

EDUCATION

University of Southern California, Los Angeles CA, USA

PhD in Civil and Environmental Engineering May 2012

Dissertation title: Stochastic and Multiscale Models for Urban and Natural Ecology

- Analysis and prediction of complex systems via stochastic modeling and simulations
- Advisor: Pr. Ghanem
- GPA 3.84

M.S. in Civil Engineering, emphasis in structural design May 2006

Ecole Normale Supérieure of Cachan, Cachan, France

Master of Math/Computer-Vision/Computer-Learning Oct. 2002

University of Nice Sophia-Antipolis, Nice, France

B.S. in Mathematics, minor in computer-science and physics June 2001

RESEARCH EXPERIENCE

IIASA Young Scientists Summer Program, Laxenburg, Austria June-Sept. 2010 - Aug. 2011
Evolution and Ecology Program, advisors: Ulf Dieckmann and Åke Brännström

- Designed a spatially explicit and individual-based forest model subjected to disturbances
- Studied the demographic and evolutionary impact of different disturbance regimes on forests

USC Los Angeles CA, USA

- Research Assistant, advisor: Dr. Roger Ghanem 2006-Present
- Designed an early warning system algorithm to detect contamination in Water Distribution Networks
- Built a multiscale and stochastic model of forest dynamics.
- Explored the geodetic network data of the California region to identify transient dynamics

CNRS Geoscience Azur, Villefranche sur Mer, France

- Intern, advisor: Dr. Gilbert Bellaiche Feb-May 2003
- Studied inverse problems in Geophysics
- Applied them to the knowledge of earth structure and earthquake location

Siemens Corporate Research, Princeton NJ, USA

- Intern, advisor: Dr. Nikos Paragios May-Oct 2002
- Imaging and Visualization department
- Designed an image registration algorithm for medical image processing using mutual information technique

INRIA, Sophia-Antipolis, France

- Intern, advisor: Dr. Bernard Mourrain Summer 2001
- GALAAD project
- Designed a Curve and Surface self-intersection detection algorithm using B-Splines

ACADEMIC INTERESTS

Theoretically, my focus is the design of computer models to simulate, analyze and predict dynamical complex systems in which uncertainty plays a significant role using mathematical tools such as stochastic partial differential equations, Markov Chain Monte Carlo and recently, multiscale particle dynamics that conserve microscopic behaviors. Nonetheless, my goals are to provide reliable models and thereby accurate predictions that will serve as a basis for policy makers. In the past couple of years, my work has been involved with the study of sustainable systems including the protection of water distribution networks against potential pollution and the impact assessment of disturbance regimes on forest dynamics.

TEACHING EXPERIENCE

USC Los Angeles CA, USA

- Teaching Assistant, Civil and Environmental Engineering Department 2006-2009
- Lectured, designed and graded assignments
- Graduate level: Finite Element Analysis - Nonlinear FEA
- Undergraduate level: Computer Methods for engineers - Mechanics of solids

Classical Piano, private lessons

- Taught 6 to 12 years old students 1994-2001

Modern Dance, Heartbeat House, Los Angeles CA

- Adult classes 2004-2006

PUBLICATIONS

Comboul M. & Ghanem R. (2012), **The value of information in the design of resilient water distribution sensor networks**, *J. of Water Resources Planning and Management* – Accepted

Comboul M. & Ghanem R. (2012), **Multiscale modeling for stochastic forest dynamics**, *J. of Selected Topics in Applied Earth Observations and Remote Sensing* – Submitted

CONFERENCES, WORKSHOPS & SEMINARS

Applications of Dynamical Systems **SIAM DS11**, Snowbird UT

- Presented a multiscale and stochastic forest model May 2011

Banff International Research Station (**BIRS**), Canada

- Participated to the Stochastic Multiscale Methods workshop on Bridging the Gap Between Mathematical Analysis and Scientific and Engineering Applications March 2011

- Computational Science and Engineering Conference**, Reno NV March 2011
- Presented a multiscale and stochastic approach to model forest dynamics
- Model and Data Hierarchies for Simulating and Understanding Climate**,
IPAM UCLA, Los Angeles March-June 2010
- 10th International Conference on Structural Safety and Reliability**, Osaka Sept. 2009
- Presented a stochastic approach to find the optimal sensor layout in Water Distribution Networks
- USC**, Civil and Environmental Engineering Student Seminars Fall 2008
- Presentations about current research topic
 - Review and discuss climate change modeling issues
- Mathematical Sciences Research Institute**, Berkeley - Climate Change Graduate Workshop July 2008
- Working towards enriching the mathematical models.
- Sandia National Laboratory**, Albuquerque NM Nov. 2007
- Trilinos user and developer meeting
 - Presented possible usage of the software to solve stochastic problems

AWARDS & FELLOWSHIPS

- USC Tuition Fellow 2006-2012
- National Academy of Sciences Grant to participate to the "Young Scientist Summer Program" at IIASA, Laxenburg (Austria) 2010
- WiSe Remarkable Women Awards 2010
- WiSe Travel Grant 2009
- "Outstanding Teaching Assistant" award, USC Civil and Environmental Engineering 2007
- "Excellence in Teaching" award, USC Center for Excellence in Teaching 2007