Titus Barik, PE

Contact Information

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Summary

I am a research scientist, educator, and licensed Professional Engineer whose career spans industry, academia, and the classroom. At Apple, Microsoft Research, and Google, I have led research in human-computer interaction, artificial intelligence, and software engineering. At NC State, Georgia Tech, and Wayne Community College, I have taught and mentored students across a wide range of CS and engineering topics. I am drawn to teaching positions that value the bridge between industry practice and academic learning.

Research Appointments

Apple, Seattle, WA

Staff Research Scientist **July 2021 to Present**

- Lead a team around Generative AI, with a focus on developer tools and building user interfaces agents.
- Provide technical leadership and strategic direction on AI/ML features in Xcode and SwiftUI runtimes. Contributed to multiple features at Apple's WWDC.
- Consult with user experience and design teams for large language models, and assess feasibility of feature proposals through prototypes and experiments.
- Research techniques for improving and specializing large language models for user interface scenarios.

Microsoft, Redmond, WA

Senior Research Scientist **August 2017 to July 2021**

- Executed human-computer interaction research to understand how software engineers, data scientists, and end-users learn, design, and program.
- Investigated opportunities for using program synthesis techniques (PROSE) within Microsoft products through building prototypes, deploying surveys, and conducting user studies.
- Applied research findings to products such as Visual Studio Code (IntelliCode), Microsoft Office, and Azure Machine Learning.

ABB Corporate Research, Raleigh, NC

Research Scientist **February 2014 to March 2016**

- Software Engineering researcher for Industrial Software Systems group at ABB, which creates methods and tools to increase quality and reduce cost of ABB internal software development.
- Applied research focus on novel visualizations for call graph navigation using situational cognition theory to aid developers' comprehension and search strategies in complex codebases.
- Research results realized as Visual Studio extensions and made available for deployment both within and outside of ABB.

Microsoft Research, Redmond, WA

Research Intern **June 2015 to August 2015**

- Conducted empirical studies, using mixed-method contextual inquiry and survey approaches, on different roles at Microsoft to understand how data-driven culture affects decision making in software development processes.

- Funded under the Strategic Internship Program (SIP) initiative, a long-term collaboration between multiple research areas at Microsoft, including Human Interactions in Programming (HIP), Visualization and Interaction for Business and Entertainment (VIBE), and Empirical Software Engineering (ESE).

Google, Mountain View, CA

Software Engineering Intern **June 2014 to September 2014**

- Returning summer internship with the Machine Intelligence: Radical Simplicity team.
- Developed light-weight error notification collector for new logic programming language for solving AI and data manipulation problems at Google. Understanding how developers introduce and resolve compiler errors can help Google generate better error notifications, thereby improving developer productivity.
- Through empirical user studies, evaluated and then implemented prototype of explanatory visualizations for a proprietary, declarative, LLVM-based compiler platform (RS). The platform is intended for end-user programmers who do not have a formal background in declarative programming, such as data scientists or analysts.

Google, Mountain View, CA

Software Engineering Intern **May 2013 to August 2013**

- Summer internship with the Google Web Server (GWS) team. GWS powers the Google homepage, as well as other critical web infrastructure.
- Developed system to understand how programming modifications impact the visual appearance of web pages, and deployed system within the GWS continuous testing framework. System is currently running in production at Google to detect web page rendering issues for `google.com` search results.

Teaching Experience

North Carolina State University, Raleigh, NC

Teaching Assistant **August 2010 to May 2011**

- Teaching Assistant for CSC/ECE 506: Architecture of Parallel Computers
  - Spring 2011.
  - Primary responsibilities included grading, answering student questions, and developing assignments and projects for the course (authored assignments are available upon request).
- Teaching Assistant for CSC 517: Object-Oriented Languages and Systems
  - Fall 2010.
  - Conducted seven lectures during the semester, on topics such as refactoring and version control, Ruby, object-relational mapping, and design patterns.
  - Continued to conduct various guest lectures for this class in Fall 2011. Classroom observation on September 7, 2011 by Professor Ed Gehringer: "Examples done on the computer with explanation. Progression in an accessible fashion. Good time management. Student response to his in-class exercises (to his two exercises, 73 and 76 students, respectively, responded). This is a very high response rate, and indicates that the students were following the material well. He has a very good rapport with the class."

