

ROGER PIQUERAS JOVER

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EXPERIENCE:

Bloomberg LP

Senior Security Architect and Research Scientist

New York, NY
Sep'15 – Present

- Technology leadership and innovation to improve the security design and implementation of Bloomberg services, technologies and tools.
- Company-wide strategic direction and decision in technology innovation in the areas of mobile security, network security and Machine Learning applied to intrusion detection.
- Corporate network security architecture and strategy, data science applied to network intrusion detection.
- Security architecture design and optimization for Blue Team (SOC), Red Team and Purple Team.
- Security leadership and architecture design/test for corporate, customer and consumer mobile application tools.
- Offensive and defensive security research on Bluetooth, WiFi, LTE, LoRa and other wireless technologies.

AT&T Security Research Center

Principal Member of Technical Staff

New York, NY

Jul'15 – Sep'15

Senior Member of Technical Staff

May'14 – Jul'15

Member of Technical Staff

Dec'10 – May'14

- RF and Software-Radio implementation of advanced LTE PHY protocol aware jamming attacks and defenses.
- Implementation, test, detection and mitigation of LTE MAC/RRC/RLC/Auth signaling overload attacks.
- Analysis and design of 5G mobile core architectures to increase resiliency against control plane signaling overloads and attacks against the mobile network.
- Big data analysis, machine learning and data mining applied to mobile network anomaly and fraud detection.
- RF wireless security research and development/management of the AT&T SRC RF security lab.

Wireless Communications Lab, Columbia University

Researcher

New York, NY

Jun'08 – Dec'10

- Improved the QoS for femtocell network users with respect to other known strategies by designing and implementing innovative RF interference avoidance and cancellation strategies.
- Analyzed the PHY/MAC of 4G (OFDMA, Mobile WiMax) networks and simulated them with Matlab.
- Optimized the subcarrier allocation problem in OFDMA-based networks without bandwidth waste by applying game theory concepts, achieving a simple solution that improves current techniques.

Wireless Circuits and Systems Group, University of California Irvine

Researcher

Irvine, CA

Apr'07 – Jun'08

- Implemented a FFT-based HW real-time wireless channel emulation of MIMO/OFDM WLAN systems.
- Programmed a Xilinx Virtex IV FPGA and simulated wireless channel models of 802.11n/WiFi systems.

Mobile Communications Group, Universitat Politècnica de Catalunya

Researcher

Barcelona, Spain

Feb'05 – Mar'06

- Designed and tested Common Radio Resource Management Strategies for GSM+UMTS+WLAN networks.
- Simulated the designed strategies on the PHY/MAC of GSM/UMTS by means of OPNET software.

EDUCATION:

Columbia University, School of Engineering and Applied Science

M. Phil. (M.S. + PhD Everything But Dissertation) in Electrical Engineering, GPA 4.0

New York, NY

Dec'10

- Relevant coursework: LTE and WiMax networks, Wireless Sensor Networks, RFID, Game Theoretic Models of Operations, Information Theory, Wireless and Mobile Networking

University of California, Irvine

M.S. in Electrical and Computer Engineering, GPA 4.0

Irvine, CA

Jun'08

- Relevant coursework: Communication systems, Digital Communications, Wireless Communications, Digital Signal Processing, Computer Networks, Random Processes, VLSI Design and Advanced Image Processing.

Polytechnic University of Catalonia

Dipl.-Ing. in Telecommunications Engineering, Top 10%

Barcelona, Spain

Mar'06

- Relevant coursework: Digital Communications, Wireless Systems, RF, Antenna Analysis and Design, Radar, Signal Processing, Optical Communications.

ADDITIONAL EXPERIENCE:

Nanotechnology Center For Mechanics in Regenerative Medicine

Nanofabrication Engineer

New York, NY

Jul'09 – Dec'10

- Fabricated nano-elastomeric/PDMS substrates with variable rigidity using electron-beam lithography.
- Characterized PDMS nanofeatures using Agilent G200 Nanoindenter

SKILLS:

Networking: Riverbed/OPNET Modeler, WireShark.

