# **CURRICULUM VITAE - DR FABIO PIERAZZI**

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### RESEARCH INTERESTS

Dr Fabio Pierazzi is a **Lecturer (Assistant Professor) in Cybersecurity** at King's College London (KCL), where he is also **Deputy Head of the Cybersecurity group** (since Sep 2022), and **Programme Leader of the MSc in Cyber Security** (since Fall 2020) to ensure its quality and relevance. He closely collaborates with the Systems Security Research Lab (S2Lab) at UCL. 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, ACM CCS, 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), and has taken the leadership in the application for NCSC Certification of KCL's MSc in Cyber Security, which in Spring 2021 resulted in a successful outcome.

## PROFESSIONAL EMPLOYMENT

Lecturer (Assistant Professor) in Cybersecurity

Dept. Informatics, King's College London (KCL), UK

since Sep 2019

Research and Education in Computer Science, with focus on Cybersecurity

• Deputy Head of Cybersecurity Group

since Sep 2022

• Programme Leader of MSc Cyber Security

since Fall 2020

**PostDoctoral Researcher** 

Systems Security Research Lab (S2Lab), RHUL & KCL, UK

Working on Concept Drift and Adversarial ML (w/ Prof. Lorenzo Cavallaro and Prof. Johannes Kinder)

Oct 2017 to Sep 2019

PostDoctoral Researcher

WEBLab, University of Modena, Italy

Working on Big Data Security Analytics for Network Intrusion Detection (w/ Prof. Michele Colajanni)

Jan 2017 to Sep 2017

Visiting Research Scholar

Dept. Computer Science, University of Maryland - College Park, USA etection (w/ Prof. V.S. Subrahmanian)

Jan 2016 to Nov 2016

Working on Cyber Deception and ML-based Malware Detection (w/ Prof. V.S. Subrahmanian)
Research Assistant
WEB

WEBLab, University of Modena, Italy

Working on Applied Cryptography for Cloud Database Security (w/ Prof. Michele Colajanni)

Jun 2013 to Dec 2013

## **EDUCATION**

Ph.D. in Computer Science

University of Modena, Italy

Thesis: Security analytics for prevention and detection of advanced cyberattacks (advisor: Prof. Colajanni)

Jan 2014 to Mar 2017

MSc in Computer Engineering and Science (110/110 cum laude)

University of Modena, Italy

Average exam score (similar to GPA, in Italy): 29.9/30.0

Sep 2010 to Apr 2013

• Thesis: Data confidentiality through adaptive encryption for cloud DataBase as a Service

BSc in Computer Engineering and Science (110/110 cum laude)

University of Modena, Italy

Average exam score (similar to GPA, in Italy): 29.0/30.0

Sep 2007 to Nov 2010

High School Scientific Diploma

Liceo Scientifico Statale "A. Tassoni", Modena, Italy

Graduation score: 100/100

Sep 2002 to July 2007

#### RESEARCH TEAM

Current Ph.D. students as First supervisor

Mohamed AbouhashemFederated Learning Security, King's College London, UKStarted Summer 2021Theo Hoifung ChowExplainability and Adversarial Robustness, King's College London, UKStarted Fall 2021Jacopo CortellazziProblem-space Adversarial Robustness, King's College London, UKStarted Fall 2019Zeliang Mark KanConcept drift anticipation, King's College London, UKStarted Fall 2019

**Research Visitors** 

Ilias TsingenopoulosPh.D. student, KU Leuven, BelgiumJan-Apr 2023Malik Al-EssaPh.D. student, University of Bari, ItalyMar-Sep 2023Dr. Daniel ArpPostDoctoral Researcher, TU Berlin, GermanySep 2022-Feb 2023Giuseppina AndresiniPh.D. student, University of Bari, Italy2021Harivallabha RangarajanMSci student, BITS Pilani, Hyderabad Campus, India2021

Ph.D. Alumni as Second Supervisor

Feargus Pendlebury Limitations of ML for Security, UCL & Royal Holloway, University of London, UK 2017–2021

