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Centre for Multidisciplinary Research, Innovation and Collaboration

CYBER SCIENCE | 2019

PIONEERING RESEARCH & INNOVATION IN CYBER SITUATIONAL AWARENESS

Timetable

JUNE 3-4, 2019
UNIVERSITY OF OXFORD, UK

W W W . C - M R I C . O R G / C Y B E R

- International Conference on Cyber Situational Awareness, Data Analytics and Assessment (CyberSA 2019).

- International Conference on Social Media, Wearable and Web Analytics (Social Media 2019).

- International Conference on Cyber Security and Protection of Digital Services (Cyber Security 2019).

- International Conference on Cyber Incident Response, Coordination, Containment & Control (Cyber Incident 2019).

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... founded on research

iisp
The Institute of Information Security Professionals

secudit *the risk analyzer*

Grayfield Solicitors

CYBER SECURITY OXFORD

UNIVERSITY OF OXFORD
DEPARTMENT OF **COMPUTER SCIENCE**

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Cyber Science 2019 Thematic Tracks

Cyber Science 2019 Tracks

- Track 1: Machine Learning for Cyber Security
- Track 2: Blockchain Applications
- Track 3: Maritime CyberSA
- Track 4: National Directives & Policy
- Track 5: National Cyber Fusion Centres
- Track 6: Cyber Foresight & Risk Management
- Track 7: Cyber Threat Intel Sharing & RoI
- Track 8: Adversarial Cyber Defence
- Track 9: Human Factors & Cognition
- Track 10: Crypto Systems & Cloud
- Track 11: Visual Analytics & CyberOps
- Track 12: Cyber Insurance & Risk Controls
- Track 13: Software Security & DevOps
- Track 14: Data Science & Social Analytics

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Conference Venue

Department of Computer Science, University of Oxford, Wolfson Building
Parks Road, Oxford OX1 3QD, United Kingdom

The University of Oxford has been recognised in 2012 and again in 2017 as an Academic Centre of Excellence in Cyber Security Research (ACE-CSR). Oxford is one of 14 universities recognised by the National Cyber Security Centre (NCSC) and the Engineering and Physical Sciences Research Council (EPSRC), based on review by a panel of experts.

Please use Oxford e-Research Centre (OeRC) entrance: 7 Keble Road, Oxford OX1 3QG

Main Contact: Telephone: +44 (0)1865 273838
Web: https://www.cs.ox.ac.uk/aboutus/contact.html

CyberSecurity@Oxford brings together the dynamic and vibrant community of researchers and experts working on Cyber Security at the University of Oxford. The network links the wide variety of research and education activities across the University, and provides an easy point of contact for engagement.

With experts working in over 20 units across the University, the network is able to address the difficult questions that cross the borders of traditional academic disciplines: what does 'good' cybersecurity look like, and how does that change in different contexts? How can technology interact gracefully with messy human realities?

Directions

By Car	From London Airports
Postcode is OX1 3QD. Use the following navigation coordinates 51.759587, -1.258277	From London Heathrow and Gatwick, take the Airline coach service. From London Stansted, take the Stansted Express train service to Liverpool Street and take the tube to either Paddington or Marylebone for direct trains to Oxford. (please ask for other airports)
By Train	
Direct services from London Paddington and London Marylebone.	

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Cyber Science 2019 Conference Presentation Timetable

Cyber Science 2019
Comprising
International Conference on Cyber Situational Awareness, Data Analytics and Assessment (Cyber SA 2019)
International Conference on Social Media, Wearable and Web Analytics (Social Media 2019)
International Conference on Cyber Security and Protection of Digital Services (Cyber Security 2019)
International Conference on Cyber Incident Response, Coordination, Containment & Control (Cyber Incident 2019)
International Workshop on Cyber Insurance and Risk Controls (CIRC 2019)
International Workshop on Secure Software Engineering in DevOps and Agile Development (SecSE 2019)

