

## Dr. Tommaso Pecorella, Ph.D.

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### CONTACT INFORMATION

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### RESEARCH INTERESTS

Most of my research centers on networked systems: network security, network management, Internet Routing (exp. in Wireless Sensor Networks), network architectures and wireless networks, Wireless Sensor Networks, Internet of Things, Wireless cellular systems (5G, 6G), Software Defined Networks, Networking simulation tools (ns-3: [www.nsnam.org](http://www.nsnam.org)). I also enjoy working on interdisciplinary problems, and collaborating with international research teams.

### EDUCATION

- Ph.D. in Computer Science **2000**  
**University of Florence**, Florence, Italy.  
**Title of Dissertation:** Analysis of the MAC and QoS techniques in multimedia satellite communications
- Master of Science in Electronic Engineering - Telecommunications track **1996**  
**University of Florence**, Florence, Italy.  
**Title of Dissertation:** Polling techniques for voice/data traffic in microcellular networks.

### RELEVANT WORKING EXPERIENCE

**Univ. of Florence**, Firenze, Italy, Ricercatore TI (Tenured Assistant Professor) **Nov. 2007 - current**

- Teaching,
- Master and PhD students advising and co-advising,
- Head of LiRS – joint laboratory between DINFO and Telecom Italia.
- Funded projects proposal writing and execution,

**EU commission**, Brussels, Belgium, (Project proposals evaluator) **Jun. 2006**

- Evaluator for the EU commission - PASR-2006 Call (third and last Call for proposals of the Preparatory Action for Security Research).

**Consorzio Nazionale Interuniversitario per le Telecomunicazioni (CNIT)** <http://www.cnit.it> Firenze, Italy (Researcher) **Sep. 2001 - Sep. 2007**

- Master and PhD students advising and co-advising,
- Funded projects proposal writing and execution.

### TEACHING EXPERIENCE

**University of Florence, Italy**

- **Security and network management:** 2002 – today
- **Telematics lab.:** 2001 – 2003
- **Statistics for engineering:** 2006 – 2008
- **Computer science lab.:** 2009 – 2011
- **Various courses for Ph.D. and industrial partners.**
- **Ms.C. Thesis advisor**
- **Ph.D. Thesis advisor**

**Saint Louis University, MO, USA:** <https://cs.slu.edu/academics/courses/csci5930>

- **Internet of Everything:** CSCI 5930 - Spring 2018
- **Internet of Things:** CSCI 5930 - Spring 2019

ACADEMIC  
ADVISING  
EXPERIENCE

After my PhD, I have advised or co-advised over 100 MS and PhD students. Almost all my recent publications are authored or co-authored with my MS or PhD students.  
In the past 10 years I have been a mentor and co-administrator for the ns-3 (<http://www.nsnam.org>) Google Summer, and recently for the Code and Google Code-In projects.

PERSONAL SKILLS  
AND COMPETENCES

**Languages:** Italian (native), English (fluent)  
**Programming (expert):** C/C++.  
**Programming (good):** Python, PHP, bash, zsh.  
**Other Tools:** ns-3 (maintainer), Jenkins, git, mercurial, R.  
**Platforms:** MacOS, Unix, Embedded devices.

SELECTED FUNDED  
PROJECTS

**Extramural Funding**

- 2009-2012 – NI2S3 (Net information integration services for security systems) – EU FP7-ICT-SEC-2007-1.
- 2009-2013 – SANDRA (Seamless Aeronautical Networking through integration Of Data links, Radios, and Antennas) – EU FP7-AAT-2008-RTD-1.
- 2009-2012 – EmerSAT (Pilot project for institutional emergency and security communications) – ASI Grant agreement n. I/054/08/0.
- 2009-2012 – IMPULSO (Integrated Multimodal Platform for Urban and extra urban Logistic System Optimization) – Italian MISE Industria 2015 founding – 2009-2012.
- 2011-2013 – MERCURIO (Innovative access and home networking systems based on ultra-wideband networks for value-added services) – Tuscany PAR FAS 2007-13. Total award about €2.700K,
- 2012-2014 – SIC (Sistema Innovativo di Comunicazione) – Tuscany POR CReO 2007-13.
- 2014-2016 – SHIELD – Tuscany POR CReO 2014-20.
- 2016-2019 – GAUChO (A Green Adaptive Fog Computing and Networking Architecture) – MIUR PRIN PE6.
- 2018-2020 – Italian 5G testbed experimentation in Prato - L'Aquila (head of the University group on *Sensors and IoT* field trial).

