Christian Murphy

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Education

PhD-Computer Science, May 2010
Columbia University, New York NY
Thesis title: "Metamorphic Testing Techniques to Detect Defects in Applications without Test Oracles"
Advisor: Prof. Gail Kaiser

MS-Computer Science, May 2006
Columbia University, New York NY

BS-Computer Engineering, *summa cum laude*, Aug 1995
Boston University, Boston MA

Professional Academic Experience

Columbia University, New York NY, Aug 2025 - present
Senior Lecturer in the Department of Computer Science
Currently teaching Introduction to CS and courses on software design.

Swarthmore College, Swarthmore PA, Aug 2023 - July 2025
Visiting Assistant Professor in the Computer Science Department
Taught undergraduate courses and worked with student members of department advisory council.

Bryn Mawr College, Bryn Mawr PA, Aug 2020 - July 2023
Senior Lecturer and Program Coordinator in the Department of Computer Science
Responsible for teaching undergraduate courses and fostering community within the Computer Science Department.

University of Pennsylvania, Philadelphia PA, Jul 2010 - Jul 2020
Associate Professor of Practice in the Dept. of Computer and Information Science
Responsible for graduate and undergraduate software engineering courses and served as director of online and on-campus graduate programs.

Awards and Honors

DO-IT Trailblazer Award, DO-IT (Disabilities, Opportunities, Internetworking, and Technology) Center, Univ. of Washington. For my work in making CS more inclusive of students living with mental health conditions. 2023.

Rosalyn R. Schwartz Teaching Award, Bryn Mawr College. The College's highest teaching honor. 2023.

Provost's Award for Teaching Excellence by Non-Standing Faculty, University of Pennsylvania. The University's highest teaching honor for full-time members of the associated faculty or academic support staff. 2019.

Exemplary Paper Award, "A Two-Course Sequence of Real Projects for Real Customers", by C. Murphy, S. Sheth, S. Morton. 48th ACM SIGCSE Technical Symposium on Computer Science Education. 2017.

Best Paper Award, "Application of Metamorphic Testing to Supervised Classifiers", by Xiaoyuan Xie, Joshua Ho, Christian Murphy, Gail Kaiser, Baowen Xu and Tsong Yueh Chen. 9th International Conference on Quality Software. 2009.

Paul Charles Michelman Memorial Award for Exemplary Service, Columbia University Dept. of Computer Science. Awarded each year by the Department of Computer Science to up to three Computer Science students for outstanding contributions to teaching in the Department and exemplary service to the Department and its mission. 2009.

CS Service Award, Columbia University Dept. of Computer Science. Awarded by the Department of Computer Science to those PhD students agreed to be in the top 10% in service contributions. 2008, 2009.

Columbia University Presidential Teaching Award. Honors the best of Columbia's graduate student teachers for the influence they have on the development of their students and their part in maintaining the University's longstanding reputation for educational excellence. 2007.

Andrew P. Kosoresow Memorial Award for Excellence in Teaching and Service, Columbia University Dept. of Computer Science. Given to a PhD student in Computer Science who has performed exemplary service to the department, devoting time and effort beyond the call to further the department's goals. 2006.

Great TA Award, Columbia University Fu Foundation School of Engineering and Applied Science. Given each semester to outstanding teaching assistants. Spring 2005, Fall 2005, Spring 2006.

Tau Beta Pi, Boston University College of Engineering. The Engineering Honor Society. 1995.

Teaching Experience

Columbia University (2025 - Present)

- COMS 3107 Clean Object-Oriented Design: Fall 2025

Swarthmore College (2023 - 2025)

- CPSC 021 Introduction to Computer Science: Spring 2024, Spring 2025
- CPSC 071 Software Engineering: Fall 2023
- CPSC 091 Special Topics - Open Source Software Development: Fall 2024

Bryn Mawr College (2020 - 2023)

- CMSC 113 Computer Science 1: Fall 2020 and Fall 2021

- CMSC 240 Principles of Computer Organization: Spring 2022 and Spring 2023
- CMSC 283 Special Topics - Software and Society: Fall 2022
- CMSC 353 Software Engineering: three times between Spring 2021 and Spring 2023
- CMSC 399 Senior Conference: Spring 2021
- EMLY 001 Emily Balch Seminar - Technology, Wellness, and Mental Health: Fall 2022

University of Pennsylvania (2010 - 2020)

