PROF. N. ASOKAN

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PERSONAL INFORMATION

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Nationality: Citizen of Canada and Finland.

EDUCATION AND DEGREES

Doctor of Philosophy (PhD) in Computer Science *May 1998*

University of Waterloo, Waterloo, Ontario, Canada.

Dissertation title: *Fairness in Electronic Commerce.*

Supervisors: Jay Black and Michael Waidner.

Committee: Peter Landrock (external), Gord Agnew, Ken Salem, Johnny Wong.

Master of Science (MS) in Computer and Information Science *December 1989*

Syracuse University, Syracuse, New York, USA.

Subject areas: Parallel programming, the Connection Machine.

Bachelor of Technology (BTech) Honours in Computer Science & Engineering *May 1988*

Indian Institute of Technology, Kharagpur, India.

Dissertation title: *A Multi-processor Database System.*

CURRENT POSITION

Aalto University, Finland. *From August 2013*

Full Professor (tenured), *Department of Computer Science.*

Director, Helsinki-Aalto Center for Information Security (HAIC), *From 2016*

PREVIOUS WORK EXPERIENCE

University of Helsinki, Finland. *September 2012 - December 2017*

Professor (part-time from Aug 2013), *Department of Computer Science.*

Nokia Research Center, Helsinki, Finland. *January 1999 - September 2012*

Distinguished Researcher in security technologies, *March 2008 - September 2012*.

Distinguished Research Leader, Security and Networking Protocols team, *January 2012 - August 2012*.

Research Leader, Trustworthy Mobile Platforms, *January 2009 - December 2010*.

Research Leader, TCI team, Internet Laboratory, *May 2008 - December 2008*.

Senior Research Manager, Secure Systems group, *February 2004 - December 2006*.

Research Manager, Applied Security Technologies group, *February 2003 - February 2004*.

Principal Scientist in security technologies, *March 2000 - March 2008*.

Senior Research Engineer, *January 1999 - February 2000*.

Helsinki University of Technology, Helsinki, Finland. *March 2006 - December 2007*

Professor (fixed-term, part-time (20%) appointment), *Department of Computer Science*.

IBM Research Division, Zurich, Switzerland. *November 1995 - December 1998*

Research Staff Member, *Network security and cryptography group, Zurich Research Laboratory. January 1998 - December 1998*.

Pre-doctoral Research Scientist, *Network security and cryptography group, Zurich Research Laboratory. November 1995 - December 1997*.

University of Waterloo, Waterloo, Ontario, Canada. *January 1990 - October 1995*

Software Systems Specialist, *Mathematics Faculty Computing Facility.*

Syracuse University, Syracuse, New York, USA. *August 1988 - December 1989*

Teaching Assistant, *School of Computer and Information Science.*.

Intellisys, Syracuse, New York, USA. *May 1989 - August 1989*

Summer intern.

Hindustan Computers Ltd., Chennai, India. *May 1987 - July 1987*

Industrial trainee.

TYPES OF EXPERIENCE

Research:

Aalto University and University of Helsinki

Systems Security: mobile platform security, machine learning and security, security of blockchains, usable security, contextual security, cloud security.

Nokia Research Center

Security Technologies: Application of data analytics to security/privacy problems, on-board credentials, security protocols for "First Connect," platform security and trusted computing, usable security, generic authentication architecture, cryptographic protocols for electronic voting and auctions, authorization protocols and infrastructures, digital rights management, security in ad hoc and disruption-prone network environments.

Networking Technologies: IPv4/IPv6 transition techniques for Mobile IP, IPv6 over GPRS, IP-based micro-mobility management.

Distributed Systems: Remote storage for mobile devices.

IBM Research Division

Electronic commerce: Generic electronic payment service, handling disputes in electronic payment systems.

Security protocols: Protocols for optimistic fair exchange, server-supported signatures, integrity protection for mobile agents, authentication of public terminals.

University of Waterloo

Security: Security issues in mobile computing.

Syracuse University

Parallel programming: Parallel implementations of algorithms and systems: the Hough transform method, Rochester connectionist simulator.

Intellisys

Image processing: A pre-processor to extract vectors out of images of text documents.

Leadership:

Aalto University

Leading strategic initiatives: Founding director of Helsinki-Aalto Center for Information Security HAIC (2016-).

Leading people: Co-founder/co-director of Secure Systems group (2014-).

Leading projects: Lead Academic Principal Investigator, ICRI-SC (2014-2017), ICRI-CARS (2017-2020); Technical leadership of Academy of Finland (BCon, CloSe, ConSec and SELIOT) and Business Finland/Tekes (CloSer) projects.

University of Helsinki

Leading people: Founder/co-director of Secure Systems group (2012-2016).

Leading projects: Lead Academic Principal Investigator, ICRI-SC (2013-2014).

Nokia Research Center

Leading people: Line manager/Group leader, Security and Networking Protocols (2012), Trustworthy Mobile Platforms (2009-2010), TCI team (2008), Secure Systems group (2004-2006), Applied Security Technologies group (2003-2004).

Leading projects: Planning, execution, and technology transfer in several research projects.

ACM: Member of the steering group of the SIGSAC conference WiSec (2011-2015), CCS SPSM workshop (2014-2017).

Other Work Experience:

Mathematics Faculty Computing Facility, University of Waterloo

Practical network security: Development of tools and mechanisms, adaptation of Kerberos authentication system for campus use.

Other software development: Development of parts of **xhier**, a system for packaging and maintenance of software on several hundred unix systems of different flavours.

Hindustan Computers Ltd.

Software development: various projects.

EXTERNAL RESEARCH FUNDING

Summary: Approximately 3.7 M€ *external research funding* raised during 2013-2018.

25 750 €: Co-PI (with my postdoc Dr. Samuel Marchal), *ML-based modeling of (suspicious) similarity in streaming data*, Zalando Payments, Germany (**research gift**) *2018*

US $600 000: Lead PI, *Intel Collaborative Research Institute for Collaborative, Autonomous and Reslient Systems* (ICRI-CARS) at Aalto, (**research gift**) *2017-2020*

419 843 €: PI, "Blockchain consensus and Beyond" (BCon), *Academy of Finland* *2017-2020*

234 894 €: Co-PI, "Securing Lifecycle of Internet of Things" (SELIOT), *Academy of Finland* 2017-2019

50 000 €: PI, "5G Security" (**research gift**), *Intel* *2016-2017*

438 500 €: Co-PI and co-ordinator, "Cloud-assisted Security Services" (CloSer), *Business Finland/Tekes* (Total funding for the consortium of 3 partners was 1.2 million €) *2016-2018*

72 120 €: PI, "Secure and Scalable Blockchain Technologies", *NEC Laboratories Europe* 2016-2017

429 921 €: PI, "Contextual Security" (ConSec), *Academy of Finland* *2014-2017*

610 000 €: Lead PI, *Intel Collaborative Research Institute for Secure Computing* (ICRI-SC) at Aalto *2014-2017*

280 011 €: PI and technical lead, "Cloud Security Services" (CloSe), *Academy of Finland* (Total funding for the consortium of 6 partners was 1.1 million €) *2014-2016*