*Received several industry research grants and consulting contracts for projects protected by a Non Disclosure Agreement.*

**Intramural Funding** Italian Universities do not grant relevant intramural fundings.

SCHOLARSHIP AND  
RECOGNITIONS

- ACM SIGCOMM Networking Systems Award 2020 for “the ns family of network simulators (ns-1, ns-2, and ns-3)”
- Travel Grant for IEEE GLOBECOM 1999 Conference. Rio de Janeiro (Brasil), Dec 1999.
- Best paper award at the IEEE GLOBECOM 2016. Washington D.C. (USA), Dec 2016.

MEMBERSHIP

- IEEE Senior member (member since 1990).
- AEIT member since 2015.
- Associate Editor for *Security and Privacy*, John Wiley & Sons Ltd., since 2017.

## REFEREED JOURNAL PUBLICATIONS

- [1] B. Picano, R. Fantacci, T. Pecorella, and A. Rashid, “Federated learning for ioe environments: A service provider revenue maximization framework,” *ITU Journal on Future and Evolving Technologies*, 2021.
- [2] F. Nizzi, T. Pecorella, F. Esposito, L. Pierucci, and R. Fantacci, “Iot security via address shuffling: the easy way,” *IEEE Internet of Things Journal*, vol. 6, no. 2, pp. 3764–3774, Apr 2019.
- [3] F. Abazari, F. Esposito, H. Takabi, H. Hosseinvand, and T. Pecorella, “Teaching software-defined network security through malicious tenant detection,” *Internet Technology Letters*, vol. 2, no. 6, 2019.
- [4] R. Fantacci, F. Nizzi, T. Pecorella, L. Pierucci, and M. Roveri, “False data detection for fog and internet of things networks,” *Sensors*, vol. 19, p. 4235, 2019. [Online]. Available: <https://www.mdpi.com/1424-8220/19/19/4235>
- [5] T. Pecorella, L. Pierucci, and F. Nizzi, ““network sentiment” framework to improve security and privacy for smart home,” *Future Internet*, vol. 10, no. 12, 2018. [Online]. Available: <http://www.mdpi.com/1999-5903/10/12/125>
- [6] F. Chiti, R. Fantacci, and T. Pecorella, “An optimized multicast scheme for data burst dissemination over satellite links,” *Vehicular Technology, IEEE Transactions on*, vol. 65, no. 11, pp. 9414–9419, Nov 2016.
- [7] T. Pecorella, L. Brillì, and L. Mucchi, “The Role of Physical Layer Security in IoT: A Novel Perspective,” *Information*, vol. 7, no. 3, p. 49, Aug. 2016. [Online]. Available: <http://www.mdpi.com/2078-2489/7/3/49>
- [8] T. Pecorella, L. Ronga, F. Chiti, S. Jayousi, and L. Franck, “Emergency satellite communications: research and standardization activities,” *Communications Magazine, IEEE*, vol. 53, no. 5, pp. 170–177, May 2015.
- [9] R. Fantacci, T. Pecorella, R. Viti, and C. Carlini, “A network architecture solution for efficient IoT WSN backhauling: challenges and opportunities,” *Wireless Communications, IEEE*, vol. 21, no. 4, pp. 113–119, August 2014.
- [10] L. Maccari, R. Fantacci, T. Pecorella, G. Ghattini, and F. Chiti, “Protecting mobile agents communications in pervasive networks with a trusted distributed mediator for id-based rsa,” *Security and Communication Networks*, vol. 7, no. 11, pp. 1887–1899, 2014. [Online]. Available: <http://dx.doi.org/10.1002/sec.903>
- [11] R. Fantacci, T. Pecorella, L. Micciullo, R. Viti, V. Pasquini, and M. Cali, “Old buildings broadband home networks: Technologies and services overview,” *Fiber and Integrated Optics*, vol. 33, no. 3, pp. 184–204, 2014. [Online]. Available: <http://www.tandfonline.com/doi/abs/10.1080/01468030.2014.906687>
- [12] A. Cimmino, T. Pecorella, R. Fantacci, F. Granelli, T. F. Rahman, C. Sacchi, C. Carlini, and P. Harsh, “The role of small cell technology in future smart city applications,” *Transactions on Emerging Telecommunications Technologies*, vol. 25, no. 1, pp. 11–20, 2014. [Online]. Available: <http://dx.doi.org/10.1002/ett.2766>
- [13] T. de Cola, L. Ronga, T. Pecorella, P. Barsocchi, S. Chessa, E. Ferro, A. Gotta, G. Oligeri, F. Potortì, R. Secchi, A. Sathiaselan, V. M. Castro, R. Peral, C. Caini, and R. Firrincieli, “Communications and networking over satellites: Satnex experimental activities and testbeds,” *International Journal of Satellite Communications and Networking*, vol. 27, no. 1, pp. 1–33, 2009. [Online]. Available: <http://dx.doi.org/10.1002/sat.921>
- [14] L. Chisci, R. Fantacci, L. Mucchi, and T. Pecorella, “A queue-based approach to power control in wireless communication networks,” *Wireless Communications, IEEE Transactions on*, vol. 7, no. 1, pp. 128–134, Jan. 2008.

