Stanley Bak Wins Trustees Award

The Stony Brook Foundation Trustees Faculty Award is supported by the Provost's Office in recognition of Stony Brook University assistant professors and their research. This award encourages early career faculty in their creative pursuit of scholarly activity. This year the Department of Computer Science is proud to announce that Professor Stanley Bak was chosen as one of the few recipients of this award.



Stanley Bak's award research seeks to advance AI safety

Bak's research entails the uses of artificial intelligence (AI) in cyber-physical systems (CPS). The usage of AI in CPS has been fairly limited because it is difficult to trust AI systems when they are hard to verify. Thus, Bak's solution is to come up with a formal verification method that will include AI components that will be safe for CPS.

Recipients, who receive a $20,000 research grant, are nominated by faculty members and the dean of their respective college, in this case the College of Engineering and Applied Sciences.

With the grant, Bak's proposed one-year project aims to supplement his existing five-year CAREER Award focused on developing the safety verification methods for AI systems that act in the real world. This supplemental funding will specifically investigate methods to enhance one of the phases of the process, reachability analysis, which propagates sets of states through differential equations. The goal is to develop efficient algorithms and operations for a set representation called constrained polynomial zonotopes, which support complex mappings for high dimensional sets. The work will involve two main tasks: developing efficient methods for intersection checking, and creating complexity reduction methods to simplify these representations using overapproximations. While advances in AI like deep reinforcement learning are able to create generally effective controllers for complex systems like emergency braking scenarios or aerospace maneuvers, Bak's research strives to prove these systems behave correctly in all circumstances.

This is not the first time Bak has won a prestigious award with his research in AI components in verifying systems. In 2023, Bak received a Faculty Early Career Development (CAREER) award presented by the National Science Foundation for his project on formal verification methods for cyber-physical systems (CPS). To read more about this award click here [LINK: https://www.cs.stonybrook.edu/about-us/News/third-2023-career-awardee] .

Congratulations to Bak on another outstanding award on AI-based CPS!

About Professor Stanley Bak

Stanley Bak graduated summa cum laude with a Bachelor's degree in Computer Science from Rensselaer Polytechnic Institute in 2007, followed by a Master's degree in Computer Science in 2009 from University of Illinois at Urbana-Champaign (UIUC). He later earned his PhD from UIUC in 2013. In Fall of 2020, Bak joined the Department of Computer Science here at Stony Brook University. He was awarded the US Air Force Office of Scientific Research (AFOSR) Young Investigator Research Program (YIP) award [LINK: https://news.stonybrook.edu/homespotlight/computer-science-professor-awarded-by-air-forces-young-investigator-research-program/] in 2020 and the National Science Foundation (NSF) CAREER Award in 2023 [LINK: https://www.cs.stonybrook.edu/about-us/News/third-2023-career-awardee] . Currently, Bak has over 100 publications and over $1 million in awarded grants.

-Kimberly Xiao