NJIT

<u>Department of Computer Science</u>

Types and Metaprogramming for Correct, Safe, and Performant Software Systems

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Hosted by Iulian Neamtiu

Date: Monday, March 11, 2024
Coffee: 2:15 PM – 2:30 PM
Time: 2:30 PM – 3:30 PM
Location: GITC 4402 (4th floor Seminar Lecture Hall)
WebEx Link: https://njit.webex.com/njit/j.php?MTID=mde64987f3f73bf541978c08ec0b9bb32

<u>Abstract:</u>

In this talk, I will present some novel directions to build correct, safe, and performant software systems using programming languages and metaprogramming techniques. In the first part of the talk, I will present reachability type systems, a family of static type systems to track sharing, separation, and side effects in higher-order imperative programs. Reachability types lead to a smooth combination of Rust-style ownership types with higher-level programming abstractions (such as first-class functions). In the second part, I will discuss how metaprogramming techniques can help build correct, flexible, and performant program analyzers. Specifically, I will present building compilers for program analysis, which are derived from high-level definitional interpreters using program generation techniques. The talk also covers my future research agenda, including applications of reachability types in quantum computing.

<u>Bio:</u>

Guannan Wei is currently a postdoctoral researcher at Purdue University. His research interests lie in programming languages and software engineering. His contributions have been published in flagship programming languages and software engineering venues, such as POPL, OOPSLA, ICFP, ECOOP, ICSE, and ESEC/FSE. Guannan received his PhD degree (2023) in Computer Science from Purdue University, advised by Tiark Rompf. He is the 2022 recipient of the Maurice H. Halstead Memorial Award for Software Engineering Research. More of Guannan's work can be found at https://continuation.passing.style.