

Lorenzo De Carli

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Status: US Permanent Resident

Current Position

Assistant Professor. January 2017–present
Computer Science Department, Colorado State University
Fort Collins, CO, USA

Education

University of Wisconsin-Madison, Madison, WI, USA

Ph.D. in Computer Science, December 2016

Advisor: Professor Somesh Jha

M.Sc. in Computer Science, May 2010

Politecnico di Torino, Torino, Italy

M.Sc. in Computer Engineering, November 2007

B.Sc. in Computer Engineering, March 2005

Research Interests

Network security: Web and cloud security, malware detection and understanding, usable security.

Traffic analysis: High-speed packet processing, efficient analysis of application-level protocols.

Publications

CONFERENCES

- [1] L. De Carli, R. Torres, G. Modelo-Howard, A. Tongaonkar, S. Jha. KALI: Scalable Encryption Fingerprinting in Dynamic Malware Traces. *MALCON 2017*.
Acceptance rate: 33%
- [2] V. Rastogi, D. Davidson, L. De Carli, S. Jha, P. McDaniel. Cimplifier: Automatically Debloating Containers. *FSE 2017*, September 2017.
Acceptance rate: 24.4% (75 of 295)
- [3] L. De Carli, R. Torres, G. Modelo-Howard, A. Tongaonkar, S. Jha. Botnet Protocol Inference in the Presence of Encrypted Traffic. *IEEE INFOCOM*, May 2017.
Acceptance rate: 20.9% (292 of 1395)
- [4] R. Sommer, M. Vallentin, L. De Carli, V. Paxson. HILTI: An Abstract Execution Environment for Deep, Stateful Network Traffic Analysis. *ACM IMC*, November 2014.
Acceptance rate: 22.9% (43 of 188)

- [5] L. De Carli, R. Sommer, S. Jha. Beyond Pattern Matching: A Concurrency Model for Stateful Deep Packet Inspection. *ACM CCS*, November 2014.
Acceptance rate: 19.5% (114 of 585)
- [6] D. Luchaup, L. De Carli, S. Jha, E. Bach. Deep Packet Inspection with DFA-trees and Parametrized Language Overapproximation. *IEEE INFOCOM*, May 2014.
Acceptance rate: 19.3% (319 of 1650)
- [7] S. J. Kim, L. De Carli, K. Sankaralingam, C. Estan. SWSL: SoftWare Synthesis for Network Lookup. *ACM/IEEE ANCS*, October 2013.
Acceptance rate: N/A
- [8] T. Nowatzki, M. Sartin-Tarm, L. De Carli, K. Sankaralingam, C. Estan, B. Robotmili. A General Constraint-centric Scheduling Framework for Spatial Architectures. *ACM PLDI*, June 2013
(distinguished paper award).
Acceptance rate: 17.2% (46 of 267)
- [9] E. Harris, S. Wasmundt, L. De Carli, K. Sankaralingam, C. Estan. LEAP: Latency- Energy- and Area-optimized Lookup Pipeline. *ACM/IEEE ANCS*, October 2012.
Acceptance rate: 28.1% (18 of 64)
- [10] B. Aggarwal, R. Bhagwan, L. De Carli, V. N. Padmanabhan, K. P. N. Puttaswamy. Deja Vu: Fingerprinting Network Problems. *ACM CoNEXT*, December 2011.
Acceptance rate: 18.9% (30 of 159)
- [11] N. Vaish, T. Kooburat, L. De Carli, K. Sankaralingam, C. Estan. Experiences in Co-designing a Packet Classification Algorithm and a Flexible Hardware Platform. *ACM/IEEE ANCS*, October 2011.
Acceptance rate: 32.3% (20 of 62)
- [12] A. Kumar, L. De Carli, S. J. Kim, M. de Kruijf, K. Sankaralingam, C. Estan, S. Jha. Design and Implementation of the PLUG Architecture for Programmable and Efficient Network Lookups. *International Conference on Parallel Architectures and Compilation Techniques (PACT)*, September 2010.
Acceptance rate: 17.3% (46 of 266)
- [13] L. De Carli, Y. Pan, A. Kumar, C. Estan, K. Sankaralingam. PLUG: Flexible Lookup Modules for Rapid Deployment of New Protocols in High-speed Routers. *ACM SIGCOMM*, August 2009.
Acceptance rate: 10.0% (27 of 270)
- [14] A. Baldini, L. De Carli, F. Risso. Increasing Performance of TCP Data Transfers Through Multiple Parallel Connections. *IEEE ISCC*, July 2009.
Acceptance rate: N/A

JOURNALS

- [1] T. Nowatzki, M. Sartin-Tarm, L. De Carli, K. Sankaralingam, C. Estan, B. Robotmili. A Scheduling Framework for Spatial Architectures Across Multiple Constraint-Solving Theories. *ACM Trans. Program. Lang. Syst. (TOPLAS)* 37, 1, November 2014.
- [2] M. Sartin-Tarm, T. Nowatzki, L. De Carli, K. Sankaralingam, C. Estan. Constraint centric scheduling guide. *ACM SIGARCH Computer Architecture News, Volume 41 Issue 2*, May 2013.

