

Cristiano Tapparello

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RESEARCH INTERESTS

Algorithms, analysis, and application of optimization tools to wireless ad hoc and sensor networks and mobile cloud computing systems. Experience, background, and current research include design and optimization of large scale software defined wireless networks; Development of smart and connected healthcare solutions; Ad hoc cloud computing systems; Wireless sensor networks; Machine learning; Software engineering.

EDUCATION

2012: Ph.D. Information Engineering

Department of Information Engineering, University of Padova, Padova, Italy.

Dissertation: "*Design of Cooperative Networking Protocols in Wireless Networks through Stochastic Optimization Techniques.*" Advisor: Prof. Michele Rossi

2008: M.S. Computer Engineering

University of Padova, Padova, Italy.

Dissertation: "*Cooperative Transmission Techniques for Multi-Hop Wireless Ad-Hoc Networks.*" Advisor: Prof. Michele Rossi

2005: B.S. Computer Engineering

University of Padova, Padova, Italy.

Dissertation: "*Development of a J2ME Application for Multifunction Copier Ricoh Aficio*"

PROFESSIONAL EXPERIENCE

08/2019 – Present: Research Assistant Professor

Department of Electrical and Computer Engineering, University of Rochester, Rochester, NY, US.

07/2016 – 07/2019: Research Associate

Department of Electrical and Computer Engineering, University of Rochester, Rochester, NY, US.

01/2014 – Present: Adjunct Instructor

Department of Electrical and Computer Engineering, University of Rochester, Rochester, NY, US.

10/2013 – 06/2016: Postdoctoral Research Associate

Department of Electrical and Computer Engineering, University of Rochester, Rochester, NY, US.

01/2012 – 10/2013: Postdoctoral Research Associate

Department of Information Engineering, University of Padova, Padova, Italy.

05/2011 – 11/2011: Research Associate (Visiting Scholar)

Center for Wireless Communications and Signal Processing Research, New Jersey Institute of Technology (NJIT), Newark, NJ, US.

GRANTS & AWARDS

U01 AA026104-01, “Development and Evaluation of an Evidence-based Mobile Health Caregiver Intervention for FASD,” C. Petrenko, C. Tapparello (Multiple PD/PI).

NIH, \$1,570,489, 07/01/2017 – 05/31/2022. Role: PI.

Support for Distributed Computing and Network Management in Mobile Ad Hoc Networks, W. Heinzelman (PI).

Harris Corp./Empire State Development, \$330,000, 07/01/2015 – 06/30/2020. Role: Co-PI.

Postdoctoral fellowship contract at the University of Padova, Italy, Euro 39,000, 01/2012 – 12/2013.

“Aldo Gini Foundation” (Padova, Italy) scholarship for international research at the New Jersey Institute of Technology (NJIT), Newark, NJ, US. Euro 3,800, 05/2011 – 11/2011.

PhD Scholarship from the Italian Ministry of University and Research (MIUR), 01/2009 – 12/2011.

TEACHING EXPERIENCE

Courses Developed:

“ECE 241 - Signals,” ECE, University of Rochester
Fall 2019

“ECE 245/445 - Wireless Communications,” ECE, University of Rochester (senior/graduate)
Fall 2016 (20 students), Fall 2017 (10 students), Fall 2018 (10 students)

“ECE 448 - Wireless Sensor Networks,” ECE, University of Rochester (graduate)
Spring 2014 (11 students), Spring 2015 (9 students), Spring 2016 (7 students), Spring 2017 (5 students), Spring 2018 (6 students), Spring 2019 (8 students)

Guest Lectures:

“The Evolution of Clustering Protocols for Mobile Ad Hoc and Wireless Sensor Networks,” senior/graduate course “Wireless Communications” held by Prof. Wendi Heinzelman, University of Rochester, NY, US, December 3, 2015.

“Wireless Sensor Networks,” senior/graduate course “Wireless Communications” held by Prof. Wendi Heinzelman, University of Rochester, NY, US, December 1, 2015 and November 25, 2014.

“Mobile Ad Hoc Networks,” senior/graduate course “Wireless Communications” held by Prof. Wendi Heinzelman, University of Rochester, NY, US, November 20, 2014.

“Wireless Sensor Networks: Working with Constrained Platforms,” graduate course “Circuits, Protocols and Applications for Telecommunication Systems” held by Prof. Lorenzo Vangelista, University of Padova, Italy, May 19, 2010.