330 000 €: PI, "Open-TEE for Android", *Huawei Corporation* *2015-2017*

US $50 000: Co-PI, Google Faculty Research Award (**unrestricted grant**) for "Contextual Security" (grant shared with Prof. Nitesh Saxena, University of Alabama at Birmingham) *2013-2014*

10 000 €: Recipient, Nokia donation for "Contextual Security" (**unrestricted grant**) *2013-2014*

200 000 €: Lead PI, *Intel Collaborative Research Institute for Secure Computing* (ICRI-SC) at University of Helsinki *2013-2014*

OTHER FUNDING

65 000 €: Donations from industry partners (F-Secure, Huawei, Intel, Nixu) for HAIC living cost scholarships for students admitted to our MSc program. `https://haic.aalto.fi/` *2016-*

US $35 000: Recipient, gift from Intel for security curriculum development (**unrestricted grant**) *2013*

Project proposals inside Nokia Research Center are subject to internal evaluation/approval processes. During my career at NRC, I have **proposed and led** projects ranging from **3-5 researchers** (initial years) to **8-12 researchers** (latter years).

SUPERVISION AND MENTORING

Supervision of postdoctoral researchers:

1. *Dr. Jorden Whitefield*, Aalto University *2019-*
2. *Dr. Saara Matala*, Aalto University *2019-*
3. *Dr. Mustafa Khalid Masood*, Aalto University *2018*
4. *Dr. Andrey Shorov*, Aalto University (now at University of Helsinki) *2017*
5. *Dr. Andrew Paverd*, Aalto University (now at Microsoft Research) *2015-2018*
6. *Dr. Samuel Marchal*, Aalto University *2015-*
7. *Dr. Ravishankar Borgaonkar*, Aalto University (now at SINTEF) *2015*
8. *Dr. Hien Truong*, University of Helsinki (now at NEC Labs Europe) *2013-2016*
9. *Dr. Sourav Bhattacharya*, Aalto University (now at Bell Labs) *2014*
10. *Dr. Sini Ruohomaa*, University of Helsinki (now at Ericsson) *2013-2014*

Supervision of doctoral research:

1. *Buse Atli Gul* *In progress*
2. *Amit Tambe* *In progress*
3. *Hans Liljestrand* *In progress*
4. *Tommi Gröndahl* *In progress*
5. *Mika Juuti* *In progress*
6. *Arseny Kurnikov* *In progress*
7. *Thomas Nyman* *In progress*
8. *Jian Liu* "Privacy-Preserving Cloud-Assisted Services", *Pass with distinction.* (now Postdoctoral researcher, UC Berkeley) *2018*
9. *Elena Reshetova*, "Mobile and Embedded Platform Security" (now Engineer, Intel) *2018*
10. *Sandeep Tamrakar*, "Applications of Trusted Execution Environments (TEEs)", (now Senior Engineer, Huawei Technologies) *2017*

Supervision of doctoral research, as advisor (formally "advisor" ('ohjaaja'), effectively de-facto supervisor including guidance of day-to-day research, joint publications):

11. *Jan-Erik Ekberg*, "Securing Software Architectures for Trusted Processor Environments", Aalto University. (now CTO for Mobile Security, Huawei Technologies) *2013*
12. *Kari Kostiainen*, "On-board Credentials: An Open Credential Platform for Mobile Devices", Aalto University. *Pass with distinction ('kiittäen hyvksytty')*. (now Senior researcher, ETH Zürich) *2012*

Supervisor: MSc theses:

(as Professor at Aalto University)

1. *Martin Kulhavy*, in progress *2018*
2. *Broderick Acquilino*, in progress *2018*

3. *Mari Nikkarinen*, in progress *2018*
4. *Raine Nieminen*, "Privacy-Preserving Indoor Localization with Paillier Encryption and Garbled Circuits" *2018*
5. *Max Reuter*, "Privacy Preserving Deep Neural Network Prediction using Trusted Hardware" *2018*
6. *Ricardo Vietitez Parra*, "The Impact of Attestation on Deniability" *2018*
7. *Koen Tange*, "High Speed Consensus with Trusted Execution Environments" *2018*
8. *Sten Hägglund*, "Impact of European Union General Data Protection Regulation to software-as-a- service providers" *2018*
9. *Johannes Väiniö*, "Physically Unclonable Functions as Trust Anchors for Connected Embedded Device Security" *2018*
10. *Artur Valiev* "Automatic Ownership Change Detection for IoT devices" *2018*
11. *Alexey Dmitrenko*, "DNN model extraction attacks using prediction interfaces" *2018*
12. *Dmitry Kirichenko*, "Detection of application used on a mobile device based on network traffic" *2018*
13. *Manish Thapa*, "Mitigating Threats in IoT Network using Device Isolation" *2018*
14. *Anwar Hassan*, "Detecting Botnets in OpenStack Cloud Environment" *2017*
15. *Radek Tomšů*, "Automated Deauthentication using Web Transaction Analysis, *2017*
16. *Buse Gül Atli*, "Anomaly-Based Intrusion Detection by Modeling Probability Distributions of Flow Characteristics", *2017*
17. *Rakesh Gopinath*, "Improving the Security and Efficiency of Blockchain-based Cryptocurrencies" *2017*
18. *Md Sakib Nizam Khan*, "Enhancing privacy in IoT devices through automated handling of ownership change" *2017*
19. *Klaudia Krawiecka*, "Improving web security using trusted hardware" **Winner**, Best information security thesis in Finland (Tietoturva ry), **Honourable Mention**, Best computer science thesis in Finland (Finnish Society for Computer Science). *2017*
20. *Gayathri Srinivaasan*, "Malicious entity categorization using graph modeling" *2016*
21. *Giovanni Armano*, "Real-Time client-side phishing prevention" *2016*
22. *Dawin Schmidt*, "A security and privacy audit of KakaoTalk's end-to-end encryption" *2016*
23. *Luigi di Girolamo*, "Design and development of an Android access management application" *2016*
24. *Rui Yang*, "Java APIs for trusted execution environments" *2016*
25. *César Pereída*, "Cache-timing techniques: exploiting the DSA algorithm" **Winner**, Best information security thesis in Finland (Tietoturva ry) *2016*
26. *Pävivi Tynninen*, "Towards automated isolation of security sensitive execution" *2016*
27. *Lari Lehtomäki*, "Realizing eID scheme on TPM 2.0 hardware" *2016*
28. *Swapnil Udar*, "Contextual Authentication and Autho- rization using Wearable Devices" *2016*
29. *Setareh Roshan Kokabha*, "An Online Anomaly-Detection Neural Networks-based Clustering for Adaptive Intrusion Detection Systems" *2015*
30. *Nguyen Hoang Long*, "Securely accessing encrypted cloud storage from multiple devices" *2015*
31. *Robin Babujee Jerome*, "Pre-processing Techniques for Anomaly Detection in Telecommunication Networks". *2015*

(as Professor at University of Helsinki)

