# Carlos H. Gañán

Assistant professor

### areas of expertise

Cybersecurity Information security Econometric modelling Data mining/cleaning Visual analytics Machine learning Internet governance

## education

2009–2013 **Ph.D.** in Information Security (*cum laude*)

Technical University of Catalonia

- Research areas: cybersecurity, networking, decision making, statistical modelling, data mining, economics of technology.
- Dissertation title: Certificate Status Information Dissemination and Validation for VANFTs
- · Advisor: Prof. José Muñoz Tapia

2010–2011 **Master** of Business Administration (120 ECTS)

Open University of Catalonia

· Course topics: Econometrics, micro and macroeconomics, risk management, decision making, systems and operations management and strategic management and leadership.

2008–2010 **Bachelor** of Business Studies (180 ECTS)

Open University of Catalonia

· Course topics: applied mathematics for business, principles of governance, principles of management, introduction to public administration.

2008–2009 **Master** in Telematics *(120 ECTS)* 

Technical University of Catalonia

- · Research areas: networks, quality of service, computational technologies.
- Dissertation title: Scalable Multi-Source Video Streaming Application over Peer-to-Peer Networks
- · Advisor: Prof. Jorge Mata

2002–2008 **Master** in Telecommunications (300 ECTS)

Technical University of Catalonia

- · Research areas: data mining, wireless sensor networks, energy man-
- Dissertation title: Energy Management Architecture for Wireless Sensor Networks
- · Advisor: Thomas Falck

### languages

Spanish •••• Catalan **OOOO** English •••• German OOOOO

### programming

Shell scripting Java, C++, Python ns3 & OMNeT++ R, Matlab, SQL, Python MT<sub>F</sub>X

### personal details

Carlos H. Gañán Zonneveldslaan 1 2235SC Valkenburg The Netherlands

**1**+31 6 47348515 @krlos.nl

> DOB: 25/10/1984 Nationality: Spanish

# **experience**

### 2016-now **Delft University of Technology**

**chnology** Delft, Netherlands

Assistant Professor

Teaching at the Faculty of Technology, Policy and Management at the department of Multi-Actors systems. Main topics:

- · Decision making;
- Internet governance;
- · Risk management;
- Mathematical modelling;
- · Big data analytics;
- · Economics of cybersecurity.

### 2016-now Universitat Oberta de Catalunya

Barcelona, Catalonia

Course Instructor

Associate professor on Fundamentals of data science, Supervising master thesis project within the Interuniversity Master's Degree in Security of Information Technologies and Telecommunications. Main topics:

- Internet of Things security;
- · authentication mechanisms;
- · information security.

### 2014–20116 **Delft University of Technology**

Delft, Netherlands

Post-doctoral Researcher

Research on various aspects related to Internet governance:

- Identifying incentives and striking the right balance between cooperative and regulatory approaches to information sharing;
- Analyzing behavioral aspects of security and privacy;
- Investigating opportunities and risks of information security markets;
- Developing and analyzing economic models to quantify the economic impact of cybercrime;
- Studying the incentives structures of different Internet intermediaries to cooperate in combating each cybercrime type;
- · Increasing the impact of voluntary action against cybercrime.

### 2009-2013 Universitat Politècnica de Catalunya

Barcelona, Spain

Junior Researcher

Research on various aspects related to information security in wireless mobile networks (VANET and MANET). Detailed achievements:

- Analyzing the cost of security both in terms of quality of service and user experience in vehicular networks;
- Enhancing privacy of security protocols for mobile networks;
- Modeling cybersecurity datasets to estimate and forecast the security level of different services;
- · Estimation of risk metrics based on security datasets.

### 2012–2012 **Middlesex University**

London, United Kingdom

Visiting researcher

Carried out research on enhancing quality of service support capability of short range communications among vehicles. Detailed achievements:

- Simulation of vehicular networks in complex urban scenarios;
- Analysis of the trade-off between secure communication and network usability.
- Analysis of authenticated data structures to support the security services in vehicular networks.

### 2008-2009 Universitat Politècnica de Catalunya

Research assistant/technician

Performing initial research on events detected by automation systems to assess impact, understand significance and categorize incidents. Recommending appropriate network addressing systems, appropriate layouts for various network configurations, and appropriate connection devices.

