



Mohammad Shojafar

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Website: www.mshojafar.com

Work: Stag Hill, 6G Innovation Centre (6GIC), University of Surrey, GU2 7XH
Guildford (United Kingdom)

ABOUT ME

Mohammad Shojafar (M'17-SM'19) is an Associate Professor in Network Security, an Intel Innovator, a Senior IEEE member, an ACM distinguished speaker, and a Fellow of the Higher Education Academy, working in the 5G & 6G Innovation Centre (5GIC & 6GIC) at the University of Surrey, UK. Before joining 5GIC & 6GIC, he was a Senior Researcher and a Marie Curie Fellow in the SPRITZ Security and Privacy Research group at the University of Padua, Italy. He was a Senior Researcher working on a network security project (~11 months) jointly with Ryerson University and Telus Communications Inc (TELUS) in Toronto, Canada, in 2019. Also, he was a CNIT Senior Researcher at the University of Rome Tor Vergata and contributed to the 3GPPP European H2020 "SUPERFLUIDITY" project.

Dr. Mohammad secured £311k for the ESKMARALD project (funded by NCSC-UK) and £40k for the APTd5G project (funded by EPSRC/UKI-FNI) in 2022. He secured €750k (PI) for AUTOTRUST (funded by the European Space Agency) in 2021. Mohammad secured \$40k (funded by the Ecuairain government) for IoT and Industry 4.0 resource allocation in 2020. Mohammad secured €275k (PI) for PRISENODE project (Horizon 2020 Marie Curie Individual project) in 2019 and €60k (PI) for an SDN security and privacy project (funded by the University of Padua) in 2018. He contributed to some Italian projects in telecommunications like GAUCHO - A Green Adaptive Fog Computing and Networking Architecture (€400k), S2C: Secure, Software-defined Cloud (€30k), and SAMMClouds- Secure and Adaptive Management of Multi-Clouds (€30k) collaborating among Italian universities.

He received a Ph.D. from the Sapienza University of Rome, Rome, Italy, in 2016 with an "Excellent" degree. He received the honored BSc in CS at Iran University of Science and Technology, Tehran, Iran, in 2006. He was a programmer/software analyzer at the National Iranian Oil Company (NIOC) and Tidewater Ltd in Iran from 2008 to 2013. He published over 180 refereed top-tier articles in prestigious venues such as IEEE TII, IEEE TCC, IEEE TNSM, IEEE T-ITS, IEEE Network, Computer Networks, and FGCS. He is an Associate Editor in IEEE Transactions on Network and Service Management, IEEE Transactions on Intelligent Transportation Systems, IEEE Systems, IEEE Consumer Electronics Magazine, and Computer Networks Journals. He published three books on Cybersecurity Applications and Network Security, which appeared in Springer recently.

WORK EXPERIENCE

Senior Lecturer (Associate Professor)

5GIC & 6GIC, University of Surrey [15/10/2019 – Current]

Address: Guildford (United Kingdom)

City: Guildford

Country: United Kingdom

- 5G/6G Communication network security (i.e., intrusion detection systems, mobile edge computing, and communication)
- Adversarial machine learning in Mobile data (i.e., adversarial ML, federated learning, reinforcement learning)
- Security in SDN/NFV and virtualized networks
- Security/Privacy in Fog/edge Computing and Fog data storage (i.e., data deduplication)
- Applied lightweight cryptography in 5G/6G network (i.e., distributed ledger, blockchain, lattice-based methods, QKD)

Senior Researcher (Senior PostDoc)

Ryerson University [01/01/2019 – 15/10/2019]

Address: Toronto (Canada)

City: Toronto

Country: Canada

My responsibilities:

- Contribute to the acquisition, set up, maintenance and integration of the SDN/NFV/SD-WAN and Cloud infrastructure
- Security Network monitoring and measurement, including, e.g., resource provisioning, performance analysis and modeling of SD-WAN
- Analytical Modelling and mathematical analysis of the security issues in Blockchain
- Analysis of SD-WAN Integrated with Blockchain and IoT data management and identify vulnerabilities, attacks, and countermeasures to preserve accountability

Senior Researcher

University of Padua [01/01/2018 – 01/01/2019]

Address: Padova (Italy)

City: Padua

Country: Italy

My responsibilities:

- Contribute to the acquisition, set up, maintenance and integration of the Software-Defined Network and Cloud infrastructure
- Security Network monitoring and measurement, including, e.g., resource provisioning, performance analysis and modeling of SDNs
- Analytical Modelling and mathematical analysis of the security issues (network trustworthy, misconfiguration, Accountability, and steal flow) on SDN/NFVs and network devices such as printers and propose robust algorithms
- Analysis SDN data and control planes and identify vulnerabilities, attacks, and countermeasures to preserve accountability
- Analytical Modelling and numerical analysis of malware/ransomware detection systems in Large datasets
- Modeling and numerical analysis of dynamic feature selection methods on Adversarial Machine Learning: attacks and Countermeasures

Senior Researcher

CNIT (Consorzio Nazionale Interuniversitario per le Telecomunicazioni) [01/12/2016 – 31/01/2018]

Address: Rome (Italy)

City: Rome

Country: Italy

I was as a CNIT senior researcher at the University of Rome Tor Vergata to work on European H2020 Superfluidity project. The SUPERFLUIDITY project aims at achieving superfluidity on the Internet: the ability to instantiate services on-the-fly, run them anywhere in the network (core, aggregation, edge) and shift them transparently to different locations.

My responsibilities:

- Establish solution environments for the 5G Cloud section of the SUPERFLUIDITY project

- Propose some scheduling and adaptive allocation techniques over the Cloud Datacenter in the SUPERFLUIDITY project
- Apply Artificial and meta-heuristic methods (e.g., machine learning and reinforcements) over 5G network architecture over SUPERFLUIDITY project.

Research Associate (PostDoc)

University of Modena and Reggio Emilia [01/12/2015 – 01/12/2016]

Address: Modena (Italy)

City: Modena

Country: Italy

Work on the project SAMMClouds: Secure and Adaptive Management of Multi-Clouds

Description: The SAMMClouds project aims to address some of the open issues related to the Software as a Service (SaaS) and Infrastructure as a Service (IaaS) systems. Specifically, the research activities will focus on the study and proposal of innovative solutions with regard to three main issues:

- Monitoring and management of IaaS cloud and multi-cloud systems
- Resource management in SaaS multi-cloud systems
- Data protection and security in cloud systems

My responsibilities:

- Propose, implement some analytical solutions techniques some novel solutions using AMPL (Knitro, MOSEK, and IBM CPLEX) optimizers.
- Incorporate the programming language (C++/python) using a bash script to the formulation, testing, deployment, and maintenance of the multi-cloud resource management issues.
- Implement VMs managing algorithm using Docker and Oracle Virtual box in some tasks.

PhD Student (Research Assistant)

Sapienza University of Rome [01/11/2012 – 20/05/2016]

Address: Rome (Italy)

City: Rome

Country: Italy

My responsibilities:

- System modeling via computational intelligence methods, particularly mathematical optimization
- Techniques such as KKT, workload anticipation techniques, and gradient-based approaches, some AI methods, and some supervised learning (regression analysis)
- CloudSim Platform knowledge and hands-on experiences (Java coding)
- CVX/MOSEK packages over MATLAB Platform knowledge and hands-on experiences

Software Programmer

National Iran Oil Company (NIOC) [01/04/2012 – 31/10/2012]

Address: Tehran (Iran)

City: Tehran

Country: Iran

My responsibilities:

- Software Analysing on PISDB and FFSDDB projects (oil field datastream organization software)
- Maintain confidentiality with regard to the information being processed, stored or accessed on the internal projects
- Coordinating the data entry flow and establishing initiative methods for reliable data entry
- Analyze, develop and implement testing procedures, programming (C++, Java) and documentation

Computer Science Lecturer

[22/09/2008 – 05/06/2012]

Address: Sowmesara (Iran)

City: Tehran

Country: Iran

Teach CS courses for BSc students. The courses are like Data Structure, Computer Networks, Network Security, Data Storage, Algorithm Design.

Software Programmer

Rahyab Rayaneh Gostar sub-firm of Tidewater ltd co. [01/04/2008 – 31/12/2008]

Address: Tehran (Iran)

City: Tehran

Country: Iran

I attended two projects **GCOMS, TCTS** as a software tester and programmer.

In **GCOMS**, which is a system under the direction of ports and maritime organization in non-container terminals domain with the slogan of creating unity procedure in port operations cycle at nine significant general cargo commercial ports of Iran.

My **responsibility** is to R&D and Design on IBM Rational Robot, IBM Rational Administrator, Testing Method and Error Recovery in Debugging Unit of GCOMS besides making tests scenarios and developing test program using C#.Net language applying Ranorex testing Tool. **This system is proud to be the second award winner of AFACT Electronic Asia Transcendent Pattern in 2011.**

In **TCTS** Project, which is a smart combination of hardware and software as an exhaustive resource for managing and leading container operations which are designed and implemented for administering the most extensive container port of Iran.