32. *Aaro Lehikoinen*, "HardScope: defence against data-oriented programming attacks" *2017*
33. *Aku Silvennoinen*, "Accountable De-anonymization in V2X Communication" *2017*
34. *Hans Liljestrand*, "Linux Kernel Memory Safety" *2017*
35. *Jian Liu*, "How to Steer Users Away from Unsafe Content". *2014*
36. *Xiang Gao*, "Strengthening Zero-Interaction Authentication Using Contextual Co-presence Detection". *2014*
37. *Thomas Nyman*, "Dynamic Isolated Domains" *2014*

(as Professor at Helsinki University of Technology)

38. *Pekka Sillanpää*, "Distributed Digital Identity System – Peer-to-Peer Perspective" *2007*
39. *Aishvarya Sharma*, "On-board Credentials: Hardware assisted secure storage of credentials" *2007*
40. *Cherdpan Sripan*, "User-to-Service authentication Using Mobile phones" *2006*
41. *Antti Halla*, "Applying a Systems Approach to Security in a Voice Over IP System" *2006*
42. *Otto Kolsi*, "Secure MIDP Applications". *2006*

Supervision of MSc theses, as advisor (formally 'advisor' ('ohjaaja'), effectively de-facto supervisor including guidance of day-to-day research, joint publications):

1. *Olli Jarva*, "Intelligent two-factor authentication Deciding authentication requirements using historical context data", Aalto University.
   Winner, Best information security thesis in Finland (Tietoturva ry), **Honourable Mention**, Best computer science thesis in Finland (Finnish Society for Computer Science). *2014*
2. *Kari Kostiainen*, "Intuitive Security Initiation Using Location-Limited Channels", Helsinki University of Technology. *2004*
3. *Jarkko Tolvanen*, "Device Security", University of Helsinki. *2001*

Supervision of research interns: These interns typically spent 4-6 months in my group under my guidance (sometimes also under the guidance of a senior researcher in my group). Many of the students went on to do follow-up work in the same or related areas. In several cases (marked with an '*'), the intern's work done under my supervision was included in the eventual thesis/dissertation.

1. *Marcin Nagy* (Aalto, doctoral)
2. * *Aditi Gupta* (Purdue, doctoral)
3. *Alexandra Afanasyeva* (SUAI St. Petersburg, doctoral)
4. * *Pern Hui Chia* (NTNU, doctoral; Helsinki University of Technology, master's)
5. * *Sandeep Tamrakar* (Aalto; doctoral)
6. * *John Solis* (UC Irvine; doctoral)
7. * *Paul Dunphy* (Newcastle; doctoral)
8. * *Long Nguyen Huang* (Helsinki University of Technology; master's)
9. * *Ersin Uzun* (UC Irvine; doctoral)
10. *Nitesh Saxena* (UC Irvine; doctoral)

TEACHING

Teaching – coursework:

Aalto University

CS-E4310 Mobile Systems Security. (annually) *Spring 2015-2019*

GIAN program, Ministry of Human Resource Development, India

Mobile Systems Security, MNIT Jaipur. *Nov 2016*

University of Helsinki

Mobile Platform Security. *Spring 2014*

Research seminar on Mobile Security. *Fall 2013*

Undergraduate seminar: Information and System Security. *Spring 2013*

Mini course: Selected topics in mobile security *Fall 2012*

Undergraduate seminar: Security in distributed systems. *Fall 2000*

Universitá degli Studi di Padova

3 lectures sponsored by the European Commission Erasmus "Lifelong Learning Programme" *Ju 2012*

Helsinki University of Technology

T-110.6120 Undergraduate seminar: Special course in data communication software (responsible for security-related topics). *Fall 2006, 2007*

T-110.7190 Research Seminar on Data communications Software: Energy Awareness (responsible for security-related topics). *Fall 2007*

T-110.7200 Graduate Research Seminar: Recent Advances in Trustworthy Computing. *Spring 2007*

T-110.7290 Graduate Research Seminar: Authentication and Key Establishment (with Kaisa Nyberg, T-79.7001). *Fall 2006*

Syracuse University

Introduction to pascal programming (adult education section). *Fall 1989*

Introduction to pascal programming. *Spring 1989*

Teaching Assistant, Introduction to pascal programming. *Fall 1988*

Indian Institute of Technology, Kharagpur

Laboratory instructor, Programming and data structures course. *Spring 1988*

Teaching – course development: Mobile Systems Security. *Spring 2014*

Teaching – tutorials:

1. *Remote Attestation – Building trust in things you can't see*, Tutorial at **ACM Asia Conference on Computer and Communications Security** (ASIACCS 2017), Abu Dhabi, UAE, `http://asiaccs2017.com/program/tutorials/` April 2017
2. *Challenges in Realizing Secure Cloud Storage Services*, Lecture at the **Summer School on Secure and Trustworthy Computing**, Bucharest, Romania, `http://summerschool.trust.cased.de/` *Sep 2015*
3. *Mobile Security*, 3 lectures at the **International Summer School on Information Security**, Bilbao, Spain, `http://grammars.grlmc.com/InfoSec2015/` *July 2015*

4. *Mobile Security*, 3 lectures at the **Third TCE Summer School on Computer Security**, Technion, Israel, http://events-tce.technion.ac.il/summer-school-2014/ (videos: https://youtu.be/PFjh-IeUJMI, and https://youtu.be/MHZZ84gWH_c) *September 2014*
5. *Mobile Security*, 3 lectures at the **International Summer School on Smart & Mobile Device Security and Privacy**, Padova, Italy. http://spritz.math.unipd.it/events/2014/SMDSP/index.html *September 2014*
6. *Mobile Platform Security Architectures*, Half day tutorial, **International Conference on Security, Privacy, and Applied Cryptography Engineering (SPACE 2012)**, Indian Institute of Technology, Chennai, India. *October 2012*
7. *Security for end users: from personal devices to Internet of Things*, (Planned) Half day tutorial, **International Conference on Security, Privacy, and Applied Cryptography Engineering (SPACE 2012)**, Indian Institute of Technology, Chennai, India. *October 2012*
8. *Intuitive security policy configuration in mobile devices using context profiling* (Invited Guest Speaker Talk), **6th Bertinoro PhD School on Security of Wireless Networking**, Bertinoro, Italy. October 2012
9. *Initializing Security Associations for Personal Devices*, **ZISC workshop on Wireless Security**, ETH Zürich, Switzerland. *September 2007*

AWARDS AND HONOURS

ACM Fellow https://awards.acm.org/fellows/award-winners *2018*

ACM SIGSAC **Outstanding Innovation Award**, https://www.sigsac.org/award/sigsac-awards.html *2018*

Finalist, NYU CyberSecurity Awareness week (CSAW) Applied Research Competition, https://csaw.engineering.nyu.edu/research *2017*

Best poster/demo, IEEE ICDCS 2017 conference, http://icdcs2017.gatech.edu/awards/ *2017*

Honorable Mention, ACM ASIACCS 2017 conference
http://asiaccs2017.com/program/distinguished-papers/ *2017*

