Sophisticated Tools Help Guide Programmers

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CURRENT RESEARCH

Program-analysis tools can guarantee that software operates correctly

The field of program analysis addresses one of the most important technological issues facing our society today: ensuring that the software systems that surround us behave correctly. Professor Thomas Reps, of the University of Wisconsin, Madison, is a leader in the development of tools that help programmers make improved software. In 1978, at the beginning of his career, his research led to the development of programming environments that incorporated knowledge of the programming language in use to aid program development—including looking over the shoulders of programmers to help them identify and fix mistakes that otherwise might have gone unnoticed! In many ways, these tools were similar to modern tools, such as Microsoft Visual Studio and Eclipse, but pre-dated them by more than two decades. Since 1986, Reps has focused on developing techniques for program analysis, and his work has concerned dataflow analysis, model checking, and computer-aided verification. One of his notable contributions is the algorithm for interprocedural dataflow-analysis that he and his collaborators developed in 1995. Their algorithm is used in Microsoft's SLAM tool for identifying bugs in device drivers, which—at the time SLAM was introduced in about 2004—were causing over 85% of the crashes in Windows. As the creator of one of the key technologies in a tool that helped make Windows much more stable, his work has had a significant impact on the computing experience of hundreds of millions of people worldwide.

One of the hallmarks of Prof. Reps's work has been its focus on frameworks that apply to general classes of problems. The advantage of such an approach is that it forces one to identify the essence of a class of problems....

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AFFILIATION

University of Wisconsin-Madison

EDUCATION

- Ph.D., in Computer Science, 1982 , Cornell University
- M.S., in Computer Science, 1982 , Cornell University
- B.A., in Applied Mathematics, 1977 , Harvard University

AWARDS

- Foreign member, Academia Europaea, 2013
- Guggenheim Fellowship, John Simon Guggenheim Memorial Foundation, 2000
- Humboldt Research Award, Alexander von Humboldt Foundation, 2000
- David and Lucile Packard Fellowship for Science and Engineering, 1988
- ACM Doctoral Dissertation Award, 1983

RESEARCH AREAS

Technology, Computational Sciences / Mathematics, IOT, Devices, Data

FUNDING REQUEST

Your contributions will support the continued research of Prof. Thomas Reps, of the University of Wisconsin, Madison, as he works to impact the computing experience globally. Donations will support the necessary $440K per year required for six graduate students, one postdoc, and Prof. Reps. In choosing to donate, you will play a role in making the software systems that surround us behave as expected.