### 2007-2008 Philips Research

Aachen, Germany

Barcelona, Spain

Intern Researcher

Detailed achievements:

- Use of machine learning techniques to analyze and extract patterns of vital signs data;
- Design of a time series model to reduce energy consumption on medical applications for wireless sensor networks;

### 2007-2007 Hewlett Packard

Barcelona, Spain

Intern Researcher

Detailed achievements:

- Firmware design and optimization for large format printers;
- Testing and design of paper and ink products.

### awards

#### 2016-2017 Postdoctoral grant Beatriu de Pinós

70k€

Prestigious scholarship with around 11% acceptance rate. Awarded by the Catalan Agency for Management of University and Research Grants.

### 2015 **Best dissertation award on ICT**

Awarded with the prestigious prize for the most outstanding doctoral thesis on the ICT field.

#### 2011-2013 **FPU Postgraduate Scholarship**

65k€

Prestigious scholarship with around 5% acceptance rate. Awarded by the Secretary of Universities and Research of the Spanish government.

#### 2009-2011 FPI-UPC Research Scholarship

30k€

Awarded by the Catalan Agency for Management of University and Research Grants.

# participation in Research Projects

2015-2018	<b>Researcher</b> Department of Homeland Security & Netherlands Organisation for Research Increasing the impact of voluntary action against cybercrime	
2014-2017	<b>Work Package Leader</b> E-CRIME (the economic impacts of	European Union's Seventh Framework Programme cyber crime) FP7 Project
2012-2014	Researcher SERVET (A SEcure and Robust tranvices in Vehicular nETworks) project	Spanish Ministry of Science and Education nsport architecture for infotainment ser- t
2009-2014	<b>Associate Researcher</b> Action IC0906: Wireless Networking	European Science Foundation for Moving Objects (WiNeMO)
2008-2013	<b>Work Package Leader</b> ARES Project (Advanced Research of	Ingenio Program 2010 on Information Security and Privacy)
2007-2009	Intern	German Federal Ministry for economics and labor

BASUMA (Body Area System for Ubiquitous Multimedia Applications)

# **publications**

### articles in peer-reviewed journals

Rotten Apples or bad harvest? What we are measuring when we are measuring abuse Tajalizadehkhoob, Samaneh, Rainer Böhme, Carlos Ganán, Maciej Korczyński, and Michel Van Eeten

ACM Transactions on Internet Technology (TOIT) 18.4 (2018) p. 49. ACM, 2018

Towards a new cyber threat actor typology
Bruijne, Mark de, Michel van Eeten, Carlos Hernández Gañán, and Wolter Pieters
WODC (Research and Documentation Centre) (2017). 2017

Abuse Reporting and the Fight Against Cybercrime

Thaveri Mohammad Hanif Orgun Cetin Carlos Gañán Tyler M

Jhaveri, Mohammad Hanif, Orcun Cetin, Carlos Gañán, Tyler Moore, and Michel Van Eeten ACM Comput. Surv. 49.4 (Jan. 2017) 68:1–68:27. ACM, 2017

- Understanding the role of sender reputation in abuse reporting and cleanup Cetin, Orcun, Mohammad Hanif Jhaveri, Carlos Gañán, Michel van Eeten, and Tyler Moore Journal of Cybersecurity 2.1 (2016) p. 83. 2016
- A model for revocation forecasting in public-key infrastructures Gañán, Carlos, Jorge Mata-Díaz, Jose L. Muñoz, Oscar Esparza, and Juanjo Alins Knowl. Inf. Syst. 43.2 (2015) pp. 311–331. 2015, IF: 2.639
- Certificate Revocation List Distribution System for the KAD Network Caubet, Juan, Carlos Gañán, Oscar Esparza, Jose Muñoz, Jorge Mata, and Juanjo Alins Comput. J. 57.2 (2014) pp. 273–280. 2014, IF: 0.888
- EPA: An efficient and privacy-aware revocation mechanism for vehicular ad hoc networks Gañán, Carlos, Jose L. Muñoz, Oscar Esparza, Jorge Mata-Díaz, and Juanjo Alins Pervasive and Mobile Computing (2014) pp. 1–17. 2014, IF: 2.079
- VESPA: Emulating Infotainment Applications in Vehicular Networks Rene, Sergi, Juanjo Alins, Jorge Mata, Carlos Gañán, Jose Muñoz, and Oscar Esparza IEEE Pervasive Computing 13.3 (2014) pp. 58–66. 2014, IF: 2.103
- BECSI: Bandwidth efficient certificate status information distribution mechanism for VANETs Gañán, Carlos, Jose L. Muñoz, Oscar Esparza, Jonathan Loo, Jorge Mata-Díaz, and Juanjo Alins