Wayne Community College, Goldsboro, NC

Adjunct Instructor **January 2009 to December 2012**

- Instructor for SGD 125: Artificial Intelligence
  - Fall 2012.
  - This pilot course was offered at Wayne Community College to evaluate traditional four year courses and their applicability in a two year college setting.
  - Taught using the "blended classroom" model, whereby readings are done before class and activities are done during class time.
- Instructor for DBA 115: Database Applications (Online)
  - Fall 2009, Fall 2010, Fall 2011, and Fall 2012.
  - Used MySQL and PHP to cover applied concepts in databases, such as developing forms, reports, and data management.
  - First instructor within the department to develop short 5-10 minute lectures using Camtasia to provide a more engaging online classroom experience (previously, students for online classes simply read the course text and completed the homeworks electronically).
- Instructor for SEC 150: Secure Communications (Online)
  - Spring 2011 and Spring 2012.
  - Migrated existing curriculum from an exam-based course to an applied course by changing the course format to from weekly quizzes to biweekly hands-on practice projects.
  - Utilized Virtual Machines (VMWare) to provide a security sandbox for students to complete and submit assignments.
  - As with Database Applications, developed short 5-10 minute lecture videos on course topics using Camtasia.
- Instructor for DBA 110: Database Concepts (Online)
  - Spring 2009, Spring 2010, Spring 2011, and Spring 2012.
  - Taught using Microsoft Access and the SAM intelligent tutoring system for automatic student assessment.
  - Overall "A - Outstanding" instructor performance evaluation for course on April 22, 2009 by Sharon Bull, Department Chair of Information Systems Technology: "Course is very well-organized and easy to navigate. He emphasizes the need for regular participation on the discussion boards when students have questions about homework or course-related material. All through the course I found many examples of Titus' efforts to help students master the material. Out of 28 students, 18 completed the Student Evaluation. Titus did a good job of encouraging participation. His average is 3.2 [/4.0] which indicates student satisfaction with the course."
- Instructor for SGD 112: Introduction to Game Design (Online)
  - Summer 2010.
  - The students used GameMaker to study game design concepts, including level design, user interfaces, core mechanics, and game balancing.
  - This is the first semester that SGD 112 was offered entirely online.

Georgia Institute of Technology, Atlanta, GA

Teaching Assistant **August 2000 to August 2004**

- Teaching Assistant for CS 2130: Languages and Translation
  - Summer 2004.
  - Lectured two hours weekly on issues of machine translation, including tokenizing, parsing, data representation, run-time environments, optimization, and the implementation of programming languages.

- Developed autograders using UNIX shell scripting and C.

- Program Developer for CS 1371: Computing for Engineers
  - Fall 2003.
  - Designed weekly assignments and lectured on topics that introduced students to the foundations of computing, with an emphasis on engineering design and algorithm implementation using MATLAB and Java.

- Program Developer for CS 1322: Object-Oriented Programming
  - Fall 2001, Spring 2002, Fall 2002, and Spring 2003.
  - Developed autograding software using advanced Java concepts to facilitate grading in a large classroom environment.
  - Worked closely with faculty, staff, and other project developers in an administrative context to design course materials such as homework assignments and tests, while additionally performing normal Teaching Assistant duties.

- Teaching Assistant for ECE 2031: Digital Design Lab
  - Spring 2001 and Fall 2002.
  - Supervised and provided assistance to students in a laboratory setting. Topics covered include introductory digital theory, CAD tools, digital and analog instrument usage, logic synthesis with Verilog and VHDL, and assembly language programming.

- Teaching Assistant for CS 1311: Introduction to Computing and Algorithms
  - Spring 2001.
  - Lectured two-hours weekly on basic algorithmic and procedural programming. Introduced object-oriented programming concepts.

Student Evaluations

North Carolina State University

CSC 517: Object-Oriented Languages and Systems

"Your lectures were exceptional, both in your approach to articulating the concept, and the presentation method you utilized – well balanced humor and student interaction. You definitely have a gift for teaching."

Wayne Community College

DBA 115: Database Applications

"I do want to let you know that you are by far the best instructor I've had over the past 2 years at Wayne Community College. You have some of the most structured and challenging classes I've ever taken. Your attention to detail, willingness to help, and general positive and professional attitude are greatly appreciated. I always look forward to working on anything for your classes as I know the assignments will be challenging and actually teach me something."

DBA 110: Database Concepts

"Thanks for all the help and for a great class. This was the most challenging class yet but I learned quite a bit."

SEC 150: Secure Communications

"Your classes were always some of my favorites and the ones I learned the most in. On top of that you are one of the few teachers that is organized and well structured at Wayne Community College. About 80% of anything I learned for my security degree came from one of your classes."