# **PUBLICATIONS**

Conference Papers

- S&P23 Limin Yang, Zhi Chen, Jacopo Cortellazzi, Feargus Pendlebury, Kevin Tu, Fabio Pierazzi, Lorenzo Cavallaro, Gang Wang, "Jigsaw Puzzle: Selective Backdoor Attack to Subvert Malware Classifiers.", IEEE Symposium on Security & Privacy (Oakland), 2023
- SaTML23 (Position Paper, 26 pages) Giovanni Apruzzese, Hyrum S. Anderson, Savino Dambra, David Freeman, Fabio Pierazzi, Kevin A. Roundy, ""Real Attackers Don't Compute Gradients": Bridging the Gap Between Adversarial ML Research and Practice", IEEE Conference on Secure and Trustworthy Machine Learning, 2023
- IMC22 (Short Paper, 7 pages) Jide Edu, Cliona Mulligan, Fabio Pierazzi, Jason Polakis, Guillermo Suarez-Tangil, Jose Such, " Exploring the Security and Privacy Risks of Chatbots in Messaging Services", ACM Internet Measurement Conference (IMC), 2022 26.4% Acceptance Rate
- USENIXSec22 Daniel Arp, Erwin Quiring, Feargus Pendlebury, Alexander Warnecke, Fabio Pierazzi, Christian Wressnegger, Lorenzo Cavallaro, Konrad Rieck. "Dos and Don'ts of Machine Learning in Computer Security", USENIX Security Symposium, 2022 16% Acceptance Rate Distinguished Paper Award
- S&P22 Federico Barbero\*, Feargus Pendlebury\*, Fabio Pierazzi, Lorenzo Cavallaro. "Transcending Transcend: Revisiting Malware Classification in the Presence of Concept Drift", IEEE Symp. Security and Privacy (Oakland), 2022 14.5% Acceptance Rate
- **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 Symposium, 2019 16% Acceptance Rate
- **CyCon17** Fabio Pierazzi, Giovanni Apruzzese, Michele Colajanni, Alessandro Guido, Mirco Marchetti, "Scalable architecture for online 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, 2013 **Best Paper Award**

## **Journal Papers**

- TIFS21 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), 2021
- **TMIS20** Fabio Pierazzi, Ghita Mezzour, Qian Han, Michele Colajanni, V.S. Subrahmanian, "A Data-Driven Characterization 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

- DLSP23 Zhi Chen, Zhenning Zhang, Zeliang Kan, Limin Yang, Jacopo Cortellazzi, Feargus Pendlebury, Fabio Pierazzi, Lorenzo Cavallaro, Gang Wang, Is It Overkill? Analyzing Feature-Space Concept Drift in Malware Detectors, Deep Learning Security & Privacy Workshop (co-located with IEEE S&P), 2023
- AlSec21 Giuseppina Andresini, Feargus Pendlebury, Fabio Pierazzi, Corrado Loglisci, Annalisa Appice, Lorenzo Cavallaro. "INSOM-NIA: Towards Concept-Drift Robustness in Network Intrusion Detection", AlSec Workshop (co-located with ACM CCS), 2021.
- AlSec21 Zeliang Mark Kan, Feargus Pendlebury, Fabio Pierazzi, Lorenzo Cavallaro. "Investigating Labelless Drift Adaptation for Malware Detection", AlSec Workshop (co-located with ACM CCS), 2021.
- **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.

## **FUNDING (SELECTED)**

PI of EPSRC NIA EPSRC New Investigator Award (NIA) on "XAdv: Robust Explanations for Malware detection" 2023–2026
PI of EPSRC-Toshiba iCASE EPSRC Industrial CASE (ICASE) Ph.D. Studentship co-funded by Toshiba Research Europe Limited on the topic of "Concept drift in distributed IIoT networks", started June 1st, 2021 2021–2025

## **ACADEMIC SERVICE**

#### Service-related Awards

- Notable Reviewer at IEEE SaTML 2023
- Top Reviewer ACM CCS 2022 (Top 30 out of 300+ reviewers; automatically invited to ACM CCS 2023 TPC)
- NeurIPS 2021 Outstanding Reviewer Award (Top 8% of reviewers)
- Top 10 Reviewers at DIMVA 2021 conference
- Outstanding Reviewer Award at DIMVA 2020 conference
- Distinguished Program Committee Member at IJCAI-ECAI 2018