- CIS 121 Data Structures and Algorithms: Fall 2019
- CIS 350 Software Design and Engineering: eight times between Spring 2012 and Spring 2020
- CIS 399 Special Topics - Open Source Software Development: five times between Spring 2014 and Fall 2016
- CIS 400/401 Senior Project: Fall 2017/Spring 2018
- CIS 542 Embedded Systems Programming: five times between Spring 2011 and Summer 2013
- CIS 573 Software Engineering: seven times between Fall 2011 and Fall 2017
- CIS 700 Special Topics - Programming & Problem Solving: four times between Summer 2012 and Fall 2013
- CIT 593 Intro to Computer Systems: three times between Fall 2010 and Fall 2012
- CIT 594 Data Structures and Software Design (Online): four times between Summer 2019 and Summer 2020
- CIT 595 Computer Systems Programming: eight times between Spring 2011 and Spring 2020

Columbia University (2006 - 2009 as graduate student)

- COMS 1004 Intro to Computer Science and Programming in Java: five times between Fall 2006 and Summer 2009
- COMS 1007 Object-Oriented Programming: Summer 2007 and Summer 2008

Publicly available online courses

- Computational Thinking for Problem Solving (Coursera), launched October 2018

Journal Articles

J. Bell, **C. Murphy**, G. Kaiser, "Metamorphic Runtime Checking of Applications without Test Oracles", *CrossTalk: The Journal of Defense Software Engineering*, Volume 28, Issue 2, Mar-Apr 2015, pp. 9-13.

X. Xie, J. W. K. Ho, **C. Murphy**, G. Kaiser, B. Xu, T. Y. Chen, "Testing and Validating Machine Learning Classifiers by Metamorphic Testing", *Journal of Systems and Software (JSS)*, Volume 84, Issue 4, Apr 2011, pp. 544-558.

H. Dai, **C. Murphy**, G. Kaiser, "Configuration Fuzzing Testing Framework for Software Vulnerability Detection", *International Journal of Secure Software Engineering (IJSSE)*, Volume 1, Issue 3, 2010, pp. 41-55.

Peer-Reviewed Conference Publications

J. Ji, **C. Murphy**, B. Blaser, and J. Akullian, "Experiences of Undergraduate Computer Science Students Living with Mental Health Conditions," in *Proc. of the 55th ACM SIGCSE Technical Symposium on Computer Science Education*, Portland OR, Mar 2024.

J. Kim and **C. Murphy**, "Student Perspectives on Assignment Deadline Policies in Computer Science Courses," in *Proc. of the 55th ACM SIGCSE Technical Symposium on Computer Science Education*, Portland OR, Mar 2024.

L. M. Soares Passos, **C. Murphy**, R. Z. Chen, M. Gonçalves de Santana, and G. Soares Passos, "Association of Sleep Quality with Anxiety and Depression Symptoms among Computer Science Students", in *2023 Anais do Simpósio Brasileiro de Educação em Computação (EduComp)*, April 2023.

L. M. Soares Passos, **C. Murphy**, R. Z. Chen, M. Gonçalves de Santana, and G. Soares Passos, "Association of Positive and Negative Feelings with Anxiety and Depression Symptoms among Computer Science Students during the COVID-19 Pandemic", in *2022 Anais do Simpósio Brasileiro de Educação em Computação (EduComp)*, April 2022.

K. Manley, L. Arain, and **C. Murphy**, "Addressing Sources of Stress and Distress among Undergraduate Computer Science Students", in *Proc. of the 17th International Conference on Frontiers in Education: Computer Science and Computer Engineering*, July 2021.

C. Murphy, A. Mushakevich, and Y. Park, "Incorporating Readings on Diversity and Inclusion into a Traditional Software Engineering Course", in *Proc. of the 6th Annual IEEE STCBP Conference on Research on Equity & Sustained Participation in Engineering, Computing, and Technology (RESPECT)*, May 2021.

P. McBurney and **C. Murphy**, "Experience of Teaching a Course on Software Engineering Principles Without a Project", in *Proc. of the 52nd ACM SIGCSE Technical Symposium on Computer Science Education*, Mar 2021.

L.M. Soares Passos, **C. Murphy**, R.Z. Chen, M. Gonçalves de Santana, and G. Soares Passos, "The Prevalence of Anxiety and Depression Symptoms among Brazilian Computer Science Students", in *Proc. of the 51st ACM SIGCSE Technical Symposium on Computer Science Education*, Portland OR, Mar 2020.