IEEE Fellow (http://www.comsoc.org/about/memberprograms/fellows/2017) *2017*

First prize (20 000 €) for OmniShare in the EU MAPPING "Privacy via IT Security" App Competition, awarded at CeBIT. http://www.mappingtheinternet.eu/node/115 *2016*

Best small course (responsible professor) and second best small course (lecturer and responsible professor) as rated by students, Computer Science department, Aalto University. https://wiki.aalto.fi/display/CSnews/CS+News#CSNews-ThebestcoursesoftheDegreeProgrammeinCSE *2015*

ACM Distinguished Scientist. (http://awards.acm.org/award_winners/asokan_4672457.cfm) *2015*

Best paper award, ACM ASIACCS 2014 conference. http://asiaccs2014.nict.go.jp/ *2014*

Google Faculty Research Award. (http://research.google.com/university/relations/fra_recipients.html) *2013*

Best demo award, IEEE PerCom 2011 conference. *2011*

Nokia Excellence Award – Research Category, Leader of a semi-finalist team (top 12/57), Nokia *2011*

NRC Breakthrough[1] (**Device Certification Server** technology transfer), Nokia. *Dec. 2010*

NRC Breakthrough (**On-board Credentials for Symbian** technology transfer), Nokia. *Jun. 2010*

Best paper award, INTRUST 2009 conference. *2009*

Induction into Nokia Research Center Club-10 (Holders of 10 Nokia patents), Nokia. *2007*

Nokia Quality Award – Research Category, Member of a finalist team (top 3), Nokia. *2007*

Inventor of the Year, Nokia. *2005*

Nokia Quality Award – Research Category, Member of the winning team, Nokia. *2005*

Research Division Award, IBM Research Division. *1998*

First Patent Application Award, IBM Research Division. *1998*

Graduate Scholarship, Syracuse University. *1988-89*

Summer Fellowship, Syracuse University. *Summer 1989*

SERVICE TO SCIENTIFIC/TECHNICAL COMMUNITY

Editorial boards and steering committees:

Associate Editor (2016) and Associate Editor-in-Chief (2017), IEEE *Security and Privacy*. *2016-2017*
Associate Editor, ACM Transactions on Information and System Security (TISSEC) *2013-2016*
Proceedings on Privacy Enhancing Technologies (PoPETs). *2014-2015, 2016-2017*
ACM CCS Workshop on Security and Privacy in Smartphones and Mobile Devices (SPSM). *2013-2017*
ACM Conference on Security and Privacy in Wireless and Mobile Networks. *2011-2015*
Computer Communications Journal. *2009-2010*
IEEE *Network*. *2007-2011*

Program chairs:

ACM CCS Workshop on Security and Privacy in Smartphones and Mobile Devices (SPSM). *2013*
International Conference on Trust and Trustworthy Computing – Technical Track (TRUST). *2013*
ACM Conference on Security and Privacy in Wireless and Mobile Networks (ACM WiSec). *2011*
ACM Workshop on Scalable Trusted Computing (ACM STC). *2009, 2010*

Program committees:

The Web Conference (formerly "WWW Conference"). *2019*
ACM Symposium on Information, Computer and Communications Security (ACM ASIACCS). *2008-2010, 2015, 2017*

[1] An "NRC breakthrough" is a technology transfer activity whose net present value is evaluated to be over 10 million € by a Nokia operating unit and the NRC Business Validation team.

IEEE International Conference on Pervasive Computing and Communications (PerCom) *2015-2016*
IEEE International Conference on Distributed Computing Systems (ICDCS) *2014*
Smart Card Research and Advanced Application Conference (CARDIS) conference *2012,2013*
International Conference on Trusted Systems (INTRUST). *2009-2010*
International Conference on Trust and Trustworthy Computing (TRUST). *2008, 2010*
ACM Workshop on Scalable Trusted Computing (ACM STC). *2008-2009*
ACM Conference on Security and Privacy in Wireless and Mobile Networks (ACM WiSec). *2008, 2010, 2013*
Financial Cryptography and Data Security. *2008-2009, 2016*
ACM Digital Rights Management Workshop (ACM DRM). *2007*
Nordic Workshop on Secure IT Systems (Nordsec). *2007, 2010*
SKLOIS Conference on Information Security and Cryptology (Inscrypt). *2006*
International Conference on Security and Privacy for Emerging Areas in Communication Networks (SecureComm). *2005-2008*
Secure Mobile Ad-hoc Networks and Sensors workshop (MADNES). *2005*
International Conference Security in Pervasive Computing (SPC). *2003-2006*
European Workshop on Security and Privacy in Ad hoc and Sensor Networks (ESAS). *2004-2007*
International Conference on Applied Cryptography and Network Security (ACNS). *2004, 2011*
Information Security Conference (ISC). *2003, 2006*
IEEE Workshop on Wireless Local Networks (WLN). *2002-2003*
European Symposium on Research in Computer Security (ESORICS). *2000*
ACM Conference on Computer and Communications Security (ACM CCS). *1999*

Direct contribution to standardization:

Bluetooth Special Interest Group: Bluetooth Secure Simple Pairing specification. (included in Bluetooth 2.1) *2007*

USB Implementors Forum: Association Models Supplement to the Certified Wireless Universal Serial Bus Specification. *2006*

Indirect contribution to standardization:

3GPP SA3, Security Working Group: Generic Authentication Architecture. *2002-2006*

CE4A: Terminal Mode (later "MiirorLink") Technical Architecture v1.0. *2004-2006*

Dissertation committees/Dissertation examinations:

Habilitation level: Dr. Melek Önen (Eurecom, 2017)

Doctoral level: Carlton Sheppard (Royal Holloway, 2018), Pawani Porambage (University of Oulu, 2018), Michael Hölzl (Johannes Kepler University, 2018), Vincent Taylor (Oxford University, 2017), Nicolae Paladi (Lund University of Technology, 2017), Stephan Heuser (TU Darmstadt, 2016), Babins Shrestha (University of Alabama at Birmingham, 2016) Claudio Marforio (ETH Zürich, 2015), Guillermo Suárez.Tabgil (Universidad Carlos III de Madrid, 2014), Nils Ole Tippenhauer (ETH Zürich, 2012), Ersin Uzun and John Solis (University of California at Irvine, 2010), Levente Buttyán, (École Polytechnique Fédérale de Lausanne, 2002), Tuomas Aura (Helsinki University of Technology, 2000).

Master's level: Stephen Asherson (University of Cape Town, 2008).

