

# CURRICULUM VITAE - DR FABIO PIERAZZI

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## RESEARCH INTERESTS

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Dr Fabio Pierazzi is a Lecturer (Assistant Professor) in Cybersecurity at King's College London, where is also a member of the Cybersecurity group (CYS) and Systems Security Research Lab (S2Lab), and Programme Leader of the MSc in Cyber Security to ensure its quality and relevance. He has a strong track record of AI & security publications in peer-reviewed venues, including top journals and top conferences in the field (e.g., USENIX Security, IEEE S&P, IEEE TIFS, IEEE TDSC), and also serves in Program Committees of well-known venues including IEEE S&P (Oakland), USENIX Security, AAAI, IJCAI, ICML, ICLR, DLS, AISec, DIMVA, and ARES, plus served as journal reviewer in multiple occasions for IEEE TIFS and ACM TOPS among others. He has worked on cybersecurity since 2011, when he started his MSc thesis in applied cryptography for cloud database security. During his Ph.D. (2014–2017), he then focused on statistical methods for the detection of advanced attackers in large networks. Fabio's research interests now focus on behavioral modeling for anomaly detection, with particular emphasis on: machine learning for systems security (mostly malware analysis and network intrusion detection), adversarial machine learning, and adaptive attackers in highly non-stationary contexts. Moreover, Fabio has delivered many teaching and mentoring activities in security in different countries (mostly UK and Italy). Fabio has also taken the leadership in the application for NCSC Certification of King's MSc in Cyber Security, which in March/April 2021 resulted in a successful outcome.





## PROFESSIONAL EMPLOYMENT

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<b>Lecturer (Assistant Professor) in Cybersecurity</b> <i>Research and Teaching in Computer Science, with focus on Cybersecurity</i>	<b>Dept. Informatics, King's College London (KCL), UK</b>  Sept 2019 to present
<b>PostDoctoral Researcher</b> <i>Working on Concept Drift and Adversarial ML (w/ Prof. Lorenzo Cavallaro and Prof. Johannes Kinder)</i>	<b>Systems Security Research Lab (S2Lab), RHUL &amp; KCL, UK</b>  Oct 2017 to Sep 2019
<b>PostDoctoral Researcher</b> <i>Working on Big Data Security Analytics for Network Intrusion Detection (w/ Prof. Michele Colajanni)</i>	<b>WEBLab, University of Modena, Italy</b>  Jan 2017 to Sep 2017
<b>Visiting Research Scholar</b> <i>Working on Cyber Deception and ML-based Malware Detection (w/ Prof. V.S. Subrahmanian)</i>	<b>Dept. Computer Science, University of Maryland - College Park, USA</b>  Jan 2016 to Nov 2016
<b>Research Assistant</b> <i>Working on Applied Cryptography for Cloud Database Security (w/ Prof. Michele Colajanni)</i>	<b>WEBLab, University of Modena, Italy</b>  June 2013 to Dec 2013

## EDUCATION

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<b>Ph.D. in Computer Science</b> <i>Thesis: Security analytics for prevention and detection of advanced cyberattacks (advisor: Prof. Colajanni)</i>	<b>University of Modena, Italy</b>  Jan 2014 to Mar 2017
<b>MSc in Computer Engineering and Science (110/110 cum laude)</b> <i>Average exam score (similar to GPA, in Italy): 29.9/30.0</i> • <u>Thesis</u> : Data confidentiality through adaptive encryption for cloud DataBase as a Service	<b>University of Modena, Italy</b>  Sep 2010 to Apr 2013
<b>BSc in Computer Engineering and Science (110/110 cum laude)</b> <i>Average exam score (similar to GPA, in Italy): 29.0/30.0</i>	<b>University of Modena, Italy</b>  Sep 2007 to Nov 2010
<b>High School Scientific Diploma</b> <i>Graduation score: 100/100</i>	<b>Liceo Scientifico Statale "A. Tassoni", Modena, Italy</b>  Sep 2002 to July 2007

