Carolina Science Outreach at USC — **August 2010 - May 2015**
Director

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