James Skripchuk

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Preparing computing learners to navigate rapidly changing online ecosystems.

EDUCATION

PhD in Computer Science 2020 – May 2025 (Expected, ABD)
North Carolina State University (NCSU)

Thesis: *Roles of Online Help-Seeking in Learning Programming: Challenges, Motivations, and Pedagogy*
Advisor: Thomas Price
Committee: Shiyan Jiang, Sandeep Kuttal, Noboru Matsuda
GPA: 4.0

Honors B.S. in Computer Science May 2020
University of Delaware (UD)

Minors: Electrical & Computer Engineering, Physics, Mathematics
GPA: 3.92, *Magna Cum Laude* (Top 4% of graduating class)

HIGHLIGHTS

Teaching, Mentorship, and Pedagogy

Undergraduate Instructor Positions

- Algorithm Analysis *(Full Instructor, 20 students)* Elon University
- Data Structures and Algorithms *(Full Instructor, 10 students*) NCSU
- Automated Learning and Data Analysis *(Co-Instructor, 70 students)* NCSU

Mentorship

- Organizer for NCSU's Socially-Relevant Computing and Analytics REU Site, coordinating 3 summer cohorts of 15 students from underrepresented backgrounds across 3 summers *(50 students total)*.
- Direct mentor of 5 undergraduates, 4 of whom were authors on peer-reviewed publications (including 1 student first-authored publication), 2 of whom are pursuing graduate education.

Instructional Design

- Instructional designer for NCSU's AI Academy, a Department of Labor funded professional development course.
- Instructional designer for UD's Computational Thinking in Music course as part of an NSF funded initiative to introduce computational thinking in general education.

Professional Development

- NCSU's Engineering Education Certificate
- NCSU's Basic & Advanced Teaching Certificate
- NCSU's Preparing the Professorate Program

Funding

Total: $141,500

- NSF Graduate Research Fellowship Program (GRFP) $111,000
- NCSU Provost's Doctoral Fellowship $30,000
- NCSU Graduate Student Association Travel Assistance Award $500

Publications

- 7 peer-reviewed publications, 3 first authored, 1 first authored by undergraduate mentee, one honorable mention for best paper award.

TEACHING INTERESTS

Core Computing Curricula (e.g. Introductory Programming, Data Structures, Algorithms), Machine Learning, Data Science, Human-Computer Interaction, Sound & Music Computing

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RESEARCH INTERESTS

Computing Education, Help-Seeking, Self-Regulated Learning, Human-Computer Interaction

RECOGNITION

NSF Graduate Research Fellowship Program (GRFP) National | 2021

A $111,000 stipend given over three years to pursue the student's own graduate-level research agenda. Given to less than 2,000 of the 13,000 submitted applications from PhDs in varying STEM fields across the entire US, and considered one of the most prestigious scholarships offered through the NSF.

Provost's Doctoral Fellowship NCSU | 2020

A $30,000 fellowship designed to help in college and departmental efforts to recruit outstanding new doctoral students to NCSU. Prospective students cannot apply directly for these fellowships, but are nominated by their respective colleges.

Computer and Information Sciences (CIS) Outstanding Senior Student Award UD | 2020

Steven Geracimos Memorial Award UD | 2018

I was nominated for and received both the CIS Outstanding Senior Student Award and the Steven Geracimos Memorial Award due to my continued and outstanding effort in academics, undergraduate research in computing education, and my role as an undergraduate teaching assistant.

- Co-designed "MUSC 106: Computational Thinking in Music" with computational musicologist Jennifer Shafer England under an NSF grant headed by Lori Pollock, with the goal of infusing computational thinking into general education.