Software: Android, Java, C, Python, Matlab, binary reverse engineering, static analysis tools (Fortify).

Hardware: FPGA (VHDL), GnuRadio, Software-Defined Radios (USRP, HackRF, LimeRF, etc), embedded computers (Raspberry Pi, Arduino), AT&T Mobility Lab (Full Ericsson RAN+EPC lab), Ericsson OSS, Sanjole LTE sniffer, Aeroflex LTE UE emulator, Niksun LTE probe, BreakingPoint-Ixia LTE UE+eNB emulators, RF lab equipment, ARM embedded device development, HW reverse engineering and debugging tools, mobile/HD/RAM/ROM forensics and data recovery.

Radio: HA Technician license – KD2MDK.

Corp security: Windows Active Directory, Windows and Linux host log analysis tools, vulnerability scanners, network pen-testing and ethical hacking, SOC architecture, end-point security, Splunk, computer forensics, hardware forensics, WEKA.

(SELECTED) CONTINUING EDUCATION/TRAINING:

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|--|---------------------|------|
| • Machine Learning with WEKA | FutureLearn | 2018 |
| • Advanced Smartphone forensics | SANS | 2018 |
| • Network Penetration Testing and Ethical Hacking | SANS | 2017 |
| • Security Architecture and Engineering (COMS W4187) | Columbia University | 2013 |
| • Network Security (COMS 4180) | Columbia University | 2011 |

LANGUAGES:

- **Spanish** and **Catalan** (native)
- **German** (fluent, Zentrale Mittelstufenprüfung ZMP June 2006, 8 years of study)

HONORS AND AWARDS:

AT&T Key Contributor Award Mar. 2014

To recognize outstanding individual contributions toward objectives of the organization.

IEEE Transactions on Mobile Computing – Distinguished reviewer Aug. 2013

For reviewers contributing significant amounts of time to reviewing manuscripts and also in the quality of their reviews.

AT&T Key Contributor Award Mar. 2013

To recognize outstanding individual contributions toward objectives of the organization.

AT&T Chief Technology Office Award Mar. 2013

For extraordinary and outstanding achievement within the CTO organization.

AT&T Chief Security Office Quarterly SVP Award Oct. – Dec. 2011

For extraordinary and outstanding achievement in support of CSO's goals.

Balsells Fellowship Sep'06 – Sep'07

Full tuition plus stipend fellowship to pursue graduate studies at the School of Engineering at University of California.

PUBLICATIONS:

- Roger Piqueras Jover, Vuk Marojevic: “*Security and Protocol Exploit Analysis of the 5G Specifications*”. arXiv Technical Report. September 2018. [Under submission]
- MARC LICHTMAN, RAGHUNANDAN M RAO, VUK MAROJEVIC, JEFFREY REED, ROGER PIQUERAS JOVER: “*5G NR Jamming, Spoofing, and Sniffing: Threat Assessment and Mitigation*”. IEEE International Conference on Communications - Workshop on 5G Security 2018 (ICC – 5GSec'18). May 2018.
- ROGER PIQUERAS JOVER: “*Some key challenges in securing 5G wireless networks*”. Response to FCC NOI DA 16-1282 (not peer reviewed). January 2017.
- ROGER PIQUERAS JOVER: “*LTE security, protocol exploits and location tracking experimentation with low-cost software radio*”. arXiv Technical Report (not peer reviewed). July 2016.