My responsibility was to test the program and troubleshooting the problems may happen in the connection exploited black box software testing. We monitored the testing and the test environment, often using Ranorex tool for this task, and often gather performance metrics by writing and executing test scripts and bug reports.

Computer Systems Analyzer

Shibkaran Construction Co [02/10/2004 – 31/05/2006]

Address: Sary (Iran)

- Install network components and operating systems (WIN 2003 serv., 15 nodes winXP, internal switch)
- Troubleshooting network issues (hardware, software or network faults)

Computer Systems Analyzer

Medical University [01/06/2003 – 22/09/2003]

Address: Sary (Iran)

- Maintenance the OSs and educate the internal management software to the 150+ employee of the medical universities
- Troubleshooting the hardware and software of the PCs
- Documentations and data orchestration using Microsoft Office (Access and SQL) and VB Programming for troubleshooting of the software integration of the official processing

EDUCATION AND TRAINING

Information and Communications Technology

Sapienza University of Rome [01/11/2012 – 20/05/2016]

Address: Rome (Italy)

Field(s) of study: Engineering and engineering trades

National classification: Advanced university studies (Doctorate)

- Design, implementation, and evaluation of energy-provisioning cloud-based (virtualized)/networked data centers testbed
- Mathematical, statistical modeling, and experimental analysis of latency problem in data centers
- CloudSim Cloud Computing Platform knowledge and hands-on experience (using C++/Java over Eclipse IDE)
- Develop efficient coding in C++/Matlab/JAVA

Computer Science (Software)

Qazvin Islamic Azad University [22/09/2007 – 15/09/2010]

Address: Qazvin (Iran)

Field(s) of study: Computing

National classification: University studies (Master)

- Programming in distributed computing e.g., grid and p2p computing using C++/Java programming.
- Programming in WSNs using NS2/Matlab IDEs.

Computer Science (Software)

Iran University Science and Technology [22/09/2001 – 04/12/2006]

Address: Tehran (Iran)

Field(s) of study: Computing

National classification: University studies (Bachelor)

- Software engineering courses
- Several technical reports and course projects such as MPI programming, C/C++/Java academic projects
- Software analyzing and modeling tools such as UML/RUP and Petri nets
- Be familiar with Microsoft Office, Microsoft Visual Studio, Adobe software

Certified Ethical Hacker (CEH)

Sharif University of Technology [01/06/2012 – 12/10/2012]

Address: Tehran (Iran)

Field(s) of study: Computing

National classification: Upper secondary education

- System Development & Management
- System Analysis & Audits
- Security Testing/Vulnerabilities
- Reporting
- Mitigation
- Ethics

JAVA J2SE Developer

Sharif University of Technology [01/04/2011 – 24/03/2012]

Address: Tehran (Iran)

Field(s) of study: Computing

National classification: Upper secondary education

Java Applets, Web Programming Skills, Teamwork, Verbal Communication, Web User Interface Design, Software Development Process, Object-Oriented Design (OOD)

LANGUAGE SKILLS

Mother tongue(s): **Persian**

Other language(s):

English

LISTENING C2 READING C2 WRITING C1

SPOKEN PRODUCTION C2 SPOKEN INTERACTION C2

Italian

LISTENING B1 READING A1 WRITING A1

SPOKEN PRODUCTION A1 SPOKEN INTERACTION A2

Spanish

LISTENING A1 SPOKEN INTERACTION A1

DIGITAL SKILLS

Knitro Optimization Toolbox / CPLEX / MATLAB / MININET

PUBLICATIONS

[List of my publications on Google Scholar](#)

[List of my Scopus indexed publications](#)

NETWORKS AND MEMBERSHIPS

Memberships

Editorial Member

- IEEE - [IEEE Transactions on Network and Service Management \(TNSM\)](#), (JCR IF 2021: 4.758)
- IEEE - [IEEE Transactions on Intelligent Transportation Systems \(T-ITS\)](#), (JCR IF 2021: 9.551)
- IEEE - [IEEE Consumer Electronics Magazine](#), (JCR IF 2021: 4.135)
- IEEE - [IEEE Systems Journal \(ISJ\)](#), (JCR IF 2021: 4.802)
- Elsevier - [Computer Networks \(COMNET\)](#), (JCR IF 2021: 5.493)
- IET - [IET Communications](#), (JCR IF 2021: 1.345)
- Springer - [Cluster Computing](#), (JCR IF 2021: 2.303)
- Springer - [Peer-to-Peer Networking and Applications](#), (JCR IF 2021: 4.488)
- Old City Publishing Inc. [Ad Hoc & Sensor Wireless Networks](#), (JCR IF 2021: 0.4)

Technical Committee (TPC) Member

- [ACM WiSeC 2023](#) Guildford, Surrey, United Kingdom, May 29 - June 01, 2023.
- [IEEE ICCE '23](#), Las Vegas, NV, USA, January 6-8, 2023.