TEACHING EXPERIENCE & INSTRUCTIONAL DESIGN

CSC 422 – Automated Learning and Data Analysis NCSU | 70 Students | Spring 2024

Co-Instructor

- **Context:** CSC 422 is NCSU's introductory undergraduate machine learning course.
- **Content:** Data collection and preparation, exploratory data analysis, various models and approaches (e.g. decision trees, KNN, SVMs, Bayes, regression, clustering), introduction to ANNs, and deep learning.
- **Activities:** Taught 5/13 lectures; introduced and facilitated topical ethical discussions at the beginning of lecture; designed and interspersed formative feedback questions into all lectures using classroom response system; modified homework assignments; created and graded low-stakes resubmittable formative quizzes for all lectures; designed exams; hosted exam review sessions; generated study guides; graded and provided feedback for all phases of course project (proposal, midway report, final report).

CSC 316 – Data Structures and Algorithms NCSU | 10 Students | Summer 2022

Full Instructor

- **Context:** CSC 316 is NCSU's intermediate data structures and algorithms course.
- **Content:** Abstract data types (e.g. lists, trees, maps, graphs) and their construction, time complexity and analysis, design strategies (e.g. divide-and-conquer, dynamic programming, greedy algorithms).
- **Activities:** Taught all lectures; facilitated group interactions via in-class problem solving sessions using a flipped classroom model; created pre-class surveys in order to fine-tune lecture content.

CSC 3300 - Algorithm Analysis Elon University | 20 Students | Fall 2021

Full Instructor

- **Context:** CSC 3300 is Elon University's intermediate data structures and algorithms course.
- **Content:** Review of data structures, algorithmic complexity and analysis, algorithm design strategies, introduction to computational complexity theory (e.g. P vs. NP, reductions).
- **Activities:** Taught all lectures; Modified lecture content to increase accessibility; facilitated small group problem-solving exercises; hosted office hours; graded all homeworks, exams, and reports.

Stanford's Code in Place Stanford University (Virtual) | 10 students | Spring 2021

Section Leader

- **Context:** Code in Place is a virtual half-semester of Stanford's CS106A offered worldwide during the COVID-19 pandemic.
- **Content:** Fundamentals of computer programming in Python, variables, and introductory graphics.
- **Activities:** Recruited and trained as a weekly section instructor; reviewed lecture materials; answered questions and fostered discussions in a small group environment.

Artificial Intelligence (AI) Academy NCSU | Spring 2021

Instructional Designer

- **Context:** AI Academy is a Department of Labor funded professional development course, which serves as "a pathway to industry credentials... to individuals interested in entering or advancing in the emerging field of AI".
- **Content:** Data collection and preparation, exploratory data analysis, various machine learning models with a focus on practical data science applications.
- **Activities:** Developed learning objectives, exercises, homeworks, hands-on workshops, and lessons; met weekly with instructor to receive feedback on materials. The redesigned materials were so well received that they now also serve as the base materials for NCSU's undergraduate and graduate machine learning courses (CSC 422/522).

MUSC 106 - Computational Thinking in Music UD | 2017-2019

Instructional Designer, Undergraduate Teaching Assistant

- **Context:** MUSC 106 is a general education course designed as a component of a NSF Funded initiative to introduce "computational thinking for all" at UD.
- **Content:** Engaged listening habits, conversational knowledge of basic musical elements (melody, harmony, structure, rhythm), principles and applications of computational thinking (decomposition, data, abstraction, algorithms).
- **Activities:** Instructional designer and undergraduate TA for two instances of the class; developed learning objectives, exercises, homeworks, projects, and lessons in collaboration with a computational musicologist; created custom Python library for students to engage in algorithmic composition using data from the Hooktheory online music database.

Teaching Assistant Positions

CISC 320 - Introduction to Algorithms	UD | Spring 2020
CISC 108 - Introduction to Computer Science I	UD | Fall 2019
MUSC 106 - Computational Thinking in Music	UD | Spring 2018, Winter 2019

PROFESSIONAL DEVELOPMENT

Engineering Education Certificate NCSU | 2021 - 2024 (Expected)

The Engineering Education Certificate focuses on the unique challenges of teaching engineering topics, requiring a total of 12 credit-hours of graduate coursework. Three seminar courses are dedicated to engineering education (EED), and course one is an approved elective of the student's choice. ED 756 is a seminar course usually reserved for PhD students in the College of Education.

