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Personal information

Surname(s) / First name(s)	**Riccardo Spolaor, Ph.D.**
Address(es)	N3 Floor, Shandong University, 72 Binhai Highway, Qingdao, Shandong, RPC
Telephone(s)	+39 3498435503 Italy - +86 15725238986 China
Email(s)	`riccardo.spolaor[at]outlook[dot]com`
Nationality, Birthdate, Gender	Italian, October 10 1986, Male

Current position

Occupation or position held	Assistant Professor
Affiliation	School of Computer Science and Technology, Shandong University, Qingdao Campus, RPC

Previous position

Occupation or position held	Research Associate
Affiliation	Department of Computer Science, University of Oxford, United Kingdom

Selected Publications*

Mauro Conti, QianQian Li, Alberto Maragno, and Riccardo Spolaor. *"The Dark Side(-Channel) of Mobile Devices: A Survey on Network Traffic Analysis."* In **(IEEE) Communications Surveys & Tutorials**, 2018. (JCR IF 2017: 17.188)

Riccardo Spolaor, Elia Dal Santo, and Mauro Conti. *"DELTA: Data Extraction and Logging Tool for Android."* In **(IEEE) Transactions on Mobile Computing**, 2018. (JCR IF 2016: 3.822)

Vincent F. Taylor, Riccardo Spolaor, Mauro Conti and Ivan Martinovic. *"Robust Smartphone App Identification Via Encrypted Network Traffic Analysis."* In **(IEEE) Transactions on Information Forensics & Security**, 2018. (JCR IF 2016: 4.332)

Mauro Conti, Luigi V. Mancini, Riccardo Spolaor, and Nino Vincenzo Verde, *"Analyzing Android Encrypted Network Traffic to Identify User Actions."* In **(IEEE) Transactions on Information Forensics & Security**, 2016. (JCR IF 2013: 2.065)

Riccardo Spolaor, Laila Abudahi, Veelasha Moonsamy, Mauro Conti, and Radha Poovendran, *"No Free Charge Theorem: a Covert Channel via USB Charging Cable on Mobile Devices."* In Proceedings of the 15th International Conference on Applied Cryptography and Network Security **(ACNS 2017)**, 2017.
Also to be presented at **BlackHat Europe Briefings 2018**.

Merylin Monaro, Chiara Galante, Riccardo Spolaor, QianQian Li, Luciano Gamberini, Mauro Conti, Giuseppe Sartori. *"Covert lie detection using keyboard dynamics."* In **(Nature) Scientific reports** 8 (1), 2018. (JCR IF 2017: 4.259)

Education and training

Title of qualification awarded	Ph.D. in Brain, Mind and Computer Science
Place and Date	University of Padua, Italy, 2014 – 2018

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*Please refer to "Publications" section for details about the authorship roles.

Ph.D. thesis title	Security and Privacy Threats on Mobile Devices through Side-Channels Analysis
Advisor	Prof. Mauro Conti
Co-Advisors	Prof. Luciano Gamberini and Prof. Giuseppe Sartori
Teaching activities	Teaching Assistant in Mobile System Security (MSS) course at University of Oxford – Academic Year 2018/19
	Teaching Assistant in Database BS course at University of Padua – Academic Years 2014/15, 2015/16, 2016/17, and 2017/18
Title of qualification awarded	MSc in Computer Science – Degree mark: 110/110
Place and Date	University of Padua, Italy, 2011 – 2014
MSc thesis title	Can't you hear me knocking - Identifying smartphone user actions with apps via traffic analysis
Advisor	Prof. Mauro Conti
Activities and marks	Computers Network Security - 30/30 with honors;
	Temporal Reasoning – 30/30 with honors;
	Constraint Programming – 30 /30 with honors;
	Wireless Networks - 30/30;
	Hypermedial Systems – 29/30;
	Artificial Intelligence – 28/30;
	Combinatorial Optimization – 28/30;
	Bioinformatics – 28/30.
Title of qualification awarded	BSc in Computer Science – Degree mark: 100/110
Place and Date	University of Padua, Italy, 2006 – 2011
BSc thesis title	walkingPH: a multi-purpose CRM mobile application with integrated sales management
Advisor	Prof. Tullio Vardanega
Title of qualification awarded	High school certificate in Electronic and Telecommunications - Degree mark: 96/100
Place and Date	I.T.I.S. Primo Levi, Mirano (Venice), Italy, 2000 – 2005

Publications

Since some work has been published with the authors in alphabetical order, the role in the works has been clarified the **first author**[†] and the **only corresponding author**[‡]. These information can be easily corroborated by the other authors.