Invited service in expert groups:

Member, IEEE Computer Society, Fellows evaluation committee.
https://www.computer.org/web/volunteers/fellows *2017*

Member, European Research Council, Starting Grant evaluation panel.
https://erc.europa.eu/document-category/evaluation-panels *2016-*

Domain expert, security/privacy group of the ACM Computing Classification System (CCS) Update Project (http://www.acm.org/about/class/2012?pageIndex=2). *2011*

Membership in the industrial advisory board of the European Commission research project S3MS. *2008*

Internal service:

Chair, Recruitment committee, Aalto University Department of Computer Science. *2019*

Member, Recruitment committee, Aalto University Department of Computer Science. *2018*

Member, Tenure-track promotion committee, Aalto University School of Electrical Engineering (Department of Communications and Networking). *2018*

Member, Recruitment committee, Aalto University Department of Computer Science. *2017*

Chair, Recruitment committee, Aalto University School of Science (Department of Computer Science and Department of Mathematics & Systems Analysis). *2017*

Department representative, Tenure Track committee, Aalto University School of Science *2016-*

Research Area Representative, Department steering group, Aalto University Department of Computer Science. 2015-2016

Member, Recruitment committee, Aalto University School of Electrical Engineering (Department of Communications and Networking). *2014*

Department representative, Doctoral program committee, Aalto University School of Science. *2014-*

Member, Patent evaluation committee, Nokia. *2010-2012*

RESEARCH IMPACT

Here are three representative examples of different types of long-term impact (pioneering research, widespread impact, large-scale deployment) of my research. The paper numbers refer to the list in the Publications section.

- **Optimistic Fair Exchange (pioneering research)**: In my dissertation, I introduced the notion of *optimistic* fair exchange (Paper 10 and two companion papers). As a sensible middle ground between the two previously known approaches to fair exchange: using a trusted third party in every transaction or using expensive cryptographic protocols. The optimistic approach relied on an off-line trusted third party who needs to be invoked only if the exchange fails. This is an example of optimizing for the common case: the common case being situations where both parties in the exchange are honest and want to see the transaction completed. Our initial papers set off a flurry of research resulting in over 1600 citations to date in Google Scholar collectively for the three works.

- **Man-in-the-middle in Tunneled Authentication Protocols (widespread impact)**: In 2002, I and my collaborators discovered a flaw in composing two authentication protocols in different channels without properly binding them. Although the flaw is simple, at least in hindsight, it was widespread and occurred in many protocols that were being standardized by the Internet Engineering Task Force. Our paper (Paper 9) had wide-ranging impact in IETF ranging from the disbanding of the *IPSec remote access (ipsra)* and incorporating

channel binding in a number of protocol specifications including popular ones like *IKEv2* and *PEAP*. Our work continues to have impact in the design of newer IETF protocols, for example as evidenced by the recently published IETF RFC 6813: *"The Network Endpoint Assessment (NEA) Asokan Attack Analysis"*, [2].

- **Secure First Connect (large scale deployment)**: In 2006, as part of the industry-wide effort to find more secure and more user-friendly solutions for the "First Connect" problem, my colleagues and I designed an efficient protocol for authenticating key agreement using short authenticated strings (US patent 7783041). The protocol was incorporated into the specifications of Bluetooth Special Interest Group and has been deployed in billions of devices that support Bluetooth versions 2.1 or later. (See Paper 7 for more information.)

I have also been working on a number of other system security topics during my career, including (most recent first):

Machine Learning vs. Security/Privacy Machine learning is transforming the landscape in many application scenarios. Security and privacy is no exception. My students and I have been applying machine learning for a variety of scenarios ranging from efficeintly detecting phishing websites (Paper 2) to improving ease-of-use (See the paragraph on "contextual security" below). But it is also increasingly clear that in an adversarial setting, designers of machine learning applications have to take new security and privacy considerations into account. Recently, we developed a technique called "MiniONN" to transform any existing cloud-hosted neural network to an oblvious form so that clients and servers can jointly compute neural network prediction without either party leaking sensitive information to the other party (Paper 1).

Mobile Trusted Computing: During the past decade, my colleagues and I have been pioneering academic research work on mobile trusted computing (Paper 3). Our early work on "On-board Credentials (ObC)" (Paper 8) has been deployed in Nokia smartphone platforms. The latest work in this direction is a system called Open-TEE which allows developers to easily make use of mobile trusted computing. Open-TEE (IEEE TrustCom 2015) was covered by The Register[3].

Contextual Security: For security and privacy mechanisms intended for end users, a fundamental challenge is their (lack of) usability. One of my recent research directions is to investigate how the wealth of contextual information on mobile devices (such as data gathered by on-board sensors or interactions within social networks) can be used to improve usability without sacrificing security. Results of this work have appeared in various venues including IEEE PerCom 2011 (Best Demo Award) and 2014, ACM ASIACCS 2014 (Best Paper Award), ACM CCS 2014 and NDSS 2016.

Mobile Security: A consistent research theme in my work has been to study the security of mobile devices and mobile communication systems. This work ranged from analyzing mobile platform security (Paper 5) and communication security architectures (NDSS 2016), designing new ways to use mobile security infrastructures (such as the work on Generic Authentication Architecture (GAA) described in the book on GAA I wrote with my colleagues "Cellular Authentication for Mobile and Internet Services [4]) to investigating the extent of mobile malware infection (Paper 4), which received wide press coverage, including by MIT Technology Review[5].

Security for Ad hoc Networking: Early in my career I worked on securing routing protocols for mobile ad hoc networks (ACM WiSe 2002, 1000+ citations) and the challenge of establishing ad hoc security associations between devices that have no prior context (Computer Communications, 23:17, pp 1627-1637, almost 600 citations). The latter work paved the way for subsequent work on Secure First Connect discussed above.

[2] http://tools.ietf.org/html/rfc6813

[3] http://www.theregister.co.uk/2015/06/30/opentee_an_open_virtual_trusted_execution_environment/

[4] Wiley 2008 http://eu.wiley.com/WileyCDA/WileyTitle/productCd-0470723173.html

[5] http://www.technologyreview.com/view/522771/first-direct-measurement-of-infection-rates-for-smartphone-viruses/

FULL LIST OF SUCCESSFUL TECHNOLOGY TRANSFERS

Nokia Research Center: Contributed to several research projects that led to successful technology transfers:

Conceived, initiated, led and jointly designed protocols and architecture for the On-board Credentials technology (available on Nokia Symbian^3 and Windows Phone 8 devices) *2005-2012*

Conceived, jointly initiated and designed protocols for the Magic Wand project which was eventually incorporated into various standards like Bluetooth Secure Simple Pairing (available on all devices supporting Bluetooth 2.1 or later) and Wireless USB Association Models *2003-2007*

Conceived, jointly initiated and did initial groundwork on the GAIN project which developed the technology that eventually became standardized as Generic Authentication Architecture (deployed in Symbian OS GBA module as well as in Nokia Bootstrapping Server Function (BSF)) *2001-2006*

Conceived, initiated, and initially led the MyPocket project which developed a remote storage framework for Symbian (which was eventually productized as the "remote storage" feature in Symbian^1 and Symbian^3 devices) 2003-2004

Contributed to the design of Baseband-5 security architecture (deployed on most Nokia devices) *2000-2001*

Jointly initiated the platform security research program B-Secure at Nokia Research Center (the program contributed to the design of Symbian OS platform security) *1999-2001*

IBM Research: Designed and implemented the Electronic Payment Service in the EU Project SEMPER which was transferred to IBM E-Till product group *1998*

RESEARCH AREAS

Systems Security and Privacy: for mobile and embedded devices, platform security, machine learning & security, secure communications, usable security, applied cryptography, secure electronic commerce.

