Dr. Chris Bourke

Associate Professor of Practice
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I graduated from the University of Nebraska–Lincoln with a PhD in Computer Science in 2008 and joined the School of Computing in 2011. I was promoted to Associate Professor of Practice in 2015. My research interests include Computer Science Education, Computational Complexity Theory and Machine Learning, though my primary activities are teaching. I have over 25 years of computing education experience. I teach a wide variety of computing courses with a focus on introductory-level and honors courses. In support of my education mission, I have authored several Open Educational Resources including several textbooks and I host a successful YouTube channel. Recently I have published educational research papers in top CS education venues.

Education

- Ph.D. in Computer Science, University of Nebraska–Lincoln, 2008
- M.S. in Computer Science, University of Nebraska–Lincoln, 2004
- B.S. in Mathematics and Computer Science, University of Nebraska–Lincoln, 2002

Experience

- Associate Professor of Practice, School of Computing, University of Nebraska–Lincoln, November 2015 – current
- Assistant Professor of Practice/Lecturer, School of Computing, University of Nebraska–Lincoln, August 2009 – October 2015
- Optimization Systems Engineer, Werner Enterprises, April 2010 – July 2011
- Project Manager/Lecturer, University of Nebraska–Lincoln, August 2007 – April 2010

Teaching

Computer Science I

- See https://github.com/cbourke/ComputerScienceI
- Offered as CSCE 155E, CSCE 155H (Honors), ECEN 194 (UNO), RAIK 183H
- Over 40 offerings and sections taught

Computer Science II

- See https://github.com/cbourke/ComputerScienceII
- Offered as CSCE 156, CSCE 156H (Honors), ECEN 194 (UNO), RAIK 184H
- Over 20 offerings and sections taught

Computer Science III

- See https://github.com/cbourke/ComputerScienceIII
- Offered as CSCE 310, CSCE 310H (Honors)
- Over 15 offerings and sections taught

Other Courses

- Exploring Virtual Reality (interdisciplinary course co-taught with Steve Kolbe, Carson Center): 6 offerings taught
- Discrete Math (CSCE 235, 235H): over 15 offerings/sections taught
- Learning to Code (CSCE 120): created & developed for the Software Development Minor
- Cryptography and Computer Security (CSCE 477/877)

Other Teaching & Projects

- School of Computing Honors Program Director, 2011 – current
- Faculty Advisor, Software Development Minor 2014 – current
- Creator, CSE Webgrader, https://github.com/cbourke/grade, 2011 – current
- PhD Committee (external) for Mahmoud Habibnezhad (2017 – 2019) and MS Committee Member (2019), graduated summer 2019
- Advisor for numerous Independent Study, Honors Theses

- Senior Design Faculty Sponsor, interdisciplinary project with the Carson Center (2021 – 2022)
- Senior Design Faculty Sponsor: VR for Civil Engineering, collaboration with Dr. Joshua Steelman and Dr. Elizabeth Jones (2019 – 2020)
- Senior Design Faculty Sponsor: VR for Structural Engineering, collaboration with Dr. Joshua Steelman (2018 – 2019)
- Design Studio Faculty Sponsor (2017 – 2018)

Awards

- College of Arts & Sciences Honors Natural Sciences Faculty of the Year award, 2020
- Tau Beta Pi (Nebraska Alpha Chapter) Distinguished Teaching Award, 2018
- Henry Y. Kleinkauf Family Distinguished New Faculty Teaching Award, 2016
- Department Student Choice Outstanding Teaching Award, 2009, 2012, 2014, 2016, 2019, 2020, 2022
- Recognition for Contribution to Students – UNL Teaching Council and UNL Parents Association, 2012, 2015, 2020

Grants

- NE Space Grant FY23 Higher Ed Mini-Grant for NASA SUITS Team (Federal Award #80NSSC20M0112), $7,000, 2023
- *Facilitating transdisciplinary practice-based learning through MUSCLE - Multi-User VR-AR hybrid based Shared Remote Collaborative Learning Environment in Education for Sustainable Development*, NSF Research on Emerging Technologies for Teaching and Learning (RETTL, NSF 20-612), submitted, co-PI, 2022
- Seminar & Travel Grant, NSF Center for Parallel and Distributed Computing Curriculum Development and Educational Resources (CDER) $3,500, 2022
- *Continuity Funding* (internal EVC grant) $5,000, 2018
- Oculus equipment grant, $4,788, 2017

Publications

[1] Chris Bourke. *Computer Science III*. Creative Commons Attribution-ShareAlike 4.0 International License, 2015–current. Available, https://bitbucket.org/chrisbourke/computerscienceii/src/master/ComputerScienceThree.pdf.