Professional Engineering Experience

As a licensed Professional Engineer, I have designed, commissioned, and debugged systems in the field. I bring a practitioner's authenticity to the classroom, one that connects coursework to the realities of industry engineering practices. The following Engineering engagements have been certified by the listed Professional Engineers. Engagements are defined as employment periods at different companies or firms and significant changes of responsibilities within the same company or firm. The Engineering responsibilities listed below may be independently verified (along with full documentation) by contacting the Georgia Board of Professional Engineers and Land Surveyors directly at 237 Coliseum Drive Macon, GA 31217-3858, (478) 207-2440.

Atronix Engineering, Atlanta, GA

Project Engineer **November 2008 to December 2010**

(Engagement details verified, signed, and sealed by Kenneth Wolfe Jr., license OH PE55769, and Jagdish K. Patel, license GA PE028452).

- Commissioned startups in the materials handling and distribution industry.
- Provided emergency support and on-site troubleshooting for customers.
- Checked electrical and network drawings created by other Engineers for correctness and function, and performed electrical checkout and testing on panels before they shipped to customer sites.
- Migrated legacy PLC systems to modern systems, converting protocols such as DH+ and serial to Ethernet.
- Generated performance estimates, performed system checking, and validated initial system configuration to ensure designs would meet various technology requirements such as trunk length, device count, and device compatibility.
- Implemented sorting and queuing algorithms for product distribution applications.
- Designed and developed PLC and HMI applications for shipping companies, providing conveyor status, conveyor control, and monitoring. Programmed PLC robotic applications to build automotive parts.
- Researched applications requiring high-availability clustering and fail over in Linux for industrial control applications. I designed low-level drivers for interfacing with industrial equipment such as pick to light systems and RFID barcode scanners.
- Provided quotes and other project estimates to customers.

Arch Chemicals (Lonza), Atlanta, GA

Project Engineer **November 2005 to November 2008**

(Engagement details verified, signed, and sealed by Christopher Allen Bouch, license GA PE035585, and Frank Hurst Annessi, licenses GA PE017923 SC 12787 VA 0402022231 PA PE035624E and MA 43225).

- Provided Engineering support to customers domestically and internationally to resolve plant issues concerning equipment failures mechanically, programmatically, and electrically.
- Prepared engineering studies and interpreted plant modifications as requested by customers, evaluating these changes for safety, feasibility, and cost.
- Quoted PLC hardware for projects.
- Specified electrical equipment and designed electrical prints in CAD to control machinery provided by other Mechanical Engineers. I researched hardware and software solutions for a PLC and HMI platform to add flexibility and modularity to our mix and batch processes using the ISA S88 specification.
- Designed and implemented the HMI programming, PLC logic, database programming, and network for said system over a period of two years before deploying at a live customer site.

- Designed a VPN system to replace dial-up networking to allow Engineers to securely troubleshoot plant issues through high-speed networks.
- Commissioned treating plants within the US, and remotely in the United Kingdom. During commissioning, I inspected the facility and informed the customer of potential safety issues and hazards.
- Presented "lessons learned" from my experiences at plant startups during monthly meetings to help improve future projects.
- Researched methods and control algorithms to make treating processes more effective and efficient.

Prism Systems, Mobile, AL

Engineering Intern **June 2000 to August 2000**
(Engagement details verified, signed, and sealed by Keith Allen Jones, license AL 21587, and Roland Joseph Poirier III, license AL 25439).

- Setup, configured, and installed industrial software on PCs for training labs at the company.
- Designed alarm schedules and sequence diagrams using ladder logic programs developed by more senior engineers. Generated tag data with English descriptions for HMI systems.
- Simulated and tested ladder logic in the office to fix and reproduce customer issues.
- Worked with another Engineering Intern to evaluate and specify hardware for a SCADA alarm project involving radio communications and modems.
- Studied and evaluated the Bristol Babcock PLC for its PID capabilities for a potential water and sewer project.
- Worked under another Engineer and programmed the simpler elements of a web-based inventory system that interfaced with a SQL Server database.

Education

North Carolina State University, Raleigh, NC

Ph.D., Computer Science August 2010 to May 2018

- Thesis Committee: Emerson Murphy-Hill (Chair), Chris Parnin, James Lester, Jing Feng, Shriram Krishnamurthi (External, Brown University)
- Thesis Proposal: "How Should Static Analysis Tools Explain Anomalies to Developers?" May 2016.
- Dissertation: "Error Messages as Rational Reconstructions." March 2018.

M.Eng, Electrical and Computer Engineering May 2009

- Graduated with 4.0 GPA.

Georgia Institute of Technology, Atlanta, GA

B.S., Computer Engineering June 2004

- Graduated with honors.
- Senior design project: "A Digital Control Systems Package (DCSP) for Linux." Developed for the DaqBoard/2000 data acquisition PCI card. System supports root locus for Single Input Single Output (SISO), function generators, and model following.

