

Research Interests

My broad research interests reside in the areas of wireless communications and networks, computer networks, and security for cyber-physical systems. The goal of my research is to design hardware and software solutions for wireless networked systems equipped with energy harvesting and radio triggering capabilities in order to eliminate the need of battery replacement. I am currently working in the area of Internet of Things (IoT), and my research focuses on the design, implementation, and performance evaluation through simulations and testbed deployments of novel optimized cross-layer strategies for wireless sensor networks (WSNs).

Education & Appointment

11/2014–present	PhD Student Computer Science Advisor: Chiara Petrioli	University of Rome “La Sapienza”, Italy
09/2017–present	Visiting Research Scientist Electrical and Computer Engineering Faculty Host: Stefano Basagni	Northeastern University, Boston, USA
08/2014–11/2014	Junior Specialist Researcher CRISP Lab	University of California, Davis, USA
09/2012–07/2014	Master of Science Electrical and Computer Engineering Advisor: Anna Scaglione Thesis title: “ <i>Cyber-Physical Security for Power Grid Protection</i> ” Abstract: <i>This thesis focuses on a novel use of a network intrusion detection system (NIDS) that we call hybrid control NIDS. Our HC-NIDS is tailored to detect attacks on networks that support controllers with power grid protection schemes. The security policies, derived from the hybrid automaton that designates the system’s expected operation, combine knowledge of desired communication rules as well as physical laws and limits that the system should obey to characterize network traffic as “safe” or “unsafe”.</i>	University of California, Davis, USA
09/2006–09/2012	Diploma (5 years program) Electronic and Computer Engineering Advisor: Polychronis Koutsakis Thesis title: “ <i>Investigation of Resource Allocation and Bandwidth Pricing for Cloud Computing Architectures</i> ” Abstract: <i>This thesis investigates resource allocation strategies for different types of time-varying traffic. We first implement two-profit driven scheduling algorithms from the literature (MaxProfit and MaxUtil) on the well-known and widely used CloudSim simulation tool, and we discuss the minor differences in the algorithms’ implementation that were dictated by the CloudSim structure. Then, we propose a new profit-driven scheduling algorithm, based on achieving the minimum service delay, which we compare with MaxProfit and MaxUtil.</i>	Technical University of Crete, Chania, Greece

Research Experience

University of Rome “La Sapienza”, Italy, Research Assistant

- **FP7 EC GENESI project:** *Radio-triggering techniques and wake-up-enabled communication stacks for Energy-Harvesting WSNs*
- **FP7 EC GENESI project:** *Energy-Harvesting-Aware Communication Protocols in the Self-Powered Internet of Things*

University of California, Davis, USA, Research Assistant

- **US Department of Energy (DOE) project:** Trustworthy Cyber Infrastructure for the Power Grid (TCIPG)
Functional Security Enhancements for Existing SCADA Systems
Joint project with UIUC, Cornell, Dartmouth and Washington State University
- **US Department of Energy's Cybersecurity for Energy Delivery Systems (CEDS) program**
Application of Cyber Security Techniques in the Protection of Efficient Cyber-Physical Energy Generation Systems
Lead organization: Lawrence Berkeley National Laboratory, Participating Organization: University of California Davis

Teaching Experience

Northeastern University, Boston, USA, Teaching Assistant

- Fundamentals of Networks (Prof. Basagni), Fall 2017

University of Rome "La Sapienza", Italy, Teaching Assistant

- Internet of Things (Prof. Petrioli), 2015-2016

Publications

1. C. Stamos, D. Vasileiadou, G. Koutsandria, I. Spanou, A. Vlachaki, A. Lazaris and P. Koutsakis, "User-Satisfaction Based Resource Allocation for GEO Satellites", in *Proc. of the IEEE International Symposium on a World of Wireless, Mobile and Multimedia Networks (WoWMoM), San Francisco, USA, 2012.*
2. M. Parvania, G. Koutsandria, V. Muthukumar, S. Peisert, C. McParland, and A. Scaglione, "Hybrid Control Network Intrusion Detection Systems for Automated Power Distribution Systems", in *Proc. of the 44th IEEE/IFIP International Conference on Dependable Systems and Networks (DSN), Atlanta, GA, 2014.*
3. G. Koutsandria, V. Muthukumar, M. Parvania, S. Peisert, C. McParland, and A. Scaglione, "A Network IDS for Protection Digital Relays in the Power Grid", in *Proc. of the 5th IEEE International Conference on Smart Grid Communications (SmartGridComm), Venice, Italy, 2014.*
4. G. Koutsandria, R. Gentz, M. Jamei, A. Scaglione, S. Peisert, and C. McParland, "A Real-Time Testbed Environment for Cyber-Physical Security on the Power Grid", in *Proc. of the 1st ACM Workshop on Cyber-Physical Systems Security & Privacy (CPS-SPC), Denver, CO, 2015.*
5. G. Koutsandria, M. Skevakis, A. Sayegh, and P. Koutsakis, "Can Everybody be Happy in the Cloud? Delay, Profit and Energy-Efficient Scheduling for Cloud Services", *Journal of Parallel and Distributed Computing, Vol. 96, 2016, pp. 202-217.*
6. S. Basagni, V. Di Valerio, G. Koutsandria, C. Petrioli, "Wake-up Radio-enabled Routing for Green Wireless Sensor Networks", *To Appear in Proceedings of IEEE 86th Vehicular Technology Conference (VTC 2017 Fall), Toronto, Ontario, Canada. September, 24-27. 2017. pp. 1 -6.*
7. S. Basagni, V. Di Valerio, G. Koutsandria, C. Petrioli, D. Spenza, "WHARP: A Wake-up Radio and Harvesting-based Forwarding Strategy for Green Wireless Networks", *To Appear in Proceedings of IEEE MASS 2017, Orlando, FL, USA. October, 22-25. 2017.*