Journals

[J06] Mauro Conti, QianQian Li, Alberto Maragno, Riccardo Spolaor[‡]. *"The Dark Side(-Channel) of Mobile Devices: A Survey on Network Traffic Analysis."* In (IEEE) Communications Surveys & Tutorials, 2018. (JCR IF 2017: 17.188)

[J05] Merylin Monaro, Chiara Galante, Riccardo Spolaor, QianQian Li, Luciano Gamberini, Mauro Conti, Giuseppe Sartori. *"Covert lie detection using keyboard dynamics."* In (Nature) Scientific reports 8 (1), 2018.
(JCR IF 2017: 4.259)

[J04] Riccardo Spolaor[††], Elia Dal Santo, and Mauro Conti. *"DELTA: Data Extraction and Logging Tool for Android."* In (IEEE) Transactions on Mobile Computing, 2018.
(JCR IF 2016 : 3.822)

[J03] Vincent F. Taylor, Riccardo Spolaor, Mauro Conti and Ivan Martinovic. *"Robust Smartphone App Identification Via Encrypted Network Traffic Analysis."* In (IEEE) Transactions on Information Forensics & Security, 2018.

[†] First author.
[‡] Only corresponding author.

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(JCR IF 2016: 4.332)

[J02] Riccardo Spolaor[†‡], QianQian Li, Merylin Monaro, Mauro Conti, Luciano Gamberini, and Giuseppe Sartori, *"Biometric Authentication Methods on Smartphones: A Survey."* In Psychology Journal, 2017.

[J01] Mauro Conti, Luigi V. Mancini, Riccardo Spolaor[†‡], and Nino Vincenzo Verde, *"Analyzing Android Encrypted Network Traffic to Identify User Actions."* In (IEEE) Transactions on Information Forensics & Security, 2016.
(JCR IF 2013: 2.065)

Conferences and Workshops

[C17] Bushra Alahmadi, Enrico Mariconti, Riccardo Spolaor[‡], Gianluca Stringhini, and Ivan Martinovic, , *"BOTection: Bot Detection by Building Markov Chain Models of Bots Network Behavior."* In Proceedings of 15th ACM ASIA Conference on Computer and Communications Security (ACM ASIACCS 2020), Taipei, Taiwan, June 1-5, 2020. (to appear).

[C16] Michael Piskozub, Riccardo Spolaor, and Ivan Martinovic, *"CompactFlow: A Hybrid Binary Format for Network Flow Data."* In Proceedings of The 13th IFIP International Conference on Information Security Theory and Practice (WISTP 2019), Paris, France, December 11-12, 2019. (to appear).

[C15] Michael Piskozub, Riccardo Spolaor[‡], Mauro Conti, and Ivan Martinovic, *"On the Resilience of Network-based Moving Target Defense Techniques Against Host Profiling Attacks."* In Proceedings of The 6th ACM Workshop on Moving Target Defense (ACM CCS 2019 workshop: MTD 2019), London, UK, November 11, 2019.

[C14] Hao Li, Zhenxiang Chen, Riccardo Spolaor, Qiben Yan, Chuan Zhao, Bo Yang and Lizhi Peng, *"DART: Detecting Unseen Malware Variants Using Adaptation Regularization Transfer Learning."* In Proceedings of IEEE International Conference on Communications (ICC), Shanghai, China. May 20-24, 2019.

[C13] Michael Piskozub, Riccardo Spolaor[‡], and Ivan Martinovic, *"MalAlert: Detecting Malware in Large-Scale Network Traffic Using Statistical Features."* In Proceedings of ACM Workshop on AI in Networks (WAIN), Toulouse, France. December 5-7, 2018. **Awarded with the Best Paper Award**

[C12] Merylin Monaro, Marta Businaro, Riccardo Spolaor, Qian Qian Li, Mauro Conti, Luciano Gamberini, and Giuseppe Sartori, *"The Online Identity Detection via Keyboard Dynamics."* In Proceedings of IEEE Future Technologies Conference (FTC 2018), Vancouver, Canada. November 13-14, 2018.