Book Chapters

[1] **Titus Barik** and Emerson Murphy-Hill. "A Process for Surviving Survey Design and Sailing through Survey Deployment." In: *Perspectives on Data Science for Software Engineering*, 2016.

Journal Publications

[2] Emerson Murphy-Hill, **Titus Barik**, and Andrew Black. "Interactive Ambient Visualizations for Soft Advice." In: *Interactive Visualization*, 2013.

Full Conference Publications

[3] Priyan Vaithilingam, Alan Leung, Jeffrey Nichols, and **Titus Barik**. "The Way We Notice, That's What Really Matters: Instantiating UI Components with Distinguishing Variations." In: *ACM CHI Conference on Human Factors in Computing Systems* (CHI 2026).

[4] Jason Wu, Amanda Swearngin, Arun Krishna Vajjala, Alan Leung, Jeffrey Nichols, and **Titus Barik**. "Improving User Interface Generation Models from Designer Feedback." In: *ACM CHI Conference on Human Factors in Computing Systems* (CHI 2026).

[5] Alan Leung, Ruijia Cheng, Jason Wu, Jeffrey Nichols, and **Titus Barik**. "SQUIRE: Interactive UI Authoring via Slot QUery Intermediate REpresentations." In: *ACM Symposium on User Interface Software and Technology* (UIST 2025).

[6] Yuwen Lu, Alan Leung, Amanda Swearngin, Jeffrey Nichols, and **Titus Barik**. "MISTY: UI Prototyping through Interactive Conceptual Blending." In: *ACM CHI Conference on Human Factors in Computing Systems* (CHI 2025).

[7] Ruijia Cheng, **Titus Barik**, Alan Leung, Fred Hohman, and Jeffrey Nichols. "BISCUIT: Scaffolding LLM-Generated Code with Ephemeral UIs in Computational Notebooks." In: *IEEE Symposium on Visual Languages and Human-Centric Computing* (VL/HCC 2024).

[8] Gabriel Matute, Wode Ni, **Titus Barik**, Alvin Cheung, and Sarah Chasins. "Syntactic Code Search with Sequence-to-Tree Matching: Supporting Syntactic Search with Incomplete Code Fragments." In: *ACM Conference on Programming Language Design and Implementation* (PLDI 2024).

[9] Jason Wu, Eldon Schoop, Alan Leung, **Titus Barik**, Jeffrey Bigham, and Jeffrey Nichols. "UICoder: Finetuning Large Language Models to Generate User Interface Code through Automated Feedback." In: *North American Chapter of the Association for Computational Linguistics* (NAACL 2024).

[10] Yuhao Zhang, Yasharth Bajpai, Priyanshu Gupta, Ameya Ketkar, Miltiadis Allamanis, **Titus Barik**, Sumit Gulwani, Arjun Radhakrishna, Mohammad Raza, Gustavo Soares, and Ashish Tiwari. "Overwatch: Learning Patterns in Code Edit Sequences." In: *ACM Conference on Systems, Programming, Languages, and Applications: Software for Humanity* (SPLASH 2022).

[11] Shirin Feiz, Jason Wu, Xiaoyi Zhang, Amanda Swearngin, **Titus Barik**, and Jeffrey Nichols. "Understanding Screen Relationships from Screenshots of Smartphone Applications." In: *ACM Conference on Intelligent User Interfaces* (IUI 2022).

[12] Alex Bäuerle, Ángel Alexander Cabrera, Fred Hohman, Megan Maher, David Koski, Xavier Suau, **Titus Barik**, and Dominik Moritz. "Symphony: Composing Interactive Interfaces for Machine Learning." In: *ACM CHI Conference on Human Factors in Computing Systems* (CHI 2022).

[13] Jieshan Chen, Amanda Swearngin, Jason Wu, **Titus Barik**, Jeffrey Nichols, and Xiaoyi Zhang. "Towards Complete Icon Labeling in Mobile Applications." In: *ACM CHI Conference on Human Factors in Computing Systems* (CHI 2022).

[14] Wode Ni, Joshua Sunshine, Vu Le, Sumit Gulwani, and **Titus Barik**. "reCode: A Lightweight Find-and-Replace Interaction in the IDE for Transforming Code

by Example." In: *ACM Symposium on User Interface Software and Technology* (UIST 2021).

[15] Nischal Shrestha, **Titus Barik**, and Chris Parnin. "Unravel: A Fluent Code Explorer for Data Wrangling." In: *ACM Symposium on User Interface Software and Technology* (UIST 2021).

