



Northeastern University
College of Engineering

Dear Graduate Admissions Committee,

I am writing to provide a strong recommendation for Zijie Zhou's application to your doctoral program in Computer Science. As Associate Teaching Professor at Northeastern University's College of Engineering, I taught Zijie in CSYE 7270: Building Virtual Environments and Real-Time 3D, where he distinguished himself through solid theoretical understanding and genuine intellectual curiosity. In my course on game engines and shader languages, Zijie demonstrated notably strong ability to grasp both practical implementation and deeper theoretical principles. While most students focus on rendering techniques, Zijie consistently probed formal foundations—questioning type systems, execution models, and semantic abstractions underlying GPU-parallel computation. This theoretical orientation aligns well with doctoral research in programming language theory.

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Zijie's research work demonstrates solid preparation for doctoral study. Under Professor Robin Hillyard's guidance, he contributed to Number, a Scala library exploring fuzzy, lazy, and exact numeric computation with tracked error bounds and algebraic abstractions. This work showcases understanding of advanced type system features, categorical thinking, and formal reasoning about correctness. His independent well-typed project (github.com/Zijie000/well-typed) represents meaningful self-directed work, implementing type soundness proofs and small-step operational semantics for simply typed lambda calculus with subtyping, following Pierce's Types and Programming Languages. This demonstrates commitment to formal methods and research independence—qualities valuable where students must identify problems and drive their own investigations.

Zijie possesses mathematical maturity for work in type theory and category theory, combines theoretical understanding with practical implementation skills, and shows self-motivation through independent projects. His background spans type systems, categorical thinking, formal verification, and language design—preparation that should enable him to contribute to research in dependent types, effect systems, program verification, or categorical semantics.

I recommend Zijie Zhou for admission to your PhD program. He represents a well-prepared candidate: mathematically capable, intellectually curious, self-motivated, and committed to understanding formal foundations of computation. I am confident he would be a productive member of your research community.

Very truly yours,

Nik Brown, PhD
Associate Teaching Professor
Northeastern University

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