Day 1: Monday 3 June, 2019

Department of Computer Science, University of Oxford	
08:00 – 09:00	**Registration, Networking and Refreshments in the <u>Atrium</u>**
09:00 – 09:05	**Welcome Session – <u>Lecture Theatre B (LTB)</u>** **Dr Cyril Onwubiko** – Chair, Cyber Security Intelligence, Research Series, London, UK

09:05 – 09:15	**Announcements & Introduction (LTB)**
	  Dr Xavier Bellekens – Conference Chair
	  Dr Arnau Erola – Conference Chair
	  Dr Martin Gilje Jaatun – Conference Chair
	  Dr Hongmei (Mary) He – Session Chair

09:15 – 09:45	**Keynote (LTB): Opening Session** **Professor Mike Hinchey** – Chair, IEEE United Kingdom & Ireland & President, IFIP
09:45 – 10:15	**Keynote (LTB):** **Jacques Sahel** – Managing Director, ICANN, Europe **John Crain** – Chief Security, Stability & Resiliency Office, ICANN, USA
10:15 – 10:35	**Coffee Break & Social Networking (Atrium)**

Suites	Lecture Theatre B	Conference Room (278)	Access Grid Room (277)
	Track 1: Machine Learning for Cyber Security	**Track 7: Cyber Threat Intel Sharing & Return on Investment**	**Track 3: Maritime CyberSA**
10:50 – 11:10	**Efficient and Interpretable Real-Time Malware Detection Using Random-Forest** *Alan Mills, Theodoros Spyridopoulos and Phil Legg*	**Cyber Threat Intelligence for "Things"** *Thomas Daniel Wagner*	**Factors Affecting Cyber Risk in Maritime** *Kimberly Tam and Kevin Jones*
11:10 – 11:30	**TrapMP: Malicious Process Detection by Utilising Program Phase Detection** *Zirak Allaf, Mo Adda and Alexandar Gegov*	**In wolf's clothing: Complications of threat emulation in contemporary cyber intelligence practice** *Jd Work*	**Cyber attacks real time detection: towards a Cyber Situational Awareness for naval systems** *Olivier Jacq, David Brosset, Yvon Kermarrec and Jacques Simonin*
11:30 – 11:50	**A Novel Method to Prevent Phishing by using OCR Technology** *Yunjia Wang and Ishbel Duncan*	**Cyber KPI for Return on Security Investment** *Cyril Onwubiko and Austine Onwubiko*	**Forensic Readiness within the Maritime Sector** *Kimberly Tam and Kevin Jones*
11:50 – 12:10	**Industry Speaker** **Simon Wilson** – *CTO UK & Ireland, Aruba Networks, a HPE Company*	**Longitudinal performance analysis of machine learning based Android malware detectors** *Suleiman Yerima and Sarmadullah Khan*	**Design principles for national cyber security sensor networks: Lessons learned from small-scale demonstrators** *Florian Skopik and Stefan Filip*
12:20 – 12:30	**Group Conference Photographs at the <u>Convocation House</u>**		
12:30 – 13:30	**Lunch at the <u>Convocation House</u>**		
14:00 – 14:30	**Keynote (LTB):** **Professor Awais Rashid** – Professor of Cyber Security at University of Bristol, UK		