[16] Reudismam Rolim, Gustavo Soares, Rohit Gheyi, **Titus Barik**, and Loris D'Antoni. "Learning Quick Fixes from Code Repositories." In: *Brazilian Symposium on Software Engineering* (SBES 2021) — 🏆 Distinguished Paper Award.

[17] Nischal Shrestha, **Titus Barik**, and Chris Parnin. "Remote, but Connected: How #TidyTuesday Provides an Online Community of Practice for Data Scientists." In: *Computer-Supported Cooperative Work and Social Computing* (CSCW 2021).

[18] Samuel Lau, Sruti Srinivasa Ragavan, Ken Milne, **Titus Barik**, and Advait Sarkar. "TweakIt: Supporting End-User Programmers Who Transmogrify Code." In: *ACM CHI Conference on Human Factors in Computing Systems* (CHI 2021).

[19] Nathaniel Weinman, **Titus Barik**, Steven Drucker, and Rob DeLine. "Fork It: Supporting Stateful Alternatives in Computational Notebooks." In: *ACM CHI Conference on Human Factors in Computing Systems* (CHI 2021).

[20] Mahnaz Behroozi, Shivani Shirolkar, **Titus Barik**, and Chris Parnin. "Does Stress Impact Technical Interview Performance?." In: *ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering* (ESEC/FSE 2020).

[21] Justin Smith, Chris Theisen, and **Titus Barik**. "A Case Study of Software Security Red Teams at Microsoft." In: *IEEE Symposium on Visual Languages and Human-Centric Computing* (VL/HCC 2020).

[22] Nischal Shrestha, Colton Botta, **Titus Barik**, and Chris Parnin. "Here We Go Again: Why Is It Difficult for Developers to Learn Another Programming Language?" In: *International Conference on Software Engineering* (ICSE 2020) — 🏆 Distinguished Paper Award.

[23] Mahnaz Behroozi, Shivani Shirolkar, **Titus Barik**, and Chris Parnin. "Debugging Hiring: What Went Right and What Went Wrong in the Technical Interview Process." In: *International Conference on Software Engineering (Software Engineering in Society)* (ICSE SEIS 2020).

[24] Souti Chattopadhyay, Ishita Prasad, Austin Z. Henley, Anita Sarma, and **Titus Barik**. "What's Wrong with Computational Notebooks? Pain Points, Needs, and Design Opportunities." In: *ACM CHI Conference on Human Factors in Computing Systems* (CHI 2020) — 🏆 Honorable Mention Award.

[25] Ian Drosos, **Titus Barik**, Philip Guo, Robert DeLine, and Sumit Gulwani. "WREX: A Unified Programming-by-Example Interaction for Synthesizing Readable Code for Data Scientists." In: *ACM CHI Conference on Human Factors in Computing Systems* (CHI 2020) — 🏆 Best Paper Award.

[26] Andrew Head, Fred Hohman, **Titus Barik**, Steven Drucker, and Robert DeLine. "Managing Messes in Computational Notebooks." In: *ACM CHI Conference on Human Factors in Computing Systems* (CHI 2019) — 🏆 Best Paper Award.

[27] Mahnaz Behroozi, Chris Parnin, and **Titus Barik**. "Hiring is Broken: What Do Developers Say About Technical Interviews?" In: *IEEE Symposium on Visual Languages and Human-Centric Computing* (VL/HCC 2019).

[28] Nischal Shrestha, **Titus Barik**, and Chris Parnin. "It's Like Python But: Towards Supporting Transfer of Programming Language Knowledge." In: *IEEE Symposium on Visual Languages and Human-Centric Computing* (VL/HCC 2018).

[29] **Titus Barik**, Denae Ford, Emerson Murphy-Hill, and Chris Parnin. "How Should Compilers Explain Problems to Developers?" In: *ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering* (ESEC/FSE 2018).

[30] **Titus Barik**. "Expressions on the Nature and Significance of Programming and Play." In: *IEEE Symposium on Visual Languages and Human-Centric Computing* (VL/HCC 2017).

[31] **Titus Barik**, Justin Smith, Kevin Lubick, Elisabeth Holmes, Jing Feng, Emerson Murphy-Hill, and Chris Parnin. "Do Developers Read Compiler Error Messages?" In: *International Conference on Software Engineering* (ICSE 2017).

[32] **Titus Barik**, Yoonki Song, Brittany Johnson, and Emerson Murphy-Hill. "From Quick Fixes to Slow Fixes: Reimagining Static Analysis Resolutions to Enable Design Space Exploration." In: *International Conference on Software Maintenance and Evolution* (ICSME 2016).

