

# Lorenzo De Carli

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**Status:** US Permanent Resident

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## 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] 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)*
- [2] 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)*
- [3] 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)*
- [4] 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)*

- [5] 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)*
- [6] 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*
- [7] 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)*
- [8] 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)*
- [9] 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)*
- [10] 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)*
- [11] A. Kumar, L. De Carli, S. J. Kim, M. de Kruijff, 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)*
- [12] 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)*
- [13] 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

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).

## Language Skills

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