Secure Distributed Systems: Blockchains and consensus, operating systems, mobile computing infrastructures, Internet-of-Things, IP networks, ad-hoc networks.

CITATION RECORD

- Google Scholar Profile: `http://scholar.google.com/citations?user=0MqQ8AgAAAAJ` (**h-index: 53**)
- ACM Author Profile: `http://dl.acm.org/author_page.cfm?id=81100611941`
- ResearcherID Profile: `http://www.researcherid.com/rid/D-3182-2012` (**h-index: 14, #citations: 1010+**)

SUMMARY OF PUBLICATION RECORD

(Note: Full publication record available at `https://asokan.org/asokan/profile/`)

- **Refereed Publications**:
  - 22 Papers in peer-reviewed international journals and magazines

  - 1 Survey article in an international technology magazine
  - 103 Papers in international conferences or workshops
  - 6 Book chapters

- **Unrefereed Publications**:
  - 5 Invited papers in international conferences or workshops
  - 2 Books
  - 63 Technical reports

MOST IMPORTANT PUBLICATIONS

1. Jian Liu, Mika Juuti, Yao Lu, N. Asokan: **Oblivious Neural Network Predictions via MiniONN transformations**, Proceedings of ACM Conference on Computer and Communication Security (ACM CCS), Dallas, November 2017. https://doi.org/10.1145/3133956.3134056 (Full version available as IACR ePrint report 2017/452, May 2015. https://eprint.iacr.org/2017/452)

2. Samuel Marchal, Giovanni Armano, Tommi Gröndahl, Kalle Saari, Nidhi Singh, N. Asokan: **Off-the-Hook: An Efficient and Usable Client-Side Phishing Prevention Application**, IEEE Transactions on Computers, 66(10):1717-1733 (2017), https://doi.org/10.1109/TC.2017.2703808

3. N. Asokan, Jan-Erik Ekberg, Kari Kostiainen, Anand Rajan, Carlos V. Rozas, Ahmad-Reza Sadeghi, Steffen Schulz, Christian Wachsmann: **Mobile Trusted Computing**, Proceedings of the IEEE 102(8): 1189-1206 (2014). http://dx.doi.org/10.1109/JPROC.2014.2332007

4. Hien Thi Thu Truong, Eemil Lagerspetz, Petteri Nurmi, Adam Oliner, Sasu Tarkoma, N. Asokan, Sourav Bhattacharya: **The Company You Keep: Mobile Malware Infection Rates and Inexpensive Risk Indicators**, Proceedings of the 23rd International World Wide Web Conference (WWW 2014), Seoul, Korea, April 2014. http://doi.acm.org/10.1145/2566486.2568046 (Full version available as CoRR abs/1312.3245, December 2013. http://arxiv.org/abs/1312.3245)

5. Pern Hui Chia, Yusuke Yamamoto, N. Asokan: **Is this app safe?: a large scale study on application permissions and risk signals**, In Proceedings of the 21st International World Wide Web Conference (WWW 2012), Lyon, France, April 2012. http://dx.doi.org/10.1145/2187836.2187879.

6. Nitesh Saxena, Jan-Erik Ekberg and Kari Kostiainen, N. Asokan : **Secure Device Pairing based on a Visual Channel** In IEEE Trans. Information Foresnsics and Security 6(1):28-38. 2011 http://dx.doi.org/10.1109/TIFS.2010.2096217 (an earlier version appeared In Proceedings of the 2006 IEEE Symposium on Security and Privacy, pages 306–313, Berkeley/Oakland, May 2006. http://doi.ieeecomputersociety.org/10.1109/SP.2006.35)

7. Jani Suomalainen, Jukka Valkonen, N. Asokan: **(Standards for) Security Associations in Personal Networks: A Comparative Analysis**, in International Journal of Security and Networks (IJSN), special issue on "Secure Spontaneous Interaction", 2009. http://dx.doi.org/10.1504/IJSN.2009.023428

8. Kari Kostiainen, Jan-Erik Ekberg, N. Asokan Aarne Rantala: **On-board Credentials with Open Provisioning**, In Proceedings of the ACM ASIACCS conference, March 2009. http://doi.acm.org/10.1145/1533057.1533074 (earlier version available as Nokia Research Center Technical Report, NRC-TR-2008-007, August 2008. http://research.nokia.com/files/NRCTR2008007.pdf)

9. N. Asokan, Kaisa Nyberg, Valtteri Niemi: **Man-in-the-middle in Tunneled Authentication Protocols**, In Proceedings of the Eleventh International Security Protocols Workshop, volume 3364 of Lecture Notes in Computer Science, pages 28-41, April 2003, Springer. http://dx.doi.org/10.1007/11542322_6

10. N. Asokan, Victor Shoup, Michael Waidner: **Asynchronous Protocols for Optimistic Fair Exchange**

    In *Proceedings of the IEEE Symposium on Research in Security and Privacy*, Oakland, CA, May 1998. IEEE Computer Society Press, pages 86-99. http://dx.doi.org/10.1109/SECPRI.1998.674826

ROYALTY AWARDS

Nokia gives royalty awards for patents that have been incorporated into Nokia product(s) and have significantly improved the competitiveness of those products, for example by being deemed essential for implementing a standard specification the Nokia IPR department.

1. Method and apparatus for providing bootstrapping procedures in a communication network (US 9,300,641)
2. System and method for establishing bearer-independent and secure connections (US 8,484,466)
3. Requesting digital certificates (US 8,397,060)
4. Method and system for managing cryptographic keys (EP 1561299, US 7,920,706)
5. System, method and computer program product for authenticating a data agreement between network entities (US 7,783,041)
6. Linked authentication protocols (US 7,707,412)
7. Authentication in a packet data network. (US 7,107,620, US 7,512,796, EP1273128)
8. Address acquisition. (EP 1252781, US 6,959,009, US 7,920,575)

OTHER PATENTS

9. Method and system for byzantine fault-tolerance replicating of data on a plurality of servers (US 10,049,017)
10. Method and apparatus for accelerated authentication (US 9,979,545)
11. Method and apparatus for providing bootstrapping procedures in a communication network (US 9,906,528)
12. Method and device for verifying the integrity of platform software of an electronic device (US 9,881,150)
13. Device to device security using NAF key (US 9,781,085)
14. Mechanisms for certificate revocation status verification on constrained devices (US 9,756,036)
15. Method and apparatus for accelerated authentication (US 9,667,423)
16. Authenticating security parameters (US 9,503,462)
17. Method and device for verifying the integrity of platform software of an electronic device (US 9,438,608)
18. Implementation of an integrity-protected secure storage (US 9,171,187)
19. Method and apparatus to reset platform configuration register in mobile trusted module (US 9,087,198)
20. Methods and apparatus for reliable and privacy protecting identification of parties' mutual friends and common interests (US 9,003,486)
21. Method and device for verifying the integrity of platform software of an electronic device (US 8,954,738)
22. Method and apparatus for adjusting context-based factors for selecting a security policy (US 8,898,793)
23. Methods, apparatuses, and computer program products for bootstrapping device and user authentication (US 8,869,252)

