

# Stefania Bartoletti

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## Biography

Stefania Bartoletti received the Laurea degree (*Summa Cum Laude*) in Electronics and Telecommunications Engineering and the Ph.D. degree in Engineering Science–Information Engineering from the University of Ferrara, Italy, in 2011 and 2015, respectively.

Since June 2016, she is recipient of a Marie-Skłodowska Curie Global Fellowship within the Horizon 2020 European Framework for a research project with the Massachusetts Institute of Technology (MIT) and the University of Ferrara, with secondment at Thales, France (i.e., worldwide leading industry in defense and security systems). In 2012, she joined the Wireless Laboratory at the University of Ferrara as a Ph.D. candidate. She was Researcher with Consorzio Nazionale Interuniversitario per le Telecomunicazioni (CNIT) from 2010 to 2012, working on passive localization within the framework of the European project SELECT. Her research interests include theory and experimentation of passive localization and tracking networks, especially with application to wireless sensor radar and next generation RFID systems. From September 2013 to August 2014, she was a Visiting Ph.D. Student at the Laboratory for Information and Decision Systems at Massachusetts Institute of Technology (MIT). Her research activity at LIDS included theory and experimentation of location-aware wireless networks.

Dr. Bartoletti served as a member of the local organization committee for the 2011 IEEE International Conference on Ultra Wideband (ICUWB), as a member of the technical program committee for the 2015 IEEE International Conference on Communications (ICC), and as reviewer for numerous IEEE Journals and international Conferences.

## Education

- **University of Ferrara, Ferrara, Italy** 2012 – 2015  
Ph.D. candidate in Engineering Science, Information Engineering Score: Excellent  
Thesis Topic: Wireless Localization Systems: Statistical Modeling and Algorithm Design  
Advisor: Professor Andrea Conti
- **University of Ferrara, Ferrara, Italy** 2006 – 2011  
Master: Laurea in Electronics and Telecommunication Engineering Score: *Summa cum Laude*  
Thesis Topic: Passive Detection and Tracking: System Design and Performance Evaluation  
Advisor: Professor Andrea Conti
- **Liceo Classico Gioacchino da Fiore, Rende, Italy** 2006 – 2009  
Liceo Classico (High School) Score: 100/100

## Research Interests

General research interests in the area of wireless communication and localization networks, and statistical signal processing. Current research interests include design, analysis, and experimentation of high-accuracy passive localization and tracking.

## Work Experience

- **Massachusetts Institute of Technology, Cambridge, MA**  
*Visiting Ph.D. Student*, Laboratory for Information and Decision Systems (LIDS) 2013 – 2014  
Advisor: Professor Moe Z. Win

- **Consorzio Nazionale Interuniversitario per le Telecomunicazioni (CNIT)**  
*Research Collaborator, SELECT Project* 2010 – 2012  
 Supervisor: Professor Andrea Conti

## Teaching Experience

- **University of Ferrara**  
*Teaching Assistant, Department of Engineering* 2012-2013  
 Course: Signals and Communications
- **University of Ferrara**  
*Teaching Assistant, Department of Engineering* 2013-2014  
 Course: Signals and Communications
- **University of Ferrara**  
*Seminar Lecturer, Department of Engineering* 2013-2014  
 Course: Laboratory for Signals and Systems
- **University of Ferrara**  
*Seminar Lecturer, Department of Engineering* 2014-2015  
 Course: Laboratory for Signals and Systems

## Research Highlights

The main research activities concern the statistical modeling and algorithm development for design and analysis of different wireless localization systems, with particular regard to semi-passive and passive systems. The key contributions are:

- derivation of a range information model for design and analysis of wideband ranging systems based on energy detection;
- development of low-complexity ranging algorithms with optimal energy detection for localization with soft-decision and hard-decision ranging;
- introduction of blind techniques for the selection of representative observations in sensor radars;
- proposal of a low-complexity scheme for localization in RFID systems based on backscatter modulation and design of Bayesian framework for estimating the order of arrival of tagged objects;
- development of a methodology for design and analysis of sensor radars by jointly considering (i) network setting, (ii) propagation environment, (iii) waveform processing, (iv) observation selection, and (v) localization algorithm; and
- proposal of a Bayesian framework for the passive tracking and velocity estimation of moving targets based on LTE signals of opportunity.

