



Dr. William M. Fitzgerald (B.Sc., M.Sc., Ph.D.)

CONTACT INFORMATION

Mobile: +353 87 9527083 *E-Mail:* info@williamfitzgerald.net *Web:* <http://www.williamfitzgerald.net>

SUMMARY OF QUALIFICATIONS

Executive Summary of Industry & Academic Experience

- **Leader in IT Security Strategy, Innovation & Research Direction**
- **Expert Theoretical & Practical IT Security & Product Security Experience**
- **Expert in Security, Cloud & Risk Standards of Best Practice**
- **Ethical Hacking Competencies**
- **Expert in Firewall, Intrusion Detection, Vulnerability & Risk Management**
- **Internationally Published in Peer-Reviewed Cyber Security Scientific Journals**

William is a **Senior Manager Product Security** at JCI (formally Tyco) where his duties include developing a Global Product Security Programme, managing the team, interfacing with global BU's and strategic agenda for products. William is also a main contributor to the Global Infrastructure Security team leading to global strategic multi-year programs.

On a professional capacity, William serves as a **Scientific Technical Program Committee** member for a number of **International Cyber Security Conferences** namely IFIP SEC, IFIP NOMS, SECRYPT, IFIP DBSec, IWSAC, AIMSAC, SETOP and CRISIS. William has contributed to a number of **standards** bodies namely **NIST & ISO**.

In the past, William held a role as a **Senior Research Scientist** within United Technologies Research Centre Ireland where he carried out strategic and innovative research in the Cyber Physical Systems Security domain namely Industrial Control Systems, Internet of Things, **Critical Infrastructure**. He worked on a number of BU projects for example PAC, EU funded FP7 projects such as SPARKS for securing smart grids and a Department of Home Security funded project CASTRA for **Smartphone** security.

William also held a role as a **Senior Technologist** within the Center of Excellence at EMC Ireland. He carried out research on **Cloud and Data Center** infrastructure security configuration management. While at EMC, William formed part of an EU wide multidisciplinary and multi-partner research team collaborating on the EU FP7 SPECS Cloud security project.

Previous to that, William held a role as a **Postdoctoral Research Fellow** at the Department of Computer Science, University College Cork and was a member of the Cork Constraint Computation Centre (4C). He carried out research (directed by Dr. Simon Foley) on **network security configuration, threat & risk management** and cyber-physical security.

William holds a **Ph.D.** in **Computer Security** from University College Cork. He also holds the following degrees **M.Sc.** (research) and **B.Sc.** (honours) both from N.U.I. Maynooth. He previously held research posts at **Telecommunications Software & Systems Group WIT** and at **Ericsson Applied Research Laboratories**, Ireland.

OBJECTIVES

William's personal **vision** and **mission** over the next year and beyond, is to establish and develop the process and program discipline to **direct, manage**, and support a world class **cyber security** agenda.

PROFESSIONAL
APPOINTMENTS

Senior Manager Product Security, Johnson Controls. Mar. 2016 -
Senior Research Scientist, UTRC Ireland. Mar. 2015 - Mar. 2016
Senior Technologist, EMC² ISI COE Ireland. Nov. 2013 - Feb. 2015
Post-Doctoral Research Fellow, University College Cork. Sept. 2010 - Nov. 2013
Research Assistant, University College Cork. July 2009 - Aug. 2010
Ph.D. Internship, University College Cork. Jan. 2006 - June. 2009
Applied Researcher, Waterford Institute of Technology. Sept. 2004 - Dec. 2005
Research Scientist, Ericsson Applied Research Laboratories. Jan. 2003 - March 2004

EDUCATION

Ph.D. Computer Security, University College Cork. Aug. 2010
“An Ontology Engineering Approach to Network Access Control Configuration”
M.Sc. Computer Science, National University of Ireland, Maynooth. Oct. 2002
“Performance Analysis of Host Based Routing”
B.Sc. (Hons) Science, National University of Ireland, Maynooth. June 2000

EXPERT DOMAINS

Cloud & next generation Data Centers:
• Automated Security Configuration of next generation Data Centres.