- [IEEE IPCCC '22](#), Austin, TX, USA, November 11th - 13th, 2022.
- [IEEE GLOBECOM '22](#), Section GCSN, Rio de Janeiro, Brazil, December 4-8, 2022.

- [IEEE PST '21](#), Auckland, New Zealand, December 13-15, 2021.
- [IEEE/ACM UCC '21](#), Leicester, UK, December 6-9, 2021.
- [IEEE GLOBECOM '21](#), Section GCSN, Madrid, Spain, December 7-11, 2021.
- [IEEE GLOBECOM '21](#), Section SAC BD, Madrid, Spain, December 7-11, 2021.
- [IEEE CPS-Sec '21](#), Dallas, Texas, USA, November 2-5, 2021.
- [IEEE ScalCom '21](#), Atlanta, USA, October 18-21, 2021.
- [IEEE/ACM CCGRID '21](#), Melbourne, Australia, May 10-13, 2021.

RECOMMENDATIONS

- **Prof. Rahim Tafazolli**, [Regius Professor](#), FREng, FIET, WWRF Fellow, Head of the Institute for Communication Systems (ICS), Director of the 6G Innovation Centre (6GIC), University of Surrey, Guildford, United Kingdom. Tel: +44 (0)1483 689834, Email: r.tafazolli@surrey.ac.uk
- **Prof. Rajkumar Buyya**, [Distinguished Professor](#), Director of the Cloud Computing and Distributed Systems (CLOUDS) Laboratory, School of Computing and Information Systems, University of Melbourne, Australia. Tel: +61-3-83441344, Email: rbuyya@unimelb.edu.au
- **Prof. Mukesh Singhal**, [Chancellor's Professor](#), University of California, Merced, USA. Tel: +1-209-228-4344, Email: msinghal@ucmerced.edu
- **Prof. Mauro Conti**, [Professor](#), Marie Curie Alumni, University of Padua, Via Trieste, 63 - 35131, Padua, Italy, Tel: +39-049-827-1488, Email: conti@math.unipd.it
- **Prof. Jemal Abawajy**, [Professor](#), Deakin University, School of Information Technology, Melbourne, Australia. Tel: +61-3-522-71376, Email: jemal.abawajy@deakin.edu.au

- **Prof. Enzo Baccarelli**, Professor, Scientific Investigator of PRIN15, Gaucho/V-FOG projects, Sapienza University of Rome, Via Eudossiana 18, 00184 Rome, Italy. Tel: +39-06-445-85466, Email: enzo.baccarelli@uniroma1.it

PROJECTS

ESKMARALD: Enhanced Security of the AKMA on 5G (COI: £311,000)

[01/01/2023 – 31/12/2024]

ESKMARALD looks at the cryptographic, security, and privacy guarantees of edge computing over mobile networks and related services, primarily as per 5G (5th Generation Mobile Networks)-related specifications. ESKMARALD will consider threat models and use formal analysis methods and tools for security protocols and cryptographic primitives.

APTd5G: APT detection in 5G networks (COI: £40,000)

[01/01/2023 – 01/07/2023]

This pilot study focuses on Advanced Persistent Threats (APTs) detection in 5G/6G networks, drawing from realistic experimental implementations on the Surrey 5G testbed that go beyond a single intrusion scenario.

Link: <https://www.ukifni.org/call-for-pilot-study-proposals-for-epsrc-uk-india-future-networks-initiative-uki-fni/>

AUTOTRUST: A Secure 5G Transport and Logistics Demonstration (PI: €750,000)

[01/02/2022 – Current]

This project aims to secure data traffic among autonomous vehicles through the SAT-5G communication and cloud systems. AutoTrust is a European Space Agency (ESA) funded project that secures €750,000 (~£650,000) and includes three British participants (the University of Surrey, University of Hertfordshire and RL Capital Auto Ltd). AutoTrust is authorised to be funded by UK Space Agency under the ARTES 4.0 SPL 5G.