- ROGER PIQUERAS JOVER, JOSHUA LACKEY: “*dHSS - Distributed Peer-to-Peer implementation of the LTE HSS based on the Bitcoin/Namecoin architecture*”. IEEE International Conference on Communications - Workshop on 5G Architecture 2016 (ICC – 5GArch’16). May 2016.
- MARC LICHTMAN, ROGER PIQUERAS JOVER, MINA LABIB, RAGHUNANDAN RAO, VUK MAROJEVIC, JEFFREY H. REED: “*LTE/LTE-A Jamming, Spoofing and Sniffing: Threat Assessment and Mitigation*”. IEEE Communications Magazine - Special issue on Critical Communications and Public Safety Networks. April 2016.
- ROGER PIQUERAS JOVER: “*LTE Security and Protocol Exploits*”. ShmooCon 2016. January 2016.
- ROGER PIQUERAS JOVER, ILONA MURYNETS, JEFFREY BICKFORD: “*Detecting malicious activity on smartphones using sensor measurements*”. 9th International Conference on Network and System Security (NSS’15). November 2015.
- ROGER PIQUERAS JOVER, ILONA MURYNETS: “*Connection-less communication of IoT devices over LTE mobile networks*”. IEEE International Conference on Sensing, Communication and Networking (IEEE SECON’15). June 2015.
- JILL JERMYN, ROGER PIQUERAS JOVER, ILONA MURYNETS, MICKHAIL ISTOMIN: “*Scalability of Machine to Machine systems and the Internet of Things on LTE mobile networks*”. IEEE WoWMoM 2015. June 2015.
- ROGER PIQUERAS JOVER, JOSHUA LACKEY, ARVIND RAGHAVAN: “*Enhancing the security of LTE networks against jamming attacks*”. EURASIP Journal on Information Security. April 2014.
- JILL JERMYN, ROGER PIQUERAS JOVER, ILONA MURYNETS, MICKHAIL ISTOMIN: “*Firecycle: A scalable test bed for large-scale LTE security research*”. IEEE International Conference on Communications 2014 (ICC’14). June 2014.
- ILONA MURYNETS, MICHAEL ZABARANKIN, ROGER PIQUERAS JOVER, ADAM PANAGIA: “*Analysis and Detection of SIMbox Fraud in Mobility Networks*”. IEEE Infocom. April 2014.
- PAUL GIURA, ILONA MURYNETS, ROGER PIQUERAS JOVER, YEVGENIY VAHLIS: “*Is It Really You? User Identification via Adaptive Behavior Fingerprinting*”. ACM Conference on Data and Application Security and Privacy (CODASPY’14). March 2014.
- ROGER PIQUERAS JOVER: “*Security Attacks Against the Availability of LTE Mobility Networks: Overview and Research Directions*”. IEEE Global Wireless Summit - Wireless Personal Multimedia Communications Symposium (GWS - WPMC). June 2013.
- ILONA MURYNETS, ROGER PIQUERAS JOVER: “*Analysis of SMS Spam in Mobility Networks*”. International Journal of Advanced Computer Science (IJACSci), Vol. 3 num. 7. July 2013.
- ROGER PIQUERAS JOVER, PAUL GIURA: “*How Vulnerabilities in Wireless Networks Can Enable Advanced Persistent Threats*”. International Journal on Information Technology (IREIT), Vol. 1 num. 2. March 2013.
- ILONA MURYNETS, ROGER PIQUERAS JOVER: “*Anomaly detection in cellular Machine-to-Machine communications*”. IEEE International Conference on Communications 2013 (ICC’13). June 2013.
- ILONA MURYNETS, ROGER PIQUERAS JOVER: “*Crime Scene Investigation: SMS Spam Data Analysis*”. ACM Internet Measurement Conference 2012 (IMC’12), November 2012.
- ILONA MURYNETS, ROGER PIQUERAS JOVER: “*How an SMS-Based Malware Infection Will Get Throttled by the Wireless Link*”. IEEE International Conference on Communications 2012 (ICC’12). June 2012.
- YANZAN SUN, ROGER PIQUERAS JOVER, XIAODONG WANG: “*Uplink Interference Mitigation for OFDMA Femtocell Networks*”. IEEE Transactions on Wireless Communications, Vol.11, No.2, pp.614-625. Feb. 2012.
- ROGER PIQUERAS JOVER, JORDI PÉREZ-ROMERO, ORIOL SALLEN, RAMÓN AGUSTÍ: “*Dynamic Pricing for Decentralized RAT Selection in Heterogeneous Scenarios*”. In the Proceedings of 2006 IEEE 17th International Symposium on Personal, Indoor and Mobile Radio Communications (PIMRC’06). September 2006.
- ROGER PIQUERAS JOVER: “*Analysis and Design of New Initial RAT Selection Strategies Based on Pricing and Path Loss for Heterogeneous Wireless Networks GSM/EDGE/UMTS*”. Final research project for the degree of Telecommunications Engineering Dipl.-Ing., Universitat Politècnica de Catalunya, March 2006.