Compliance-Driven Automated Security Configuration:
• Catalogues of Best Practice Security Standards.

Threat Management:
• (Decentralised) Semantic Threat Graphs, SCAP & Vulnerability Repositories.

Automated Network Security Configuration:
• Firewall, SAN Switch, Smartphone security Synthesis & Analysis.

Trust Management:
• Decentralised & Distributed Trust Frameworks.

Internet of Things:
• Security Configuration of Distributed & Decentralised IoT.

Cyber Physical (Industrial Controls) Systems Security:
• Threat & Vulnerability Analysis of SCADA, ICS, Building Automation, Smart Grid.

Semantic/Ontology Engineering:
• Applying Semantic Modelling and Reasoning Techniques to the Security Domain.

HACKER SKILLS

Security Framework Usage (for example):
• Network, Vulnerability & Web scanners (e.g. nmap, WireShark, openVAS, BurpSuite)
• Packet Crafting, Exploitation & Pentest Frameworks (e.g. Scapy, Metasploit, Kali Linux)

European Organisation for Security Membership

- Contributor to the EoS Cyber Security Roadmap, 2015.

Standards Body Membership

- Committee Member of the Cloud Security Alliance SLA Working Group, 2014.
- Contributed to both ISO and NIST standards on Cloud Computing, 2014.
- Member of the NIST Cyber Physical Systems Public Working Group, 2015.

Conference & Workshop Programme Committee:

- PC Member of the IFIP Information Security & Privacy Conf: 2014 - 2017.
- PC Member of the International Conference on Security & Cryptography: 2013 - 2017.
- PC Member of the IEEE/IFIP Network Operations and Management Symposium: 2016
- PC Member of the IFIP Data & Applications Security & Privacy Conf: 2015.
- PC Member of International Workshop on Security & Privacy Engineering: 2015.
- PC Member of the International Workshop on Security Assurance in the Cloud: 2014.
- PC Member of the International Workshop on Autonomous & Spontaneous Security: 2013,2014.
- PC Member of the Artificial Intelligence: Methodology, Systems, Applications Conf: 2014.
- Pubs. Chair for the International Workshop on Autonomous & Spontaneous Security: 2013.
- Pubs. Chair for the International Conference on Risks & Security of Internet & Systems: 2012.

Journal Reviewer:

- Journal of Computer Security (JCS): 2011 and 2013.
- Computers & Security Journal (COSE): 2011 - 2107.
- Journal of Research & Practice in Information Technology (JRPIT): 2012.
- Journal of Network & Systems Management (JNSM): 2009.
- Computer Standards & Interfaces (CSI): 2008.

Conference & Workshop Reviewer:

- International Conference on Security & Cryptography (SECRYPT): 2013, 2014, 2015, 2016.
- IFIP Working Conference on Data & Applications Security & Privacy (DBSec): 2012,2015.
- International Workshop on Security & Privacy Engineering: 2015.
- International Workshop on Autonomous & Spontaneous Security (SETOP): 2013,2014.
- European Symposium on Research in Computer Security (ESORICS): 2012, 2013.
- ACM Symposium on Applied Computing (SAC): 2008, 2011 and 2012.
- Privacy, Security & Trust (PST): 2012.
- International Workshop on Security in Information Systems (WOSIS): 2009.
- New Security Paradigms Workshop (NSPW): 2007.
- Autonomic & Trusted Computing (ATC): 2007.
- New Technologies, Mobility & Security (NTMS): 2007.
- IEEE International Workshop on IP Operations & Management (IPOM): 2006.
- Management of Multimedia & Mobile Networks & Services (MMNS): 2006.
- International Symposium on Wireless Communication Systems (ISWCS): 2006.
- International Conference on Pervasive Computing: 2006.
- Vehicular Technology Conference (VTC): 2006.