## Project Experience

- Italian Ministry of Education, University and Research under PRIN (2013 – 2015): *Green tags and sensors with ultrawideband identification and localization capabilities (GRETA)*
- European Commission under FP7-IST EU grant #257544 (2010-2013): *Smart and efficient location, identification, and cooperation techniques (SELECT)*
- Italian Ministry of Economic Development under Industria 2015 (2010-2013): *Multifunctional wireless system for the integrated management of electric energy, comfort and safety within buildings (WEBS)*

- European Commission under Horizon 2020, Marie Skłodowska-Curie actions, Individual Global Fellowship (2016 – 2019): *Passive tracking of people and things for behaviour analysis*

## Honors and Awards

- **Paul Baran Young Scholar Award**, The Marconi Society, 2016.
- **Best Ph.D. Thesis in the field of Communication Technologies**, National Telecommunications and Information Theory Group (GTTI), 2015
- **IEEE CWIT Student Paper Award (first place)**, IEEE Canadian Workshop on Information Theory, 2015
- **Nicolò Copernico Award for innovative thesis in Sciences and Technologies**, Unindustria Ferrara, 2015
- **Soroptimist Prize for scientific research**, Soroptimist International, 2015

## Invited Talks

- “Active and Passive Localization via Wideband Signals” – Stanford Center for Position, Navigation, and Time – November 2016
- “Wideband Ranging for Location-aware Networks” – Arizona State University, USA – March 2014
- “A Mathematical Model for Wideband Ranging” – Wireless Information and Network Science Laboratory, LIDS, MIT, USA – June 2014

## Professional Service

- Technical Program Committee (TPC) Chair:
  - IEEE ICC ANLN Workshop 2017
  - IEEE ICC ANLN Workshop 2018
- Technical Program Committee (TPC) Member:
  - IEEE PIMRC 2018
  - IEEE GLOBECOM 2018
  - IEEE GLOBECOM 2017
  - IEEE ICC 2016
  - EURASIP/IEEE EUSIPCO 2016
- Local Organization Committee Member:
  - IEEE ICUWB 2011
- Reviewer for various international conferences
- Reviewer for (selected journals)
  - IEEE Journal on Selected Areas in Communications
  - IEEE Trans. on Aerospace and Electronic Systems
  - IEEE Trans. on Wireless Communications
  - IEEE Trans. on Vehicular Technology.
  - IEEE Communications Letters
  - IEEE Wireless Communications Letters

## Professional Memberships

- Institute for Electrical and Electronics Engineers (IEEE), Student Member, 2011 – 2015
- Institute for Electrical and Electronics Engineers (IEEE), Member, 2015 – present

- Consorzio Nazionale Interuniversitario per le Telecomunicazioni (CNIT), 2011–present

## Publication List

### Journal Papers

- [J7] M. Z. Win, F. Meyer, Z. Liu, W. Dai, S. Bartoletti, and A. Conti, "Efficient Multi-Sensor Localization for the Internet-of-Things" *IEEE J. Sig. Proc. Mag.*, to appear.
- [J6] S. Bartoletti, A. Conti, and M. Z. Win, "Threshold Profiling for Wideband Ranging" *IEEE J. Sig. Proc. Lett.*, vol. 25, no. 6, pp. 873–877, Mar. 2018.
- [J5] S. Bartoletti, A. Conti, and M. Z. Win, "Device-free Counting via Wideband Signals" *IEEE J. Sel. Areas in Commun.*, vol. 35, no. 5, pp. 1163–1174, May 2017.
- [J4] S. Bartoletti, A. Giorgetti, M. Z. Win, and A. Conti, "Blind selection of representative observations for sensor radar networks," *IEEE Trans. Veh. Technol.*, vol. 64, no. 4, pp. 157–160, Apr. 2015.
- [J3] S. Bartoletti, W. Dai, A. Conti, and M. Z. Win, "A mathematical model for wideband ranging," *IEEE J. Sel. Topics Signal Process.*, vol. 9, no. 2, pp. 216–228, Mar. 2015.
- [J2] F. Guidi, N. Decarli, S. Bartoletti, A. Conti, and D. Dardari, "Detection of multiple tags based on impulsive backscattered signals," *IEEE Trans. Commun.*, vol. 62, no. 11, pp. 3918–3930, Nov. 2014.
- [J1] S. Bartoletti, A. Conti, A. Giorgetti, and M. Z. Win, "Sensor radar networks for indoor tracking," *IEEE Wireless Commun. Lett.*, vol. 3, no. 2, pp. 157–160, Apr. 2014.