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- [17] R. Fantacci, L. Maccari, T. Pecorella, and F. Frosali, "A secure and performant token-based authentication for infrastructure and mesh 802.1x networks," *Infocom*, 2006. [Online]. Available: [http://www.ieee-infocom.org/2006/Posters/1568980809\\_A%20secure%20and%20performant%20token-based%20authentication/abstract.pdf](http://www.ieee-infocom.org/2006/Posters/1568980809_A%20secure%20and%20performant%20token-based%20authentication/abstract.pdf)
- [18] R. Fantacci, G. Mennuti, and T. Pecorella, "An efficient demand-assign medium access control protocol for high-speed wireless networks," *IEEE Trans. Wireless Commun.*, vol. 4, no. 5, pp. 2591–2599, Sept 2005.
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- [21] R. Fantacci, S. Nannicini, and T. Pecorella, "Performance evaluation of a reservation TDMA protocol for voice/data transmissions in a LEO satellite communication system," *Int. J. Satell. Commun. and Networking*, vol. 21, no. 6, pp. 511–531, Nov./Dec. 2003.
- [22] L. S. Ronga, T. Pecorella, E. Del Re, and R. Fantacci, "A gateway architecture for IP satellite networks with dynamic resource management and DiffServ QoS provision," *Int. J. Satell. Commun. and Networking*, vol. 21, no. 4-5, pp. 351–366, July–October 2003.
- [23] R. Fantacci, F. Chiti, T. Pecorella, and G. Giambene, "Performance evaluation of a virtual queuing channel allocation scheme for microcellular networks," *Telecommunication Systems*, vol. 23, no. 1-2, pp. 35–68, June 2003.
- [24] R. Fantacci, T. Pecorella, G. Giambene, and F. Bossoli, "Stability and performance analysis of a MAC protocol for a time-code air interface in LEO mobile satellite systems," *IEEE Trans. Veh. Technol.*, vol. 52, no. 3, pp. 607–621, May 2003.
- [25] R. Fantacci, S. Nannicini, and T. Pecorella, "Performance evaluation of polling protocols for data transmission on wireless communication networks," *Telecommunication Systems*, vol. 21, no. 1, pp. 9–33, September 2002.

## REFEREED BOOK CHAPTERS

- [1] L. Carlà, F. Chiti, R. Fantacci, and T. Pecorella, "Current and future trends in open source network simulators for wireless systems," in *Modeling and Simulation of Computer Networks and Systems*, M. S. Obaidat, P. Nicopolitidis, and F. Zarai, Eds. Boston: Morgan Kaufmann, 2015, ch. 15, pp. 451 – 464. [Online]. Available: <http://www.sciencedirect.com/science/article/pii/B9780128008874000158>
- [2] F. Chiti, R. Fantacci, and T. Pecorella, "Social sensor networks for transportation management in smart cities," in *Sensor Networks for Sustainable Development*, M. Ilyas, S. S. Alwakeel, M. M. Alwakeel, and e.-H. M. Aggoune, Eds. CRC Press, 2014, ch. 16, pp. 357–378. [Online]. Available: <http://dx.doi.org/10.1201/b17124-22>