[C11] Shanshan Wang, Qiben Yan, Zhenxiang Chen, Lin Wang, Riccardo Spolaor, Bo Yang, and Mauro Conti, *"Lexical Mining of Malicious Urls for Classifying Android malware".* In Proceedings of International Conference on Security and Privacy in Communication Networks (SecureComm 2018), Singapore, Singapore. August 8-10, 2018

[C10] Lorenzo Bordoni, Mauro Conti, and Riccardo Spolaor[‡], *"Mirage: Toward a Stealthier and Modular Malware Analysis Sandbox for Android."* n Proceedings of the European Symposium on Research in Computer Security (ESORICS 2017), Oslo, Norway. September 11-13, 2017.

[C09] Merylin Monaro, Riccardo Spolaor[‡], Qianqian Li, Mauro Conti, Luciano Gamberini and Giuseppe Sartori. "Type Me the Truth! Detecting Deceitful Users via Keystroke Dynamics." In Proceedings of the 6th International Workshop Cyber Crime (ARES 2017 workshop: IWCC 2017), Reggio Calabria, Italy, August 29 - September 1, 2017.

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[C08] Riccardo Spolaor[†‡], Laila Abudahi, Veelasha Moonsamy, Mauro Conti, and Radha Poovendran, *"No Free Charge Theorem: a Covert Channel via USB Charging Cable on Mobile Devices."* In Proceedings of the 15th International Conference on Applied Cryptography and Network Security (ACNS 2017), Kanazawa, Japan, July 10-13, 2017.

[C07] Riccardo Spolaor[†‡], Merylin Monaro, Pasquale Capuozzo, Marco Baesso, Mauro Conti, Luciano Gamberini, and Giuseppe Sartori, *"You Are How You Play: Authenticating Mobile Users via Game Playing."* In Proceedings of the the second international Workshop on Communication Security (EUROCRYPT 2017: workshop WCS 2017), Paris, France, April 30 - 4 May, 2017.

[C06] Maddalena Favaretto, Riccardo Spolaor[‡], Mauro Conti and Marco Ferrante, *"You Surf So Strange Today: Anomaly Detection in Web services via HMM and CTMC."* In Proceedings of The 12th International Conference on Green, Pervasive and Cloud Computing (GPC 2017), Cetara, Amalfi Coast, Italy, May 11-14, 2017.

[C05] Mauro Conti, Claudio Guarisco, and Riccardo Spolaor[‡], *"CAPTCHaStar! A Novel CAPTCHA Based on Interactive Shape Discovery."* In Proceedings of the 14th International Conference on Applied Cryptography and Network Security (ACNS 2016), London (Guildford), UK, June 19-22, 2016. *(acceptance rate 19.12 %)*

[C04] Mauro Conti, Michele Nati, Enrico Rotundo, and Riccardo Spolaor[‡], *"Mind The Plug! Laptop-User Recognition Through Power Consumption."* In Proceedings of the 2016 International Workshop on IoT Privacy, Trust, and Security (ACM AsiaCCS 2016 workshop: IoTPTS 2016), Xi'an, China, May 30 - June 3, 2016.

[C03] Valeriu-Daniel Stanciu, Riccardo Spolaor, Mauro Conti, and Cristiano Giuffrida, *"On the Effectiveness of Sensor-enhanced Keystroke Dynamics Against Statistical Attacks."* In Proceedings of the 6th ACM Conference on Data and Application Security and Privacy (ACM SIGSAC CODASPY 2016), New Orleans, LA, USA, March 9-11, 2016. *(acceptance rate 19.13 %)*

[C02] Vincent F. Taylor, Riccardo Spolaor, Mauro Conti, and Ivan Martinovic, *"App-Scanner: Automatic Fingerprinting of Smartphone Apps From Encrypted Network Traffic."* In Proceedings of the 1st IEEE European Symposium on Security and Privacy (IEEE EuroSP 2016), Saarbrücken, Germany, March 21-24, 2016. *(acceptance rate 17.26%)*

[C01] Mauro Conti, Luigi V. Mancini, Riccardo Spolaor[†‡], and Nino Vincenzo Verde, *"Can't you hear me knocking: Identification of user actions on Android apps via traffic analysis."* In Proceedings of the 5th ACM Conference on Data and Application Security and Privacy (ACM SIGSAC CODASPY 2015), San Antonio, TX, USA, March 2-4, 2015. *(acceptance rate 21.00%)*

Hacking Conferences

[H01] Riccardo Spolaor[§†‡], Riccardo Bonafede, Veelasha Moonsamy, and Mauro Conti *"No Free Charge Theorem 2.0: How to steal private information from a mobile device using a powerbank"*, In BlackHat Europe Briefings '18, London, UK, December 4-7, 2018.