J. Weng and **C. Murphy**, "Bridging the Diversity Gap in Computer Science with a Course on Open Source Software", in *Proc. of the 3rd Annual IEEE STCBP Conference on Research on Equity & Sustained Participation in Engineering, Computing, and Technology (RESPECT)*, Baltimore MD, Feb 2018.

C. Murphy, S. Sheth, S. Morton, "A Two-Course Sequence of Real Projects for Real Customers", in *Proc. of the 48th ACM SIGCSE Technical Symposium on Computer Science Education*, Seattle WA, Mar 2017.

S. Sheth, **C. Murphy**, K. Ross, D. Shasha, "A Course on Programming and Problem Solving", in *Proc. of the 47th ACM SIGCSE Technical Symposium on Computer Science Education*, Memphis TN, Mar 2016, pp. 323-328.

C. Murphy, R. Powell, K. Parton, A. Cannon, "Lessons Learned from a PLTL-CS Program", in *Proc. of the 42nd ACM SIGCSE Technical Symposium on Computer Science Education*, Dallas TX, Mar 2011.

X. Xie, J. Ho, **C. Murphy**, G. Kaiser, B. Xu, T.Y. Chen, "Application of Metamorphic Testing to Supervised Classifiers", in *Proc. of the 9th International Conference on Quality Software (QSIC)*, Jeju, South Korea, Aug 2009, pp. 135-144.

C. Murphy, K. Shen, G. Kaiser, "Automatic System Testing of Programs without Test Oracles", in *Proc. of the 2009 ACM International Symposium on Software Testing and Analysis (ISSTA)*, Chicago IL, Jul 2009, pp. 189-199.

C. Murphy, G. Kaiser, I. Vo, M. Chu, "Quality Assurance of Software Applications using the In Vivo Testing Approach", in *Proc. of the Second IEEE International Conference on Software Testing, Verification and Validation (ICST)*, Denver CO, Apr 2009, pp. 111-120.

C. Murphy, K. Shen, G. Kaiser, "Using JML Runtime Assertion Checking to Automate Metamorphic Testing in Applications without Test Oracles", in *Proc. of the Second IEEE International Conference on Software Testing, Verification and Validation (ICST)*, Denver CO, Apr 2009, pp. 436-445.

C. Murphy, G. Kaiser, K. Loveland, S. Hasan, "Retina: Helping Students and Instructors Based on Observed Programming Activities", in *Proc. of the 40th ACM SIGCSE Technical Symposium on Computer Science Education*, Chattanooga TN, Mar 2009, pp. 178-182.

C. Murphy, G. Kaiser, L. Hu, L. Wu, "Properties of Machine Learning Applications for Use in Metamorphic Testing", in *Proc. of the 20th International Conference on Software Engineering and Knowledge Engineering (SEKE)*, Redwood City CA, Jul 2008, pp. 867-872.

C. Murphy, D. Phung, G. Kaiser, "A Distance Learning Approach to Teaching eXtreme Programming", in *Proc. of the 13th Annual ACM Conference on Innovation and Technology in Computer Science Education (ITiCSE)*, Madrid, Spain, Jun 2008, pp. 199-203.

M.Chu, **C. Murphy**, G. Kaiser, "Distributed In Vivo Testing of Software Applications", in *Proc. of the First IEEE International Conference on Software Testing, Verification and Validation (ICST)*, Lillehammer, Norway, Apr 2008, pp. 509-512 (student paper).

C. Murphy, E. Kim, G. Kaiser, A. Cannon, "Backstop: A Tool for Debugging Runtime Errors", in *Proc. of the 39th ACM SIGCSE Technical Symposium on Computer Science Education*, Portland OR, Mar 2008, pp. 173-177.

C. Murphy, G. Kaiser, M. Arias, "An Approach to Software Testing of Machine Learning Applications", in *Proc. of the 19th International Conference on Software Engineering and Knowledge Engineering (SEKE)*, Boston MA, Jul 2007, pp. 167-172 (short paper).

Workshop and Misc. Publications

R. Zablah and **C. Murphy**, "The Restructuring and Refinancing of Technical Debt", in *Proc of the Seventh International Workshop on Managing Technical Debt (MTD)*, Bremen, Germany, Oct 2015, pp. 77-80.