#### **Program Chair**

2023 2nd Workshop on Robust Malware Analysis (WoRMA), co-located with IEEE EuroS&P 2023 2022 1st Workshop on Robust Malware Analysis (WoRMA), co-located with ACM AsiaCCS 2022

#### Workshop Chair

2023 IEEE EuroS&P

### **Program committees**

2024 IEEE S&P (Oakland)

2023 IEEE S&P (Oakland), USENIX Security, ACM CCS, IEEE SaTML, EuroSec, DLSP

2022 IEEE S&P (Oakland), USENIX Security, ACM CCS, ICML, DIMVA, SYSTOR, AI4Cyber/MLHat (co-located KDD), AISec (CCS Workshop), IEEE NCA

2021 NeurIPS, AAAI, ICLR, ICML, DIMVA, ARES, DLS Workshop, DSN-DSML Workshop, EuroSec Workshop, KDD-MLHat Workshop, AlSec, IEEE NCA

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)

#### **Artifact Evaluation PC**

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

#### **Guest Editor**

**2021-** Research Topic (similar to Special Issue) on "Distributed Fog/Edge computing architectures for IoT applications" for *Frontiers in Communication and Networks* journal.

#### **Editorial Board**

2020- Frontiers in Communications and Networks

# Distinguished Reviewers Committee (Journals)

**2021-** ACM TOPS

#### Journal Reviewing (selected)

**2016–2023** ACM TOPS (2019-2023), IEEE TIFS (2017-2022), IEEE TDSC (2022), 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 (Invited in the PC discussion for at least one paper)

2021 USENIX Security

# Sub-Reviewing

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 IEEE S&P 2022 in the "Attack Investigations" session
- Session Chair at NCA 2020 in the "Network Security" session
- Session Chair at ARES 2020 in the "ML for Cybersecurity" session

May 2022

Nov 2020

Aug 2020

Ph.D. Thesis External Reviewer	
Angelo Sotgiu, University of Cagliari, Italy	Nov 2022
Maura Pintor, University of Cagliari, Italy	Nov 2021
Francesco Crecchi, University of Cagliari, Italy	Feb 2021
Ph.D. Defense Committee	
Angelo Sotgiu (and other students), University of Cagliari, Italy	Feb 16, 2023
Marco Melis, Michele Scalas, Diego Deplano, Stefano Sonedda, University of Cagliari, Italy	Mar 9, 2021
TALKS, SEMINARS AND COLLOQUIUMS (SELECTED)	
Invited Talks	
MLSec Seminars organized by University of Cagliari	April 2022
Software Engineering Ph.D./PostDoc Winter School, Berlin, Germany  ACE CON Winter Plans Control of the Con	Mar 2021
<ul> <li>ACE-CSR Winter Ph.D. School, UK</li> <li>Computing Colloquium of Boise State University, USA</li> </ul>	Dec 2020 Oct 2020
SoSySec seminar at INRIA, Rennes, France	Jun 2020
InfoSec Seminars at University College London, UK	May 2020
ISG Seminars at Royal Holloway, University of London, UK	Feb 2020
"Network security analytics for detection of advanced cyberattacks", Dartmouth College, USA	Nov 2017
Discussion Colloquiums	
Robust Intelligence Webinar on IEEE SaTML 2023 paper	Feb 2023
Panel Member on Al Security at "Deep Learning for Security" (DLS) workshop, co-located with IEEE S&P	May 2022
Dagstuhl Seminar on Security of Machine Learning	Jul 2022
Security Data Science Colloquium (SDSC) organized by Microsoft	Jun 2021
AlSecAl, King's College London, UK	Jan 2020
Discussion Colloquiums	
Panel Member on Al Security at "Deep Learning for Security" (DLS) workshop, co-located with IEEE S&P	May 2022
Dagstuhl Seminar on Security of Machine Learning	Jul 2022
Security Data Science Colloquium (SDSC) organized by Microsoft	Jun 2021
AlSecAl, King's College London, UK	Jan 2020
Public Engagement and Dissemination	
Robust Intelligence Webinar on IEEE SaTML 2023 paper	Feb 2023
Computerphile YouTube video on "Machine Learning & Malware Analysis"	Jan 2023
Official CyBOK Webinar for "Malware and Attack Technologies" Knowledge Area, UK	Mar 2021
SELECTED HONORS, SCHOLARSHIPS AND AWARDS	
Notable Reviewer at IEEE SaTML 2023	Feb 2023
Top Reviewer at ACM CCS 2022      Top Reviewer at ACM CCS 2022      Top Reviewer at ACM CCS 2022	Nov 2022
Distinguished Paper Award @ USENIX Security Symposium     NeurIDS code Outstanding Paginguer Award (Tap 9% Paginguers)	Aug 2022 Oct 2021
<ul> <li>NeurIPS 2021: Outstanding Reviewer Award (Top 8% Reviewers)</li> <li>Top-10 reviewers of DIMVA 2021</li> </ul>	Jul 2021
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 computer science cohort at UniMoRe	2017
• Ranked 1st and awarded 3-year scholarship for CS Ph.D. at the University of Modena, Italy	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	
Education-related Roles	
Programme Leader of MSc in Cyber Security     MSc in Cyber Security, King's College	
Responsible of ensuring that the content is of quality and up-to-date, and meets NCSC certification criteria.	Since Fall 2020
• NCSC Certification Lead  I have been the leader of the application for NCSC certification for MSc with general, broad foundation in Cyber Security, King's College	
King's College London's MSc in Cyber Security, successfully awarded in Spring 2021.	Since Fall 2019
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# Module Leader/Creator