Invited Speaker:

- *Laying Siege to a City - IoT Attacks*, **CEM Systems**, Belfast, Ireland, Jan 2017. † († On-site visit.)
- *Modelling SCAP Components and System Configuration Automation in an Ontology-based Framework*, **RSA World Headquarters**, Bedford, MA USA, May 2013. † († On-site visit.)
- *Modeling SCAP Components in an Ontology-based Framework*, **EMC² World Headquarters**, Hopkinton, MA, USA, May 2013.†
- *A Semantic Threat Graphs Approach to Security Policy Configuration Management*, **Symantec Research Labs Seminar Series**, April 2013.
- *A Threat-based Approach to Managing Security Configuration*, iCIS Seminar Series, **Calgary University**, Alberta, Canada, August 2012.†

PUBLICATIONS

Book Editor

- J. Garcia-Alfaro, G. Lioudakis, N. Cuppens-Boulahia, S. Foley, W.M. Fitzgerald (Eds.): 8th International Workshop, DPM 2013, and 6th International Workshop, SETOP 2013, Egham, UK, September 12-13, 2013, LNCS Vol. 8247, ISBN 978-3-642-54567-2.
- F. Martinelli, J. Lanet, W. M. Fitzgerald, S. N. Foley (Eds.): 7th International Conference on Risks and Security of Internet and Systems (CRiSIS), Cork, Ireland, October 10-12, 2012. IEEE Computer Society 2012, ISBN 978-1-4673-3087-9.

Peer-Reviewed Journals

- W. M. Fitzgerald, U. Neville, S. N. Foley: “*MASON: Mobile Autonomic Security for Network Access Controls*”, Journal of Information Security & Applications, Elsevier, Vol 18, 2013.
- S. N. Foley, W. M. Fitzgerald: “*Management of Security Policy Configuration using a Semantic Threat Graph Approach*”, Journal of Computer Security, IOS Press, Vol. 19, No. 3, 2011.
- W. M. Fitzgerald, S. N. Foley: “*Aligning Semantic Web Applications with Network Access Controls*”, Computer Standards & Interfaces, Volume 33, Issue 1, Elsevier, January 2011.
- W. M. Fitzgerald, S. N. Foley, M. Ó Foghlú: “*Network Access Control Configuration Management using Semantic Web Techniques*”, Journal of Research and Practice in Information Technology, Vol. 41, No. 2, May 2009.

Peer-Reviewed Conferences & Workshops

- R. Brennan, Z. Etizoni, K. Feeney, D. O’Sullivan W. M. Fitzgerald, S. N. Foley: “*Consumer Managed Federated Homes*”, IEEE Communications Magazine, 52(6): 194-201, 2014.
- W. M. Fitzgerald, S. N. Foley: “*Avoiding Inconsistencies in the Security Content Automation Protocol*”, IEEE 6th Symposium on Security Analytics and Automation (SafeConfig), Washington, D.C., USA, October 2013.†
- F. Turkmen, S. N. Foley, B. O’Sullivan, W. M. Fitzgerald, T. Hadzic, S. Basagiannis, M. Boubekeur: “*Explanations and Relaxations for Policy Conflicts in Physical Access Control*”, IEEE 25th International Conference on Tools with Artificial Intelligence (ICTAI), 2013.
- W. M. Fitzgerald, F. Turkmen, S. N. Foley and B. O’Sullivan: “*Anomaly Analysis for Physical Access Control Security Configuration*”, 7th International Conference on Risks and Security of Internet and Systems (CRiSIS), October 2012.†
- W. M. Fitzgerald, U. Neville and S. N. Foley: “*Automated Smartphone Security Configuration*”, 5th International Workshop on Autonomous and Spontaneous Security (SETOP), ESORICS, September 2012.†
- S. N. Foley, W. M. Fitzgerald: “*Decentralized Semantic Threat Graphs*”, 26th Annual IFIP WG 11.3 Working Conference on Data and Applications Security (DBSec), France, July 2012.†

† Presented.