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Suites	Lecture Theatre B	Conference Room (278)	Access Grid Room (277)
	Track 4: National Directives & Cyber Policy	**Track 6: Cyber Foresight & Risk Management**	**Track 10: Crypto System & Cloud**
14:40 – 15:00	**Does the NIS implementation strategy effectively address cyber security risks in the UK?** *Meha Shukla, Shane Johnson and Peter Jones*	**Security awareness escape room - a possible new method in improving security awareness of users** *Eszter Diána Oroszi*	**Analysis of Obfuscated Code with Program Slicing** *Mahin Talukder, Syed Islam and Paolo Falcarin*
15:00 – 15:20	**Facebook Data: Sharing, Caring, and Selling** *Renate Schubert and Ioana Marinica*	**Collaborative Training and Response Communities - An Alternative to Traditional Cyber Defense Escalation** *Erik Moore, Steven Fulton, Roberta Mancuso, Tristen Amador and Dan Likarish*	**A Scalable Attribute Based Encryption for Secure Data Storage and Access in Cloud** *Kamalakanta Sethi, Ankit Pradhan, Punith. R and Padmalochan Bera*
15:20 – 15:40	**Towards Better Understanding of Cyber Security Information Sharing** *Adam Zibak and Andrew Simpson*	**A Social Engineering Course Project for Undergraduate Students Across Multiple Disciplines** *Aunshul Rege, Katorah Williams and Alyssa Mendlein*	**Arithmetic Circuit Homomorphic Encryption and Multiprocessing Enhancements** *Ruitao Kee, Jovan Sie, Rhys Wong and Chern Nam Yap*
15:40 – 16:00	**BATSense: Anomalous Security-Event Detection using TBATS Machine Learning** *Pranshu Bajpai, Tyler Olsen, Seth Edgar, Rob McCurdy and Richard Enbody*	**Resiliency under Strategic Foresight: The effects of Cybersecurity Management and Enterprise Risk Management alignment** *Abraham Althonayan and Alina Andronache*	**Cyber Security Supervision in the Insurance Sector: Smart Contracts and Chosen Issues** *Remy Remigius Zgraggen*
16:00 – 16:30	**Coffee Break & Social Networking (Atrium)**		
16:30 – 17:00	**Keynote (LTB):** **Ros Smith** – Senior Product Manager in Identity and Access Management, BBC, UK		
from 17:00	**Poster Discussion**		
19:00	**Social Evening Dinner & Drinks - Rewley House**		

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Day 2: June 04, 2019

	Department of Computer Science, University of Oxford		
08:00 – 09:00	Registration, Networking and Refreshments in the <u>Atrium</u>		
Suites	Lecture Theatre B	Conference Room (278)	Access Grid Room (277)
	Track 11: Visual Analytics & CyberOps	Track 2: Blockchain Applications	Track 9: Human Factors & Cognition
09:00 – 09:20	**What makes for effective visualisation in Cyber Situational Awareness for Non-Expert Users?** *Fiona Carroll, Phil Legg and Adam Chakof*	**MANiC: Multi-step Assessment for Crypto-miners** *Jonah Burgess, Philip O'Kane, Domhnall Carlin and Sakir Sezer*	**Organizational formalization and employee information security behavioral intentions based on an extended TPB model** *Yuxiang Hong and Steve Furnell*
09:20 – 09:40	**The Future of Cyber Analytics: Identity Classification for Systematic and Predictive Insight** *Mary C. (Kay) Michel and Michael C. King*	**A cost-efficient Protocol for Open Blockchains** *Chunlei Li, Chunming Rong and Martin Gilje Jaatun*	**Practical approach for measuring the level of user behavior** *Ferenc Leitold*
09:40 – 10:00	**Threat Modeling of Connected Vehicles: A privacy analysis and extension of vehicleLang** *Wenjun Xiong and Robert Lagerström*	**Ethereum Blockchain for Securing the Internet of Things: Practical Implementation and Performance Evaluation** *Subhi Alrubei, Jonathan Rigelsford, Callum Willis and Edward Ball*	**Security-Related Stress: A Perspective on Information Security Risk Management** *Martin Lundgren and Erik Bergström*
10:00 – 10:20	**Online Anomaly Detection of Time Series at Scale** *Andrew Mason, Yifan Zhao, Hongmei He, Raymon Gompelman and Srikanth Mandava*	**Secure Chaotic Maps-based Authentication Scheme for Real-Time Data Access in Internet of Things** *Wenting Li, Haibo Cheng and Ping Wang*	**Big Social Data - Predicting Users' Interests from their Social Networking Activities** *Alexiei Dingli and Bernhardt Engerer*
10:20 – 10:40	Coffee Break & Social Networking (Atrium)		

