New PL/SE Course

17-732: Emerging Programming Paradigms

Tue/Thurs 1:30-2:50 in NSH 2507

Starts Tuesday, September 9 (after the CSD IC)

Jonathan Aldrich and Bill Scherlis

Section A: 6 units (reading seminar)

Section B: 12 units (reading seminar and language design workshop)

In this reading seminar we explore, from a software engineering perspective, several of the new programming paradigms that are emerging for larger-scale network-based applications. This exploration, in the form of reading, discussion, and experimentation, is done at two levels: overall system architecture and programming infrastructure. Our goal is to better understand both the core phenomena and what is the significance of these phenomena for future software engineering.

Examples at the architectural level include web-based applications (e.g., Google docs, MS Live), cloud computing (force.com, Amazon EC2), frameworks (J2EE, ASP.net, SWT), data intensive computing (MapReduce/Hadoop), and service-oriented architectures (SOA). Examples at the level of programming infrastructure include web client programming (rich clients, AJAX, Flash, Silverlight), server-side programming (Python, PHP, data access), server configurations (multicore, distributed, cluster, virtualization), and GUI programming for applications (SWT, FLEX).

6 units of the course will be a once-a-week reading seminar, focused on becoming familiar with the development challenges posed by these paradigms, and some of the most innovative current research on them (including recent work at CMU). We'll ask everyone to read material in advance and react to it (perhaps by experimenting in the paradigm), and will split the discussion time between understanding the reading and brainstorming about extensions and alternatives. Each participant will play a coordinator/presenter role for one or two topics and associated papers.

For an optional additional 6 units, we'll meet a second time during the week for a language/library design workshop. Each participant will develop a small language or library design focusing on aiding one of the paradigms studied in the course. The workshop will rotate among participants, discussing proposals and ideas and exploring potential research solutions. The end result will be a well-motivated proposal along with some core theory and/or a small design prototype.