“Wireless Sensor Networks: How to Program, TinyOS and Synapse++,” graduate course “Wireless Systems and Networks” held by Prof. Michele Rossi, University of Padova, Italy, April 1, 2010.

PROFESSIONAL ACTIVITIES

Member of ACM (2013–Present), IEEE (2004–Present), IEEE Communications Society (2004–Present), IEEE Computer Society (2004–2010)

Chair of the Rochester Chapter of the IEEE Communications Society (2016–Present)

Founder Member and Treasurer of Java User Group (JUG) Padova (2006–Present)

Developer and Maintainer of the Open Source project Network Simulator 3 (ns-3) (2013–Present)

General Co-Chair of the Workshop on Cloud Connected Health (CCH) 2017, in association with IEEE/ACM CHASE 2017

Technical Program Committee member for: Workshop on ns-3 (2015–2018), IEEE ICC (2015–2018), IEEE GLOBECOM (2015–2018), IEEE WCNC (2012,2013,2018), IEEE SECON (2014), IEEE WoWMoM (2010), WiOpt (2009).

Reviewer for the following journals: IEEE Transactions on Communications, IEEE Transactions on Wireless Communications, IEEE Transactions on Green Communications and Networking, IEEE/ACM Transactions on Networking, IEEE Journal on Selected Areas of Communication, IEEE Transactions on Mobile Computing, IEEE Transactions on Vehicular Technology, ACM Transactions on Sensor Networks, Springer Wireless Networks, Elsevier Ad Hoc Networks, MDPI Sensors.

UNIVERSITY OF ROCHESTER SERVICE

Member (2013–2014) and Co-Chair(2015–2016) of the University of Rochester Postdoctoral Association (UR PDA)

SUPERVISED STUDENTS

University of Rochester, Rochester, NY:

Nadir Adam (3rd year Ph.D. student), Utku Demir (3rd year Ph.D. student), George Klimiashvili (B.S. 2020), Veerendra Balchand (B.S. 2020), Jordan Floyd (B.S. 2020), Abrar Rahman Protyasha (B.S. 2021), Aaron Faulkenberry (B.S. 2019), Javon Walker (B.S. 2019), Hoda Ayatollahi (Ph.D. 2018), Alphonse Mugisha (M.S. 2018), Rebecca Van Dyke (M.S. 2018), Avram Webberman (M.S. 2018), Abhishek Singh (M.S. 2018), Abhinanda Dutta (M.S. 2018), Chinenye Tassie (B.S. 2018), Colin Funai (Ph.D. 2017), Justin Fraumeni (B.S. 2017), Ibrahim Akbar (B.S. 2017), Kofi Adu-Manu (Visiting Ph.D. student from University of Ghana), Megha Modak (M.S. 2016), Yuan Xing (M.S. 2016), Teddy Reiss (B.S. 2018), Lauren Kemperman (B.S. 2017), Jean Chakmakas (B.S. 2017), Abner Aquino (B.S. 2016), Shurouq Hijazi (B.S. 2016).

University of Padova, Padova, Italy:

Giovanni Toso (1st year Ph.D. student), Ivano Calabrese (Research Collaborator), Federico Favaro (Research Collaborator), Mario-Emilio Ceconato (M.S. 2013).

LIST OF PUBLICATIONS**Journal Publications**

7. C. Funai, **C. Tapparello**, and W. Heinzelman, "Computational Offloading for Energy Constrained Devices in Multi-hop Cooperative Networks," *IEEE Transactions on Mobile Computing*.
6. H. Ayatollahi, **C. Tapparello** and W. Heinzelman, "MAC-LEAP: Multi-Antenna, Cross Layer, Energy Adaptive Protocol," *Ad Hoc Networks*, Vol. 83, February 2019, pp. 91-110.
5. K. S. Adu-Manu, N. Adam, **C. Tapparello**, H. Ayatollahi and W. Heinzelman, "Energy-Harvesting Wireless Sensor Networks (EH-WSNs): A Review," *ACM Transactions on Sensor Networks*, Vol. 14 Issue 2, July 2018, Article No. 10.
4. K. S. Adu-Manu, **C. Tapparello**, W. Heinzelman, F. A. Katsriku and J.-D. Abdulai, "Water Quality Monitoring Using WSNs: Current Trends and Future Research Directions," *ACM Transactions on Sensor Networks*, Vol. 13, Issue 1, January 2017, Article No. 4.
3. **C. Tapparello**, O. Simeone and M. Rossi, "Dynamic Compression-Transmission for Energy-Harvesting Multihop Networks with Correlated Sources," *IEEE/ACM Transactions on Networking*, Vol. 22, No. 6, December 2014, pp. 1729-1741.
2. P. Casari, **C. Tapparello**, F. Guerra, F. Favaro, I. Calabrese, G. Toso, S. Azad, R. Masiero and M. Zorzi, "Open-source Suites for the Underwater Networking Community: WOSS and DESERT Underwater," *IEEE Network*, S.I. Open Source for Networking: Development and Experimentation, Vol. 28, No. 5, September 2014, pp. 38-46.
1. M. Rossi, **C. Tapparello** and S. Tomasin, "On Optimal Cooperator Selection Policies for Multi-Hop Ad Hoc Networks," *IEEE Transactions on Wireless Communications*, Vol. 10, No. 2, February 2011, pp. 506-518.