Link: <https://business.esa.int/space-and-5g-convergence-transport-logistics>

PRISENODE: Privacy- and security-aware solutions in Software-defined Fog Data Center (PI: €275,000)

[01/01/2020 – 31/12/2022]

In this project, I integrate fog technology with SDDCs and design a scalable fog network to manage the cloud service demands and provide secure processing and traffic data privacy in SDDC. I named this project PRISENODE: Privacy- and security-aware solutions in Software-defined Fog Data Center. My project targets fog data center (FDC) which consists of SDN-enabled switches that are instantiated on an SDDC server and serve as edge switches (Fog Nodes; FNs). FNs accommodate small-size flows with limited response time and deliver high-user QoE. In this way, I design a fundamental tool (open-source software) and a holistic business model for privacy- and security-aware data traffic passed through SDN-enabled FDCs/CDCs. The salient feature of my project is to jointly monitor network traffic, validate network traffic policies, and detect malicious entities in the cloud system, as well as introduce related security- and privacy-aware defenses in SDDCs.

Link: <https://cordis.europa.eu/project/rcn/222120/factsheet/en>

HONOURS AND AWARDS

Honours and awards

- Grant: 310,263 Pounds, NCSC-UK, **[ESKMARALD: Enhanced Security of the AKMA \(Authentication and Key Management for Application and Deployments\)](#)** (2023-2024)- (CoI)
- Grant: 40,000 Pounds, EPSRC/UKI-FNI-UK, APTd5G: APT detection in 5G networks (2023)- (CoI)
- Grant: 750,000 Euro, European Space Agency, **[AUTOTRUST: A Secure 5G Transport and Logistics Demonstration](#)** (2022-2023)- (PI)
- Grant: 275,000 Euro, European Commission, **[Marie Curie Individual Fellowship](#)** (2019-2021)- (PI)
- Grant: 20,000 US-Dollar, **[Energy and delay provisioning in IoT and Industry 4.0](#)**, (2020 for 18 months) - (CoI)
- Grant: 58,500 Euro, Italian Government, High Impact Research, Ministry of Higher Education, Rome, Italy (2012-2015) - (PI)

- **Permanent resident in Italy (obviously in EU) since Jan. 2018.**
- **Global Talent Visa in the UK, since Jan. 2022.**

- **Award:** 19,500 Euro, Department of "Enzo Ferrari", University of Modena and Reggio Emilia, Modena, Italy
- **Award (PI):** 54,000 Euro+5000 euro supporting, University of Padua, Padua, Italy
- **Award:** 5,000 Euro, Principle Investigator, Research Fund for University of Padua, Padua, Italy
- Among top 1000 in the Iranian National University Exam (500,000 participants), 2001.

OTHER SKILLS

Other skills

JBuilder, SQL Server (programming), Cascading Style Sheets (CSS), Microsoft Visual Studio, Computer technology (engineering), Test management (data systems), VMs management software

PRESENTATIONS

Presentations

Keynote Presentations

- **(2017)** SPRITZ-CLUSIT Workshop on Future Systems Security and Privacy, Padua, Italy Link: <http://spritz.math.unipd.it/events/2017/EU-cybersecuritymonth-workshop/>
- **(2018)** Keynote in Fog and Cloud Technology (University of Ottawa), 1-3 March, Canada
- **(2018)** Keynote in [I2SBD2C](#) (International Spring School for Big Data and Cloud Computing), 7-8 April, Tunisia

CITATIONS

Citations

- **Google Scholar:** Citations: 6000+, H-Index: 40
- **SCOPUS:** Citations: 4300+, H-Index: 34

PHD/MSC STUDENTS

PhD/Msc Students

- [Zahra Pooranian](#) (2020+) -- **current Postdoc**
- [Rekha Mundackal Das](#) (2022+) -- **current Ph.D. student**
- [Esmail Amiri](#) (2020+) -- **current Ph.D. student**
- [Sanaz Soltani](#) (2020+) -- **current Ph.D. student**

- [Parya Hajimirzaei](#) (2020-2022) -- **Ph.D. graduated**
- [Mohammad Mahdi Tajiki](#) (2017-2019) -- **Ph.D. Co-supervised**
- [Paola Vinueza](#) (2015-2018) -- **Ph.D. Co-supervised**
- [Rahim Taheri](#) (2017-2020) -- **Ph.D. Co-supervised**
- [Farhad Aghili](#) (2012-2018) -- **Ph.D. Co-supervised**
- [Meysam Ghahramani](#) (2016-2021) -- **Ph.D. Co-supervised**

- Domenico Paravati (2015) -- **MSc. Co-supervised**
- Massimo Biancifiori (2014) -- **MSc. Co-supervised**
- Saeed Javanmardi (2013) -- **MSc. Co-supervised**
- Ali Ahmadi Douchali (2012) -- **MSc. Co-supervised**