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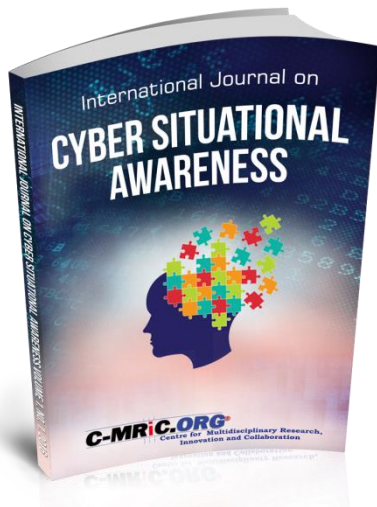**Centre for Multidisciplinary Research, Innovation and Collaboration**

11:00 – 11:30	Keynote (Convocation House): Dr Aunshul Rege – Associate Professor, Department of Criminal Justice, Temple University, USA		
11:30 – 12:00	Keynote (Convocation House): Professor Sadie Creese – Professor of Cyber Security, Department of Computer Science, University of Oxford, UK		
12:00 – 12:10	**Group Conference Photographs at the <u>Convocation House</u>**		
12:10 – 13:10	**Lunch in the <u>Convocation House</u>**		
13:10 – 13:20	**Group Plenary Discussion & Bidding to host Cyber Science 2020**		
Suites	**Lecture Theatre B**	**Lecture Theatre A**	**Access Grid Room (277)**
	Track 13: SecSE Workshop	**Track 12: Cyber Insurance & Risk Controls (CIRC) Workshop**	**Track 14: Data Science & Social Analytics**
13:30 – 14:00	**Keynote: Chrissy Morgan Practically Teaching the Next Generation**	**13:40 - 14:00** Two simple models of business interruption accumulation risk in cyber insurance *Ulrik Franke and Joachim Draeger*	**Examining the Roles of Muhajirahs in the Islamic State via Twitter** *Aunshul Rege and Scott Vanzant*
14:00 – 14:20	**Security Risk Assessment and Management as Technical Debt** *Kalle Rindell and Johannes Holvitie*	**Quantile based risk measures in cyber security** *Maria Francesca Carfora and Albina Orlando*	**Domain Identification for Commercial Intention-holding Posts on Twitter** *Yanyuan Zhu, Mee Chi So and Paul Harrigan*
14:20 – 14:40	**Threat modelling and agile software development: Identified practice in Norwegian organisations** *Karin Bernsmed and Martin Gilje Jaatun*	**Cyber Insurance and Time-to-Compromise: An Integrated Approach** *Ganbayar Uuganbayar, Fabio Massacci, Fabio Martinelli and Artsiom Yautsiukhin*	**A Comparison of Machine Learning Approaches for Detecting Misogyny Speech in Urban Dictionary** *Theo Lynn et al.*
14:40 – 15:10	**Attack Surface Identification and Reduction Model Applied in Scrum**	**Demand side expectations of cyber insurance**	**The determinants of individual cyber security behaviours**