- [3] T. Pecorella, R. Fantacci, L. Micciullo, A. Stango, N. Prasad, P. Pacyna, N. Rapacz, and T. Chmielecki, "Security concepts in IPv6 based aeronautical communications," in *Future Aeronautical Communications*, S. Plass, Ed. Rijeka: Intech, 2011, pp. 101–128. [Online]. Available: <http://www.intechopen.com/articles/show/title/security-concepts-in-ipv6-based-aeronautical-communications>
- [4] N. Celandroni, F. Davoli, E. Ferro, A. Gotta, S. Karapantazis, G. Mennuti, A. Morell, T. Pecorella, G. Granados, P. Todorova, and M. A. Vásquez Castro, "Dynamic bandwidth allocation," in *Resource Management in Satellite Networks*, G. Giambene, Ed. Springer, 2007, pp. 207–238. [Online]. Available: [http://dx.doi.org/10.1007/978-0-387-53991-1\\_7](http://dx.doi.org/10.1007/978-0-387-53991-1_7)

## REFEREED CONFERENCE PUBLICATIONS

- [1] L. Mucchi, F. Nizzi, T. Pecorella, R. Fantacci, and F. Esposito, "Benefits of physical layer security to cryptography: Tradeoff and applications," in *2019 IEEE International Black Sea Conference on Communications and Networking (BlackSeaCom)*, June 2019, pp. 1–3.
- [2] F. Nizzi, T. Pecorella, M. Bastianini, C. Cerboni, A. Buzzigoli, and A. Fratini, "The role of network simulator in the 5g experimentation," in *Proceedings of the 2019 Workshop on Next-Generation Wireless with Ns-3*, ser. WNGW 2019. New York, NY, USA: ACM, 2019, pp. 13–17. [Online]. Available: <http://doi.acm.org/10.1145/3337941.3337949>
- [3] F. Nizzi and T. Pecorella, "Protocol prototype implementation using ns-3: A use-case," in *Proceedings of the 2019 Workshop on Next-Generation Wireless with Ns-3*, ser. WNGW 2019. New York, NY, USA: ACM, 2019, pp. 30–33. [Online]. Available: <http://doi.acm.org/10.1145/3337941.3337950>
- [4] F. Nizzi, T. Pecorella, A. Bonadio, F. Chiti, R. Fantacci, D. Tarchi, and W. Cerroni, "FOG-oriented joint computing and networking: the GAUChO project vision," in *2018 AEIT International Annual Conference*, Oct 2018, pp. 1–6.
- [5] F. Nizzi, T. Pecorella, M. Bertini, R. Fantacci, M. Bastianini, C. Cerboni, A. Buzzigoli, M. Gattoni, and A. Fratini, "Evaluation of iot and videosurveillance applications in a 5g smart city: the italian 5g experimentation in prato," in *2018 AEIT International Annual Conference*, Oct 2018, pp. 1–6.
- [6] M. Pennacchioni, M. G. Di Benedetto, T. Pecorella, C. Carlini, and P. Obino, "NB-IoT system deployment for smart metering: Evaluation of coverage and capacity performances," in *2017 AEIT International Annual Conference (2017 AEIT)*, Cagliari, Italy, Sep. 2017.
- [7] C. Rasconà, M. G. Di Benedetto, T. Pecorella, C. Carlini, and P. Obino, "Performance evaluation of LTE in unlicensed bands for indoor deployment of ultra-broadband mobile networks," in *2017 AEIT International Annual Conference (2017 AEIT)*, Cagliari, Italy, Sep. 2017.
- [8] M. Neri, M. G. Di Benedetto, C. Carlini, A. Castellani, P. Obino, P. Sciarratta, and T. Pecorella, "Ultra-broadband mobile networks from LTE-Advanced to 5G: evaluation of massive MIMO and multi-carrier aggregation effectiveness," in *2017 AEIT International Annual Conference (2017 AEIT)*, Cagliari, Italy, Sep. 2017.
- [9] S. Foni, T. Pecorella, R. Fantacci, C. Carlini, P. Obino, and M. G. Di Benedetto, "Evaluation methodologies for the NB-IoT system: issues and ongoing efforts," in *2017 AEIT International Annual Conference (2017 AEIT)*, Cagliari, Italy, Sep. 2017.
- [10] M. Franchi, T. Pecorella, A. Ridolfi, R. Fantacci, and B. Allotta, "Kinematic Constraints and ns-3 Mobility Models: The AUV Issue," in *Proceedings of the Workshop on ns-3*, ser. WNS3 '17. New York, NY, USA: ACM, Jun. 2017, pp. 103–109. [Online]. Available: <http://doi.acm.org/10.1145/3067665.3067673>