BOOKS:

- (Book chapter) “*Applying low-cost software radio for experimental analysis of LTE security, protocol exploits and location leaks*”. Intrusion Detection and Prevention for Mobile Ecosystems - Taylor & Francis LLC, CRC Press. Summer 2017.
- (Book chapter) “*Security and impact of the IoT on LTE mobile networks*”. Security and Privacy in Internet of Things (IoT): Models, Algorithms, and Implementations - Taylor & Francis LLC, CRC Press. Winter 2015.

OTHER PUBLICATIONS:

- ROGER PIQUERAS JOVER, TERESA FAZIO, SHALOM WIND: “*Variable Rigidity PDMS Structures*”, in The Gordon Research Conference on Nanostructure Fabrication, July 2010, Tilton, NH.

- ROGER PIQUERAS JOVER, TERESA FAZIO, SHALOM WIND: "*Biocompatible Surfaces with Locally Variable Rigidity*", in The 54th International Conference on Electron, Ion and Photon Beam Technology and Nanofabrication, EIPBN. June 2010, Anchorage, AK.

PATENTS:

- CRYPTOGRAPHICALLY SIGNING AN ACCESS POINT DEVICE BROADCAST MESSAGE. US Patent US9860067B2, filed October 2015.
- METHOD AND APPARATUS FOR COMMUNICATING NETWORK MANAGEMENT TRAFFIC OVER A NETWORK. US Patent US9729197 B2, filed October 2015.
- METHOD AND APPARATUS FOR ENCRYPTION OF COMMUNICATIONS OVER A NETWORK. US Patent US9769128 B2, filed September 2015.
- METHOD AND APPARATUS FOR ENCRYPTION OF COMMUNICATIONS OVER A POWER LINE NETWORK. US Patent Application PCT/US2016/050039, filed September 2016. Patent pending.
- METHODS AND APPARATUS TO TRANSMIT DATA IN A CONNECTIONLESS MODE. US Patent US9832790B2, filed September 2015.
- METHOD AND APPARATUS FOR DISTRIBUTING SOFTWARE UPDATES. US Patent US9904535B2, filed September 2015.
- METHOD AND APPARATUS FOR COMMUNICATIONS MANAGEMENT IN A NEIGHBORHOOD NETWORK. US Patent US9735833 B2, filed July 2015.
- METHOD AND APPARATUS FOR AUTHENTICATION AND IDENTITY MANAGEMENT OF COMMUNICATING DEVICES. US Patent US9820146 B2, filed June 2015.
- SIGNAL FINGERPRINTING FOR AUTHENTICATION OF COMMUNICATING DEVICES. US Patent US9913139B2, filed June 2015.
- METHOD AND APPARATUS FOR PROVIDING SECURITY USING NETWORK TRAFFIC ADJUSTMENTS. US Patent US9667317 B2, filed June 2015.
- DECENTRALIZED AND DISTRIBUTED SECURE HOME SUBSCRIBER SERVER DEVICE. US Patent US9667600 B2, filed April 2015.
- SECURITY ENHANCEMENTS FOR A SOFTWARE-DEFINED NETWORK WITH NETWORK FUNCTIONS VIRTUALIZATION. US Patent US9742807 B2, filed November 2014.
- ENDPOINT DEVICE ANTENNA BEAM FORMING BASED JAMMING DETECTION AND MITIGATION. US Patent US9288007 B2, filed November 2013.
- BASE STATION ANTENNA BEAM FORMING BASED JAMMING DETECTION AND MITIGATION. US Patent Application US20150138992 A1, filed November 2013.
- METHOD AND APPARATUS FOR PROVIDING BROADCAST CHANNEL ENCRYPTION TO ENHANCE CELLULAR NETWORK SECURITY. US Patent US 9,119,064 B2, filed November 2013.
- MALWARE AND ANOMALY DETECTION VIA ACTIVITY RECOGNITION BASED ON SENSOR DATA. United States Patent US 9,295,028 B2, filed November 2013.
- DETECTION AND MITIGATION OF DENIAL-OF-SERVICE ATTACKS IN WIRELESS COMMUNICATION NETWORKS. United States Patent US 9,295,028 B2, filed October 2013.
- SYNCHRONIZING MOBILE DEVICES AND DISPLAYS. US Patent US 8,915,441 B2, filed October 2012.
- SHORT MESSAGE SERVICE SPAM DATA ANALYSIS AND DETECTION. United States Patent US 13/539,675, filed July 2012.
- METHOD AND APPARATUS FOR RANKING APPS IN THE WIDE-OPEN INTERNET. US Patent Application US20140006418 A1, filed July 2012.
- METHOD AND APPARATUS FOR DERIVING AND USING TRUSTFUL APPLICATION METADATA. United States Patent US9449104 B2, filed July 2012.
- METHOD AND APPARATUS FOR SEARCHING FOR SOFTWARE APPLICATIONS. US Patent Application US20140006440 A1, filed July 2012.
- METHOD AND APPARATUS FOR ROBUST MOBILE APPLICATION FINGERPRINTING. US Patent Application US20140006375 A1, filed July 2012.
- 12 more patent applications filed pending to be published.