	George O. M. Yee	*Ulrik Franke and Per Håkon Meland*	*Bertrand Venard*
15:10 – 15:30	**An Empirical Study on Culture, Automation, Measurement, and Sharing of DevSecOps** *Nora Tomas, Jingyue Li and Huang Huang*	**Analysing cyber-insurance claims to design harm-propagation trees** *Louise Axon, Arnau Erola, Ioannis Agrafiotis, Michael Goldsmith and Sadie Creese*	**A Preliminary Exploration of Uber Data as an Indicator of Urban Liveability** *Aguinaldo Bezerra, Gisliany Alves, Ivanovitch Silva, Pierangelo Rosati, Patricia Takako Endo and Theo Lynn*
15:30 – 16:00	**Coffee Break & Social Networking (Atrium)**		
Suites	**Lecture Theatre B**	**Lecture Theatre A**	**Access Grid Room (277)**
	Track 13: SecSe Industrial	**Track 5: National Cyber Fusion Centres**	**Track 8: Adversarial Cyber Defence**
16:00 – 16:20	**Industry Speaker Frank Aakvik** – *Capture*	**Cyber Onboarding is 'Broken'** *Cyril Onwubiko and Karim Ouazzane*	**A Combined Attack-Tree and Kill-Chain Approach to Designing Attack-Detection Strategies for Malicious Insiders in Cloud Computing** *Adrian Duncan, Sadie Creese and Michael Goldsmith*
16:20 – 16:40	**Industry Speaker Marco Constantino** – *Kongsberg Digital*	**Adaptive and Intelligible Prioritization for Network Security Incidents** *Leonard Renners, Felix Heine, Carsten Kleiner and Gabi Dreo Rodosek*	**Pattern discovery in intrusion chains and adversarial movement** *Nima Asadi, Aunshul Rege and Zoran Obradovic*
16:40 – 17:00	**Industry Speaker Nick Murison –** *Synopsys*	**Towards a Conversational Agent for Threat Detection in the Internet of Things** *Christopher D. McDermott et al.*	**Destructive Attacks Detection and Response System for Physical Devices in Cyber-Physical Systems** *Peyman Kabiri and Mahdieh Chavoshi*
17:00 – 17:20	**Industry Speaker Thomas Frederik Düllmann –** *ISTE, University of Stuttgart, Germany*	**Brexit Impact on Cyber Security of United Kingdom** *Muntaha Saleem*	**Keystroke Dynamics using Auto Encoders** *Yogesh Patel, Karim Ouazzane, Vassil Vassilev, Ibrahim Faruqi and George Walker*
	Closing remarks & Thank you by Dr Cyril Onwubiko in Lecture Theatre B		
17:40 – onwards	**Networking (Atrium)**		

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International Journal on Cyber Situational Awareness (IJCSA)

The **International Journal on Cyber Situational Awareness (IJCSA)** is a comprehensive reference journal, dedicated to disseminating the most innovative, systematic, topical and emerging theory, methods and applications on Situational Awareness (SA) across Cyber Systems, Cyber Security, Cyber Physical Systems, Computer Network Defence, Enterprise Internet of Things (EIoT), Security Analytics and Intelligence to students, scholars, and academia, as well as industry practitioners, engineers and professionals.

https://www.c-mric.com/journals/ijcsa

Editor-in-Chief: Dr Cyril Onwubiko

**Associate Editors:**
Professor Frank Wang
Professor Karen Renaud

C-MRiC Other Services

We provide a number of other and interrelated services, such as:

- Innovation, Research & Development ranging from national cyber security programmes, enterprise security management, information assurance, protection strategy & consultancy

- Customised & Professional Training

- Technology-inspired programmes, and undertake independent bespoke technology-based & survey-based research engagements

- Security Testing and Lab Experimentations

- Conference Organisation

- Printing and Publications

- Consultancy & Consortium-led collaborations

Cyber Science 2020

Cyber Science is the flagship conference of the Centre for Multidisciplinary Research, Innovation and Collaboration (C-MRiC) focusing on pioneering research and innovation in Cyber Situation Awareness, Social Media, Cyber Security and Cyber Incident Response. It is an IEEE technically co-sponsored conference. Cyber Science aims to encourage participation and promotion of collaborative scientific, industrial and academic inter-workings among individual researchers, practitioners, members of existing associations, academia, standardisation bodies, and including government departments and agencies. The purpose is to build bridges between academia and industry, and to encourage interplay of different culture. Cyber Science invites researchers and industry practitioners to submit papers that encompass principles, analysis, design, implementation, methods and applications. It is a yearly conference held at various cities; the first three meetings have been in London, followed by Glasgow, Scotland in 2018, University of Oxford, England in 2019.