- W. M. Fitzgerald, S. N. Foley: “Reasoning about the Security Configuration of SAN Switch Fabrics”, 4th IEEE Symposium on Configuration Analytics and Automation (SafeConfig), Arlington, VA, USA, October 2011.†
- W. M. Fitzgerald, S. N. Foley: “Management of Heterogeneous Security Access Control Configuration using an Ontology Engineering Approach”, 3rd ACM Workshop on Assurable & Usable Security Configuration (SafeConfig), Chicago, USA, October 2010.†
- S. N. Foley, W. M. Fitzgerald: “An Approach to Security Policy Configuration using Semantic Threat Graphs”, 23rd Annual IFIP WG 11.3 Working Conference on Data and Applications Security (DBSec), Concordia University, Montreal, Canada, July 2009.†
- W. M. Fitzgerald, S. N. Foley, M. Ó Foghlú: “Network Access Control Interoperation using Semantic Web Techniques”, 6th International Workshop on Security in Information Systems (WOSIS), Barcelona, Spain, June 2008.†
- S. N. Foley, W. M. Fitzgerald: “Semantic Web and Firewall Alignment”, 1st International Workshop on Secure Semantic Web (SSW), IEEE CS Press, Cancun, Mexico, April 2008.†
- S. N. Foley, W. M. Fitzgerald, S. Bistarelli, B. O’Sullivan, M. Ó Foghlú: “Principles of Secure Network Configuration: Towards a Formal Basis for Self-Configuration”, Springer LNCS, 6th IEEE International Workshop on IP Operations and Management, Volume 4268/2006, ISBN 978-3-540-47701-3, October 2006.†
- W. M. Fitzgerald, J. Clarke: “SecurIST: Co-ordinating the development of a Strategic Research Agenda for Security and Dependability R&D”, 39th IEEE International Carnahan Conference on Security Technology, Las Palmas de G.C., Spain, October 2005.†
- W. M. Fitzgerald, K. Doolin, F. Mahon, C. Hauser, A. Gomez-Skarmeta, S. Butler, P. Schlosser, B. Weyl: “Daidalos Security Framework for Mobile Service”, eChallenges, Slovenia, October 2005.
- M. G. George, W. M. Fitzgerald, J. Doody: “An Approach for Network Forwarding Systems Quality”, 1st Information Technology and Telecommunications (IT&T) conference, Athlone, Ireland, pp 103-111, ISSN 1649 - 1246, September 2001.

Other Publications

- W. M. Fitzgerald, S. Tabet, “Automated Security Management of the 3rd Platform and Next Generation Data Centers using SPECS”, FP7 SPECS workshop, SecureCloud, April 2014.
- S. N. Foley, W. M. Fitzgerald, W. MacAdams “Federated Autonomic Network Access Control”, 4th IEEE Symposium on Configuration Analytics and Automation (SafeConfig), poster paper, Arlington, VA, USA, October 2011.†
- R. Brennan, Z. Etzioni, J. Keeney, K. Feeney, D. O’Sullivan, W. M. Fitzgerald, S. N. Foley, “Federated Autonomic Management of HAN Services”, 12th IFIP/IEEE International Symposium on Integrated Network Management, poster paper, Dublin, Ireland, May 2011.
- W. M. Fitzgerald, S. N. Foley, M. Ó Foghlú: “Confident Firewall Policy Configuration Management using Description Logic”, 12th Nordic Workshop on Secure IT Systems, short paper, Reykjavik, Iceland, October 2007.†
- Z. Dooly, J. Clarke, W. M. Fitzgerald, W. Donnelly, M. Riguidel, K. Howker, “D3.3 ICT Security & Dependability Research beyond 2010: Final strategy”, Co-ordinating the development of a Strategic Research Agenda for Security and Dependability R&D, SecurIST, Sixth Framework Programme, January 2007.
- J. Clarke, Z. Dooly, W. M. Fitzgerald and K. Howker: “SecurIST: Ensuring Secure, Dependable & Resilient ICT Technologies to Empower the European Citizen of the Future”, Information Security Solutions Europe (ISSE), Italy, October 2006.
- J. Clarke, Z. Dooly, W. M. Fitzgerald: “SecurIST: Security & Dependability to Empower the Citizen in the 21st Century”, 15th IST Mobile Summit, Myconos, Greece, June 2006.

