Automatic Parallelization with Hybrid Analysis

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ABSTRACT:
Hybrid Analysis (HA) is a compiler technology that can seamlessly integrate all static and run-time analysis of memory references into a single framework capable of generating sufficient information for most memory related optimizations.

In this talk, we will present Hybrid Analysis as a framework to perform automatic parallelization of loops. For the cases when static analysis does not give conclusive results, we extract sufficient conditions which are then evaluated dynamically and can (in)validate the parallel execution of loops. The HA framework has been fully implemented in the Polaris compiler and has parallelized 22 benchmark codes with 99% coverage and speedups superior to the Intel Ifort compiler.

BIO:
Lawrence Rauchwerger is a Professor Computer Science and of Computer Engineering in the Department of Computer Science, Texas A&M University. He is also the co-Director of the Parasol Laboratory. He received an Engineer degree from the Polytechnic Institute Bucharest, a M.S. in Electrical Engineering from Stanford University and a Ph.D. in Computer Science from the University of Illinois at Urbana-Champaign. Since 1996 he has been on the faculty of the Department of Computer Science at Texas A&M where he co-founded the Parasol Lab. He has held Visiting Faculty positions at the University of Illinois at Urbana-Champaign, Bell Labs, IBM T.J. Watson Research Center, and INRIA Saclay, Paris.