

Autonomic Networks

Overview

Autonomic networks play a major role in many self-organizing networking systems, ranging from computer networks (such as self-management, including self-configuration, self-optimization, self-healing, and self-protecting sensor networks, peer-to-peer networks, delay tolerant networks, robot networks, etc.) to social and even biological networks. Only very recently, researchers have started understanding the fundamental mechanisms underlying autonomic networks and developed mathematical models and designed dedicated efficient techniques (e.g., for fault and attack tolerance, delay tolerance, mobility tolerance, etc.).

The goal of this course is two-fold:

- First, we will introduce the fundamental models and methods used to reason about the correctness and performance of autonomic network algorithms. In particular, we will teach essential algorithmic and analytic techniques which, after attending the course, remain a useful toolbox and allow the students to develop and study their own algorithms.
- Second, we complement the theoretical lectures with practical case studies. That is we consider case studies in sensor networks, self-managed networks, and even robotics, to show the various application domains of autonomic network algorithms.

In particular, students will learn about mathematical tools such as distributed algorithm design and analysis, computational geometry, randomization, graph theory, etc. This active field of research also offers a wide range of research questions.

Internationally acclaimed academicians, researchers and practitioners with proven knowledge, experience, and demonstrable ability in teaching, consultancy, research, and training in the field of Distributed Computing will deliver lectures and discuss potential research problems in the course. The course is planned as per the norms set by **Global Initiative of Academic Networks (GIAN)**, an initiative by Govt. of India for Higher Education.

Objectives

The primary objectives of the course are as follows:

- Introduce theoretical models for autonomic network algorithms.
- Introduce essential algorithmic techniques to devise efficient algorithms and analyze them theoretically and practically.
- Provide students with a set of tools to become independent researchers in the field.
- Highlight open research directions.
- Highlight interesting application domains (sensor networks, delay tolerant networks, mobility tolerance, mobility management/ robot networks, fault tolerance, Self-* properties, etc.)

Schedule	October 30 - November 03, 2017 , 1 Credit course covering 10 lecture hours (2 hours/day) Number of participants for the course will be limited to fifty.
You Should Attend If...	<ul style="list-style-type: none"> ▪ you are an computer engineer or research scientist from IT industry, service and government organizations including R&D laboratories interested in designing autonomic networks ▪ you are interested to learn about applications of autonomic networks ▪ you are a student (BS/BE/BTech/MS/MSc/MTech/PhD) or faculty/research staff from academic institution interested in learning how to do research on and/or work with autonomic networks
Fees	<p>The participation fees for taking the course is as follows:</p> <p>Participants from abroad : US \$250 Industry/ Research Organizations: Rs. 12000/- Academic Institutions: Faculty/Research Staff: Rs. 6000/- Student: Rs. 1000/- (Refundable subject to joining the course)</p> <p>The above fee includes all instructional materials, computer use for tutorials and assignments (if any), laboratory equipment usage charges, 24 hr free Internet facility. The participants will be provided with accommodation on payment basis.</p>

The Faculty



Prof. Sébastien Tixeuil is a **Professor** (*Professeur des Universités*), **Networks and Systems Department Head** at *LIP6, University Pierre et Marie Curie (UPMC), France*. He obtained his PhD in 2000 from University of Paris-Sud XI, and was a visiting Professor in Osaka University, Sapienza University, and Nara Institute of Science and Technology. His main research area is **Distributed Computing**, more precisely the study of achievable tasks despite challenged environments (that is, networks subject to unforeseen faults and attacks). His first field of study was *self-stabilization*, which denotes the capacity of a network to recover from arbitrary transient faults, and he progressively extended his research scope, considering harder attacks, such as *Byzantine*, in more *dynamic, wireless* environments.



Dr. Partha Sarathi Mandal is an Associate Professor at the Department of Mathematics in IIT Guwahati. He was a recipient of the ISCA Young Scientist Award, awarded by the President of India in January 2007, and Postdoctoral Fellowship of the INRIA, France in December 2006. He worked as a Research Fellow at the Advanced Computing & Microelectronics Unit in Indian Statistical Institute, Kolkata. From January to July 2008, he was at the Dept. of CSE in IIT Kanpur as a Postdoc. His research interests include distributed algorithms for swarm robots, algorithmic aspects of Ad-hoc & wireless sensor networks, fault-tolerant distributed algorithms.

Course Coordinator

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