- [11] B. Allotta, A. Ridolfi, M. Bianchi, F. Fanelli, J. Gelli, N. Monni, D. Nocciolini, M. Pagliai, and T. Pecorella, "Employment of an Autonomous Underwater Vehicle as mobile bridge among heterogeneous acoustic nodes," in *Oceans'17*, Aberdeen (UK), Jun. 2017, pp. 1–6.
- [12] F. Chiti, R. Fantacci, F. Nizzi, T. Pecorella, and L. Pierucci, "A cooperative spectrum sensing protocol for IEEE 802.15.4m Wide-Area WSNs," in *IEEE ICC 2017 Ad-Hoc and Sensor Networking Symposium (ICC'17 AHSN)*, Paris, France, May 2017, pp. 2419–2424.
- [13] P. Imputato, S. Avallone, and T. Pecorella, "Network emulation support in ns-3 through kernel bypass techniques," in *Proceedings of the 11th EAI International Conference on Performance Evaluation Methodologies and Tools*, ser. VALUETOOLS 2017. New York, NY, USA: ACM, 2017, pp. 259–260. [Online]. Available: <http://doi.acm.org/10.1145/3150928.3150966>
- [14] L. Brilli, T. Pecorella, L. Pierucci, and R. Fantacci, "A novel 6LoWPAN-ND extension to enhance privacy in IEEE 802.15.4 networks," in *Globecom 2016*. IEEE, 345 E 47TH ST, NEW YORK, NY 10017 USA, Dec. 2016, pp. 1–5.
- [15] L. Brilli, T. Pecorella, and L. Mucchi, "Physical layer security for IoT devices configuration and key management - a proof of concept," in *Proceedings of the AEIT Annual Conference*, Oct. 2016.
- [16] L. Brilli, R. Fantacci, T. Pecorella, and T. Ionta, "The effect of video caching on network resource planning - a real-case study," in *Proceedings of the AEIT Annual Conference*, Oct. 2016.
- [17] S. Alshaya, D. Giuli, F. Paganelli, T. Pecorella, and F. Hadi, "Secure SCADA systems for oil industry in Gulf Cooperation Council countries," in *Proceedings of the AEIT Annual Conference*, Oct. 2016.
- [18] —, "Towards a comprehensive strategy in industrial control system security," in *Proceedings of the AEIT Annual Conference*, Oct. 2016.
- [19] V. Rege and T. Pecorella, "A realistic MAC and energy model for 802.15.4," in *Proceedings of the Workshop on ns-3*, ser. WNS3 '16. New York, NY, USA: ACM, Jun. 2016, pp. 79–84. [Online]. Available: <http://doi.acm.org/10.1145/2915371.2915379>
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- [21] R. Viti, L. Brilli, T. Pecorella, and R. Fantacci, "User initiated fast identity switch between LTE UEs," in *2015 AEIT International Annual Conference (AEIT)*, Oct 2015, pp. 1–6.
- [22] T. Pecorella, R. Viti, G. Rigazzi, and C. Carlini, "Application driven son," in *Wireless Communications and Mobile Computing Conference (IWCMC), 2014 International*, Aug 2014, pp. 985–989.
- [23] R. Fantacci, T. Pecorella, R. Viti, and C. Carlini, "Short paper: Overcoming IoT Fragmentation Through Standard Gateway Architecture," in *IEEE World Forum on Internet of Things (WF-IoT)*, 2014, pp. 181–182.
- [24] R. Fantacci, T. Pecorella, R. Viti, C. Carlini, and P. Obino, "Enabling technologies for smart building, what's missing?" in *AEIT Annual Conference, 2013*, Oct 2013, pp. 1–5.
- [25] F. Chiti, R. Fantacci, T. Pecorella, and A. Tassi, "Optimized short message transmission for reliable communications over satellite broadcast channels," in *Globecom 2013*. IEEE, 345 E 47TH ST, NEW YORK, NY 10017 USA, 2013, pp. 1–5.
- [26] L. Bartolozzi, T. Pecorella, and R. Fantacci, "ns-3 RPL module: IPv6 Routing Protocol for Low power and Lossy Networks," in *WNS3 - Workshop on ns-3*. ACM, 6 2012, pp. 359–366. [Online]. Available: <http://dl.acm.org/citation.cfm?id=2263019.2263076>
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- [43] R. Fantacci, T. Pecorella, G. Vannuccini, and G. Vestri, "Performance analysis of a multiple access protocol for voice and data support in broadband wireless LANs," in *Proceedings of VTC 2003 fall*, Oct. 2003.
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