- J. Clarke, Z. Dooly, W. M. Fitzgerald: “*SecurIST: The Application Security Initiative*”, IST Africa Conference, Pretoria, South Africa, May 2006.
- Z. Dooly, W. M. Fitzgerald, J. Clarke: “*SecurIST: Ensuring Secure, Dependable & Resilient European ICT Technologies to Empower the Citizen, Protect Critical Infrastructure & Provide Economic Growth*”, Euro-Atlantic Symposium on Critical Information Infrastructure Assurance, Switzerland, March 2006.
- W. M. Fitzgerald, K. Doolin, F. Mahon, C. Hauser, A. Gomez-Skarmeta, S. Butler, P. Schlosser, B. Weyl: “*Daidalos Security Framework for Mobile Service*”, Innovation and the knowledge Economy: Issues, Applications, Case Studies, Parts 1-2 Volume 2 of Information and Communication Technologies and the Knowledge Economy, pages 1077-1084, ISBN 9781586035631, IOS Press, October 2005.
- J. Clarke, W. M. Fitzgerald: “*SecurIST: Coordinating the development of a Strategic Research Agenda for Security and Dependability R&D*”, Information Security Solutions Europe, ISSE, Hungary, September 2005.

LEADERSHIP
EXPERIENCE

I have pro-actively assisted and performed leadership, management and supervision duties in a number of ways, for example:

- Communicate regularly with CIO, CISO, VP’s and Senior directors on strategic agenda.
- Involved with merger and acquisition strategy between legacy Tyco and JCI.
- Manage product security team and fiscal year budgets.
- Managed (partner coordination, research, budget, deliverables) a number of multi-year EU project workpackages.
- Supported both technical & non-technical development of EU funding consortia and proposals.
- Pro-actively foster internal and external relationships to drive new potential collaborations.
- Formed part of the hiring process and (post-)graduate recruitment fairs.
- Directed and supported a number of postgraduate students.
- Facilitated team meetings and individual consulting to motivate foster a cohesive work environment.

ENGINEERING
EXPERIENCE

Senior Manager Product Security, JCI Ireland.

March 2016 -

I lead and manage the global product security team. I have developed a roadmap of and operationally stood up a global product security programme that includes best practice security catalogues, risk management, secure SDLC process and training & development. I interact daily with BU customers providing global security governance and oversight. I interact with external vendors for procurement of products and service offerings around security and privacy. I report directly to the CTO and CISO weekly.

RESEARCH
EXPERIENCE

Senior Cyber Security Research Scientist, UTRC Ireland.

March 2015 - March 2016

My research focuses on cyber physical systems and IoT security. Part of this research agenda is funded by the collaborative EU FP7 SPARKS project that aims to ensure effective cyber security and resilience of smart grids. I also conducted research on a USA Department of Homeland Security project. I am involved in a number of BU projects. I actively seek to collaborate, lead and develop new cyber security strategic direction within UTRC.

Senior Research Technologist, EMC Ireland CoE.

Nov. 2013 - Feb. 2015

My research focused on secure provisioning of cloud services and next generation data centres through automated SLA management. This research is funded by the collaborative EU FP7 SPECS project

that will develop an open-source PaaS framework to provide security-as-a-service through automated SLA negotiation, monitoring and enforcement targeting for example cloud federation, secure storage and secure cloud multi-tenancy.

Post-Doctoral Researcher, University College Cork.

Sept. 2010 - Nov. 2013

My research focused on network security configuration (for example firewall analysis), smartphone security and threat management. This research was (partially) supported by the Science Foundation Ireland funded strategic research cluster project: *Federated, Autonomic Management of End-to-end communication services (FAME)*. Within FAME, I collaborated with a number of project partners from industry (for example EMC² and Cisco) and academia (for example TCD, Hamilton Institute and TSSG/WIT). For example, in collaboration with EMC², I explored ontology engineering techniques for NIST's Security Content Automation Protocol. My research interests also included cyber-physical security, funded by United Technologies Research Center (UTRC).

Ph.D. Internship, University College Cork.