TUTORIALS, SERVICE AND EDITORIAL:

- ELSEVIER Future Generation Computer Systems: Special issue on Advancements in 5G Network Security – Co-guest editor.
- (Tutorial) LTE and 5G protocol security procedures and vulnerability analyses using software radio testbeds – 2018 IEEE Conference on Military Communications (IEEE MILCOM).

- Invited panelist: Physical-layer security for future emerging networks: challenges and limitations - 2016 IEEE International Conference on Communications (IEEE ICC) – Workshop on Wireless Physical Layer Security
- LTE Mobility Security and Virtualization Tutorial – 2016 IEEE International Conference on Communications (IEEE ICC'16)
- Member of the IEEE Communications Society Industry Relation task force.
- Journal of Cyber Security and Mobility: Special issue on Next generation mobility network security – Guest Editor.

PROGRAM COMMITTEE:

- IEEE Conference on Communications and Network Security (IEEE CNS) – TPC member - 2019
- IEEE Wireless Communications and Networking Conference (IEEE WCNC) - TPC member – 2019.
- 1st IEEE Workshop on 5G Wireless Security (5G-SECURITY) – TPC member – 2018.
- International Symposium on Security and Privacy on the Internet of Things – TPC member – 2017, 2018.
- IEEE Aalborg 5G Summit – TPC Co-Chair - 2016
- 2016 IEEE Sarnoff Symposium – Demo/Exhibit Chair – 2016.
- IEEE 5G Summit Bay Area – TPC Co-Chair - 2015
- IEEE 5G Summit Toronto – TPC Co-Chair - 2015
- 2nd IEEE Workshop on Software Defined 5G Networks (Soft5G) – TPC member - 2016
- The 36th IEEE Sarnoff Symposium – TPC member - 2015
- IEEE International 5G Summit – Organizing committee, program co-chair – 2015
- Int. Conf. on Emerging Security Systems and Technologies (SECUREWARE) – TPC member - 2015
- IEEE Workshop on Data Analysis for Social and Secure Smartphone Applications – TPC member - 2014
- Global Wireless Summit – Wireless Vitae – TPC member – 2014
- All Things Cellular – Sigcomm workshop (previously CellNet) – TPC member – 2014
- International Conference on Internet Monitoring and Protection – TPC member - 2013, 2014, 2015
- IEEE GWS - Wireless Personal Multimedia Communications Symposium (WPMC'13) – Session chair

