Sara Rampazzi

Department of Electrical Engineering
and Computer Science

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University of Michigan
Computer Science and Engineering
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Research areas

Embedded hardware security, embedded systems design, modeling, and simulation with application to medical devices, automotive, and the Internet of Things.

Education

PhD in Electronics, Computer Science and Electrical Engineering
University of Pavia (Italy), *2014.*
Thesis: Embedded system for Lab-On-Chip biosensors
Advisor: Giovanni Danese

MEng in Computer Science Engineering
University of Pavia (Italy), *2010.*
Thesis: Design and implementation of a portable device for multi-parameter analysis based on Surface Plasmon Resonance
Advisor: Francesco Leporati

BS in Computer Science Engineering
University of Pavia (Italy), *2008.*

Academic positions

Research Investigator — Feb 2018-*present*
Electrical Engineering & Computer Science,
University of Michigan

Intermittent Lecturer — Jan 2019-*present*
Electrical Engineering & Computer Science,
University of Michigan

Affiliate Researcher — Aug 2017-Jan 2018
Electrical Engineering & Computer Science,
University of Michigan

Postdoc fellow — 2014
Computer Science Engineering,
University of Pavia

Research experience

Principal Researcher for MCity PASS project — 2018-*present*
University of Michigan
The Protecting Automotive Analog Sensor Security (PASS) project aims to protect sensors at the analog layer to enable automotive systems to better assess the trustworthiness of input from untrusted sensors.

Senior personnel on THAW 2018-*present*
University of Michigan
The Trustworthy Health and Wellness (THAW) is an NSF-funded project that tackles the fundamental challenges necessary to provide trustworthy information systems for health and wellness.

Visiting researcher Spring *2014*
Integrated System Design Division
Univ. de Las Palmas de Gran Canaria *(Spain)*
Researcher project on Support Vector Machine (SVM) for Hyperspectral Images classification in healtcare.

Teaching experience

Intermittent Lecturer Winter 2019
Course: EECS 496 - Major Design Experience Professionalism
Department of Electrical Engineering and Computer Science,
University of Michigan
Topic: Design principles for multidisciplinary team projects, team strategies, entrepreneurial skills, ethics, social and environmental awareness, and life long learning.

Instructor of record 2013-2014
Course: C coding
Department of Mathematics, University of Pavia
Topic: Ansi C PL syntax and static and runtime semantics.

Instructor of record 2010-2012
Course: Introduction to Computer Systems II
Computer Science Engineering, University of Pavia
Topic: introduction to web programming, HTML, CSS, JAVASCRIPT language syntax and examples of application.

Teaching Assistant 2007-2010
Course: Introduction to Computer Systems
Computer Science Engineering, University of Pavia
Topic: Ansi C PL syntax and semantics.

Industry experience

Firmware developer for LTE systems 2016-2017
Azcom Technology
Client: **Blue Danube Inc.**
Project: Firmware and software developer for smart antenna based wireless network.

Software engineer consultant 2015-2016
Alten Italia
Client: **Leonardo S.p.A.**
Project: Embedded software developer for the spacecraft EUCLID Command and Data Handling (C&DH) system and orbit control.
Client: **Magneti Marelli (Fiat Chrysler Automobiles Group)**
Project: Model-based design engineer for HMI in automotive cluster area.

Refereed conference publications

° corresponding (senior) author

Yulong Cao, Chaowei Xiao, Benjamin Cyr, Yimeng Zhou, Won Park, Sara Rampazzi°, Qi Alfred Chen, Kevin Fu, Z. Morley Mao, "**Adversarial Machine Learning on LIDAR-based Object Detection in Autonomous Driving**", accepted in ACM CCS, Nov 2019.

Connor Bolton, Sara Rampazzi, Chaohao Li, Andrew Kwong, Wenyuan Xu, Kevin Fu, "**Blue Note: How Intentional Acoustic Interference Damages Availability and Integrity in Hard Disk Drives and Operating Systems**". In Proceedings of the *39th Annual IEEE Symposium on Security and Privacy*, May 2018.

Sara Rampazzi, Francesco Leporati, Giovanni Danese, Marabelli Franco, Andrea Valsesia, "**A Novel Portable Surface Plasmon Resonance Based Imaging Instrument for On-Site Multi-Analyte Detection**". In *Federated Conference on Computer Science and Information Systems (FedCSIS '13),* Sept. 2013, pp. 619-626.

Sara Rampazzi, Giovanni Danese, Lucia Fornasari, Francesco Leporati, Franco Marabelli, Nelson Nazzicari, Andrea Valsesia, "**Lab On Chip: Portable Optical Device for On-Site Multi-parametric Analysis**". In *IEEE Euromicro Conference on Digital System Design (Euromicro DSD'13),* 4-6 Sept 2013, pp. 807-810.

Refereed journal publications

Simone Marini, Francesca Vitali, Sara Rampazzi, Andrea Demartini, Tatsuya Akutsu, "**Protease target prediction via matrix factorization**". In *Bioinformatics*, 29 Aug. 2018, bty746.

Sara Rampazzi, Givanni Danese, Francesco Leporati, Franco Marabelli, "A **Localized Surface Plasmon Resonance-Based Portable Instrument for Quick On-Site Biomolecular Detection**". In *IEEE Transactions on Instrumentation and Measurement*, Vol. 65 Is. 2, 1 Dec. 2015, pp. 317-327.