Mobile Information Systems (2013) pp. 1-31. 2013, IF: 1.789

- PPREM: Privacy Preserving REvocation Mechanism for Vehicular Ad Hoc Networks Gañán, Carlos, Jose L. Muñoz, Oscar Esparza, Jorge Mata-Díaz, and Juanjo Alins Computer Standards & Interfaces (Aug. 2013) pp. 1–12. Elsevier B.V., 2013, IF: 1.177
- COACH: COllaborative certificate stAtus CHecking mechanism for VANETs Gañán, Carlos, Jose L. Muñoz, Oscar Esparza, Jorge Mata-Díaz, Juan Hernández, and Juanjo Alins

Journal of Network and Computer Applications 36.5 (Sept. 2013) pp. 1337-1351. 2013, IF: 1.772

- A Modeling of Certificate Revocation and Its Application to Synthesis of Revocation Traces Gañán, Carlos, Jorge Mata-Diaz, Jose L. Muñoz, Juan Hernández, Oscar Esparza, and Juanjo Alins
  - IEEE Transactions on Information Forensics and Security 7.6 (Dec. 2012) pp. 1673-1686. 2012, IF: 1.895
- Risk-based decision making for Public Key Infrastructure using fuzzy logic Gañán, Carlos, Jose L. Muñoz, Oscar Esparza, Jorge Mata-Díaz, and Juanjo Alins International Journal of Innovative Computing, Information and Control (IJICIC) 8.11 (2012) pp. 7925–7942. 2012, IF: 1.667
- Low-cost group rekeying for unattended wireless sensor networks Hernández, Juan, Juan Vera-del-Campo, Josep Pegueroles, and Carlos Gañán Wireless Networks 19 (May 2012) pp. 47–67. 2012, IF: 1.055

### international peer-reviewed conferences/proceedings

Cleaning Up the Internet of Evil Things: Real-World Evidence on ISP and Consumer Efforts to Remove Mirai

Cetin, Orçun, Carlos Gañán, Lisette Altena, Takahiro Kasama, Daisuke Inoue, Kazuki Tamiya, Ying Tie, Katsunari Yoshioka, and Michel Van Eeten

Network and Distributed System Security Symposium (NDSS), 2019

Tell Me You Fixed It: Evaluating VulnerabilityNotifications via Quarantine Networks.

Cetin, Orcun, Carlos Gañán, Lisette Altena, Samaneh Tajalizadehkhoob, and Michel van Eeten

Euro Security & Privacy 2019, 2019

Detect Me If You... Oh Wait. An Internet-Wide View of Self-Revealing Honeypots

Morishita, Shun, Takuya Hoizumi, Wataru Ueno, Rui Tanabe, Carlos Gañán, Michel van Eeten, Katsunari Yoshioka, and Tsutomu Matsumoto

IFIP/IEEE International Symposium on Integrated Network Management, IM 2019, Washington, DC, USA, April 09-11, 2019.

MalPaCA: Malware Packet Sequence Clustering and Analysis

Nadeem, Azqa, Christian Hammerschmidt, Carlos H Gañán, and Sicco Verwer arXiv preprint arXiv:1904.01371, 2019

Let Me Out! Evaluating the Effectiveness of Quarantining Compromised Users in Walled Gardens

Çetin, Orçun, Lisette Altena, Carlos Gañán, and Michel van Eeten

Fourteenth Symposium on Usable Privacy and Security (SOUPS 2018), 2018

Plug and prey? measuring the commoditization of cybercrime via online anonymous markets Van Wegberg, Rolf, Samaneh Tajalizadehkhoob, Kyle Soska, Ugur Akyazi, Carlos Hernandez Ganan, Bram Klievink, Nicolas Christin, and Michel Van Eeten

27th USENIX Security Symposium (USENIX Security 18), 2018

Make notifications great again: learning how to notify in the age of large-scale vulnerability scanning