Patents

[P01] Mauro Conti, Claudio Guarisco and Riccardo Spolaor, *"METHOD FOR RECOGNIZING IF A USER OF AN ELECTRONIC TERMINAL IS A HUMAN OR A ROBOT"*, US Patent App. 15/535,390, First prize at Notte dei Brevettatori 2015, Padua.

Submitted papers

[S03] Bushra Alahmadi, Enrico Mariconti, Riccardo Spolaor, Gianluca Stringhini, and Ivan Martinovic, *"BOTection: Bot Detection by Building Markov Chain Models of Bots Network Behavior."* Submitted.

[§]Speaker

[S02] Anli Yan, Zhenxiang Chen, Riccardo Spolaor, Shuaishuai Tan, Chuan Zhao, Lizhi Peng, and Bo Yang, *"Updating Models of Network-Based Malware Detection via Incremental Learning."* Submitted.

[S01] Hao Li, Kun Ma, Riccardo Spolaor, Zhenxiang Chen, Qiben Yan, and Bo Yang, *"NBADroid: Network Behavior Analysis to Detect Unseen Malware Variants for Android."* Submitted.

Project Proposal Writing

Experience in writing national and international research projects.

"MindMe: Machine Learning and Recognition for User Authentication by Behavioral Biometrics", with University of Padua (Italy) and University of Surrey (UK), Call: Samsung Global Research Outreach, 2014.

"FLIGHTPlus: Improving Flight Situation-awareness and Security", University of Padua (Italy), University of Bordeaux (France), University of Oxford (UK), and Cyberens (France), Call: European Community Funding Horizon2020, 2015.

"THASP: Advanced Threat-Awareness System for Secure Societies via Privacy-Aware People Profiling", with University of Padua (Italy), CNR: National Center of Research (Italy), University of Milan (Italy), and Sapienza University of Rome (Italy), Call: Italian PRIN: Research Projects of National Interest, 2016-17.

Contribution to the Scientific Community

Program Committee Co-Chair of the EdgeSP workshop 2019 (co-located with SEC 2019).

Program Committee member of STM workshop 2019 (co-located with ESORICS 2019), and ACNS 2020.

Member of the Editorial Board of Frontiers Journal in Big Data.

Reviewer for international journals in the area of computer science, among which (IEEE) Transactions on Information Forensics & Security, (IEEE) Transactions on Mobile Computing, (IEEE) Communications Surveys & Tutorials, (IEEE) Transactions on Industrial Electronics, (IEEE) Transactions on Network and Service Management, Frontiers (Editorial Board Member), (ACM) Transactions on Privacy and Security (TOPS), (KSII) Transactions on Internet and Information Systems, (Elsevier) Computer Communications, and Security & Privacy magazine.

Reviewer and sub-reviewer for conferences in the area of computer network security, among which CCS, NDSS, USENIX Security, WWW, ACNS, AsiaCCS, ESORICS, CNS, CCPS, DIMVA, INFOCOM, NSS, PoPETS, CocoNet, ICC, SACMAT, SHPCS SpaIoT, Trustcom, WIFS, WiSec, and WISTP.

Participation to Scientific Events

International Summer School on Smart & Mobile Device Security and Privacy, Padua (Italy), 2-6 September, 2019. Speaker.

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International Summer School on Smart & Mobile Device Security and Privacy, Padua (Italy), September, 2014. Participant and Volunteer.

CLUSIT security summit, Milan (Italy), March, 2015. Authot of the thesis winner of the fifth place and co-author (with Claudio Guardisco as first author) of the thesis winner of the first place of CLUSIT best thesis award prize. Author and Speaker.

Workshop on Contextual security. Aalto University, Helsinki (Finland), 2nd December, 2015. Author.

Post-Snowden Cryptography. Brussels (Belgium), December, 2015. Participant.

1st IEEE European Symposium on Security and Privacy (EuroSP 2016), Saarbrucken (Germany), 21st-24th March, 2016. Author.

2nd International Workshop on IoT Privacy, Trust, and Security (IoTPTS 2016) and AsiaCCS 2016. Xidian University, Xi'an (China), 28th May - 5th June, 2016. Author and Speaker.