### Refereed Conference Proceedings

- [C15] S. Bartoletti, A. Conti, and M. Z. Win, "Device-free Counting via OFDM Signals of Opportunity," in *Proc. IEEE Workshop on Advances in Network Localization and Navigation (ICC)*, Kansas City, USA, May 2018.
- [C14] S. Bartoletti, A. Conti, and M. Z. Win, "Towards Counting via Passive Radar using OFDM Waveforms," in *Proc. IEEE Workshop on Advances in Network Localization and Navigation (ICC)*, Paris, France, May 2017.
- [C13] S. Bartoletti, N. Decarli, A. Guerra, F. Guidi, D. Dardari, and A. Conti, "Energy-based order of arrival estimation via UWB-UHF RFID," in *Proc. EURASIP Workshop on RFID Technology (EURFID)*, Oberaudorf, Germany, Oct. 2015, pp. 1–6.
- [C12] N. Decarli, et Al. , "The GRETA architecture for energy efficient radio identification and localization," in *Proc. EURASIP Workshop on RFID Technology (EURFID)*, Oberaudorf, Germany, Oct. 2015, pp. 1–8.
- [C11] A. Bagni, A. Conti, S. Bartoletti, D. Menin, G. Sineri, C. Domenicali, V. Fornario, G. Garani, E. Ballardini, C. Borgna-Pignatti, and M. Dondi, "Clinical analysis of spontaneous startles in preterm neonates via sensor networks," in *Proc. IEEE Int. Symp. Med. Meas. Applic. (MEMEA)*, Benevento, Italy, May 2016, pp. 1–5.
- [C10] S. Bartoletti, W. Dai, A. Conti, and M. Z. Win, "Wideband localization via range likelihood based on reduced dataset," in *Proc. IEEE Canadian Workshop on Inf. Theory*, St. John's, NL, Canada, Jul. 2015, **Student Paper Award (first place)**.
- [C9] S. Bartoletti, A. Conti, and M. Z. Win, "Passive radar via LTE signals of opportunity," in *Proc. IEEE Workshop on Advances in Network Localization and Navigation (ICC)*, Sydney, Australia, Jun. 2014, pp. 181–185.
- [C8] S. Bartoletti, N. Decarli, A. Guerra, F. Guidi, D. Dardari, and A. Conti, "Order of arrival estimation via UHF-UWB RFID," in *Proc. IEEE Workshop on Advances in Network Localization and Navigation (ICC)*, Sydney, Australia, Jun. 2014, pp. 133–137.
- [C7] S. Bartoletti, A. Giorgetti, and A. Conti, "Sensor radars with subset diversity," in *Proc. IEEE Workshop on Advances in Network Localization and Navigation (ICC)*, Budapest, Hungary, Jun. 2013, pp. 32–36.
- [C6] R. D'Errico, M. Bottazzi, F. Natali, E. Savioli, S. Bartoletti, A. Conti, D. Dardari, N. Decarli, F. Guidi, F. Dehmas, L. Ouvry, U. Alvarado, N. Hadaschik, C. Frankek, Z. Mhanna, M. Sacko, Y. Wei, and

- A. Sibille, "An UWB-UHF semi-passive RFID system for localization and tracking applications," in *Proc. IEEE Int. Conf. on RFID-Technology and Applications*, Nice, France, Nov. 2012, pp. 18–23.
- [C5] S. Bartoletti, A. Giorgetti, and A. Conti, "UWB sensor radar networks for indoor passive navigation," in *Proc. Tyrrhenian Int. Workshop on Adv. in Radar and Remote Sens.*, Naples, Italy, Sep. 2012, pp. 140–145.
- [C4] S. Bartoletti, M. Guerra, and A. Conti, "UWB passive navigation in indoor environments," in *Proc. 4th Int. Symp. on Applied Sci. in Biomed. and Commun. Technol.*, Barcelona, Spain, Oct. 2011, pp. 1–5.
- [C3] S. Bartoletti and A. Conti, "Passive network localization via UWB wireless sensor radars: the impact of TOA estimation," in *Proc. IEEE Int. Conf. on Ultra-Wideband*, Bologna, Italy, Sep. 2011, pp. 576–580.
- [C2] S. Bartoletti *et Al.*, "Quaternary prediction technique for MPEG video compression," in *Proc. IEEE Int. Conf. on Software, Telecomm. and Computer Networks*, Split, Croatia, Sep. 2010, pp. 1–4.
- [C1] S. Bartoletti, A. Conti, and A. Giorgetti, "Analysis of UWB radar sensor networks," in *Proc. IEEE Int. Conf. Commun.*, Cape Town, South Africa, May 2010, pp. 1–6.

### Patent Applications

- [P1] M. Z. Win, S. Bartoletti, W. Dai, and A. Conti, "Wideband Ranging System," U.S. Patent Disclosure: MIT Technology Licensing Office, Jul. 20, 2018.