

# Curriculum vitæ of Cataldo Basile



## Education and qualifications

Cataldo Basile holds a Ph.D. in Computer and System Engineering (Ingegneria Informatica e dei Sistemi), obtained May 2, 2005 from the Politecnico di Torino, Torino, Italy, by presenting the thesis “Theoretical issues and architectural design of policy-based security systems”.

Cataldo Basile holds a “laurea” (a.k.a. M.Sc.) in Computer Engineering *summa cum laude* (110 e lode/110), obtained November 22, 2001 from the Politecnico di Torino, Torino, Italy, by presenting the thesis “Una architettura di sicurezza basata su politiche formali”<sup>1</sup>.

Cataldo Basile received from the Unione Industriale di Torino the “Premio Optime 2001”, which every year awards the best graduates from the universities in Torino.

## Current position

Cataldo Basile is an assistant professor the Politecnico di Torino (Ricercatore a tempo determinato ai sensi dell’art. 24 della legge 240/10 lettera b), member of the Torino Security (TORSEC) group, Dipartimento di Automatica e Informatica<sup>2</sup>.

The TORSEC group performs research and consultancy projects in the field of network and computer security, for both public agencies and private firms, and taking part in several projects related to the networking and security field. His current role and responsibilities include (but are not limited to):

- principal investigator and coordinator of the activities in the policy-based security management research field, aiming to perform automatic or semi-automatic risk analysis and mitigation of computer networks;
- principal investigator and coordinator of the activities in the software security research fields;
- principal investigator in the field of vulnerability assessment, and penetration testing;
- team leader and technical coordinator of EC funded and national projects;
- manager of collaboration with academia, industries, and public bodies to launch and seek funding for new research projects at Italian and European level and for preparing new H2020 proposals;
- consultant engineer of industries and public bodies for the design and realization of advanced security applications, security assessment and testing, assessment of compliance with the Italian privacy law (DPR 196/2003) and GDPR, and for automated ticketing machines (DL 13/7/2000, 23/7/2001);
- supervisor of Ph.D. Master, and Bachelor students;
- teaching assistant of the courses “Sicurezza dei Sistemi informativi”, “Computer systems security”, and “Cryptography”.

Cataldo Basile is author of 41 publications. A selection of the most important journal papers is reported later in this document.

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<sup>1</sup>An architecture for policy-based security enforcement.

<sup>2</sup>Department of Computer and Control Engineering

## Past research positions

Cataldo Basile has performed post-doc research activities in the following Universities:

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|-----------------------|---|
| 01/08/2020-today      | Assistant Professor at the Politecnico di Torino (Ricercatore a tempo determinato ai sensi dell'art. 24 della legge 240/2010, lettera b)");   |
| 12/06/2017-11/06/2020 | Assistant Professor at the Politecnico di Torino (Ricercatore a tempo determinato ai sensi dell'art. 24 della legge 240/2010, lettera a)");   |
| 1/1/2005-11/06/2017   | Research Assistant at the Politecnico di Torino;  |
| 20/1/2009-31/10/2009  | Research assistant at the Università di Trento (Contratto di prestazione d'opera intellettuale per lo svolgimento dell'attività di ricerca relativa alla "Analisi di sicurezza delle diverse soluzioni proposte nel corso del progetto RE-TRUST applicando le tecniche ereditate dai campi della security, dependability e del trust.") |

## Research investigations and achievements

Cataldo Basile's interests focus on computer system security, in particular, he is concentrating on the following topics:

- *policy-based security management*, for the definition of an expert system for the automatic management of security tasks both in virtual and physical networks.
- *policy refinement*, for the definition of models to automatically enforce security policies in networked computer systems from high-level requirements.
- *policy conflict and anomaly analysis*, for the definition of models to detect errors in the configuration of security controls in networked information systems.
- *software security*, for the definition of software attestation techniques;
- *decision support for software protection*, for the definition of an expert system able to help developers to automatically protect assets in software applications;
- *empirical software engineering*, for the definition of experiments to empirically assess the effectiveness of software protections.

Cataldo Basile has published 15 journal papers, 23 conference papers, and three book chapters. He has also been awarded of the ACM SIGSOFT Distinguished Papers Awards and Best Paper Awards for the paper "Mariano, Ceccato; Paolo, Tonella; Cataldo, Basile; Bart, Coppens; Bjorn, De Sutter; Paolo, Falcarin; Marco, Torchiano (2017), How Professional Hackers Understand Protected Code while Performing Attack Tasks. In: ICPC 2017: 25th International Conference on Program Comprehension, Bueno Aires (Argentina), 22-23 Maggio. pp. 154-164".