Cetin, Orcun, Carlos Ganán, Maciej Korczynski, and Michel van Eeten

16th Workshop on the Economics of Information Security (WEIS 2017), 2017

Partial Device Fingerprints

Ciere, Michael, Carlos Gañán, and Michel van Eeten

Joint European Conference on Machine Learning and Knowledge Discovery in Databases, 2017

Beyond the pretty penny: the Economic Impact of Cybercrime

Gañán, Carlos, Michael Ciere, and Michel van Eeten

Proceedings of the 2017 New Security Paradigms Workshop on ZZZ, 2017

The Role of Hosting Providers in Fighting Command and Control Infrastructure of Financial Malware

Tajalizadehkhoob, Samaneh, Carlos Gañán, Arman Noroozian, and Michel van Eeten

Proceedings of the 2017 ACM on Asia Conference on Computer and Communications Security, 2017

Risk Management for Third Party Payment Networks

Driel, Willem van, Carlos Gañán, Michael Lobbezoo, Michel van Eeten, and Tyler Moore 15th Annual Workshop on Economics of Information Security (WEIS) 2016, 2016, hi5: 26

Who gets the boot? Analyzing victimization by DDoS-as-a-service

Noroozian, Arman, Maciej Korczyński, Carlos Gañan, Daisuke Makita, Katsunari Yoshioka, and Michel van Eeten

International Symposium on Research in Attacks, Intrusions, and Defenses, 2016

Estimating the costs of consumer-facing cybercrime: A tailored instrument and representative data for six EU countries

Riek, Markus, Rainer Böhme, Michael Ciere, Carlos Gañán, Michael van Eeten, and Tyler Moore 15th Annual Workshop on Economics of Information Security (WEIS) 2016, 2016

Apples, Oranges and Hosting Providers: Heterogeneity and Security in the Hosting Market Tajalizadehkhoob, Samaneh, Maciej Korczyński, Arman Noroozian, Carlos Gañán, and Michel van Feten

IEEE/IFIP Network Operations and Management Symposium, NOMS 2016, 2016, hi5: 22

Understanding the Role of Sender Reputation in Abuse Reporting and Cleanup Cetin, Orcun, Mohammad Hanif Jhaveri, Carlos Gañán, Michel van Eeten, and Tyler Moore 14th Annual Workshop on Economics of Information Security (WEIS) 2015, 2015, hi5: 26

### An empirical analysis of ZeuS C&C lifetime

Gañán, Carlos, Orcun Cetin, and Michel van Eeten

10th ACM Symposium on Information, Computer and Communications Security, 2015, Singapore, hi5: 32

How Dynamic is the ISPs Address Space? Towards Internet-Wide DHCP Churn Estimation Moura, Giovane, Carlos Gañán, Qasim Lone, Payam Poursaied, Hadi Asghari, and Michel van Eeten

14th IFIP Networking Conference, 2015, Toulouse, France, hi5: 22

Why Them? Extracting Intelligence about Target Selection from Zeus Financial Malware Tajalizadehkhoob, Samaneh, Hadi Asghari, Carlos Gañán, and Michel van Eeten 13th Annual Workshop on Economics of Information Security (WEIS) 2014, 2014, hi5: 26

#### Secure Handoffs for V2I Communications in 802.11 Networks

Gañán, Carlos, Sergi Reñé, Jose Muñoz, Oscar Esparza, Jorge Mata, and Juanjo Alins 10th ACM symposium on Performance evaluation of WSN, 2013, Barcelona, Spain, hi5: 21

#### Analysis of Inter-RSU Beaconing Interference in VANETs

Gañán, Carlos, Jonathan Loo, Arindam Ghosh, Oscar Esparza, Sergi Reñé, and Jose L. Muñoz

Multiple Access Communications, 2012, Dublin, Ireland, hi5: 13

### On the Self-similarity Nature of the Revocation Data

Gañán, Carlos, Jorge Mata-Díaz, Jose L. Muñoz, Oscar Esparza, and Juanjo Alins Information Security, 2012, Passau, Germany, hi5: 35

#### Impact of the Revocation Service in PKI Prices

Gañán, Carlos, Jose L. Muñoz, Oscar Esparza, Jorge Mata-Díaz, and Juanjo Alins Information and Communications Security, 2012, Hong Kong, hi5: 33