Preprint

* co-first and corresponding author

Sara Rampazzi*, Yazhou Tu, Bin Hao, Angel Rodriguez, Kevin Fu, and Xiali Hei, "**Trick or Heat? Attack on Amplification Circuits to Abuse Critical Temperature Control Systems**"
arXiv preprint arXiv:1904.07110

Posters

Yulong Cao, Chaowei Xiao, Benjamin Cyr, Yimeng Zhou, Won Park, Sara Rampazzi, Qi Alfred Chen, Kevin Fu, Z. Morley Mao, "**Adversarial Sensor Attack on LIDAR-based Perception in Autonomous Driving**",
Accepted to AdvMLCV2019 (CVPR 2019 Workshop on Adversarial Machine Learning in Real-World Computer Vision Systems), June 2019.

Angel Rodriguez, Sara Rampazzi and Kevin Fu, "**IoT Two Factor Neurometric Authentication System using Wearable EEG**". In the Poster Session of the IEEE Workshop on the Internet of Safe Things (SafeThings 2019), May 2019.

Connor Bolton, Sara Rampazzi, Chaohao Li, Andrew Kwong, Wenyuan Xu, Kevin Fu, "**Blue Note: How Intentional Acoustic Interference Damages Availability and Integrity in Hard Disk Drives and Operating Systems**". In the Poster Session of the 39th Annual IEEE Symposium on Security and Privacy, May 2018.

Patents issued

Sara Rampazzi, Giovanni Danese, Lucia Fornasari, Francesco Leporati, Franco Marabelli, Nelson Nazzicari, Andrea Valsesia "**Detection device of molecular compounds based on Surface Plasmon Resonance**". European patent #IT2013MI01345 20130806. Priority 2013. Issued 2015.

Invited talks and seminars

"Protecting Cyber-physical Systems from Physical Attacks" Invited seminar, University of California, Santa Barbara, 05/23/2019

"Cybersecurity in Hospitals: comparing EU and US strategies" Seminar & discussion panel in second level postgraduate Master in Cyberlaw and Policies for Digital Innovation, University of Milan, Bicocca, 12/19/2018

"Cybersecurity and Implantable Devices". In Women in Electrophysiology, Medical Education - Medtronic Accademy, 10/13/2018

"Fear The Hacked IoT Medical Devices: the apocalypse is already happening, and no one noticed?". In Proceedings of USENIX 2018 Summit on Hot Topics in Security (HotSec 18), 08/14/2018

"Sensor Security in Cyber-Physical Systems", seminar for graduate students of the Ph.D. School of Electrical and Electronics Engineering and Computer Science, University of Pavia, 07/15/2018

"Portable Lab-on-chips for biomolecular detection", seminar in first level postgraduate Master and Specialization Course in Clinical Engineering, University of Pavia, 04/12/2016

"A Novel Portable Surface Plasmon Resonance Based Imaging Instrument for On-Site Multi-Analyte Detection". Conference presentation in the 6th International Symposium on Multimedia Applications and Processing, colocated event of FedCSIS 2013, 9/10/2013.

Service to profession

Technical Program Committee Member of SafeThings 2019 - IEEE Workshop on the Internet of Safe Things
Colocated with 2019 IEEE Symposium on Security and Privacy
May 20-22, 2019 - San Francisco, California, USA

Peer Reviewer
ACM Transactions on Privacy and Security; 2019 – *present*
ACM Transactions on Computing for Healthcare; 2019 - *present*
Science Magazine; 2018 - *present*
Sensors; 2016 - *present*

NSF SaTC grant proposal review panelist
Panelist reviewer for small (500K) grant proposals on the Secure and Trustworthy Cyberspace (SaTC) program of the National Science Foundation; 2018 – *present*

Consultant for Archimedes, Center of Medical Device Security
University of Michigan, 2018-*present*
Archimedes is an independent center created to help medical device manufacturers, industry experts and physicians to navigate the operational hazards of cybersecurity implementation in healthcare.

Mentoring & Advising

Computer Engineering Undergraduate Advisor
University of Michigan, Winter 2019
Helping students in the undergraduate programs offered through the Electrical Engineering and Computer Science Department.

Mentor for the First Generation Engineering Program
University of Michigan, 2018-*present*
The purpose of the program is to bring first generation Michigan Engineering students (undergraduate & graduate) together to build the community, and share resources and experiences.

Society of Women Engineers Summer Camp mentor
University of Michigan, Summer 2018
Summer Engineering Exploration (SEE) Camp mentor for high school students interested in engineering and security in Cyberspace.

IEEE Student Branch Computer Science Area Advisor
IEEE Pavia Student Branch, Region 8, Italian section,
University of Pavia, *2011-2014*.
Introducing computer science engineering undergraduate students to research and future professions.

Organization committee member
Euromicro SEAA 2014/ DSD 2014 Conference, Verona (Italy), 2014

Technical Skills

PLs:	Matlab, C, Perl, Java
Design/Modelling/ Simulation tools:	Matlab-Simulink, COMSOL Multiphysics, StateFlow, IBM Rational Rhapsody.
Programming/ Validation/Testing tools:	IBM Rational Logiscope, GNURadio, QA System Cantata++, dSpace Target Link, MPLAB, MikroC for PIC and ARM

Languages

Italian	Native speaker
English	Fluent
Spanish	Fluent