24. Securing communication (US 8,769,284)
25. Credential provisioning (US 8,724,819)
26. Method, apparatus and computer program product for secure software installation (US 8,701,197)
27. Method and apparatus for selecting a security policy (US 8,621,656)
28. Method and apparatus to bind a key to a namespace (US 8,566,910)
29. Administration of wireless local area networks (US 8,532,304)
30. Authenticated group key agreement in groups such as ad-hoc scenarios (US 8,386,782)
31. Methods, apparatuses, and computer program products for authentication of fragments using hash trees (US 8,352,737)
32. Secure data transfer (US 8,145,907)
33. Establishment of a trusted relationship between unknown communication parties (US 8,132,005)
34. Accessing protected data on network storage from multiple devices (US 8,059,818)
35. Method for remote message attestation in a communication system (US 7,913,086)
36. Information hiding non-interactive proofs-of-work (Korea 37764-KR-PCT)
37. Method for protecting electronic device, and electronic device (US 7,630,495)
38. System and method for dynamically enforcing digital rights management rules (US 7,529,929)
39. Secure backup and recovery using a key recovery service (Korea 808654)
40. Controlling delivery of certificates in a mobile communication system (US 7,526,642)
41. Method for sharing the authorization to use specific resources (US 7,343,014)
42. System and method of secure authentication and billing for goods and services using a cellular telecommunication and an authorization infrastructure (US 7,308,431)
43. Method, system, and devices for transferring accounting information (US 7,251,733)
44. Method, system and computer program product for secure ticketing in a communication device (US 7,207,060)
45. Method for applying electronic payment schemes in short-range e-commerce. (US 7,194,438)
46. IP mobility in a communication system (US 7,191,226)
47. Method, system and computer program product for a trusted counter in an external security element for securing a personal communication device. (US 7,178,041)
48. Personal device, terminal, server and methods for establishing a trustworthy connection between a user and a terminal (US 7,149,895, EP 1026641)
49. System and method of bootstrapping a temporary public-key infrastructure from a cellular communication authentication and billing infrastructure. (US 7,107,248, EP1397787B1)
50. Addressing and routing in mobile ad hoc networks.
51. SIM based authentication mechanism for DHCPv4/v6 messages. (US 6,704,789, EP1175765B1)

EXTERNAL PRESENTATIONS

1. *Common-sense Applications of Hardware-based Trusted Execution Environments* (Invited talk), International Workshop on Banking Security with Trusted Hardware , Bangkok, Thailand. December 2018
2. *Hardware-assisted run-time Protection* (Invited talk), at Google Android Security Local Research Day (ASLR-D), Mountain View, USA. October 2018
3. *Common-sense Applications of Hardware-based Trusted Execution Environments* (Invited talk), at Huawei Security and Privacy workshop, Helsinki, Finland. October 2018
4. *On secure resource accounting for outsourced computation* (Invited talk), at Sunblaze group, University of California, Berkeley, USA. October 2018
5. *Can Blockchains be made better using hardware-assisted security* (Invited talk), at the Blockchain Symposium, Center for Secure Distributed Ledgers and Contracts, Darmstadt, Germany. September 2018
6. *On secure resource accounting for outsourced computation* (**Invited keynote**), at SysTEX 2018, Toronto, Canada. October 2018
7. *Securing Cloud-assisted Services* (Invited talk), at School on Security & correctness in the Internet of Things, Graz, Austria. September 2018
8. *Securing Cloud-assisted Services* (Invited plenary talk), at CySeP summer school, KTH, Stockholm, Sweden. June 2018
9. *Machine Learning in the Presence of Adversaries* (Invited talk), at Nokia Bell Labs, Espoo, Finland. April 2018
10. *Machine Learning in the Presence of Adversaries* (Invited talk), at Shonan seminar on resilient machine-to-machine communication, Shonan, Japan. March 2018
11. *Common-sense Applications of Hardware-based Trusted Execution Environments* (Invited talk), at NYU Tandon School of Engineering, New York, NY, USA. March 2018
12. *Securing Cloud-assisted Services* (**Invited keynote**), at Data 61 Cyber Summer School, Melbourne, Australia February 2018
13. *Common-sense applications of hardware-based trusted execution environments* (**Invited keynote**), at the Workshop on Trusted Computing and its Applications, Surrey, UK. January 2018
14. *Securing Cloud-assisted Services* (Invited talk), at Secure Cloud Services and Storage Workshop, Oslo, Norway. September 2017
15. *Fast client-side phishing detection: a case-study in applying machine learning to solve security/privacy problems*, (**Invited talk**), CROSSING conference, TU Darmstadt, Germany. May 2017
16. *Securing Cloud-assisted Services* (Invited talk), at LORIA, Nancy, France. April 2017

17. *Fast client-side phishing detection*, (Invited talk), School of EEE, Nanyang Technological University, Singapore. April 2017

18. *Securing Cloud-assisted Services* (Invited talk), at NEC Labs, Tokyo, Japan. January 2017

19. *Technology Transfer from Security Research Projects: A Personal Perspective* (Invited talk), at NTT Mushahino R&D Center, Tokyo, Japan. January2017

20. *Securing Cloud-assisted Services* (**Invited keynote**), at the SECODIC workshop, Salzburg, Austria. September 2016

21. *How Far Removed Are You? Scalable Privacy-Preserving Estimation of Social Path Length* (**Invited talk**), at the International Summer School on Social Networks Security, Privacy, and Trust" (SNSPT), Padova, Italy. September 2016

22. *Things, Trouble, Trust: On Building Trust in IoT Systems* (**Invited talk**), at the CROSSING seminar, TU Darmstadt, Germany. August 2016

23. *The Quest for Usable Security* (**Invited talk**), University of Surrey workshop on Mobile Security, Surrey, UK. December 2015

24. *Technology Transfer from Security Research Projects: A Personal Perspective* (**Invited keynote**), at 20th Nordic IT Security Conference (NordSec), KTH, Stockholm, Sweden. October 2015

25. *The Quest for Usable Security* (**Invited talk**), Android Security Symposium, Vienna, Austria (video: `https://youtu.be/gVPkFV5Zg2c`) September 2015

26. *How Far Removed Are You? Scalable Privacy-Preserving Estimation of Social Path Length* (Invited talk) University of Oxford, Oxford, United Kingdom March 2015

27. *How Far Removed Are You? Scalable Privacy-Preserving Estimation of Social Path Length* (Invited talk) Security Seminar, University of Edinburgh, Edinburgh, United Kingdom January 2015

28. *On Mobile Malware* (Invited talk), School of Computer Science Colloquium, McGill University, Montréal, Canada. December 2014

29. *Technology Transfer from Security Research Projects: A Personal Perspective* (**Invited lecture**), at Cybersecurity and Privacy (CySeP) Winter School, KTH, Stockholm, Sweden. October 2014

30. *On Mobile Malware* (**Invited talk**), ACM Conference on Security and Privacy in Wireless and Mobile Networks (WiSec), Oxford, United Kingdom. July 2014