[33] **Titus Barik**, Emerson Murphy-Hill, and Thomas Zimmermann. "A Perspective on Blending Programming Environments and Games: Beyond Points, Badges, and Leaderboards." In: *IEEE Symposium on Visual Languages and Human-Centric Computing* (VL/HCC 2016).

[34] **Titus Barik**, Robert DeLine, Steven Drucker, and Danyel Fisher. "The Bones of the System: A Case Study of Logging and Telemetry at Microsoft." In: *International Conference on Software Engineering (Software Engineering in Practice)* (ICSE SEIP 2016).

[35] **Titus Barik**, Kevin Lubick, Samuel Christie, and Emerson Murphy-Hill. "How Developers Visualize Compiler Messages: A Foundational Approach to Notification Construction." In: *IEEE Working Conference on Software Visualization* (VISSOFT 2014).

[36] **Titus Barik**, Michael Everett, Rogelio E. Cardona-Rivera, David L. Roberts, and Edward F. Gehringer. "A Community College Blended Learning Classroom Experience through Artificial Intelligence in Games." In: *Frontiers in Education* (FIE 2013).

[37] **Titus Barik**, Arpan Chakraborty, Brent Harrison, David L. Roberts, and Robert St. Amant. "Speed/Accuracy Tradeoff in ACT-R Models of the Concentration Game." In: *International Conference on Cognitive Modeling* (ICCM 2013).

[38] **Titus Barik**, Brent Harrison, David L. Roberts, and Xuxian Jiang. "Spatial Game Signatures for Bot Detection in Social Games." In: *Artificial Intelligence and Interactive Digital Entertainment* (AIIDE 2012).

Short Conference Publications

[39] **Titus Barik**, Rahul Pandita, Justin Middleton, and Emerson Murphy-Hill. "Designing for Dystopia: Software Engineering Research for the Post-Apocalypse." In: *Foundations of Software Engineering (Visions and Reflections)* (FSE VAR 2016).

[40] **Titus Barik**, Brittany Johnson, and Emerson Murphy-Hill. "I ♥ Hacker News: Expanding Qualitative Research Findings by Analyzing Social News Websites." In: *Foundations of Software Engineering (New Ideas)* (FSE NI 2015).

[41] **Titus Barik**, Kevin Lubick, Justin Smith, John Slankas, and Emerson Murphy-Hill. "FUSE: A Reproducible, Extendable, Internet-scale Corpus of Spreadsheets." In: *Mining Software Repositories (Data Showcase)* (MSR 2015).

[42] **Titus Barik**, Kevin Lubick, and Emerson Murphy-Hill. "Commit Bubbles." In: *International Conference on Software Engineering (New Ideas and Emerging Results)* (ICSE NIER 2015).

[43] **Titus Barik**, Jim Witschey, Brittany Johnson, and Emerson Murphy-Hill. "Compiler Error Notifications Revisited: An Interaction-First Approach for Helping Developers More Effectively Comprehend and Resolve Error Notifications." In: *International Conference on Software Engineering (New Ideas and Emerging Results)* (ICSE NIER 2014).

WORKSHOP PUBLICATIONS

[44] **Titus Barik**, Chris Parnin, and Emerson Murphy-Hill. "One λ at a Time: What Do We Know About Presenting Human-Friendly Output from Program Analysis Tools?" In: *Workshop on Evaluation and Usability of Programming Languages and Tools* (PLATEAU 2017).

[45] Denae Ford, **Titus Barik**, Leslie Rand-Pickett, and Chris Parnin. "The Tech-Talk Balance: What Technical Interviewers Expect from Technical Candidates." In: *International Workshop on Cooperative and Human Aspects of Software Engineering* (CHASE 2017).

[46] **Titus Barik**. "How Should Static Analysis Tools Explain Anomalies to Developers?" In: *Foundations of Software Engineering (Student Research Competition)* (FSE SRC 2016).

[47] Denae Ford, **Titus Barik**, and Chris Parnin. "Studying Sustained Attention and Cognitive States with Eye Tracking in Remote Technical Interviews." In: *Eye Movements in Programming: Models to Data* (EMIP 2015).

[48] **Titus Barik**. "Improving Error Notification Comprehension in IDEs by Supporting Developer Self-Explanations." In: *IEEE Symposium on Visual Languages and Human-Centric Computing Graduate Consortium* (VL/HCC GC 2015).

[49] Kevin Lubick, **Titus Barik**, and Emerson Murphy-Hill. "Can Social Screencasting Help Developers Learn New Tools?" In: *International Workshop on Cooperative and Human Aspects of Software Engineering* (CHASE 2015).