- EED 501: Teaching Undergraduate Engineers *(Complete)*
- EED 502: Content, Assessment, and Pedagogy *(Complete)*
- EED 511: Diversity & Social Justice in Engineering Education *(Complete)*
- ED 756: Scholar Leader – Systemic Change in Education *(In-Progress)*

Preparing the Professoriate NCSU | 2023 – 2024

Preparing the Professoriate is a selective, nationally recognized year-long program designed to give exceptional doctoral students and postdoctoral scholars an immersive mentoring, teaching, and future faculty preparation experience.

- Designed and executed a teaching project consisting of updating the content of NCSU's undergraduate Automated Learning and Data Analysis Course with recent developments in machine learning (e.g. Deep Learning, Transformers, Diffusion Models), as well as integrating tighter formative feedback loops.

Basic & Advanced Teaching Certificate NCSU | 2021 - 2024

The Basic Teaching Certificate is structured to provide foundational workshops and electives that develop teaching and mentoring skills within a higher education environment. The Advanced Teaching Certificate builds upon this by discussing pivotal articles on teaching and the opportunity to participate in a community of practice focused on teaching.

PUBLICATIONS AND PRESENTATIONS

† indicates a current or former undergraduate research advisee.
★ indicates an award winning paper.

Papers

Premiere conferences in Computing Education are considered high quality, selective venues for archival research. These conferences exceed many journals in their selectivity, visibility, and impact.

[C7] J. Bacher, T. Price, **J. Skripchuk**, W. Wengran, Y. Shi, K. Tran. "Are Engineering Students Motivated by Interacting With Simulations They Program? A Controlled Study." *Proceedings of the 1st ACM SIGCSE Virtual Conference (SIGCSE Virtual)*. December 2024. (TBD. SIGCSE Virtual is a new conference that aims to be a companion to the bi-annual ACM CompEd, with similar acceptance rates of approx. 35%)

[C6] J. Skripchuk, J. Bacher, T. Price. "An Investigation of the Drivers of Novice Programmers' Intentions to Use Web Search and GenAI." *Proceedings of the International Computing Education Research Conference (ICER)*. 2024. Melbourne, Victoria, Australia. (20% acceptance rate; 36/179 full papers)

[C5] ★ K. Tran, J. Bacher, Y. Shi, **J. Skripchuk**, T. Price. "Overcoming Barriers in Scaling Computing Education Research Programming Tools: A Developer's Perspective." *Proceedings of the International Computing Education Research Conference (ICER)*. 2024. Melbourne, Victoria, Australia. (20% acceptance rate; 36/179 full papers). ***Honorable Mention for Best Paper (given to 3/36 papers).***

[C4] B. Wilson†, **J. Skripchuk**, J. Bacher. "Exploring Psychoacoustic Representations for Machine Learning Music Generation." *International Conference on Computational Creativity (ICCC)*. 2023. Waterloo, Ontario, Canada. (26% acceptance rate; 21/81 short papers accepted as short talks.)

[C3] J. Skripchuk, N. Bennett†, J. Zheng†, E. Li†, T. Price. "Analysis of Novices' Web-Based Help-Seeking Behavior While Programming." *Proceedings of the ACM SIGCSE Technical Symposium (SIGCSE)*. 2023. Toronto, Ontario, Canada. 2023. (35% acceptance rate; 165/474 full papers.)

[C2] J. Skripchuk, Y. Shi, T. Price. "Identifying Common Errors in Open-ended Machine Learning Projects." *Proceedings of the ACM SIGCSE Technical Symposium (SIGCSE)*. 2022. Providence, RI. (29% acceptance rate; 144/516 full papers.)

[C1] W. Wang, A. Kwatra, **J. Skripchuk**, N. Gomes, A. Milliken, C. Martens, T. Barnes, T. Price. "Novices' Learning Barriers When Using Code Examples in Open-Ended Programming." *Proceedings of the ACM Innovation and Technology in Computer Science Education (ITiCSE)*. Paderborn, Germany. 2021. (31% acceptance rate; 84/275 full papers.)