Journal Submissions

3. **C. Tapparello**, C. Petrenko, J. Parr, J. Floyd, H. Olson, W. Heinzelman, Z. Duan, "FMF Connect: a Novel Cloud-based mHealth App for Caregivers Raising Children with FASD," in preparation.
2. C. Petrenko, J. Parr, C. Kautz, **C. Tapparello**, and H. Olson, "Development of the Families Moving Forward Connect Mobile Health Intervention for Fetal Alcohol Spectrum Disorders: Qualitative Evaluation of Design and Functionalities," submitted.
1. Y. Xing, **C. Tapparello**, Y. Qian and L. Dong, "Optimal Wireless Transmission to Multiple RF Energy Harvesters using Deep Learning," submitted.

Book Chapters

1. **C. Tapparello**, C. Funai, S. Hijazi, A. Aquino, B. Karaoglu, H. Ba, J. Shi, and W. Heinzelman, "Volunteer Computing on Mobile Devices: State of the Art and Future Research Directions,"

Enabling Real-Time Mobile Cloud Computing through Emerging Technologies, IGI Global, 2015.

Conference and Workshop Publications

21. H. Ayatollahi, **C. Tapparello**, and W. Heinzelman, "Optimizing Multi-antenna Communication in Cluster-based Wireless Networks," IEEE Wireless Communications and Networking Conference (WCNC), Marrakech, Morocco. April 15-18, 2019.
20. N. Adam, **C. Tapparello**, and W. Heinzelman, "Infrastructure vs. Multi-Hop D2D Networks: Availability and Performance Analysis," IEEE International Conference on Computing, Networking and Communications (ICNC), Honolulu, Hawaii, USA. February 18-21, 2019.
19. U. Demir, A. Faulkenberry, **C. Tapparello**, and W. Heinzelman, "Reducing Delay in Group Reformation in WiFi Direct Networks through Redundancy," IEEE GLOBECOM, Abu Dhabi, United Arab Emirates, December 9-13, 2018.
18. H. Ayatollahi, **C. Tapparello**, M. N. Wijesundara and W. Heinzelman, "Energy Conservation in Animal Tracking," IEEE International Conference on Computing, Networking and Communications (ICNC), Maui, Hawaii, USA. March 5-8, 2018.
17. N. Adam, **C. Tapparello**, M. N. Wijesundara and W. Heinzelman, "JumboNet Elephant Tracking Using Delay-Tolerant Routing with Multiple Sinks", IEEE International Conference on Computing, Networking and Communications (ICNC), Maui, Hawaii, USA. March 5-8, 2018.
16. U. Demir, **C. Tapparello**, and W. Heinzelman, "Maintaining Connectivity in Ad Hoc Networks Through WiFi Direct", IEEE Mobile and Ad Hoc Sensor Systems (MASS), Orlando, FL, USA. October 22-25, 2017.
15. Y. Xing and **C. Tapparello**, "Dynamic Fountain Codes for Energy Efficient Data Dissemination in Underwater Sensor Networks," MTS/IEEE OCEANS, Anchorage, AK, USA. September 18-21, 2017.
14. M. Wijesundara, A. Gamage, Y. Gokulan and **C. Tapparello**, "Design of a low-frequency linear motion testbed for electromagnetic kinetic energy harvesters in JumboNet," IEEE National Information Technology Conference (NITC), Colombo, Sri Lanka. September 14-15, 2017.
13. H. Ayatollahi, **C. Tapparello**, and W. Heinzelman, "Reinforcement Learning In MIMO Wireless Networks with Energy Harvesting," IEEE International Conference of Communications (ICC), Paris, France. May 21-25, 2017.
12. C. Funai, **C. Tapparello** and W. Heinzelman, "Enabling Multi-hop Ad Hoc Networks Through WiFi Direct Multi-group Networking," IEEE International Conference on Computing, Networking and Communications (ICNC), Silicon Valley, CA, USA. January 26-29, 2017.
11. M. N. Wijesundara, **C. Tapparello**, A. Gamage, Y. Gokulan, L. Gittelsohn, T. Howard and W. Heinzelman, "Design of a Kinetic Energy Harvester for Elephant Mounted Wireless Sensor Nodes of JumboNet," IEEE GLOBECOM, Washington, DC, USA. December 4-8, 2016.
10. C. Funai, **C. Tapparello** and W. Heinzelman, "Mobile to Mobile Computational Offloading in Multi-hop Cooperative Networks," IEEE GLOBECOM, Washington, DC, USA. December 4-8, 2016.
9. **C. Tapparello**, W. Heinzelman, K. Conn and C. A. Mullen, "ManageMyCondition: A Standard Framework for the Development of Cloud-based Medical Condition Management Applications,"