## PUBLICATIONS

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### Conference Papers

- S&P20** Fabio Pierazzi\*, Feargus Pendlebury\*, Jacopo Cortellazzi, Lorenzo Cavallaro, "Intriguing Properties of Adversarial ML Attacks in the Problem-Space", IEEE Symp. Security & Privacy (Oakland), 2020 — **12.3% Acceptance Rate**
- USENIXSec19** Feargus Pendlebury\*, Fabio Pierazzi\*, Roberto Jordaney, Johannes Kinder, Lorenzo Cavallaro, "TESSERACT: Eliminating Experimental Bias in Malware Classification across Space and Time", USENIX Security, 2019 — **16% Acceptance Rate**
- CyCon17** Fabio Pierazzi, Giovanni Apruzzese, Michele Colajanni, Alessandro Guido, Mirco Marchetti, "Scalable architecture for on-line prioritisation of cyber threats", IEEE International Conference on Cyber Conflicts (CyCon), 2017.
- CyCon16** Mirco Marchetti, Fabio Pierazzi, Alessandro Guido, Michele Colajanni, "Countering Advanced Persistent Threats through security intelligence and big data analytics", IEEE International Conference on Cyber Conflicts (CyCon), 2016.
- NCCA15** Fabio Pierazzi, Andrea Balboni, Alessandro Guido, Mirco Marchetti, "The network perspective of cloud security", IEEE Network Cloud Computing and Applications, 2015.
- ISCC14** Luca Ferretti, Fabio Pierazzi, Michele Colajanni, Mirco Marchetti, Marcello Missiroli, "Efficient detection of unauthorized data modification in cloud databases", IEEE Symposium Computers and Communications, 2014.
- SECURWARE13** Luca Ferretti, Fabio Pierazzi, Michele Colajanni, Mirco Marchetti, "Security and confidentiality solutions for public cloud database services", Conf. Emerging Security Information, System and Technology, Aug 2013 — **Best Paper Award**

### Journal Papers

- TIFS20** Fabio Pierazzi, Stefano Cristalli, Danilo Bruschi, Michele Colajanni, Mirco Marchetti, Andrea Lanzi, "GLYPH: Efficient ML-based Detection of Heap Spraying Attacks", IEEE Trans. Information Forensics & Security (TIFS), 2020
- TMIS20** Fabio Pierazzi, Ghita Mezzour, Qian Han, Michele Colajanni, V.S. Subrahmanian, "A Data-Driven Analysis of Modern Android Spyware", ACM Trans. Management Information Systems, 2020.

- TDSC19** Chongyang Bai, Qian Han, Ghita Mezzour, Fabio Pierazzi, and V.S. Subrahmanian, "DBank: Predictive Behavioral Analysis of Recent Android Banking Trojans", IEEE Transactions on Dependable and Secure Computing (TDSC), 2019.
- TETC17** Giovanni Apruzzese, Fabio Pierazzi, Michele Colajanni, Mirco Marchetti, "Detection and threat prioritization of pivoting attacks in large networks", IEEE Transactions on Emerging Topics in Computing (TETC), 2017.
- TDSC17** Tanmoy Chakraborty, Fabio Pierazzi, V.S. Subrahmanian, "EC2: Ensemble Clustering & Classification for predicting Android malware families", IEEE Transactions on Dependable and Secure Computing (TDSC), 2017.
- TIFS17** Sushil Jajodia, Noseong Park, Fabio Pierazzi, Andrea Pugliese, Edoardo Serra, Gerardo Simari, V.S. Subrahmanian, "A probabilistic logic for cyber deception", IEEE Transactions on Information Forensics and Security, Nov. 2017.
- ComNet16** Mirco Marchetti, Fabio Pierazzi, Michele Colajanni, Alessandro Guido, "Analysis of high volumes of network traffic for Advanced Persistent Threat detection", Elsevier Computer Networks Journal, Jun 2016.
- CoSe16** Fabio Pierazzi, Sara Casolari, Michele Colajanni, Mirco Marchetti, "Exploratory security analytics for anomaly detection", Elsevier Computers & Security, Feb 2016.
- TCC14** Luca Ferretti, Fabio Pierazzi, Michele Colajanni, Mirco Marchetti, "Scalable architecture for multi-user encrypted SQL operations on cloud database services", IEEE Transactions on Cloud Computing (TCC), 2014.
- TCC14** Luca Ferretti, Fabio Pierazzi, Michele Colajanni, Mirco Marchetti, "Performance and cost evaluation of an adaptive encryption architecture for cloud databases", IEEE Transactions on Cloud Computing (TCC), 2014.

#### Workshop & Poster Papers

- USENIXSec19-Poster** Fabio Pierazzi\*, Feargus Pendlebury\*, Jacopo Cortellazzi, Lorenzo Cavallaro. "POSTER: Realistic Adversarial ML Attacks in the Problem-Space", USENIX Security Symposium (poster), 2019.
- CCS18-Poster** Feargus Pendlebury\*, Fabio Pierazzi\*, Roberto Jordaney, Johannes Kinder, Lorenzo Cavallaro, "POSTER: Enabling Fair ML Evaluations for Security", Proceedings of ACM CCS 2018 (poster paper).
- HPCS14-LSAUC** Marcello Missiroli, Fabio Pierazzi, Michele Colajanni, "Security and privacy of location-based services for in-vehicle device systems", International Workshop on Location-based Services and Applications in Ubiquitous Computing (LSAUC), as part of Proc. IEEE HPCS, 2014.