### Toward Revocation Data Handling Efficiency in VANETs

Gañán, Carlos, Jose L. Muñoz, Oscar Esparza, Jorge Mata-Díaz, and Juanjo Alins Communication Technologies for Vehicles, 2012, Vilnius, Lithuania, hi5: 16

### RAR: Risk Aware Revocation Mechanism for Vehicular Networks

Gañán, Carlos, Jose L. Muñoz, Oscar Esparza, Jorge Mata-Diaz, Juanjo Alins, Carlos Silva-Cardenas, and Gumercindo Bartra-Gardini

2012 IEEE 75th Vehicular Technology Conference (VTC Spring), 2012, Yokohama, Japan, hi5: 90

NeuroCast: Adaptive Multi-source P2P Video Streaming Application for Wireless Networks Gañán, Carlos, Juan Caubet, Sergi Reñé, Jorge Mata-Díaz, Juanjo Alins, and Óscar Esparza Wired/Wireless Internet Communications, 2011, Vilanova i la Geltrú, Spain, hi5: 15

### Analysis of Video Streaming Performance in Vehicular Networks

Reñé, Sergi, Carlos Gañán, Juan Caubet, Juanjo Alins, Jorge Mata-Díaz, and Jose L. Muñoz INFOCOMP, 2011, Sant Joan d'Espi, Spain, hi5: 5

### PKIX Certificate Status in Hybrid MANETs

Muñoz, Jose L., Oscar Esparza, Carlos Gañán, and Javier Parra-Arnau

Ifip International Federation For Information Processing, 2009, Brussels, Belgium, hi5: 14

### local peer-reviewed conferences/proceedings

CRL Issuing Mechanism for the KAD Network

Caubet, Juan, Carlos Gañán, Oscar Esparza, and Jose L. Muñoz Jitel 2013 - IX Jornadas de Ingeniería Telemática, 2013

Impacto de las unidades a pie de carretera en las interferencias en redes vehiculares Gañán, Carlos, Sergi Reñé, Jorge Mata-Díaz, and Juanjo Alins Jitel 2013 - IX Jornadas de Ingeniería Telemática, 2013

Estructuras de datos autenticadas para gestionar datos de revocación en VANETs Gañán, Carlos, Jose L. Muñoz, M. F. Hinarejos, A. Isern, and Juanjo Alins RECSI 2012 - XII Reunión Española sobre Criptología y Seguridad de la Información, 2012

Gestión del riesgo inherente en la revocación de certificados de redes vehiculares Gañán, Carlos, Jose L. Muñoz, M. F. Hinarejos, A. Isern, and Juanjo Alins RECSI 2012 - XII Reunión Española sobre Criptología y Seguridad de la Información, 2012

Un Esquema de Pago Seguro mediante Multicupones para Escenarios Multi-Comerciante Isern, A., M. F. Hinarejos, J. Ferrer, M. Palleras, Carlos Gañán, J. L. Muñoz, Jordi Forné, and Oscar Esparza

RECSI 2012 - XII Reunión Española sobre Criptología y Seguridad de la Información, 2012

Aplicación adaptativa multi-fuente para streaming de vídeo en redes P2P inalámbricas Caubet, Juan, Carlos Gañán, Sergi Reñé, Juanjo Alins, and Jorge Mata-Díaz Jitel 2011 - VIII Jornadas de Ingeniería Telemática, 2011

Mecanismo para evitar ataques por confabulación basados en code passing Jáimez, Marc, Oscar Esparza, Carlos Gañán, and Jarvier Parra-Arnau Jitel 2009 - VII Jornadas de Ingeniería Telemática, 2009

Nuevo criterio para la estimación de información de estado de certificados en MANET Muñoz, Jose L., Jarvier Parra-Arnau, Carlos Gañán, and Marc Jáimez Jitel 2009 - VII Jornadas de Ingeniería Telemática, 2009

### book chapters

Muñoz, Jose L., Oscar Esparza, Carlos Gañán, Jorge Mata-Díaz, Juanjo Alins, and Ivan Ganchev. "MHT-Based Mechanism for Certificate Revocation in VANETs". English. In: Wireless Networking for Moving Objects. Ed. by Ivan Ganchev, Marília Curado, and Andreas Kassler. Vol. 8611. Lecture Notes in Computer Science. Springer International Publishing, 2014, pp. 282–300. ISBN: 978-3-319-10833-9.

