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Dear Members of the Search Committee:

I am writing to apply for the Associate Professor position in the Sydney Horizon Educators program at the University of Sydney's School of Computer Science. The Sydney Horizon Educators program's emphasis on educational leadership, scholarship, and innovation represents an ideal alignment with my expertise and aspirations. The program is also well-timed, with rapid advances in artificial intelligence opening up both new challenges and remarkable opportunities for higher education. I should mention that, while I currently hold the rank of Teaching Professor, I am applying for the advertised opening at the Associate Professor level, recognizing that academic rank structures differ between institutions and that this position offers opportunities for educational leadership that align with my career goals.

Over eight years teaching one of the world's largest and most innovative introductory computer science courses, I have pursued a singular professional goal: to teach computer science to everyone who wants to learn and to inspire them to use their technical superpowers to improve our world. My approach combines pedagogical innovation and software engineering to create interactive and engaging environments that support learning at scale.

While at Illinois, I have taught introductory computer science to over 16,000 students. When I began teaching [CS 124](#) in Fall 2017, it was taught in Java to 700 students, 50% earned A-range grades, and 5% failed. In Fall 2024, we offered both Kotlin and Java, 1,200 students enrolled, 80% earned A-range grades, and only 2.5% failed. We have reduced performance gaps between genders, between majors and non-majors, and between students with less and more prior experience. But not through a loss of rigor. In Fall 2017, students only wrote code once in a proctored environment: on the paper final exam. In Fall 2024, CS 124 students completed multiple autograded programming challenges each week in our computer-based testing facility, with quiz performance comprising the majority of their course grade. We cover more material now than we did in 2017, and more than introductory computing courses at peer institutions. Over this interval, overall performance has improved, even as expectations and the amount of proctored assessment have risen.

Improved student performance in CS 124 is the result of innovative changes to course design and delivery. One of the most important changes is our use of frequent small assessment. Infrequent high-stakes assessments—such as heavily-weighted exams—cause students to get behind, cram to catch up, and forget immediately after the big test. In contrast, frequent small assessments cause students to keep up, study, and learn. CS 124 has entirely abandoned high-stakes assessment: we give no midterm or final. Instead, students complete weekly proctored computer-based quizzes, each comprising several autograded programming challenges and multiple-choice questions. Frequent small assessment provides immediate feedback to both students and staff, enabling early intervention for those who are struggling while reducing stress through flexible policies like dropped scores and retakes.

Our use of frequent small assessment is greatly supported by Illinois's [computer-based testing facility](#). This facility—already a remarkable innovation—is poised to become even more valuable as we confront the challenges of AI. Unlike instructors who are returning to paper or oral examination, I can still assess coding in an authentic environment. I can now both teach students to collaborate with coding agents and ensure they can complete coding tasks unaided. I would love to help establish a similar facility at the University of Sydney.

A second core educational innovation that has supported student success in CS 124 is our move from lectures to our current tutorial model. As the pandemic began, it became clear to me that remote lecturing was even less effective than in-person lecturing. In response, I completely restructured our materials into a series of interactive daily lessons. Each lesson combines text, video, runnable code examples, coding and debugging exercises, and interactive walkthroughs—a novel format that supports asynchronous live coding demonstrations. Compared to lectures, which often promote passivity, our daily lessons encourage active, self-directed learning. Students move at their own pace, with staff available on our online tutoring site throughout the day to help them whenever they get stuck.

I have also contributed to curricular and program development outside of my core teaching responsibilities. I led a team of colleagues that redesigned our early core programming curriculum, revamping a CS2 course that was creating issues with equity and downstream preparation. Our changes facilitated long-stalled improvements to neighboring courses in the sequence, and have proven effective over the past several years. I created a new reading and discussion seminar on the relationship between [society and technology](#), which I have now taught for several semesters. Inspired by the ongoing revolution in AI, I am designing a new course on [using and understanding AI](#), which I will pilot in Spring 2026.

While my current role does not focus on academic research, the novel tools and technologies that I have created represent research and development. Several have been published at leading computer science education venues, including SIGCSE, CSEEE&T, and ASE. Working with collaborators at Illinois, I have led research studies exploring [how students develop preferences between instructors](#), [the effectiveness of split deadline policies in improving student performance in large courses](#), and [how to effectively author multiple variants of questions to support asynchronous assessment](#). I have also published papers on innovative CS 124 tools, such as our [programming question authoring system](#).

My engagement with research and scholarship starts with building and deploying novel tools and ideas to support students in my own courses. Through ongoing data collection and discussion with senior course staff, we investigate the efficacy of changes, producing a cycle by which my course is continuously evolving and improving. Significant improvements and results are shared in a variety of ways: through my writing, online engagement with other instructors, and academic publication. I also maintain [learnes.online](#), a public version of my CS1 course materials that allows anyone to use and benefit from course-specific innovations and materials.

Before I began as teaching faculty at Illinois, I spent six years at the University at Buffalo as a research-focused faculty member. I led a [mobile systems research group](#), mentored three excellent doctoral students, supervised both graduate and undergraduate students, co-authored many papers, created innovative courses, and spearheaded a holistic curricular overhaul. During that time, I also raised almost \$3M in external funding, including

the prestigious NSF CAREER award. Since arriving at Illinois, my grant writing has been limited to internal awards, but I do have experience obtaining competitive external funding.

I have held various service roles at Illinois. When possible, I have tried to approach them in ways that produce lasting impact. As the first teaching-track faculty to chair our teaching faculty search, I redesigned the interview process, [replacing an unhelpful teaching demonstration with an open-ended presentation on effective pedagogy](#). This change has proven highly successful. It reduces the inappropriate emphasis on classroom teaching and allows candidates to present their holistic approach to instruction: assessment, materials, scaling, equity, use of technology, and so on. These well-attended talks also expose faculty to new pedagogical ideas and techniques. I have also served on the university's General Education Board and engineering college's Curriculum Review Committee.

I maintain networks connecting me with teaching faculty at many other institutions. I helped start the [Illinois Computer Science Summer Teaching Workshop](#), an event that brings together educators to discuss best practices, propose new directions, and challenge the status quo. I have authored [essays on my website](#) on a variety of teaching-related topics. I also participate in a large online community of practice, engaging in conversations about computer science education with colleagues from across the country and around the world. I particularly enjoy mentoring junior teaching faculty colleagues. Over my time at Illinois, I have also supervised over two thousand CS 124 course staff.

While my current position does not leave much time for pursuing external partnerships, I have had some success in seeing [learnes.online](#) used outside of Illinois: by faculty using the content to support their own courses, by [outreach programs for diverse high school students](#), and by teacher training courses. I am particularly excited that, in Fall 2025, we are piloting our first community college collaboration with Wilbur Wright College, and we plan to expand on this initial effort in future semesters. I maintain connections with EdStem and PrairieLearn, two leading educational technology companies.

The Sydney Horizon Educators program represents an exceptional opportunity to advance educational innovation at scale while contributing to pedagogical scholarship. The program's 70/20/10 teaching/research/service split closely aligns with both my current appointment structure (60/20/20) and my professional priorities. I am particularly excited by the prospect of managing high-enrollment units at Sydney, bringing my experience transforming large courses to a new institutional context. The access to education-focused grants would support continued development of novel educational technologies and research on student learning at scale. I am eager to contribute to Sydney's mission of preparing students for their future careers through outstanding educational delivery, curriculum innovation, and scholarship that advances computer science education, particularly at the dawn of the AI era. I would welcome the opportunity to discuss how my experience and vision align with the School of Computer Science's goals for this position.

Best,

Geoffrey Challen