Title: Runtime Software Engineering: Towards Goal-oriented Self-Integrating Systems-of-Systems

Abstract:
We increasingly rely on complex systems to provide core societal services, such as communication, transport and electric power. These systems must adapt to unpredictable real-world environments, evolve to meet changing goals and deal with other systems discovered at runtime. To address such challenges, Software Engineering (SE) practices that used to ensure system viability from its offline development must now move into the runtime (SE@R) and handle unexpected situations dynamically. Key challenges chiefly include system openness, shifting goals and increasing scales. This requires systems to detect and interact with new types of resources or systems, which were not foreseen at design time; so as to continue to attain their goals, which may also change in new ways. Focus on system *goal-orientation* and (opportunistic) *self-integration* becomes essential here. Furthermore, these aspects must extend to *multiple scales*, in terms of space, time and information granularities. This talk provides an overview of the aforementioned SE@R concepts, as they have been slowly entering into the SE research mainstream; highlights several outstanding research directions; and opens the discussion to a broad, inter-disciplinary analysis of the most promising alternatives for proceeding and accomplishing these most stringent challenges.