Posters

[P2] J. Skripchuk, J. Bacher, Y. Shi, K. Tran, T. Price. "Novices' Perceptions of Web-Search and AI for Programming." *Proceedings of the ACM SIGCSE Technical Symposium (SIGCSE)*. Portland, OR. 2023. (67% acceptance rate; 151/227 posters)

[P1] J. S. England, **J. Skripchuk**. "Computational Thinking in Music: A Data-Driven General Education STEAM Course." *Proceedings of the ACM SIGCSE Technical Symposium (SIGCSE)*. Portland, OR. 2020. (63% acceptance rate; 115/184 posters)

Workshops and Invited Talks

[W2] J. Skripchuk. "Identifying Common Errors in Open-Ended Machine Learning Projects". *Computing Education Research at Davis Weekly Seminar.* UC Davis. Virtual. 2023.

[W1] A.C. Bart, T. Rutherford, **J. Skripchuk**. "Evaluating an Instrumented Python CS1 Course." *4th Educational Data Mining in Computer Science Education (CSEDM) Virtual Workshop*. 2020.

SERVICE

Park Scholar Selection Committee NCSU | 2022 – 2023

Committee Member

Committee member for NCSU's Park Scholarship program, a prestigious and selective four-year undergraduate scholarship award which aims to "bring exceptional students to NC State, based on outstanding accomplishments and potential in scholarship, leadership, service, and character."

- Reviewed applications, interviewed students, and collaborated with other committee members in order to select recipients for the award.

Conference Reviewing

Reviewer: ACM SIGCSE Technical Symposium (SIGCSE) 2023-2024

ADVISING & MENTORSHIP

Socially-Relevant Computing and Analytics REU 50 students total | Summers 2022 – 2024

Graduate Mentor and Coordinator

The Socially-Relevant Computing and Analytics (SRCA) REU immerses undergraduate students from underrepresented backgrounds nationwide in an 8-week research experience at NCSU, fostering an inclusive research community among cohorts of approximately 15 students per summer.

- Designed and hosted the annual data science workshop, teaching students practical data science skills for their research projects.
- Organized weekly graduate student networking events, pairing undergraduates with different graduate students for in-depth conversations about academia and graduate student life.

Research Mentees

Students for whom I was their primary mentor. Mentorship goals were learning practical research skills (such as literature reviews, study design, research software design, analysis methodologies, and writing) and understanding how said skills relate to personal and career goals.

Bryan Wilson 2022 – 2023

B.S. Electrical & Computer Engineering at NCSU, Class of 2024

Advised on research project on representation learning for music generation, resulting in his first-author short paper in ICCC '23 **[C4]**. Completed two summer research internships at Apple in acoustic technology and currently applying to PhD programs.

Camille Jones 2022

B.S. Computer Science at NCSU, Class of 2024

Advised on an independent study investigating game-based learning methods, such as learning objective sequencing and modifying a commercial game to teach programming. Currently completing NCSU's Accelerated Bachelor's/Master's Program.

Neil Bennett Summer 2022

B.S. Computer Science at NCSU, Class of 2024

Advised on a team with Jeffery on a research project using qualitative methodologies to analyze novice programmers' web help-seeking behaviors, which was accepted as a full paper with him as an author in SIGCSE '23 **[C3]**. Currently a Software Engineer at Blue Fusion Technologies.

Jeffrey Zheng Summer 2022

B.S. Computer Science at University of Pittsburgh, Class of 2026

Advised on a team with Neil on a research project using qualitative methodologies to analyze novice programmer's web help-seeking behaviors, which was accepted as a full paper with him as an author in SIGCSE '23 **[C3]**. Went on to complete internships at Eerie Insurance and BNY.

Eric Li 2021 – 2022

B.S. Mechanical Engineering at NCSU, Class of 2023

Advised on an independent study creating a browser extension to log students' behaviors while using the web to seek for help, which was accepted as a full paper with him as an author in SIGCSE '23 **[C3]**. Currently a Software Engineer at Dell Technologies.