Moreover, he has been:

- invited expert at the "Software Security in Mobile Communications" Panel during the 2nd International ICST Conference on Security and Privacy in Mobile Information and Communication Systems (MobiSec 2010), May 27-28 2010 held in Catania, and invited speaker at the International Workshop on Software PROtection, Vienna (Austria), 28 October 2016, for the presentation of the "The ASPIRE Framework for Software Protection: the ASPIRE Decision Support System";
- invited participant and speaker at the Dagstuhl seminar 19331, August 13th, 2019, for the presentation of the research "An Expert System for Software Protection";
- Lead Guest Editor of the Special Issue on "Automated Management of Security in Software Networks" of the Security and Communication Networks, John Wiley & Sons Ltd / Hindawi, (ISSN: 1939-0122), April 2019;
- reviewer of 16 following high-quality international journals, including IEEE Transactions on Network and Service Management (TNSM) and IEEE/ACM Transactions on Networking (TON);
- member of the Program Committee of more than 30 international conferences and symposia.

## Project management

Cataldo Basile took or is taking part, with management and leading responsibilities, in the following research projects:

- FISHY** (2020-now) *A coordinated framework for cyber resilient supply chain systems over complex ICT infrastructures* H2020-EU.2.1.1 SU-ICT-02-2020 RIA  
Partner technical leader for the Politecnico di Torino; Work Package Leader of the WP4 “FISHY Security and Certification Manager: Design and development” and Task 5.2 leader “Secure Infrastructure Abstraction”.
- PALANTIR** (2020-now) *Practical Autonomous Cyberhealth for resilient SMEs & Microenterprises* H2020-EU.3.7.6 H2020-EU.3.7.4 SU-DS03-2019-2020 IA  
Partner technical leader for the Politecnico di Torino.
- HOME** (2018-now) *Hierarchical Open Manufacturing Europe, Programma Operativo Regionale “Competitività regionale e occupazione” F.E.S.R. 2014/2020 AZIONE I.1b.2.2 e F.S.E. 2014/2020 AZIONE I.8.II.2.3.1*  
Partner Technical Leader for the Dipartimento di Automatica e Informatica del Politecnico di Torino; Task Leader of the task T1.6 “Requisiti di sicurezza delle LAN di fabbrica”.
- ASPIRE** (2013-2017) *Advanced Software Protection: Integration, Research and Exploitation, EC/DG-INFOSOC, FP7-ICT-2013-10, ICT-2013.1.5 – Trustworthy ICT, GA 609734*,  
Member of the Project Technical Committee and the Project Steering Committee; Partner Technical Leader for the Politecnico di Torino; Work Package Leader of the WP5 “Framework”; Task Leader of the Tasks T3.2 “Remote Attestation” and Task T4.1 “Security Model and Evaluation Methodology”; coordinating the initial phases of the project definition, participation to the preparation of the proposal, and active work from the project start until the final review, held in Brussels on January 11-12th 2017.
- SECURED** (2013-2016) *SECURity at the network Edge, EC/DG-INFOSOC, FP7-ICT-2013-10, ICT-2013.1.5 – Trustworthy ICT, GA 611458*  
Member of the Project Steering Committee, Project Technical Leader for the policy-based security management and policy security analysis tasks; Work Package Leader of the WP4 “Security Policies”; participation to the preparation of the proposal, and active work from the project start until the final review, held in Brussels on November 23-24th 2016.
- PoSecCo** (2010-2013) *Policy and Security Configuration Management, EC/DG-INFOSOC, FP7-ICT-2009-5, ICT-2009.1.4 – Trustworthy ICT, GA 257129*  
Partner Technical Leader of the Politecnico di Torino; member of the Project Steering Committee; Work Package leader of the WP3 “Decision Support for Policy Refinement”; participation to the preparation of the proposal and work from the project start until the final review, held in Madrid on November 2013.
- POSITIF** (2004-2007) *Policy-based security tools and framework, EC/DG-INFOSOC, FP6-IST, IST-2002-2.3.1.5 – Towards a global dependability and security framework, GA 002314*  
Project Technical Coordinator, leader of work package WP3 “Policy Transformation”; main designer of the policy-based architecture, participation to the preparation of the proposal and active work from the project start, in February 2004, to the final review hold in Milano in July 2007.
- RE-TRUST** (2009) *Remote entrusting by run-time software authentication, EC/DG-INFOSOC, FP6-IST, IST-2004-2.3.4.1 b8 – IST-2004-2.3.4.1. FET open, GA 021186*  
technical leader of the security analysis tasks, support to the project coordination, leader of the work package WP4 “Trust and Security Analysis”.

Moreover, Cataldo Basile contributed with his research to the following research projects:

- Open\_TC (2005-2009, EC/DG-INFOSOC) for an overall policy model for the security of Trusted Virtual Domains usable for automatic refinement of configurations, privacy policy model for virtual storage.
- Deserec (2006-2008, EC/DG-INFOSOC) for a refinement models to support dependability and fast re-configurability in case of attacks or failures.

### **Academic teaching and tutoring activities**

Cataldo Basile is the teacher of the courses “Hacking techniques” and “Security of software networks”, Doctorate Research in Computer And Control Engineering.

Cataldo Basile is currently professor of “Sicurezza dei Sistemi Informativi” and teaching assistant of the course “Cryptography”, “Security Verification and Testing” MSc in Ingegneria Informatica at the Politecnico di Torino. He has been assigned as a lecturer, teaching assistant, or tutor to more than 30 courses at Bachelor and Master level.