F.-H. Su, J. Bell, **C. Murphy**, G. Kaiser, "Dynamic Inference of Likely Metamorphic Properties to Support Differential Testing", in *Proc. of the Tenth IEEE/ACM International Workshop on Automation of Software Test (AST)*, Firenze, Italy, May 2015.

C. Murphy, M. S. Raunak, A. King, S. Chen, C. Imbriano, G. Kaiser, I. Lee, O. Sokolsky, L. Clarke, L. Osterweil, "On Effective Testing of Health Care Simulation Software", in *Proc. of the 3rd International Workshop on Software Engineering in Health Care (SEHC)*, Honolulu HI, May 2011.

C. Murphy, M. Vaughan, W. Ilahi, G. Kaiser, "Automatic Detection of Previously-Unseen Application States for Deployment Environment Testing and Analysis", in *Proc. of the 5th International Workshop on Automation of Software Test (AST)*, Cape Town, South Africa, May 2010.

S. Sheth, N. Arora, **C. Murphy**, G. Kaiser, "weHelp: A Reference Architecture for Social Recommender Systems", in *Proc. of the Third International Workshop on Social Software Engineering (SSE)*, Paderborn, Germany, Feb 2010.

H. Dai, **C. Murphy**, G. Kaiser, "Configuration Fuzzing for Software Vulnerability Detection", in *Proc. of the Fourth International Workshop on Secure Software Engineering (SecSE)*, Krakow, Poland, Feb 2010, pp. 525-530.

C. Murphy, "Using Runtime Testing to Detect Defects in Applications without Test Oracles", in *Proc. of the 2008 Foundations of Software Engineering (FSE) Doctoral Symposium*, Atlanta GA, Nov 2008, pp. 21-24.

C. Murphy, S. Sheth, G. Kaiser, L. Wilcox, "genSpace: Exploring Social Networking Metaphors for Knowledge Sharing and Scientific Collaborative Work", in *Proc. of the First International Workshop on Social Software Engineering and Applications (SoSEA)*, L'Aquila, Italy, Sep 2008, pp. 29-36.

C. Murphy, G. Kaiser, M. Arias, "Parameterizing Random Test Data According to Equivalence Classes", in *Proc. of the 2nd International Workshop on Random Testing (RT'07)*, Atlanta GA, Nov 2007, pp. 38-41 (short paper).

Magazine Articles

"Making CS Education Inclusive for Students with Mental Health Conditions", National Center for Women & Information Technology (NCWIT) *re:think*, Spring 2023.

Presentations, Panels, Posters, etc.

"Understanding Intersectional Experiences of Computer Science Students Living with Mental Health Conditions" (Birds of a Feather session co-organizer), 56th ACM SIGCSE Technical Symposium on Computer Science Education, Pittsburgh PA, February 2025.

"Computer Science Faculty Perspectives on Undergraduate Student Mental Health" (poster co-presenter), 56th ACM SIGCSE Technical Symposium on Computer Science Education, Pittsburgh PA, February 2025.

"Intersectional Identities of Asian Americans Living with Mental Health Conditions in Computer Science Education" (poster co-presenter), 56th ACM SIGCSE Technical Symposium on Computer Science Education, Pittsburgh PA, February 2025.

"Equity and Inclusion Considerations in CS Education for Students Living with Mental Health and Medical Conditions" (Birds of a Feather session co-organizer), 55th ACM SIGCSE Technical Symposium on Computer Science Education, Portland OR, March 2024.

"Equity and Inclusion Considerations in CS Education for Students Living with Mental Health and Medical Conditions", webinar sponsored by AccessComputing, Feb. 17, 2023.

"Experiences of Computer Science Students Living with Mental Health Conditions", presentation at Robert Louis Stevenson School Symposium on Computer Science and Student Mental Health, New York NY, Jan. 27, 2023.

"Diversity Includes Disability Includes Mental Illness: Expanding the Scope of DEI Efforts in Computer Science" (Birds of a Feather session co-organizer), 53rd ACM SIGCSE Technical Symposium on Computer Science Education, Providence RI, Mar 3, 2022.

"Fostering Inclusive Spaces for STEM Students Living with Mental Illness" (Teach-In co-organizer), Bryn Mawr College, Nov. 10, 2021.

"Diversity Includes Disability Includes Mental Illness: Expanding the Scope of DEI Efforts in Computer Science" (Birds of a Feather session co-organizer), 2021 CMD-IT/ACM Richard Tapia Celebration of Diversity in Computing, Online, Sept. 16, 2021.