REVIEWER:

- IEEE Transactions on Wireless Communications
- IEEE Transactions on Mobile Computing (2013 Distinguished Reviewer)
- IEEE Transactions on Vehicular Technology
- IEEE Communications Letters
- IEEE/ACM Transactions on Networking
- IEEE Wireless Communications Magazine
- IEEE Internet of Things Journal
- Elsevier Ad-Hoc Networks Journal
- Wiley Wireless Communications and Mobile Computing
- Wiley International Journal of Communication Systems
- Conferences: WiSec, Sigmetrics, ICC, ICASSP, WCNC, Milcom, IEEE S&P, USENIX Security

SELECTED TALKS:

- *Exploring LTE security with open-source tools, testing protocols exploits and analyzing their potential impact on 5G mobile networks.* Virginia Tech Hume Center. November 2018.
- *LTE and 5G Security Analysis.* Seminar at the FCC. July 2018.
- *Protocol-fuzzing LTE Mobile Networks with Open-Source Tools, Testing Protocol Exploits and Analyzing Their Potential Impact on 5G Mobile Networks.* HushCon East. June 2018.
- *LTE and 5G protocol security.* UC Irvine. May 2018.
- *LTE security, protocol exploits and location tracking experimentation with low-cost software radio.* Hacker Halted. September 2016.
- *LTE protocol exploits: IMSI catchers, blocking devices and location leaks.* TakeDownCon. June 2016.
- *LTE Security and Protocol Exploits.* ShmooCon 2016. January 2016.

- *LTE protocol exploits and control plane signaling scalability*. Ericsson Research. November 2015.
- *Security Threats and Challenges of the IoT Over Mobile Networks*. International Wireless Industry Consortium workshop on IoT. November 2015.
- *An overview of Wireless and Mobile Network Security*. Intel Labs. June 2015.
- *Security Analysis and Design in LTE using Simulation Modeling*. Riverbed/OPNET Modeler User Conference. February 2015.
- *Security Attacks Against the Availability of LTE Mobility Networks: Overview and Research Directions*. IBM NY Thomas J. Watson Research Center. Summer 2014.
- *Security Attacks Against the Availability of LTE Mobility Networks: Overview and Research Directions*. Telefonica Research. June 2014.
- *Next-generation Mobility Security Architecture Research Testbed*. 15th Annual AT&T Cyber Security Conference. September 2013.
- *SMS spam data analysis and detection*. 2nd Annual AT&T Mobility and Security Research Workshop. October 2012.

TEACHING:

- | | | |
|-----------------------------------|---------------------------------|--------------------------|
| • Digital Communications I and II | University of California Irvine | Spring'07 and Winter'08. |
| • VLSI Circuit Design | University of California Irvine | Fall'07 |
| • Digital Communications | Columbia University | Fall'08 |
| • Random Signals and Noise | Columbia University | Spring'09 |
| • Information Theory | Columbia University | Spring'10 |

MEMBERSHIPS AND ACTIVITIES:

- Professional memberships: IEEE, IEEE ComSoc, IEEE Internet of Things technical community, IEEE Cybersecurity technical community, ACM, Sigcomm, Sigmobility.
- Activities: Soccer player, fervent FC Barcelona supporter, movie and music enthusiast, food lover, traveler, runner around the Reservoir in Central Park, fatherhood.

IMMIGRATION STATUS:

- US Permanent Resident