



UNIVERSITÀ DI PISA
DIPARTIMENTO DI INGEGNERIA DELL'INFORMAZIONE
Dottorato di Ricerca in Ingegneria dell'Informazione

Doctoral Course

“Formal methods for cyber security and malware detection”

Prof. Antonella Santone

University of Molise - Italy

Short Abstract: The huge diffusion of computational capabilities in embedded systems, cars, smart houses, smartphones, critical infrastructures, e-health, and the penetration of computers and software in enterprises of every dimension have led to an enormous number of victims of cyber attacks. Formal methods are techniques used to mathematically model systems in order to verify properties in a thorough fashion. Thus, formal methods offer the potential to develop secure systems. These lectures aim to introduce some formal verification techniques that have gained great interest in the recent years and to explain how they can be used for the cyber security and malware detection.

Course Contents in brief:

- Specification language for concurrent systems
- Temporal logic to express properties
- Automated formal verification tools
- Code obfuscation and Security
- Android Malware detection
- Formal tools for identifying mobile malicious behaviour

Total # of hours: 16

References:

- [1] E.M.Clarke, O. Grumberg, D. Peled: “Model Checking”, MIT Press, December 1999. ISBN 0-262-03270-8
- [2] P. Vinod, V.Laxmi, M.S.Gaur: Survey on Malware Detection Methods, 3rd Hackers“ Workshop on Computer and Internet Security, Department of Computer Science and Engineering, Prabhu Goel Research Centre for Computer & Internet Security, IIT, Kanpur, pp-74-79, March, 2009.
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CV of the Teacher

Antonella Santone was born in Montreal (Canada) on June 13, 1969. She is an Associate Professor at the University of Molise since September 2017. She received the Laurea degree in Computer Science at the University of Pisa, Italy, in April 1993. In September 1997 she received the Ph.D. degree in Computer Systems Engineering at the Dipartimento di Ingegneria della Informazione, University of Pisa. She has been Assistant Professor at the University of Pisa from November 1998 to October 2001. She has been an Associate Professor at the Department of Engineering of the University of Sannio from November 2001 to August 2017. She has been President of the Didactical Committee of the master's degree in Computer Science Engineering, University of Sannio, from the academic year 2005/2006 to the academic year 2013/2014. She has been President of the Didactical Committee of the degree in Computer Science Engineering, University of Sannio, from the academic year 2011/2012 to the academic year 2013/2014. She has been President of the CampusOne Project. From 2006 to 2009 she has been a member of the Socrates/Erasmus Committee of the Faculty of Engineering, University of Sannio. From 2009 to 2012 she has been President of the Orientation Committee of the Faculty of Engineering, University of Sannio. She was involved in several research activities and projects. Antonella Santone's current research is focused on formal verification methods. Her research interests include formal description techniques, temporal logic, concurrent and distributed systems modelling, heuristic search, formal methods in systems biology and in security engineering. She has written almost one hundred papers for international journals and conferences.

Room and Schedule

Room: *Aula Riunioni del Dipartimento di Ingegneria dell'Informazione*

Schedule:

18 Giugno 2018 ore 9:00 – 13:00, **Largo Lucio Lazzarino 1, Pisa – Piano 6**

19 Giugno 2018 ore **14:00 – 18:00**, Via G. Caruso 16, Pisa – Ground Floor

20 Giugno 2018 ore 9:00 – 13:00, Via G. Caruso 16, Pisa – Ground Floor

21 Giugno 2018 ore 9:00 – 13:00, Via G. Caruso 16, Pisa – Ground Floor