"Conversations with Faculty about Student Mental Health" (panelist), 2021 CMD-IT/ACM Richard Tapia Celebration of Diversity in Computing, Online, Sept. 16, 2021.

"Supporting Computer Science Student Mental Health through Unprecedented Times" (Birds of a Feature session co-organizer), 52nd ACM SIGCSE Technical Symposium on Computer Science Education, Online, Mar 15, 2021.

"Incorporating Diversity-Related Topics into a Traditional CS Course" (Birds of a Feather session co-organizer), 2019 ACM Richard Tapia Celebration of Diversity in Computing, San Diego CA, Sept 19, 2019.

"Learn About Open Source Software" (Birds of a Feather session co-organizer), 2019 ACM Richard Tapia Celebration of Diversity in Computing, San Diego CA, Sept 19, 2019.

"Curious about Student Participation in Humanitarian Open Source Software?" (panelist), 50th ACM SIGCSE Technical Symposium on Computer Science Education, Minneapolis MN, Mar 1, 2019.

"Supporting Students Living With Mental Illness" (Birds of a Feather session co-organizer), 50th ACM SIGCSE Technical Symposium on Computer Science Education, Minneapolis MN, Feb 28, 2019.

"Learn About Open Source Software" (Birds of a Feather session co-organizer), 2018 ACM Richard Tapia Celebration of Diversity in Computing, Orlando FL, Sept 21, 2018.

"We're All in This Together: CS students, the tech industry, and mental health" (Birds of a Feather session co-organizer), 49th ACM SIGCSE Technical Symposium on Computer Science Education, Baltimore MD, Feb 22, 2018.

"Addressing Diversity & Inclusion Issues in Computer Science through Contributions to Free and Open Source Software" (Birds of a Feather session co-organizer), 2017 ACM Richard Tapia Celebration of Diversity in Computing, Atlanta GA, Sept 21, 2017.

"Community Engagement with Free and Open Source Software" (panel moderator), 48th ACM SIGCSE Technical Symposium on Computer Science Education, Seattle WA, Mar 9, 2017.

Industry Experience

Professional Access Limited, New York NY, Mar 2005 - May 2006
Senior Technology Consultant
Wrote requirements documents, managed the release cycle of an ASP .NET application, and coordinated QA efforts for an information security project for Citigroup.

IconMedialab, London UK, Nov 2000 - Jul 2001
Chief Technology Officer
Managed a group of 15 developers and helped define technical direction of company; reviewed software architecture and performed Java code reviews for London-based projects.

Art Technology Group, Boston MA and San Francisco CA, Sep 1996 - Sep 2000
Software Architect
Defined system requirements and technical architecture for clients' e-commerce projects in US and Europe; conducted product training for customers, technology partners, and internal sales.

Digital Equipment Corporation, Littleton MA, Aug 1995 - Sep 1996
Technical Support Engineer
Provided back-end support for systems management products.

Service

Student Advisory Council Faculty Liaison, Swarthmore College Computer Science Dept., 2023 - 2025.

Acting Department Chair, Bryn Mawr College Dept. of Computer Science, Spring 2023.

Program Coordinator, Bryn Mawr College Dept. of Computer Science, 2020 - 2023.

Faculty Co-Director, Univ. of Pennsylvania Online Masters of Computer & Information Technology Program, 2018 - 2019.

Faculty Director, Univ. of Pennsylvania Masters of Computer & Information Technology Program, 2014 - 2018.

Organizing Committee Co-Chair, Univ. of Pennsylvania CIS Department Summit on Diversity & Inclusion, 2018 - 2019.

Paper Reviewer, ACM SIGCSE Technical Symposium on Computer Science Education, 2012 - 2017, 2023 - pres.

PC Member, International Workshop on Metamorphic Testing, 2016 - 2017.

PC Member, Conference on Software Engineering Education & Training, 2012 - 2013.

Co-Chair, First International Workshop on Software Test Output Validation, 2010.

PhD Committee Member, Columbia University Dept. of Computer Science, Fall 2008-Spring 2010.

Emerging Scholars Program Coordinator, Columbia University Dept. of Computer Science, Spring 2008-Fall 2009.

TA Coordinator, Columbia University Dept. of Computer Science, Fall 2007-Fall 2008.