- IEEE International Workshop on Cloud Connected Health (CCH), Washington D.C., USA. June 27-29, 2016.
8. H. Ayatollahi, **C. Tapparello** and W. Heinzelman, "Transmitter-Receiver Energy Efficiency: A Trade-off in MIMO Wireless Sensor Networks," IEEE Wireless Communications and Networking Conference (WCNC), New Orleans, LA, USA. March 9-12, 2015.
 7. C. Funai, **C. Tapparello**, H. Ba, B. Karaoglu and W. Heinzelman, "Extending Volunteer Computing through Mobile Ad Hoc Networking," IEEE GLOBECOM, Austin, TX, USA. December 8-12, 2014.
 6. **C. Tapparello**, H. Ayatollahi and W. Heinzelman, "Energy Harvesting Framework for Network Simulator 3 (ns-3)," 2nd International Workshop on Energy Neutral Sensing Systems (ENSsys), Memphis, TN, USA. November 6, 2014.
 5. **C. Tapparello**, P. Casari, G. Toso, I. Calabrese, R. Otnes, P. van Walree, M. Goetz, I. Nissen and M. Zorzi, "Performance Evaluation of Forwarding Protocols for the RACUN Network," The 8th ACM International Conference on Underwater Networks and Systems (WUWNet), Kaohsiung, Taiwan. November 11-13, 2013.
 4. D. Altolini, V. Lakkundi, N. Bui, **C. Tapparello** and M. Rossi, "Low Power Link Layer Security for IoT: Implementation and Performance Analysis," IEEE International Wireless Communications and Mobile Computing Conference (IWCMC), Cagliari, Italy. June 1-5, 2013.
 3. **C. Tapparello**, S. Tomasin and M. Rossi, "Online Policies for Opportunistic Virtual MISO Routing in Wireless Ad Hoc Networks", IEEE Wireless Communications and Networking Conference (WCNC), Paris, France. April 1-4, 2012.
 2. **C. Tapparello**, D. Chiarotto, M. Rossi, O. Simeone and M. Zorzi, "Spectrum Leasing via Cooperative Opportunistic Routing in Distributed Ad Hoc Networks: Optimal and Heuristic Policies," Asilomar Conference on Signals, Systems and Computers, Pacific Grove, CA, USA. November 6-9, 2011. (Student Paper Contest Finalist)
 1. **C. Tapparello**, S. Tomasin and M. Rossi, "On Interference-Aware Cooperation Policies for Wireless Ad Hoc Networks," IEEE International Conference on Ultra Modern Telecommunications (ICUMT), Moscow, Russia. October 18-20, 2010.

Conference and Workshop Submissions

3. G. Klimiashvili, **C. Tapparello**, and W. Heinzelman, "LoRa vs. WiFi Ad Hoc: A Performance Analysis and Comparison," in preparation.
2. N. Adam, **C. Tapparello**, and W. Heinzelman, "Performance Evaluation of Wi-Fi Direct Multi-Hop Ad-Hoc Networks," submitted.
1. A. Faulkenberry, U. Demir, **C. Tapparello**, and W. Heinzelman, "Evaluating Methods for Enabling Continuous Operation in Dynamic WiFi Direct Networks," submitted.