Patents

- [1] K. Sankaralingam, J. Menon, L. De Carli. Memory Processing Core Architecture. *US Application US14453990*, Filed Aug 2014.
- [2] R. Bhagwan, V. N. Padmanabhan, B. Aggarwal, L. De Carli. Learning signatures for application problems using trace data. *US Patent US8880933B2*, Published Nov 2014.

Honors & Awards

- WARF (Wisconsin Alumni Research Foundation) innovation award finalist for “Memory Processing Unit Boosts Performance, Conserves Energy” (patent application with Karthikeyan Sankaralingam and Jai Menon), 2015
- Distinguished Paper Award, ACM SIGPLAN conference on Programming Language Design and Implementation (PLDI), 2013

Research Experience

- Research assistant.** Advisor: Professor Somesh Jha. September 2008–December 2016
Topic: Network security and traffic analysis
Department of Computer Sciences, University of Wisconsin-Madison, Madison, WI, USA
- Research intern.** Mentor: Ruben Torres. July–October 2014
Topic: Automatic analysis of malware communication protocols
Narus Inc., Sunnyvale, CA, USA
- Research intern.** Mentor: Robin Sommer. June–September 2012
Topic: Parallelization of complex intrusion detection workloads
International Computer Science Institute, Berkeley, CA, USA
- Research intern.** Mentor: Robin Sommer. May–August 2011
Topic: Hardware-accelerated traffic analysis
International Computer Science Institute, Berkeley, CA, USA
- Research intern.** Mentor: Ranjita Bhagwan. May–August 2010
Topic: Automatic diagnosis of network failures
Microsoft Research, Bangalore, Karnataka, India
- Research assistant.** Mentor: Professor Fulvio Risso. November 2007–July 2008
Topic: Algorithms and languages for deep packet inspection
Netgroup, Politecnico di Torino, Torino, Italy

Mentoring Experience

RESEARCH MENTOR (2009-2013)

Mentor for undergraduate and graduate student research in collaboration with Professor Karthikeyan Sankaralingam, University of Wisconsin-Madison. Mentored students Sung-Jin Kim (Ph.D., 2015) and Michael Sartin-Tarm (B.Sc., 2013).

UNDERGRADUATE MENTOR (2008)

Undergraduate thesis mentor in collaboration with Professor Fulvio Risso, Politecnico di Torino. Mentored student Stefano Cancedda (B.Sc., 2008).

Professional Activities

PROGRAM COMMITTEE MEMBER

International Conference on Sensor Networks (SENSORNETS) 2018; Asian Internet Engineering Conference (AINTEC) 2017; IEEE International Conference on Trust, Security and Privacy in Computing and Communications (TrustCom) 2016.

EXTERNAL REVIEWER

International Conference on Software Engineering (ICSE) 2017; Conference on Detection of Intrusions and Malware & Vulnerability Assessment (DIMVA) 2016; Network and Distributed System Security Symposium (NDSS) 2016; ACM Symposium on Principles of Programming Languages (POPL) 2016; IEEE Symposium on Security and Privacy (Oakland) 2015; Conference on Principles of Security and Trust (POST) 2014-2015; Symposium on Engineering Secure Software and Systems (ESSOS) 2015; ACM Conference on Computer and Communications Security (CCS) 2014; Conference on Computer Aided Verification (CAV) 2013-2014; IEEE Computer Security Foundations Symposium (CSF) 2014; Symposium and Bootcamp on the Science of Security (HotSoS) 2014.

JOURNAL REVIEWER

IEEE/ACM Transactions on Networking (TNET); IEEE Transactions on Industrial Informatics (TII); Elsevier Computers & Security (COSE); IEEE Journal on Selected Areas in Communications (JSAC); IEEE Transactions on Mobile Computing (TMC); PLOS ONE; ACM Computing Surveys (CSUR); IEEE Access.

Language Skills

- **English:** near-native
- **Italian:** native