

Department of Computer Science
University of Houston

**FACULTY CANDIDATE SEMINAR
SPRING 2011**

WHEN: MONDAY, MARCH 21, 2011
WHERE: PGH 232
TIME: 11:00 AM

SPEAKER: Dr. Filip Pizlo, Purdue University

Host: Dr. Barbara Chapman

TITLE: Fragmentation Tolerant Real Time Garbage Collection

Abstract:

Managed languages such as Java and C# are being considered for use in hard real-time systems. A hurdle to their widespread adoption is the lack of garbage collection algorithms that offer predictable space-and-time performance in the face of fragmentation. This presentation starts with my Stopless algorithm, which was the world's first lock-free concurrent copying real-time garbage collector, and continues through the evolution of this approach. My subsequent Chicken and Clover algorithms improve on the Stopless design with opportunistic and probabilistic guarantees respectively. Finally, I present Schism, the world's first wait-free concurrent copying garbage collector with proven time and space bounds. An implementation of these algorithms in two production-strength compiler infrastructures (Microsoft Bartok and Fiji VM) will be discussed, and a thorough evaluation of the collectors' throughput and predictability characteristics will be presented. All four algorithms are shown to exhibit predictability and throughput that exceeds that of previous approaches to concurrent defragmentation.

Bio:

Filip Pizlo is finishing his PhD in computer science at Purdue University under Professors Jan Vitek and Tony Hosking. His work deals with developing new compiler, concurrency, and memory management techniques to increase the performance and robustness of high-level computer programming languages. Artifacts of this work include the Fiji VM bare-metal Java runtime, the Schism concurrent real-time garbage collector, and the Jikes RVM high-throughput locking infrastructure. Filip is also involved in gamma-ray astrophysics as part of VERITAS, the world's most sensitive very-high-energy gamma-ray telescope.