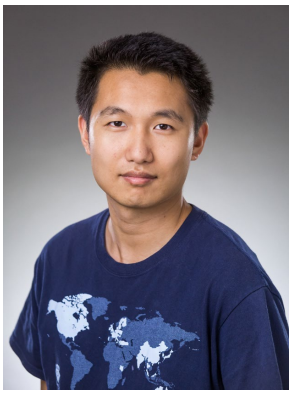
PURDUE UNIVERSITY | Elmore Family School of Electrical and Computer Engineering

Faculty Candidate Seminar – Software Engineering



Xiaoqi "Danny" Chen

PhD Student
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Wednesday, March 22, 2023
Presentation: 10:30 A.M. – 11:30 A.M.
Reception: 11:30 A.M. – 12:00 P.M.
MSEE 239

Building smarter networks using in-network computing

Abstract: High-speed programmable switches allow network operators to run succinct, customized algorithms to process individual packets, providing us a prime opportunity to improve network performance and security. In my research, I adopt approximation techniques to design algorithms that fit the switches' strict memory and computational constraints, allowing more granular network measurement and real-time, closed-loop control. I then deploy these algorithms in real-world campus and carrier networks to improve user experience. In this talk, I will first introduce BeauCoup, a framework for simultaneously executing a large number of traffic measurement queries without exceeding the memory access constraints of the switch hardware. BeauCoup utilizes coupon collectors to approximately answer each count-distinct query using less than one memory access per packet on average. Second, I will present ConQuest, an algorithm that approximately analyzes the switch's queuing buffer and identifies bursty flows. ConQuest enables the switch to react to bursts in real time and protect other user traffic from suffering high delay or packet loss.

Bio: Xiaoqi Chen is a Ph.D. student in the Department of Computer Science, Princeton University, advised by Prof. Jennifer Rexford. Previously, he received his Bachelor in CS from Yao Class, Tsinghua University. His research focuses on designing efficient algorithms for high-speed traffic processing in the network data plane, to improve the performance, reliability, and security of future networks. His work has been published in SIGCOMM, INFOCOM, CoNEXT, and has received the Best Paper Award at Symposium of SDN Research (SOSR) 2022. He was named a finalist for the 2020 Facebook Fellowship and a Siebel Scholar in 2022.