## ACADEMIC SERVICE

### Awards

- Outstanding Reviewer Award at DIMVA conference 2020
- Distinguished Program Committee Member at IJCAI-ECAI 2018

### Program committees

- 2022** IEEE S&P (Oakland), USENIX Security
- 2021** NeurIPS, AAAI, ICLR, ICML, DIMVA, ARES, DLS Workshop, DSN-DSML Workshop, EuroSec Workshop, KDD-MLHat Workshop
- 2020** ICML, AAAI, IJCAI, DLS (S&P Workshop), DSML (DSN Workshop), DIMVA, MLCS (ECML-PKDD Workshop), EuroSec Workshop, ARES, SafeML (ECAI workshop), IEEE TrustCom, AISec (CCS Workshop), IEEE NCA, Poster/Demo Track of ACM CCS
- 2019** AAAI, IJCAI, AISec (CCS Workshop), Poster Track of IEEE S&P (Oakland), IEEE NCA, CARDS, Shadow PC of IEEE S&P (Oakland)
- 2018** IJCAI, IEEE Smart Industries Workshop, IEEE BDAA Workshop, Shadow PC of IEEE S&P (Oakland)

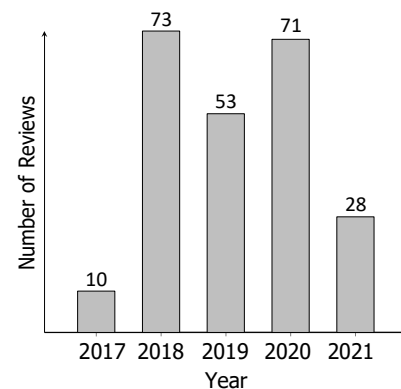


Figure 1: Papers reviewed from Nov 1, 2017 to Feb 15, 2021.

### Artifact Evaluation PC

- 2018–2020** USENIX Security Symposium (2020), ACSAC (2018, 2019), SOSP (2019), USENIX WOOT Workshop (2019)

### Guest Editor

- 2021-2022** Special Issue on "Offensive Machine Learning", ACM DTRAP journal
- 2021–** Research Topic<sup>1</sup> on "Distributed Fog/Edge computing architectures for IoT applications" for *Frontiers in Communication and Networks* journal.

### Editorial Board

- 2020–** Frontiers in Communications and Networks

### Journal Reviewing (selected)

- 2016–2021** ACM TOPS (2019-2021), IEEE TIFS (2017-2021), IEEE TNNLS (2017-2020), Elsevier JISA (2017-2020), IEEE TBD (2019), IEEE TCSS (2016), IEEE CIM (2019,2020), IEEE TETCI (2018), Elsevier ComNet (2018), Elsevier ESWA (2017), Elsevier FGCS (2019, 2021)

**Publons Verified Reviews** <https://publons.com/researcher/3086392/fabio-pierazzi/>

### External Reviewer<sup>2</sup>

- 2021** USENIX Security

### Sub-Reviewing

<sup>1</sup>Similar to special issue, but without fixed deadlines and open-ed submission pool.

<sup>2</sup>Invited in the PC discussion for at least one paper

2020 ACSAC

2019 RAID, DIMVA, ACM WWW (TheWebConf), IEEE EuroS&P

2018 ACM CCS, ACSAC, DLS (S&P Workshop), ACM CODASPY, ARES

2015–2017 IEEE TCC (2017), IEEE ICC (2016), IEEE NetSciCom (2016), Elsevier EWMA (2015), IEEE NCA (2015)

#### Other

- **Session Chair** at NCA 2020 in the "Network Security" session Nov 2020
- **Session Chair** at ARES 2020 in the "ML for Cybersecurity" session Aug 2020
- **Workshop Chair** of CARDS conference 2019

#### Ph.D. Thesis External Reviewer

- Francesco Crecchi, University of Cagliari, Italy Feb 28, 2021

#### Ph.D. Defense Committee

- Marco Melis, Thesis in Computer Science, University of Cagliari, Italy March 9, 2021
- Michele Scalas, Thesis in Computer Science, University of Cagliari, Italy March 9, 2021
- Diego Deplano, Thesis in Automatic Control, University of Cagliari, Italy March 9, 2021
- Stefano Sonedda, Thesis in Electronics, University of Cagliari, Italy March 9, 2021