Cataldo Basile is currently the supervisor or co-supervisor of sixteen MSc thesis students. Moreover, he has been co-tutor of nine Ph.D. students, supervisor or co-supervisor of more than forty master thesis students, seven bachelor students, in the degree in Ingegneria Informatica at the Politecnico di Torino, co-supervisor of two students in the TOP-UIC Project, in the Joint degree between the Politecnico di Torino and the University of Illinois at Chicago, and tutor of an international student from the Shibaura Institute of Technology.

### **Other work activities**

Cataldo Basile is leading the CyberChallenge.IT initiative for the Politecnico di Torino, the first Italian training program in cybersecurity for high-school and undergraduate students.

Cataldo Basile is the tutor of the *pwnthem0le* Student Team of the Politecnico di Torino, which focuses on Cybersecurity and Ethical Hacking, participates CTF (Capture The Flag) competitions, and collaborate with the Department of Control and Computer Engineering and the Department of Mathematical Sciences “Giuseppe Luigi Lagrange”.

Cataldo Basile is an organizer of the *m0lecon* Security Conference and CTF, since the first edition (<https://m0lecon.it/>).

Cataldo Basile has been the teacher of the courses “Introduzione alla sicurezza informatica” organized by the TEACH Between S.p.A., from 2004 to 2008, and teacher of several introductory and advanced courses in cybersecurity for private companies.

Cataldo Basile has been the instructor of more than 20 courses funded by the Regione Piemonte and Regione Lazio to prepare experts in cybersecurity.

### **Foreign Languages**

English (Advanced user, IELTS certification); French (Intermediate); Spanish (Elementary).

### **Selected journal publications**

- [1] A. Viticchié, L. Regano, C. Basile, M. Torchiano, M. Ceccato, and P. Tonella, “Empirical assessment of the effort needed to attack programs protected with client/server code splitting,” *Empirical Software Engineering*, vol. 25, no. 1, pp. 1–48, Jan. 2020.
- [2] M. Ceccato, P. Tonella, C. Basile, P. Falcarin, M. Torchiano, B. Coppens, and B. D. Sutter, “Understanding the behaviour of hackers while performing attack tasks in a professional setting and in a public challenge,” *Empirical Software Engineering*, vol. 24, no. 1, pp. 240–286, Feb. 2019.

- [3] C. Basile, D. Canavese, L. Regano, P. Falcarin, and B. D. Sutter, “A meta-model for software protections and reverse engineering attacks,” *J. Syst. Softw.*, vol. 150, pp. 3–21, Apr. 2019.
- [4] C. Basile, F. Valenza, A. Lioy, D. R. Lopez, and A. P. Perales, “Adding support for automatic enforcement of security policies in NFV networks,” *IEEE/ACM Trans. Netw.*, vol. 27, no. 2, pp. 707–720, Apr. 2019.
- [5] A. Viticchié, C. Basile, F. Valenza, and A. Lioy, “On the impossibility of effectively using likely-invariants for software attestation purposes,” *JoWUA*, vol. 9, no. 2, pp. 1–25, Jun. 2018.
- [6] F. Valenza, C. Basile, D. Canavese, and A. Lioy, “Classification and analysis of communication protection policy anomalies,” *IEEE/ACM Trans. Netw.*, vol. 25, no. 5, pp. 2601–2614, 2017.
- [7] C. Basile, D. Canavese, C. Pitscheider, A. Lioy, and F. Valenza, “Assessing network authorization policies via reachability analysis,” *Comput. Electr. Eng.*, vol. 64, pp. 110–131, Oct. 2017.
- [8] C. Basile, D. Canavese, A. Lioy, C. Pitscheider, and F. Valenza, “Inter-function anomaly analysis for correct SDN/NFV deployment,” *Int. Journal of Network Management*, vol. 26, no. 1, pp. 25–43, Jan. 2016.
- [9] C. Basile and A. Lioy, “Analysis of application-layer filtering policies with application to HTTP,” *IEEE/ACM Trans. Netw.*, vol. 23, no. 1, pp. 28–41, Feb. 2015.
- [10] D. Montero, M. Yannuzzi, A. L. Shaw, L. Jacquin, A. Pastor, R. Serral-Gracià, A. Lioy, F. Risso, C. Basile, R. Sassu, M. Nemirovsky, F. Ciaccia, M. Georgiades, S. Charalambides, J. Kuusijärvi, and F. Bosco, “Virtualized security at the network edge: a user-centric approach,” *IEEE Communications Magazine*, vol. 53, no. 4, pp. 176–186, Apr. 2015.
- [11] C. Basile, S. D. Carlo, and A. Scionti, “Fpga-based remote-code integrity verification of programs in distributed embedded systems,” *IEEE Trans. Systems, Man, and Cybernetics, Part C*, vol. 42, no. 2, pp. 187–200, Mar. 2012.
- [12] C. Basile, A. Cappadonia, and A. Lioy, “Network-level access control policy analysis and transformation,” *IEEE/ACM Trans. Netw.*, vol. 20, no. 4, pp. 985–998, Aug. 2012.

The full publications’ list is available at <https://iris.polito.it/cris/rp/rp07508>



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