[2] Chris Bourke. *Computer Science II*. Creative Commons Attribution-ShareAlike 4.0 International License, 2015–current. Available, https://bitbucket.org/chrisbourke/computerscienceii/src/master/ComputerScienceTwo.pdf.

[3] Chris Bourke. *Computer Science I*. Creative Commons Attribution-ShareAlike 4.0 International License, 2015–current. Available, https://bitbucket.org/chrisbourke/computerscienceii/src/master/ComputerScienceOne.pdf.

[4] Chris Bourke, Yael Erez, and Orit Hazzan. Executable exams: Taxonomy, implementation and prospects. In *Proceedings of the 54th ACM Technical Symposium on Computer Science Education V. 1*, SIGCSE 2023, page 381–387, New York, NY, USA, 2023. Association for Computing Machinery.

[5] Ryan Bockmon and Chris Bourke. Validation of the placement skill inventory: A cs0/cs1 placement exam. In *Proceedings of the 54th ACM Technical Symposium on Computer Science Education V. 1*, SIGCSE 2023, page 39–45, New York, NY, USA, 2023. Association for Computing Machinery.

[6] Chris Bourke. Development & evolution of a computer science I course. Technical report, University of Nebraska–Lincoln, December 2021. Available, https://digitalcommons.unl.edu/prtunl/202/.

[7] Chris Bourke. CSE webgrader. https://github.com/cbourke/grade/, 2010–current.

[8] Derrick Stolee, Chris Bourke, and N. V. Vinodchandran. A log-space algorithm for reachability in planar acyclic digraphs with few sources. In *Proceedings of 25th Annual IEEE Conference on Computational Complexity*, pages 463–468, June 2010.

[9] Chris Bourke, Raghunath Tewari, and N. V. Vinodchandran. Directed planar reachability is in unambiguous log-space. *ACM Transactions on Computation Theory*, 1(4):1–17, February 2009. Available, http://cse.unl.edu/~cbourke/pubs/DPRinUL-ToCT.pdf.

[10] Chris Bourke, Kun Deng, Stephen D. Scott, Robert E. Schapire, and N. V. Vinodchandran. On reoptimizing multi-class classifiers. machine learning. *Machine Learning*, 72(2–3):219–242, 2008. Available, http://cse.unl.edu/~cbourke/pubs/ROMCC-ML.pdf.

[11] Chris Bourke. Contributions to computational complexity and machine learning: Unambiguity in log-space computations and reoptimizing multi-class classifiers. Master's thesis, University of Nebraska–Lincoln, December 2008.

[12] Deng Kun, Chris Bourke, Stephen Scott, Julie Sunderman, and Yaling Zheng. Bandit-based algorithms for budgeted learning. In *Proceedings of IEEE International Conference on Data Mining (ICDM)*, pages 463–468, 2007. Available, http://cse.unl.edu/~cbourke/pubs/BBABL-ICDM07.pdf.

[13] Chris Bourke, Raghunath Tewari, and N. V. Vinodchandran. Directed planar reachability is in unambiguous log-space. In *Proceedings of the 22nd Annual IEEE Conference on Computational Complexity*, pages 217–221, 2007. Available, http://cse.unl.edu/~cbourke/pubs/DPRinUL-CCC.pdf.

[14] Chris Bourke. A note on the Karp-Lipton collapse for the exponential hierarchy. Technical Report UNL-CSE-2007-0004, University of Nebraska–Lincoln, 2007. Available, http://cse.unl.edu/~cbourke/pubs/EXPnote.pdf.

[15] Deng Kun, Chris Bourke, Stephen Scott, and N. V. Vinodchandran. New algorithms for optimizing multi-class classifiers via ROC surfaces. In *Proceedings of the 3rd International Workshop ROC Analysis in Machine Learning (ROCML-2006). Held within the 23rd International Conference on Machine Learning (ICML'06)*, pages 17–24, June 2006. Available, http://cse.unl.edu/~cbourke/pubs/NAOMCCvROCS.pdf.

[16] Chris Bourke, John M. Hitchcock, and N. V. Vinodchandran. Entropy rates and finite-state dimension. *Theoretical Computer Science*, 349(3):392–406, 2005. Available, http://cse.unl.edu/~cbourke/pubs/erfsd.pdf.

[17] Chris Bourke. Finite-state dimension of individual sequences. Master's thesis, University of Nebraska–Lincoln, May 2004.