Scientific and Technical Software

- C. McParland, S. Peisert, G. Koutsandria, V. Muthukumar, "HC-NIDS: Signatures and Simulations for Detecting Cyber-Attacks Aiming to Cause Damage Against Cyber-Physical Energy Systems", *Sponsored by the United States Department of Energy.*

Scholarships and Fellowships

- Best Student Paper Runner-Up, IEEE MASS 2017
- Scholarship for a period abroad, University of Rome "La Sapienza", 2017
- Research Grant for Young Investigators, University of Rome "La Sapienza", 2016
- Summer School Scholarship, 1st IEEE ComSoc Summer School, 2015
- Sapienza PhD Fellowship, University of Rome "La Sapienza", Italy, 2014-2017
- Summer School Scholarship, Trustworthy Cyber Infrastructure for the Power Grid (TCIPG), 2013
- Undergraduate Studies Fellowship, Technical University of Crete, Chania, Greece, 2009

Invited Talks and Posters

- “Green Wireless Sensor Networks for Structural Health Monitoring and Safe Transport of Artworks”, Exhibitor and demo presenter of the GENESI project, *ICT 2015 conference, Lisbon, Portugal*.
- “Harvesting Aware Routing in Environmentally Powered Wireless Sensor Networks”, Poster, *1st IEEE ComSoc Summer School 2015, Trento, Italy*.
- “A Network IDS for Protection Digital Relays in the Power Grid”, Paper presentation, *IEEE International Conference on Smart Grid Communications 2014 (SmartGridComm), Venice, Italy*.
- “Functional Security Enhancements for Existing SCADA Systems”, Invited presentation, *Trustworthy Cyber Infrastructure for the Grid (TCIPG) All-Hands Meeting, Davis, CA USA*.
- “Hybrid Control Network Intrusion Detection Systems for the Power Grid”, Poster, *2nd Annual Research Investment in the Sciences and Engineering (RISE) Symposium, Davis, CA USA*.
- “Intrusion Detection based on verification of hybrid automata models”, Poster, *2013 Trustworthy Cyber Infrastructure for the Grid (TCIPG) Annual Industry Workshop, Urbana, Illinois USA*.
- “Bio-Inspired Distributed Time Scheduling in Clustered Networks”, Poster, *17th Annual Signal and Image Sciences Workshop, Lawrence Livermore National Laboratory, Livermore, CA USA*.

Academic Service and Volunteer

- TPC member of the Med-Hoc-Net 2018, Volunteer of the Infocom 2018 TPC meeting, Publicity co-chair of the IEEE WoWMoM 2017.
- Reviewer of the IEEE Transactions on Industrial Informatics, Transactions on Mobile Computing, Pervasive and Mobile Computing, IEEE MASS 2017, IEEE VTC-2017 FALL, IEEE SECON 2017, IEEE DCOSS 2017, IEEE ICC 2017, IEEE Globecom 2016, ASCC 2015, IEEE SmartGridComm 2014.
- PhD International Tutor for the academic year 2016-2017.
- Assistant at the workshops of the NERD project organized by the Computer Science dep. of the University of Rome “La Sapienza”, in collaboration with IBM, Rome, June 2015, Oct.-Nov. 2015, Feb.-March. 2017.
The NERD project is dedicated to high school girls. Its goal is to introduce female students to the IT world, and show to them how computer science is a creative discipline in which women excel.
- IT Support at the Information Theory and Applications (ITA) Workshop, San Diego, USA, 2013.

Selected Projects

- Implementation and Performance Evaluation of a Call Admission Control (CAC) Mechanism for Wireless Cellular Networks.
- Implementation of Active Queue Management using the Network Simulator ns-2.
- Implementation of the Viterbi algorithm in the context of single antenna wireless channels.
- Design and implementation of the database for an on-line professional social networking service using the MySQL open-source relational database management system.

Technical Skills

- Scientific programming tools: Matlab, Maple, CPLEX, Flex, Bison
- Programming Languages: C++, C, Java, Python, Ladder logic, SQL, Bro Scripts, nesC, Assembly, VHDL
- Operating Systems: Linux, Apple OS X, Microsoft Windows, TinyOS

Languages

- Greek: Native. Greek citizen
- English: First Certificate in English, University of Cambridge
- French: Adequate in written/spoken French, DELF
- Italian: Low Intermediate level