[50] **Titus Barik**. "Improving Error Notification Comprehension through Visual Overlays in IDEs." In: *IEEE Symposium on Visual Languages and Human-Centric Computing Graduate Consortium* (VL/HCC GC 2014).

[51] **Titus Barik**. "Inferring Cognitive Behaviors from Low-level User Interactions in Games." In: *Foundations of Digital Games Doctoral Consortium* (FDG DC 2013).

PATENTS

[52] **Titus Barik**, Gustavo Soares, Piyush Arora, Peter Groenewegen, Sumit Gulwani, Ameya Ketkar, Vu Le, Wode Ni, David Pugh, Arjun Radhakrishna, Ivan Radicek, Ashish Tiwari, Mark Wilson-Thomas. "Edit automation using an anchor target list." 2024.

[53] Gustavo Soares, Piyush Arora, **Titus Barik**, Peter Groenewegen, Sumit Gulwani, Ameya Ketkar, Vu Le, Wode Ni, David Pugh, Arjun Radhakrishna, Ivan Radicek, Ashish Tiwari, Mark Wilson-Thomas. "Edit automation using a temporal edit pattern." 2024.

Academic and Professional Service

Student Advising and Mentorship

I advised students through industry research internships and fellowships.

Apple

- Saketh Kasibatla (UC San Diego) 2026
- Arun Krishna Vajjala (George Mason University), now at Apple 2025
- Xia Su (University of Washington) 2025
- Jenny Liang (Carnegie Mellon University) 2025
- Yuwen Lu (University of Notre Dame), now at Krea AI 2024
- Forough Mehralian (UC Irvine), now at Apple 2024
- Venkatesh Potluri (University of Washington), now at U. of Michigan 2023
- Devin Green (Stanford University), now at Apple 2023
- Regina Cheng (University of Washington), now at Apple 2023
- Wode Ni (Carnegie Mellon University), now at Brilliant 2022
- Gabriel Matute (UC Berkeley), now at Databricks 2022
- Jason Wu (Carnegie Mellon University), now at Purdue University 2021
- Ángel Cabrera (Carnegie Mellon University), now at Axiom Bio 2021
- Alex Bäuerle (Ulm University), now at Google 2021

Microsoft

- Sam Lau (UC San Diego), now at UC San Diego 2020
- Nicholas Nelson (Oregon State University), now at Clark College 2019
- Ian Drosos (UC San Diego), now at Trent AI 2018
- Rini Chattopadhyay (Oregon State Univ.), now at Univ. of S. California 2019
- Fred Hohman (Georgia Tech), now at Apple 2018
- Andrew Head (UC Berkeley), now at University of Pennsylvania 2018
- Justin Smith (NC State University), now at Lafayette College 2018

Educational Talks and Outreach

- **Apple, Sales and Operations Support Skill Start Training** (2025). Panel introducing prompt engineering for server-side and on-device large language models, with practical application to daily work within the SOS organization.
- **University of Washington, PLSE** (2024). "Building Software Tools Through Sporadic Brilliance." Invited talk on HCI/PL in academia to AI in industry, exploring how large language models are reshaping both industry practice and the research landscape itself.
- **NCSU Computer Science Doctoral Recruiting Day** (2024). "Careers in Industry." Invited as alumni panelist at North Carolina State University to speak on industry research paths for admitted PhD students.
- **Apple, Software Engineering** (2023). "Large Language Models for Software Engineering." Invited by senior leadership to lecture engineering managers in developer tools organization on applying LLMs to improve developer productivity and build LLM-driven features within the Xcode ecosystem.
- **Alabama School of Mathematics and Science** (2022). "Building Tools for Software Developers and Data Scientists." Invited alumni talk for high school students on careers in industry research and personal experiences in tech.
- **Microsoft, DevDiv Day of Learning** (2020). "Lights! Camera! Action! Effective Storytelling Through Video Demos, Screencasts, and More." Taught a course for the Microsoft Developer Division on crafting story-driven demos to drive engagement and influence. Published in Communications of the ACM with Sumit Gulwani and Mario Jaurez, "Storytelling and Science: Incorporating Storytelling into Organizational Culture."

- **PL+HCI Swimmer School** (2020). "Building Tools for Computational Notebooks: A PL+HCI Approach." Invited talk. The summer school brings together perspectives on HCI and programming languages research.
- **Carolina Games Summit** (2013). "Game Design Educators Panel." Panel member. Discussed experiences on teaching computer science through games at community colleges.
- **Carolina Games Summit** (2012). "Introduction to Game AI Using Python." Presented at the *Carolina Games Summit* with Rogelio E. Cardona-Rivera. As a result of the presentation, a pilot course was introduced at Wayne Community College.

