

MARCO CANINI

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ACADEMICS

Post-Doctoral Researcher, EPFL, School of Computer and Communication Sciences, Switzerland 2009–Present

- Advisor: Prof. Dejan Kostić
- Developed practical solutions for aggregating network traffic to improve the energy efficiency of computer networks without compromising performance. Built a system that uses concolic testing to check for potential faults in production networked system implementations in federated and heterogeneous settings. Pioneered the problem of testing OpenFlow controller programs and built a system to discover bugs through a combination of model checking and symbolic execution. Released the tool as open source.

Visiting Ph.D. Student, University of Cambridge, Computer Laboratory, UK 2008

- Advisor: Dr. Andrew W. Moore
- Designed and built a hierarchical traffic classification method for network-based application identification employing machine-learned models on a NetFPGA platform. Created a methodology for deriving application traffic ground truth. Designed a per-flow packet sampling scheme enabling online classification at high-speed.

Ph.D., University of Genoa, Department of Communication, Computer and System Sciences, Italy 2006–2009

- Awards: Full Ph.D. scholarship from the University of Genoa
- Thesis: “Accurate real-time traffic classification at high-speed in IP networks”
- Advisor: Prof. Raffaele Bolla

Laurea, University of Genoa, Department of Communication, Computer and System Sciences, Italy 1999–2005
(Equivalent to a Master of Science following a Bachelor of Science)

- Score: *110/110 with honors*
 - Master Thesis: “Study, development and analysis of network-processor-based techniques for very high-speed IP-traffic generation”
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INDUSTRY EXPERIENCE

Telefonica Research, Madrid, Spain – Research Collaborator Nov 2010

- Measured the effects of crosstalk in a VDSL2 testbed in the context of an energy-efficient access network design. Discovered that crosstalk reduction allows for a bonus in performance while saving energy.

Google, Mountain View, CA, USA – Software Engineer Intern Jul 2007–Nov 2007

- Developed a fast method to query the global-scale corporate network monitoring infrastructure and a dashboard application reporting network health and device status information. This tool is used 24/7 by network operators.

Intel Research, Cambridge, UK – Senior Research Intern Feb 2006–Dec 2006

- Held a lead role in the design and implementation of CoMo, a middleware for network data-mining applications. Created a unified data model capable of abstracting the details of many data sources; introduced a new programming paradigm to make it easier to write applications.

National Inter-University Consortium for Telecommunications, Genoa, Italy – Research Assistant Jun 2005–Dec 2005

- Built a tool to perform highly accurate measurements of packet inter-arrival times on Gigabit-speed links based on the Intel IXP2400 network processor.

Reliable Networked Systems

1. **M. Canini**, D. Venzano, P. Perešini, D. Kostić and J. Rexford “A NICE Way to Test OpenFlow Applications”. To appear in *Proceedings of the 9th USENIX Symposium on Networked Systems Design and Implementation (NSDI)*, 2012 (Acceptance rate: 17.8%).
2. **M. Canini**, V. Jovanović, D. Venzano, B. Spasojević, O. Cramer and D. Kostić “Toward Online Testing of Federated and Heterogeneous Distributed Systems”. *Proceedings of the 2011 USENIX Annual Technical Conference (ATC)*, 2011 (Acceptance rate: 20.0%).
3. **M. Canini**, D. Kostić, J. Rexford and D. Venzano “Automating the Testing of OpenFlow Applications”. *Proceedings of the 1st International Workshop on Rigorous Protocol Engineering (WRiPE)*, 2011.
4. **M. Canini**, D. Novaković, V. Jovanović and D. Kostić “Fault Prediction in Distributed Systems Gone Wild”. *Proceedings of the 4th ACM SIGOPS/SIGACT Workshop on Large Scale Distributed Systems and Middleware (LADIS)*, 2010.
5. M. Yabandeh, A. Anand, **M. Canini** and D. Kostić “Finding Almost-Invariants in Distributed Systems”. *Proceedings of the 30th IEEE Symposium on Reliable Distributed Systems (SRDS)*, 2011.

Energy-Efficient Networks

6. E. Goma, **M. Canini**, A. Lopez Toledo, N. Laoutaris, D. Kostić, P. Rodriguez, R. Stanojević and P. Yagüe Valentín “Insomnia in the Access or How to Curb Access Network Related Energy Consumption”. *Proceedings of the 2011 ACM SIGCOMM*, 2011 (Acceptance rate: 14.3%).
7. N. Vasić, D. Novaković, S. Shekhar, P. Bhurat, **M. Canini** and D. Kostić “Identifying and Using Energy-Critical Paths”. *Proceedings of the 7th International Conference on emerging Networking EXperiments and Technologies (ACM CoNEXT)*, 2011 (Acceptance rate: 18.9%).