31. *On Mobile Malware* (Invited talk), NEC Labs Europe, Heidelberg, Germany. January 2014

32. *On Mobile Malware* (Invited talk), CrySP Speaker Series, University of Waterloo, Canada. (video: `https://crysp.uwaterloo.ca/events/20131216-Asokan.mp4`) December 2013

33. *The Untapped Potential of TEEs on Mobile Devices* (**Invited keynote**), Financial Cryptography and Data Security Conference (FC), Okinawa, Japan. April 2012

34. *Mobile Platform Security Architectures* (**Invited keynote**), 11th Smart Card Research and Advanced Application Conference (CARDIS), Graz, Austria. November 2012

35. *Context Profiling for Mobile Devices* (Invited talk), Securing Clouds & Mobility Track, Intel European Research & Innovation Conference (ERIC 12), Barcelona, Spain. October 2012

36. *The Case for Usable Mobile Security* (Invited talk), Department of Computer Science, University of Helsinki. August 2012

37. *Intuitive Security Policy Configuration in Mobile Devices Using Context Profiling* (Invited), University of Colombo School of Computer Science (UCSC), University of Colombo, Sri Lanka. July 2012

38. *The Case for Usable Mobile Security* (**Invited Keynote**), Jaffna University International Research Conference (JUICE-2012), University of Jaffna, Sri Lanka. July 2012

39. *Solutions for Mobile Security and Privacy Protection* (**Invited Keynote**), Trust in Digital Life workshop, Biel, Switzerland. March 2012

40. *Intuitive security policy configuration in mobile devices using context profiling* (Invited Guest Talk), IIIT-Bangalore, India. February 2012

41. *Usable Mobile Security* (**Invited talk**), 8th International Conference on Distributed Computing and Internet Technology (ICDCIT 2012), Bhubaneswar, India. February 2012

42. *On "Device Clouds"* (Invited participant talk), Dagstuhl 11491 "Secure Computing in the Cloud", Dagstuhl, Germany. December 2011

43. *Usable mobile security* (**Invited keynote**), First International Workshop on Trustworthy Embedded Devices, Leuven, Belgium. September 2011

44. *A Perspective on the Evolution of Mobile Platform Security Architectures*, (Invited) Laboratory for Communications and Applications, EPFL, Switzerland. April 2011

45. *A Perspective on the Evolution of Mobile Platform Security Architectures*, (Invited) ETH Zurich Computer Science Colloquium, Zurich, Switzerland. March 2011

46. *A Perspective on the Evolution of Mobile Platform Security Architectures* (**Invited keynote**), First ACM Conference on Data and Application Security and Privacy (ACM CODASPY), San Antonio, Texas, USA. February 2011

47. *On-board Credentials* (Invited), Electrical and Computer Engineering, University of Toronto, Canada. August 2010

48. *Intuitive and Sensible Access Control* (Invited), Security group, NTNU, Trondheim, Norway. January 2010

49. *On-board Credentials with Open Provisioning* (Invited), Q2S, NTNU, Trondheim, Norway. January 2010

50. *Discrimination is Useful :Why and How to discriminate messages in public DTNs* (Invited participant talk), Dagstuhl 09071 "Delay and Disruption-Tolerant Networking (DTN) II", Dagstuhl, Germany. February 2009

51. *On-board Credentials with Open Provisioning* (Invited), Distinguished Lecturer Seminar Series, Donald Bren School of Information and Computer Sciences, University of California, Irvine, California, USA. October 2008

52. *On-board Credentials with Open Provisioning* (**Invited keynote**) at the Workshop in Information Security Theory and Practices (WISTP) 2008, Seville, Spain. May 2008

53. *Securing Disruption-tolerant Communication*, (Invited), DIT seminar series, Dipartimento di Ingegneria e Scienza dell'Informazione - DISI, University of Trento, Italy. *February 2008*

54. *Securing Disruption-tolerant Communication*, (Invited), Computer Science Department, University of Calgary, Canada. *January 2008*

55. *Securing First Connect*, (Invited), Computer Science Department, University of Calgary, Canada. *January 2008*

56. *Identity-based Cryptography for Security in Disruption-prone Environments*, Internet Research Task Force, DTNRG working group meeting, Dublin, Ireland. *May 2007*

57. *Security Associations for Personal Devices*, (Invited) Horst Görtz Institute for IT-Security, Ruhr University of Bochum, Germany. *March 2007*

58. *Security Associations for Personal Devices*, (Invited) Networking Laboratory, Helsinki University of Technology, Finland. *February 2007*

59. *Security Associations for Personal Devices*, (Invited) IBM T.J. Watson Research Center, Hawthorne, NY, USA. *February 2007*

60. *Phishing and Phones*, (Invited) Panel on "Future of Phishing", Usable Security Workshop, Tobago. *February 2007*

61. *Securing First Connect*, (Invited) Distributed systems seminar, University of Waterloo, Canada. *May 2006*

62. *Issues in Initializing Security*, (Invited) IEEE Symposium on Signal Processing and Information Technology, Athens, Greece *December 2005*

63. *Man-in-the-middle in Tunnelled Authentication protocols*, Security Protocols Workshop, Cambridge, UK. *April 2003*

64. *Security Issues in Ad-hoc Routing Protocols* (Invited), École Polytechnique Fédérale de Lausanne, Switzerland. *December 2002*

65. *AAA for IPv6 network access*, (Invited) Faster Pro 2001 Workshop, Tampere University of Technology, Finland. *January 2001*

66. *New uses for the cellular authorization infrastructure*, Helsinki University of Technology, Finland. *December 2000*

67. *Fair Exchange*, University of Alberta, Canada. *May 2000*

68. *Fair Exchange*, University of Waterloo, Canada. *April 2000*

69. *Security Issues in Mobile Communication Systems*, (Invited) IETF Internet Architecture Board (IAB) workshop on wireless internetworking, Mountain View, CA., USA. *March 2000*

70. *Generic Electronic Payment Service*, 2^{nd} SEMPER day seminar, Zurich, Switzerland. *December 1998*

71. *Fairness in Electronic Commerce*, Public thesis defense, University of Waterloo, Canada. *May 1998*

72. *Asynchronous Protocols for Optimistic Fair Exchange*, IEEE Symposium on Security and Privacy, Oakland, CA., USA. *May 1998*

73. *Secure Electronic Commerce*, (Invited) 10th Prognose Zirkel Zürich Info Day, Technopark, Zurich, Switzerland. *March 1998*

74. *Secure Electronic Commerce*, Distributed systems seminar, University of Waterloo, Canada. *May 1997*

75. *Optimistic Fair Exchange*, ACM CCS '97, Zurich, Switzerland. *April 1997*

76. *Server Supported Signatures*, ESORICS '96, Rome, Italy. *September 1996*

77. *Anonymity in Mobile Computing Environments* (panel participant), MCSA '94 workshop, Santa Cruz, CA., USA. *December 1994*

78. *A Parallel Implementation of the Hough Transform Method*, 32nd Midwest Symposium on Circuits and Systems, Urbana-Champaign, IL., USA. *August 1989*