Diversity, Equity and Inclusion

- **Apple HBCU Scholars Program** (2023). Served as interviewer and mentor. The program is a partnership between Apple and the Thurgood Marshall College Fund (TMCF), a non-profit that supports Historically Black Colleges and Universities (HBCUs). Students participating in the program receive a merit based scholarship, professional development coaching from TMCF, and are paired with an Apple mentor.
- **Apple Career Experience Program** (2022). Mentored and managed Apple retail store employees within our research team. Career Experiences connect retail store team members with months-long opportunities to develop new skills in engineering, design, or project management to grow their careers at Apple. The program is designed to bridge the gap for non-traditional candidates, allowing them to gain relevant tech-industry skills without needing a traditional degree in Computer Science or Mathematics.
- **Microsoft PROSE Research Fellowship Program** (2021). Collaborated with Sumit Gulwani to bootstrap a fellowship program in India, a remote apprenticeship model that nurtures scientific talent in diverse communities. Through these efforts we aim to increase the available talent pool of young researchers who may not have access to graduate education or students—often with strong software engineering skills—who desire to be more involved in research and innovation but are unable to pursue a full-time PhD.
- **Netflix, Systems Reading Group** (2020). "Does Stress Impact Technical Interview Performance?" Invited talk on inclusive software engineering interviews that better assess candidate problem-solving. These practices have since been adopted at companies including Microsoft.
- **Raleigh INTech Camp** (2017). Tech mentor and instructor for 25 middle school girls on HTML, CSS, and JavaScript, as part of a program to inspire girls to pursue careers in technology.
- **REU Site: Science of Software** (2016). Mentored undergraduates in software engineering research at NC State University, through a summer program recruiting women and underrepresented students via the STARs Alliance and non-PhD-granting universities.

Program and Organizing Committees

- Human Factors in Computing Systems (CHI SC) 2026
- International Conference on Software Engineering (ICSE) 2026
- Programming Languages and Tools (PLATEAU) 2026
- User Interface Software and Technology (UIST) 2025

- Programming Languages and Tools (PLATEAU) 2025
- Human Factors in Computing Systems (CHI) 2025
- Programming Languages and Tools (PLATEAU) 2024
- Human Factors in Computing Systems (CHI) 2024
- IEEE Symposium on Visual Languages and Human-Centric Computing 2023
- Programming Languages and Tools (PLATEAU) 2023
- Foundations of Software Engineer (ESEC/FSE) 2023
- Human Factors in Computing Systems (CHI) 2023
- IEEE Symposium on Visual Languages and Human-Centric Computing 2022
- International Conference on Program Comprehension (ICPC) 2021
- Programming Languages and Tools (PLATEAU) 2021
- IEEE Symposium on Visual Languages and Human-Centric Computing 2021
- FSE Artifact Evaluation Committee (ESEC/FSE AEC) 2020
- Automated Software Engineering (ASE) 2020
- International Conference on Program Comprehension (ICPC) 2020
- Software Maintenance and Evolution Industry (ICSME) 2020
- Programming Languages and Tools (PLATEAU) 2019
- Programming Experience (PX) 2019
- International Conference on Software Engineering Demonstrations (ICSE) 2019
- Programming Languages and Tools (PLATEAU) 2018
- FSE Student Research Competition (ESEC/FSE SRC) 2018
- International Workshop on Software Fairness (FairWare) 2018
- International Conference on Program Comprehension (ICPC) 2018
- Programming Experience (PX) 2018
- Mining Software Repositories Challenge Track (MSR Challenge) 2017
- International Workshop on BIG Data Software Engineering (BIGDSE) 2016
- Software Maintenance and Evolution (ICSME) 2016
- OOPSLA Artifacts (OOPSLA AEC) 2015
- OOPSLA Artifacts (OOPSLA AEC) 2014

Awards and Licenses

North Carolina State University

- Certificate of Accomplishment in Teaching, May 2012. Received official letter of recommendation and transcript notation.
- Mentored TA Award, Spring 2011, for CSC/ECE 506: Architecture of Parallel Computers, under the mentorship of Professor Ed Gehringer. Offered to students who demonstrate teaching responsibilities beyond that of a regular Teaching Assistant.

Industry

- Professional Engineer, Georgia Board of Professional Engineers and Land Surveyors, 2011. License No. PE035568. January 2011. (Supersedes Engineer In-Training License, EIT021976, August 2004).
- FCC-certified Technician class HAM radio license (KG4UXO). Issued August 2002.