Service

- Faculty Advisor, UNL Game Development Club (over 100 active members), 2018 – current
- Faculty Advisor, Cornhacks 2021 – current
- Reviewer, Advanced Placement Computer Science Principles Exam (College Board), 2022
- CSE Assessment Committee, 2012 – current
- Chair, CSE Faculty Learning Community, 2019 – current
- Engineering and Computing Education Core (ECEC) faculty representative, 2019 – current
- School of Computing Bylaws Committee, 2021 – 2022
- Remote Learning Assessment Committee (chair), 2020
- External promotion reviewer (Utah State University), 2020, 2021
- Durham School Professor of Practice Reappointment Committee, External Reviewer, 2020
- CSE Strategic Planning Committee, 2019 – 2021
- College of Engineering Task Force on First-Year Engineering (2018 – 2019)
- College of Engineering Task Force on Faculty Workload and Evaluation 2017 – 2018
- Professor of Practice Search Committee, 2016
- College of Engineering's College Curriculum & Academic Standards Committee, 2014 – 2019
- Graduate Teaching Assistant Committee Chair, 2011 – 2019
- CSE Curriculum Committee, 2012 – 2019

Professional Development

- FIRST (Faculty-led Inquiry into Reflective and Scholarly Teaching) Program 2021; final portfolio available at https://digitalcommons.unl.edu/prtunl/202/
- Seeing Equity Workshop (2021/01/13)
- Lessons Learned Workshop (2021/01/19)
- COE Peer Observation (2021/03/17)
- Spring 2021 Teaching and Learning Symposium (2021/03/19)
- ECEC: EITS Seminars (08-12, 8/27, 09/10, 09/17, 10/08)
- Center for Transformative Teaching's "Making your course more user-friendly for students" (2020/11/20)
- 2020 Innovation in Pedagogy and Teaching Symposium (virtual, 2020/05/12)
- Workshop for Lecturers: How to Excel at Teaching in 1317 Easy Steps (Center for Transformative Teaching & EVC office, 2020/03/04)
- Spring 2020 Teaching & Learning Symposium (2020/02/28)
- Faculty Learning Community, 2018-2019, HS-to-College Transition Focus
- ARISE Undergraduate Learning Assistants Seminar (Spring 2019, 6 seminars)
- Century Club Presenter: Utilizing Video (2019/10/08, available https://www.youtube.com/watch?v=0j6M6Gt9-fE)
- Century Club 2019/02/05, 2019/03/05, 2019/04/02, 2019/09/17; 2018/01/16, 2018/03/06, 2018/04/03, 2018/09/04, 2018/10/02, 2018/11/06
- Innovation in Pedagogy & Technology Symposium (2017/05/09, 2018/05/08, 2019/05/07)
- NU Collaboration Initiative (2019/10/31)
- College of Engineering COPUS & Peer Observation, Fall 2018-Spring 2019
- 2017 Spring Teaching & Learning Symposium (2017/03/03)
- 2017 Fall Teaching & Learning Symposium (2017/08/09)
- Presenter for Teaching & Learning Improvement Committee, Peer Observation Panel (2017/08/03); participant (04/25, 11/16)
- 2016 CoE Excellence in Teaching Workshop (CITL), 2016/09/23, 2016/10/28, 2016/11/11

- Active Learning in Mathematics courses (Nathan Wakefield), 2016/11/11
- 2016 Fall Teaching & Learning Symposium, 2016/10/07
- 2016 Innovation in Pedagogy & Technology Symposium, 2016/05/10
- Faculty Learning Community (ARISE), Fall 2016
- Faculty Learning Community (ARISE), Spring 2016
- Fall 2015 Teaching & Learning Symposium: Creating a Culture of Success, 2015/11/13
- Peer Observation Seminar (ARISE), Spring 2015
- 2015 Innovation in Pedagogy and Technology Symposium, 2015/05/14
- College of Engineering Excellence in Teaching Seminar: ASCE EXCEED 2015/03/02
- 2015 Teaching & Learning Symposium: Innovation, Engagement, and Evidence, 2015/02/13
- College of Engineering Excellence in Teaching Seminar: Blended Learning Seminar, *Should I Blend My Course*, 2015/01/30
- Peer Instruction Workshop (ARISE), 2014
- Online Learning Seminar (UNIT), 2014
- 3rd Annual Online & Blended Learning Symposium, 2014
- Participant, Echo360 lecture capture pilot, 2013

Outreach

- NE SciFest, 2023
- Future Business Leaders of America Judge, 2023
- Cornhacks Judge 2019 – current
- NUBE Camp 2019 – current
- Encounter Engineering (presenter, recruitment event, 2020/11/07)
- CodeLNK/Hour of Code presenter (outreach), 2016 – current
- Computer Science Teacher Association (CSTA) of Nebraska Member, 2014 – current
- Introduce a Girl to Engineering Day presenter, 2018 – current