14th International Conference on Applied Cryptography and Network Security (ACNS 2016), Guildford (UK), 19th - 22nd June, 2016. Author and Speaker.

International Summer School on Social Networks Security, Privacy, and Trust (SNSPT 2016), Padua (Italy), 4th-9th September, 2016, Participant.

5th International Workshop on Symbiotic Interaction, Padua (Italy), 29th-30th September, 2016. Participant and Poster presenter.

2nd IEEE European Symposium on Security and Privacy (EuroSP 2017), Paris (France), 26th-29th April, 2017. Participant.

2nd Workshop on Communication Security (WCS 2017), Paris (France), 30th April, 2017. Author and Speaker.

15th International Conference on Applied Cryptography and Network Security (ACNS 2017), Kanazawa (Japan), 10th-12th July, 2017. Author and Speaker.

12th International Conference on Availability, Reliability and Security (ARES 2017), Reggio Calabria (Italy), 29th August - 1st September, 2017. Author.

22nd European Symposium on Research in Computer Security (ESORICS 2017), Oslo (Norway) on 11th-13th September, 2017. Author and Speaker.

3rd IEEE European Symposium on Security and Privacy (EuroSP 2018), London (UK), 24th-26th April, 2018. Participant.

BlackHat Europe, London (UK), 4th-7th December, 2018. Author and Speaker.

Visiting periods

Host organization	Shandong University, Qingdao (RPC)
Host supervisor	Prof. Xiuzhen Cheng
Duration	28th December 2018 - 11th January, 2019
Host organization	University of Jinan, Jinan, (RPC)
Host supervisor	Prof. Zhenxiang Chen

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Duration	10th September, 2018 - 14th September, 2018
Host organization	University of Oxford, Oxford (UK)
Host supervisor	Prof. Ivan Martinovic
Duration	13th January, 2018 - 17th July, 2018
Host organization	University of Oxford, Oxford (UK)
Host supervisor	Prof. Ivan Martinovic
Duration	10th April, 2017 - 03rd August, 2017
Host organization	Ruhr-Universität Bochum, Bochum (Germany)
Host supervisor	Prof. Christina Popper
Duration	21st - 28th August, 2016
Host organization	University of Oxford, Oxford (UK)
Host supervisor	Prof. Ivan Martinovic
Duration	7th - 29th June, 2016
Host organization	Radboud University, Nijmegen (The Netherlands)
Host supervisor	Prof. Lejla Batina
Duration	3rd-15th December, 2015

Work experience

Date	2011
Occupation or position held	Software designer and developer
Company	Sintesi SAS, Via Salemi n.5, Mestre (VE), Italy
Date	2009 – 2010
Occupation or position held	Computers and CD/DVD duplicator technician
Company	EuropaLink, Via Mons. Oddo Stocco 6, Salzano (VE) Italy
	`http://www.europalink.net`
Date	2006 – 2010
Occupation or position held	Promoter Epson specialist (on-call contact)
Company	INSTORE s.r.l., Via Visconti di Modrone Uberto 2 - 20122 Milano, Italy
	`http://www.in-store.it`

Personal skills and competences

Mother tongue(s)	**Italian**
Other language(s)	English, French, and Chinese

Self-assessment *European level*(*)	Understanding		Speaking		Writing
	Listening	Reading	Spoken interaction	Spoken production	
English	C2	C2	C1	C1	C2
French	A2	A2	A2	A1	A1
Chinese	A1	A1	A1	A1	A1

(*)*Common European Framework of Reference (CEF) level*

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Computer skills and competences	Application developer for Android OS and with SQLite. Deep knowledge of Computer Network Security, in particular User Authentication and Privacy. Knowledge of programming languages such as C, C++, Java, HTML, CSS, XML, Javascript, Php, Perl, Python, Matlab /Octave, SQL, Ruby. Experience with Machine Learning libraries for such as TensorFlow, mlpy, scikit.learn and scipy for Python, and QT and CPLEX for C++. Knowledge of software versioning and source control as Git and SVN. Experiences on analysis, design and usage of Artificial Intelligence, Constraints Programming and Machine Learning algorithms. In particular on unsupervised clustering and supervised classification algorithms. Practice knowledge of the computer hardware architecture. Basic knowledge of concurrent and distributed programming.
Sports Practiced	Swimming, Rugby, and Tae-kwon do
Driving licence(s)	Italian B

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