Jan. 2006 - Aug. 2010

Supervisor: Dr. Simon N. Foley.

External examiners: Prof. Frédéric Cuppens (ENST Bretagne, FR), Prof. Joan Borrell (UAB, ES).

The thesis of my dissertation was that knowledge about detailed network access control configuration (for example, the Linux iptables firewall), enterprise-level security requirements including best practice recommendations (for example, RFC and NIST standards for firewalls) and their relationships can be modelled, queried and reasoned over within an ontology-based framework. A threat-based approach was taken to structure this knowledge which provided a basis to automatically synthesise and perform (query & structural) analysis of network access control configurations.

Applied Researcher, Waterford Institute of Technology.

Sept. 2004 - Dec. 2005

While at the Telecommunications Software & Systems Group (TSSG), my research (directed by Prof. Willie Donnelly) focused on the security aspects of the following EU FP6 projects: SecurIST and Daidalos. In addition, I also collaborated and contributed to a number of EU FP7 and Enterprise Ireland project proposals. I was also involved in writing both EU and National project proposals.

Research Scientist, Ericsson Applied Research Laboratories.

Jan. 2003 - March 2004

The research (directed by Dr. Konrad Wrona) focused on a dynamic game theoretical model of node cooperation within ad-hoc networks, based on evolutionary game theory.

M.Sc. Internship, National University of Ireland, Maynooth.

Sept. 2000 - Oct. 2002

Supervisor: Dr. Stephen Brown.

The research developed a tool called *KETTLe: Kernel Event Tracing for Time & Logic*. *KETTLe* monitors the execution time of IP forwarding stack mechanisms for a given datagram traversing a Linux router.

Note, the role also involved lecturing, laboratory demonstration and assignment corrections.

ACADEMIC
EXPERIENCE

Lecturing and Supervision, University College Cork.

April. 2008 - Feb. 2013

I have actively lead research programmes & managed postgraduate and undergraduate students.

Ph.D. External Examiner:

- Hisain Elshaafi: *“Establishment and Maintenance of Trustworthy Composite Services Using Multidimensional Service Attributes”*, Waterford Institute of Technology, Ireland, May 2014. Supervisors are Dr. Dmitri Botvich & Mr. Jimmy McGibney (same institute).

Co-supervised the following taught M.Sc. degree projects with Dr. Simon N. Foley:

- Li, X.: **Botnet Analysis and Detection for the Smartphone**, 2012.
- Neville, U.: **A Firewall Configuration Management Tool For The Smartphone**, 2011.
- Cui, W.: **Semantic Web Techniques for Intrusion Detection and Prevention**, 2009.
- O’Neill, L.J.: **Semantic Web Techniques for Network Discovery**, 2009.

Developed, lectured and tutored on the following lectures (inc. assignments):

- **Hacker: Anatomy of an Attack**, University College Cork: 2010 & 2011.
- **Firewalls & Firewall Configuration**, University College Cork, 2010 - 2013.
- **An Introduction to iptables**, University College Cork: 2010 - 2013.
- **Firewall Configuration Management**, University College Cork: 2010 - 2013.
- **Hacker: Introduction to Security Auditing**, National University of Maynooth: 2008.

ADDITIONAL
CERTIFICATION

EMC ViPR SRM Implementation and Maintenance v2 course	July 2014
EMC/RSA Information Storage and Management v2 course	May 2014
EMC/RSA Interviewing Skills (EMEA) course	May 2014
EMC/RSA Emotional Intelligence (EMEA) course	April 2014
JEB/EDI Teachers Diploma in Information Technology	June 2008
Occupational First Aid Certificate including Defibrillator Training in accordance with the ‘Irish safety, health and welfare at work act 1993’.	2007
Fire Safety & Warden Training.	2007
Irish FÁS Construction Site Safe Pass.	2002

ADDITIONAL
INFORMATION

I have had a variety of interesting occupations from working in a beef slaughter hall to steel fixing in the construction industry! As a hobby, I still dabble in *stone masonry** and auto-mechanics.

*<http://www.williamfitzgerald.net/misc/misc.html>

REFEREES

On request