Daniele Codetta Raiteri

Curriculum vitae

PERSONAL DATA

Born in Brescia on November 22th, 1977
Living in Alessandria
Telephone: 0131 360 339

BIO AND EDUCATION

Education:

- *Ph.D. in Computer Science*, **Università di Torino**, 2006
- *M.Sc. in Computer Science*, **UPO**, 2002
- *High School Diploma*, I.T.C. "Leonardo da Vinci", Alessandria, 1996

Attended schools:

- *Bertinoro International Spring School for Graduate Studies in Computer Science*, **Centro Universitario Bertinoro**, 2003
- *Advanced Course on Information Science and Technology,* **Università di Torino**, 2003
- *Advanced Course on Petri Nets*, **Katholische Universität, Eichstätt**, 2003
- *Systematics of Net Modelling*, 2nd edition**, Università di Milano**, 2004
- *Valutazione delle Prestazione di Sistemi Complessi*, **Centro Universitario Bertinoro**, 2004
- *Tecniche Innovative per la Valutazione dell'Affidabilità e Disponibilità di Impianti Industriali*, **Politecnico di Milano**, 2007

Collaborations: 3ASI, COREP, CESI-Ricerca, ENS-Cachan, Thales-Alenia-Space, ESA-ESTEC, RSE.

Past projects: VERIFIM, WISEDEMON, PACO, CRUTIAL, PERF.

Lecturer in *Programming and Software Engineering*.

UNIVERSITY CAREER

2011-	Assistant Professor, UPO
2008-2009	Research Associate, UPO
2006-2007	Research Assistant, Consorzio Nazionale Interuniversitario per le Telecomunicazioni
2003-2005	Ph.D. Student, Università di Torino

UNIVERSITY POSITIONS

2011-	Commissione Orari, DiSIT, UPO
2016-	Consiglio di Biblioteca, DiSIT, UPO
2020-	Commissione Internazionalizzazione, DiSIT, UPO

SCIENTIFIC POSITIONS

2006-	Consorzio Nazionale Interuniversitario per le Telecomunicazioni (CNIT)
2010-	Gruppo di ricerca nazionale italiano sull'Informatica Quantitativa (INFQ)
2011-	Associazione Italiana dei Docenti Universitari di Informatica (GRIN)

MAIN FIELDS OF INTEREST

1. system reliability
2. graphic-probabilistic models
3. fault tree analysis
4. Petri nets
5. Bayesian networks

CURRENT ISSUES OF RESEARCH

1. **Analysis of continuous time Bayesian networks.** Bayesian networks are a well-known model for uncertain reasoning, and represent a system as a graph: nodes are random variables; arcs establish dependencies. They can have a temporal dimension: we distinguish between discrete and continuous time networks. In the second case, we are defining a version where the variables may change their value after a random delay or in an immediate way. Several approaches for the analysis of this model are under study and implementation.

2. **Automatic generation of Bayesian networks.** If the system is complex, the Bayesian network may contain many nodes, arcs, and parameters. Therefore its definition may be hard. A solution is the automatic generation of the Bayesian network from an high-level representation of the system, such as a fault tree intuitively representing the failure propagation from the components to the whole system. This appoach can be improved by taking into account new elements in the fault tree and in the Bayesian network.

3. **The DrawNet tool for the definition and the analysis of models.** DrawNet is a software tool which can be used to draw any kind of graph-based model. Moreover it can perform the analysis of models by means of the corresponding solvers integrated in DrawNet during the years. Many kinds of models are managed by DrawNet: fault tress, Petri nets, Bayesian

networks, etc. DrawNet is in constant evolution to allow us the definition of new kinds of models and the execution of new analysis methods.

4. **Fault Detection, identification, and recovery.** An autonomous system must be able to detect a fault, identify its cause, and execute actions to mitigate its effects on the mission. A diagnostic software module can be based on a model representing the system behaviour, such as a Bayesian network. Data collected from sensors can become observations for the network variables, while its analysis can evaluate the current and future state of the system, the cause of the state, and the reactive or preventive actions to be run.

5. **From reliability to security.** The models applied so far in the reliability field, can be used to evaluate the security of critical systems or infrastructures, with respect to computer network attacks. We need to adapt such models and identify the measures which can be computed. For example, the attack success probability can be estimated by a fault tree, the mean numer of successful attempts, by a Petri net, and the best countermeasures to mitigate the attack, by a Bayesian network.

CURRENT FUNDED PROJECTS

PROGRAMME	FUNDED PROJECT
Fondi di Ateneo per la Ricerca (FAR) 2017	*Model-Driven assessment of Resilient Infrastructures* (MoDRI), 2019-2021

TOP FIVE PAPERS

1. D. Codetta-Raiteri, L. Portinale, *"Decision Networks for Security Risk Assessment of Critical Infrastructures"*, **ACM Transactions on Internet Technology**, vol. 18(3), ACM, March 2018
2. D. Codetta-Raiteri, L. Portinale, *"Generalized Continuous Time Bayesian Networks as a modelling and analysis formalism for dependable systems"*, **Reliability Engineering and System Safety**, vol. 167, pages 639-651, Elsevier, November 2017
3. L. Portinale, D. Codetta Raiteri, *"Modeling and Analysis of Dependable Systems: A Probabilistic Graphical Model Perspective"*, World Scientific Publishing, July 2015
4. D. Codetta-Raiteri, L. Portinale, *"Dynamic Bayesian Networks for Fault Detection, Identification, and Recovery in Autonomous Spacecraft"*, **IEEE Transactions on Systems, Man, and Cybernetics: Systems**, vol. 45(1), pages 13-24, IEEE, January 2015
5. D. Codetta-Raiteri, L. Portinale, *"Approaching dynamic reliability with predictive and diagnostic purposes by exploiting dynamic Bayesian networks"*, **Journal of Risk and Reliability**, vol. 228(5), pages 488-503, SAGE, October 2014

AWARDS

1. Outstanding Reviewer Award, *Applied Sciences*, MDPI, 2017

2. IChemE Journals Best Reviewer Award, *Process Safety and Environmental Protection*, Elsevier, 2015
3. Donald Julius Groen Prize*, Institution of Mechanical Engineers*, 2014 [5]
4. IEEE Student Travel Grant, *International Conference on Dependable Systems and Networks*, 2004

FURTHER INFORMATION

-