### thesis

Certificate Status Information Distribution and Validation in vehicular networks Gañán, Carlos, Doctoral Dissertation, Univesitat Politècnica de Catalunya, 2013

Scalable Multi-Sourcer Video Streaming Application over P2P networks Gañán, Carlos, Master's Thesis, Univesitat Politècnica de Catalunya, Sept. 2009

Energy Management Architexture for Wireless Sensor Networks Gañán, Carlos, Master's Thesis, Koninklijke Philips Electronics, Mar. 2008

# teaching experience

**Organization and Management, Decision making** 2017-now

Course manager and Lecturer

M.Sc. course, (3 ECTS; +/- 20 students)

2016-now Mathematical models and society

Course manager and Lecturer

M.Sc. course, (3 ECTS; +/- 90 students)

Responsibilities:

· Lecturing the whole course;

- Coordinating with the other co-lecturers;
- Grading and giving feedback to the students.

2016-now

Course manager and Lecturer MSc Level (+/- 3,000 students)

Responsibilities:

- Teaching, managing and developing course contents;
- Producing video lectures;
- Assisting other partner institutions (Cambridge, Muenster and Southern Methodist University) with the development of the video lectures;
- · Coordinating with the student assistants;
- Acting as first point of contact with the course participants.

2015-now **Cyber Security: Economics and Insurance** 

Course manager and Lecturer

M.Sc. course, (5 ECTS; +/- 20 students)

Responsibilities:

- Course content development;
- · Lecturing the whole course;
- · Preparing the assignments;
- Grading and giving feedback to the students.

2015-2016 **Economics of Security** 

3TU Master (TU Delft, Twente University)

Professional Online Education Course

Responsibilities:

- Integrating the course materials in an instructional online platform to enhance pedagogical technique;
- Planning lessons and assignments;
- Design of the course data analytics projects;
- Leading group discussions and graded their assignments.

**Economics of Cybersecurity** 2015

> Course manager and Lecturer MSc/PhD-level (+/- 400 students)

Responsibilities:

- · Teaching, managing and developing course contents;
- · Producing video lectures;
- Assisting other partner institutions (Cambridge, Muenster and Southern Methodist University) with the development of the video lectures;
- Coordinating the course with edX and TU Delft's extension school;
- Acting as first point of contact with the course participants.

**Cyber Security Economics** 

Leiden University

Delft University of Technology

Delft University of Technology

Massive Open Online Course

Course manager and Lecturer

M.Sc. course, (5 ECTS; +/- 40 students)

Course content development;

### 2012-2013 Internet Transport, Control and Management

Technical University of Catalonia

Assistant Lecturer

B.Sc. level, (+/- 100 students) Responsibilities:

- Developing part of the course materials;
- · Teaching on campus master classes;
- · Conducting laboratory sessions;
- · Planning all assignments and in-class exercises;
- Managing student concerns, grading exams, holding office hours and extra review sessions.

#### **2012-2013 Linux Networks**

Technical University of Catalonia

Lecturer

M.Sc. level, (+/- 40 students). Responsibilities:

- Helping create curriculum;
- · Composing exams and assignments;
- · Leading weekly discussion sessions;
- Grading all written work and determining final grades.

# professional activities

#### Reviewer

- Journal of Information Policy
- IEEE Transactions on Information Forensics and Security- Journal
- Computer Communications Journal Elsevier
- · Ad Hoc Networks Journal Elsevier
- Journal of Network and Computer Applications Elsevier
- IET Information Security Journal
- IEEE Vehicular Technology Conference
- · IEEE Transactions on Mobile Computing Journal

#### **Program committee**

- International Workshop on Traffic Measurements for Cybersecurity 2016, 2017, 2018
- IEEE Globecom 2015 Security Symposium
- ACM AsiaCCS 2016 Workshop on Traffic Measurements for Cybersecurity
- ComTel 2012,2013,2014,2015,2016,2017,2018 International Congress on computing and telecommunications

### Organizer

- Workshop on the Economics of Information Security (WEIS) 2015
- International Conference on Information and Communications (ICICS) 2010