### TALKS AND SEMINARS (SELECTED)

- (peer-reviewed) Presentation of IEEE S&P 2020 paper at AISSAI Workshop of ITASEC  Apr 2021
- Invited Talk (virtual) at Software Engineering Ph.D./PostDoc Winter School, Berlin, Germany  Mar 2021
- ACE-CSR Winter Ph.D. School, UK  Dec 2020
- Invited Talk (virtual) at Computing Colloquium of Boise State University, USA  Oct 2020
- (peer-reviewed) Talk at AVAST's CyberSec&AI workshop about TIFS20 paper, London/SF/Prague    Oct 2020
- (invited) Dagstuhl Seminar on Security of Machine Learning (cancelled; postponed due to covid19)  Aug 2020
- Invited Talk (virtual) at SoSySec seminar at INRIA, Rennes, France  Jun 2020
- Invited Talk (virtual) at InfoSec Seminars at University College London, UK  May 2020
- Invited Talk at ISG Seminars at Royal Holloway, University of London, UK  Feb 2020
- Paper presentation of TESSERACT at USENIX Security Symposium, Santa Clara, USA  Aug 2019
- Invited Talk "Network security analytics for detection of advanced cyberattacks", Dartmouth College, USA  Nov 2017

### SELECTED HONORS, SCHOLARSHIPS AND AWARDS







- Outstanding Reviewer Award at DIMVA conference 2020 Jul 2020
- Distinguished Program Committee Member at IJCAI-ECAI 2018 Spring 2018
- Ph.D. Dissertation selected as the best among the dissertations of my UniMoRe CS cohort 2017
- Ranked 1st and awarded 3-year scholarship for CS Ph.D. at the University of Modena, Italy From Jan 2014 to Dec 2016
- Best Paper Award @ SECURWARE 2013 Aug 2013
- Passed the public exam to practice as *Computer Engineer* in Italy Jul 2013
- Award for outstanding MSc study achievements at University of Modena, Italy a.y. 2011/2012

### TEACHING EXPERIENCE

#### Module Leader/Creator

- **Security Testing (7CCSONST)** **MSc in Advanced Cyber Security (Online MSc), King's College London, UK**  *Module Creator* Spring 2022
- **Security Testing (7CCSMSCT)** **MSc in Cyber Security, King's College London, UK**  *Module Leader and Module Creator* Spring 2020, Spring 2027

#### Guest Lectures

- **Machine Learning for Security** **MSc Computer Science, Karlsruhe Institute of Technology (KIT), Germany**  *Guest Lecture on "Concept Drift for Malware Classification"* Summer 2020
- **Security Monitoring I: Malware Analysis and Detection** **Security Specialization Course, University of Bologna, Italy**  *Guest lectures on static analysis, dynamic analysis, ML-based malware detection* Spring 2020, Spring 2027
- **Machine Learning for Malware Analysis** **Cyber Academy, Specialization Course, University of Modena, Italy**  *Guest lectures on ML-based malware detection* Spring 2029
- **Malicious Software** **BSc Computer Science, Royal Holloway, University of London, UK**  *Guest Lectures on "Machine learning for malware analysis"* Spring 2028, Spring 2029
- **Security Engineering (7CCSMSEN)** **MSc Computer Science, King's College London, UK**  *Guest Lecture on "Authentication and Access Control"* Fall 2028
- **Computer Security** **MSc Computer Engineering, University of Modena, Italy**  *Guest Lectures on Network Security and Web Security, and Lab TAing* Fall 2025, Fall 2026

- **Network Systems and Applications**

*Several Guest Lectures on Cloud Computing, and Lab Design and TAing*

**MSc Computer Engineering, University of Modena, Italy** 

*Spring 2074, Spring 2075, Spring 2077*

## **OTHER RELEVANT ACADEMIC ROLES**

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**Programme Leader of KCL MSc in Cyber Security** Responsible of ensuring that the content is of quality and up-to-date, and meets NCSC accreditation criteria, while coordinating with the MSc programmes director for any challenge (KCL has one director for all MSc programmes). Since Oct 2020

## **TECHNICAL SKILLS IN SECURITY (SELECTED)**

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- Traffic and malware analysis with python data science libraries, including pandas, scipy, scikit-learn, matplotlib, PyTorch
- Advanced Penetration Testing of Web Applications (e.g., SQL injections, XSS, CSRF)
- Collection and analysis of Network IDS alerts (Snort, Suricata, Bro) and IP netflows (nprobe)
- Hands-on experience on monitoring real-world networks (up to 10k hosts)
- Malware execution and log analysis in Cuckoo sandbox (e.g., ransomaware)
- Web Security and Penetration Testing

## **LANGUAGES**

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- **English:** fluent
- **Italian:** native speaker

## **REFERENCES**

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Available upon request.

Date: April 14, 2021