Cyber SA

Social
Media

Cyber
Science

Cyber
Incident
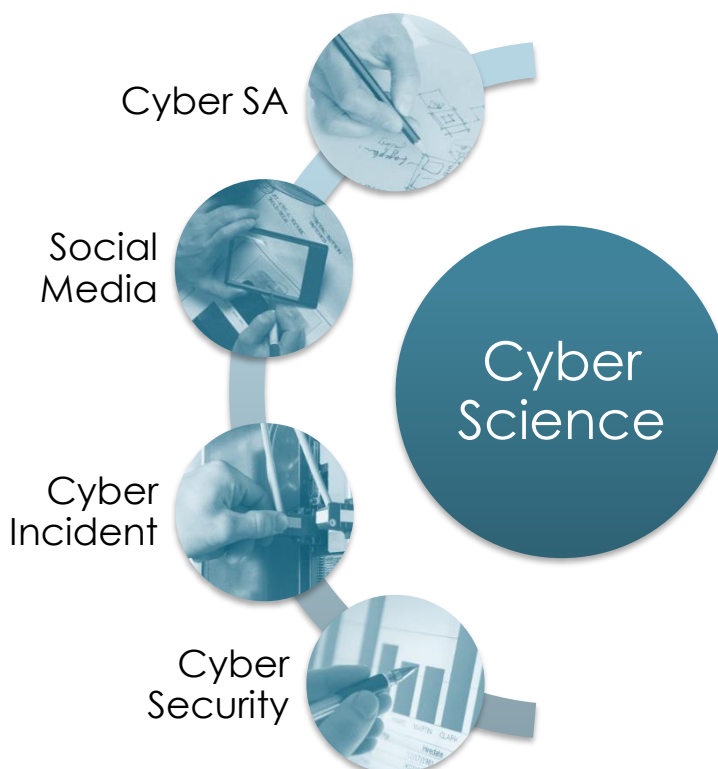
Cyber
Security

The theme for Cyber Science 2020 is:

Theme – Machine Learning for insight in Cyber Security and Situational Awareness

Dates: **Cyber Science 2020 will be held on Monday 15th to Wednesday 17th June 2020.**

Venue: **TBC**

Request to host Cyber Science 2020

To bid to host the Cyber Science 2020 joint & co-located multidisciplinary and internationally refereed conferences, or to organise a workshop or seminar as part of the Cyber Science 2020, please contact us immediately, it's first come first served, however, all bids will be assessed fairly. A decision will be made in **September 2019**. All bids must be submitted via email to submission@c-mric.org **Thank-you!**

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Organiser / Contact Us

Centre for Multidisciplinary Research, Innovation and Collaboration (C-MRiC.ORG)

Centre for Multidisciplinary Research, Innovation and Collaboration (C-MRiC) is a nonprofit non-governmental organisation.

The aim is to participate, encourage and promote collaborative scientific, industrial and academic inter-workings among individual researchers, practitioners, members of existing associations, academia, standardisation bodies, and including government departments and agencies.

The purpose is to build bridges between academia and industry, and to encourage interplay of different cultures.

C-MRiC is committed to outstanding research and innovation through collaboration, and to disseminate scientific and industrial contributions through seminars and publications. Its products range from conferences on advanced and emerging aspects of societal issues, ranging from Cyber security to environmental pollution, and from Health IT to Wearable, with the best of breeds of such contributions featuring in our journal publications.

C-MRiC is reliant on individual and corporate voluntary and free memberships to support its activities such as peer reviews, editorials, participating, organising and promoting conference and journal publications.

We collaborate with academia, industries and government departments and agencies in a number of initiatives, ranging from national cyber security, enterprise security, information assurance, protection strategy, climate control to health and life sciences.

We participate in academic and industrial initiatives, national and international collaborative technology-inspired programmes, and undertake independent bespoke technology-based & survey-based research engagements.

C-MRiC is free membership to both individuals and corporate entities; it is voluntary, open and professional.

Membership to C-MRiC entitles you free access to our publications, early sightings to research and innovations, and allows you to submit, request and pioneer research, conference or journal project through us. Members are selected based on expertise to support some of our activities on a voluntary basis, such as peer reviews, editorials, participating, organising and promoting conference and journal publications.

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