Network Monitoring and Application Identification

8. W. Li, **M. Canini**, A.W. Moore and R. Bolla “Efficient Application Identification and the Temporal Stability of Classification Schema”. *Computer Networks*. 53, 6, p. 790-809, 2009.
9. **M. Canini**, W. Li, M. Zadnik and A.W. Moore “Experience with High-Speed Automated Application-Identification for Network-Management”. *Proceedings of the 5th ACM/IEEE Symposium on Architectures for Networking and Communications Systems (ANCS)*, 2009.
10. **M. Canini**, D. Fay, D.J. Miller, A.W. Moore and R. Bolla “Per Flow Packet Sampling for High-Speed Network Monitoring”. *Proceedings of the First International Conference on Communication Systems And NETWORKS (COMSNETS)*, 2009.
11. **M. Canini**, W. Li, A.W. Moore and R. Bolla “GTVS: Boosting the Collection of Application Traffic Ground Truth”. *Proceedings of the First International Workshop on Traffic Monitoring and Analysis (TMA)*, 2009.
12. M. Zadnik and **M. Canini** “Evolution of Cache Replacement Policies to Track Heavy-Hitter Flows”. *Proceedings of the 12th Passive and Active Measurement Conference (PAM)*, 2011.
13. M. Zadnik and **M. Canini** “Evaluation and Design of Cache Replacement Policies under Flooding Attacks”. *Proceedings of the 2nd International Workshop on TRaffic Analysis and Classification (TRAC)*, 2011.

SELECTED TALKS

- **Insomnia in the Access Or How to Curb Access Network Related Energy Consumption**
ACM SIGCOMM'11 (Toronto, Canada, Aug 2011), University of Cambridge (Jul 2011)
- **Online Testing of Federated and Heterogeneous Distributed Systems**
ETH Zurich (Dec 2011) , Cisco (EPFL Innovation Square, Nov 2011) , USENIX ATC'11 (Portland, OR, USA, Jun 2011),
62nd RIPE Meeting (Amsterdam, Netherlands, May 2011), University of Cambridge (Sep 2010),
Workshop on Large Scale Distributed Systems and Middleware (Zurich, Switzerland, July 2010)
- **Automating the Testing of OpenFlow Applications**
Workshop on Rigorous Protocol Engineering (Vancouver, Canada, Oct 2011), Cisco (Rolle, Switzerland, Dec 2011)
- **How to Curb Networking Energy Consumption**
Hong Kong University of Science and Technology (Oct 2011), Chinese University of Hong Kong (Jun 2010)
- **Accurate Internet Traffic Classification**
EPFL (Jun 2009) , ipoque (A leading provider of deep packet inspection solutions, Leipzig, Germany, May 2009),
Eurecom (Graduate school and research center in communications systems, Sophia-Antipolis, France, Apr 2009)

TEACHING EXPERIENCE

EPFL, School of Computer and Communication Sciences

- Guest-lectured “Advanced Computer Networks and Distributed Systems” graduate course. Autumn 2011
- Guest-lectured “Operating Systems” undergraduate course. Spring 2010
- Organized regular presentations for a postgraduate course.
- Supervised small groups of graduate students along their course projects.
- Supervised graduate student in his semester project.

CNOSFAP Liguria, Center for Continuing Education

- Originated and taught the course “Technologies and Applications for the World Wide Web” Autumn 2002

One-to-one supervision

- Worked informally on a one-to-one basis with a Ph.D. student at Brno University of Technology, advising him on his research and collaborating with him on two papers which will be part of his dissertation.
- Organized and supervised the work of 7 interns at EPFL, mentoring them in the areas of Operating Systems and Networking.

PROFESSIONAL SERVICE

Program Committee: HotSDN'12, ICCCN'12.

External Reviewer: CoNEXT'10, ACM Computer Communications Review 2008-10, IEEE Network 2010, Telecommunication Systems Journal 2010, COMSNETS'11, IPCCC'11.

Affiliations: ACM, Association for Computing Machinery since 2007
USENIX, the Advanced Computing Systems Association since 2010
IEEE, Institute of Electrical and Electronics Engineers since 2011

Awards: Travel grants for SIGCOMM'08, IMC'08, CoNEXT'08, PAM'09, SIGCOMM'09 and SIGCOMM'10

ORGANIZATIONAL/ADMINISTRATIVE EXPERIENCE

- Devised an interview process and interviewed candidates for a research software engineer position at EPFL.
 - Interviewed candidate students for Ph.D. positions at EPFL.
 - Managed a seminar series for the EPFL systems group.
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PATENTS

- “A Method and Device for Predicting Faults in an IT System”. International patent application PCT/EP2011/062031, Jul 2010
 - “Insomnia in the Access or How to Curb Access Network Related Energy Consumption”. US provisional patent application P126108, Aug 2011
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OTHER INTERESTS

Open source: contributed to several projects including Click modular router, GNOME, GNU Scientific Library, Mono, PHP Xdebug, and Xayara.

Ultimate frisbee; martial arts; travel

LANGUAGES

Native Italian; fluent English; beginner French