• Mitigating Circumstances Board

 ${\it Review and approval for students assessment\ mitigations}.$ 

Computer Science Programmes, King's College London, UK

Fall 2019-Summer 2021

• Security Testing (7CCSMSCT) Module Leader and Module Creator

Security Testing (7CCSONST)

MSc in Cyber Security, King's College London, UK

Spring 2020, 2021, 2022, 2023

MSc in Advanced Cyber Security (Online MSc), King's College London, UK Spring 2022

**Dissertation Supervisor** 

**Module Creator** 

King's College London, UK Supervised 15 MSc and 14 BSc dissertations. Royal Holloway, University of London Second supervisor of 1 MSc dissertation. 2019-ongoing 2018

**University of Modena**, **Italy** Second supervision of 4 MSc dissertation, and 1 BSc dissertation.

2015-2017

**Guest Lectures** 

 Security Monitoring I: Malware Anaylsis and Detection Specialization Course, University of Bologna, Italy Guest Lectures on static analysis, dynamic analysis, ML-based malware detection Spring 2020, 2021, 2022, 2023

MSc Computer Science, University of Bologna, Italy

 Cybersecurity Guest Lecture on "Trends and Challenges in Automated Malware Detection"

Fall 2021, 2022

Fall 2015, Fall 2016

 Machine Learning for Security MSc Computer Science, Karlsruhe Institute of Technology (KIT), Germany Guest Lecture on "Concept Drift for Malware Classification" Summer 2020, 2021

• Machine Learning for Malware Analysis Guest Lectures on ML-based malware detection Cyber Academy, Specialization Course, University of Modena, Italy Spring 2019

 Malicious Software BSc Computer Science, Royal Holloway, University of London, UK Guest Lectures on "Machine learning for malware analysis" Spring 2018, Spring 2019

• Security Engineering (7CCSMSEN) Guest Lecture on "Authentication and Access Control" MSc Computer Science, King's College London, UK Fall 2018

MSc Computer Engineering, University of Modena, Italy Computer Security Guest Lectures on Network Security and Web Security, and Lab TAing

Network Systems and Applications

MSc Computer Engineering, University of Modena, Italy

Several Guest Lectures on Cloud Computing, and Lab Design and TAing Spring 2014, Spring 2015, Spring 2017

# TECHNICAL SKILLS IN SECURITY (SELECTED)

- 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**

• English: fluent

• Italian: native speaker

Date: May 8, 2023