

Ahmed El-Hassany

Curriculum Vitae

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Research Interests

Networks, Software-Defined Networks, Systems, Distributed Systems, Program Synthesis.

Education

2015–present **PhD student**, *ETH Zürich*, Switzerland.

Advised by: Prof. Laurent Vanbever

2009–2011 **M.S. Computer Science**, *University of Delaware*, Newark, DE.

2003–2008 **B.Sc. Computer Engineering**, *Islamic University of Gaza*, Gaza, Palestine.

Awards

- Fulbright Foreign Student Scholarship for Master's program, 2009-2011.
- 2nd place winner team at IEEE/ACM Supercomputer Conference 2009 High Performance Computing Contest.
- Google Summer of Code, 2008.
- Palestinian Prime Minister's special award for undergraduate achievements, 2008.

Publications

Conferences

- [1] **A. El-Hassany**, P. Tsankov, L. Vanbever, and M. Vechev, "NetComplete: Practical Network-Wide Configuration Synthesis with Autocompletion," in *NSDI 2018*.
- [2] **A. El-Hassany**, P. Tsankov, L. Vanbever, and M. Vechev, "Network-wide Configuration Synthesis," in *CAV 2017*.
- [3] R. May, **A. El-Hassany**, L. Vanbever, and M. Vechev, "BigBug: Practical Concurrency Analysis for SDN," in *SOSR 2017*.
- [4] **A. El-Hassany**, J. Miserez, P. Bielik, M. Vechev, and L. Vanbever, "SDNRacer: Concurrency Analysis for Software-Defined Networks," in *PLDI 2016*.
- [5] E. Z. Yang, G. Campagna, O. S. Ağacan, **A. El-Hassany**, A. Kulkarni, and R. R. Newton, "Efficient Communication and Collection with Compact Normal Forms," in *ICFP 2015*.
- [6] J. Miserez, P. Bielik, **A. El-Hassany**, L. Vanbever, and M. Vechev, "SDNRacer: Detecting Concurrency Violations in Software-defined Networks," in *SOSR 2015*.
- [7] C. Scott, A. Wundsam, B. Raghavan, A. Panda, A. Or, J. Lai, E. Huang, Z. Liu, **A. El-Hassany**, S. Whitlock, H. Acharya, K. Zarifis, and S. Shenker, "Troubleshooting Blackbox SDN Control Software with Minimal Causal Sequences," in *SIGCOMM 2014*.

- [8] **A. El-Hassany**, E. Kissel, D. Gunter, and M. Swany, "Design and Implementation of a Unified Network Information Service," in *IEEE International Conference on Services Computing (SCC 2013)*.

Workshops

- [9] E. Kissel, **A. El-Hassany**, G. Fernandes, M. Swany, D. Gunter, T. Samak, and J. M. Schopf, "Scalable Integrated Performance Analysis of Multi-Gigabit Networks," in *IEEE Network Operations and Management Symposium (NOMS)*, 2012.

Technical Reports

- [10] **A. El-Hassany**, P. Tsankov, L. Vanbever, and M. Vechev, "Network-wide Configuration Synthesis," *arXiv preprint arXiv:1611.02537*, 2016.

Demos

- [11] **A. El-Hassany**, E. Kissel, and J. Griffioen, "GEMINI Tutorial: Measuring and instrumenting GENI experiment. GEC 13-16, 2012–2013," ser. GENI Engineering Conference (GEC), 2012-2013.
- [12] **A. El-Hassany**, E. Pouyoul, V. Singh, B. Tierney, I. Monga, S. Gangualy, M. Ikeda, M. Swany, and E. Kissel, "Using Periscope to monitor End-to-End Circuit Service at Layer2 (ECSEL). SC'11," ser. ACM/IEEE Supercomputing Conference, 2011.

Presentations and invited talks

Network-wide Configuration Synthesis.

- Computer Aided Verification (CAV'17), talk available at <https://youtu.be/dUbFWtHLTCI>, July 2017 Heidelberg Germany
- Workshop on Network Verification <http://network-programming.org/wnv/>. April 2017. Palo Alto, CA, US.

BigBug: Practical Concurrency Analysis for SDN .

- ACM SIGPLAN conference on Programming Language Design and Implementation (PLDI'16), talk available at <https://youtu.be/QzYBOc3G9FU>. June 2016. Santa Barbara, CA, US.

SDNRacer: Concurrency Analysis for Software-Defined Networks.

- ACM Symposium on SDN Research (SOSR). April 2017. Santa Clara, CA, US.

UNIS: Design and Implementation of a Unified Network Information Service.

- IEEE Conference on Services Computing (IEEE SCC). July 2013. Santa Clara, CA US.

Professional Experience

June '15 – Present **Research Assistant**, *ETH Zürich*, Switzerland.

- Network-wide Configuration Synthesis <http://synet.ethz.ch>. Published in [2, 10].
- SDN Verification <http://sdnracer.ethz.ch>. Published in [3, 4, 6].

Spring '15 **Research Associate**, *Indiana University*, Bloomington, IN.

- Measured garbage collector and data serialization overhead for unstructured data.
- Developed efficient methods for representing data in Haskell's runtime system. Published in [5].

July '13 – Nov. '14 **Research Scientist**, *International Computer Science Institute*, Berkeley, CA.

- Worked with Prof. Scott Shenker group on designing and building next generation SDN architecture (SDNv2).
- Integrated research systems for troubleshooting SDN controllers with ONOS; an open source SDN controller <http://onosproject.org/>. Published in [7].
- Helped ONOS QA team adopt parts of STS in their testing infrastructure.

- Summer '13 **Summer Student**, *Lawrence Berkeley National Laboratory*, Berkeley, CA.
- Worked with the Energy Sciences Network (ESnet) team.
 - Designed and developed scalable multi-domain Topology Service for dynamic multi-domain network circuits' setup.
 - *Technology used*: Java, Python, Tornado, MongoDB.
- Aug. '11 – July '13 **Research Associate**, *Indiana University*, Bloomington, IN.
- Designed and developed a RESTful Unified Network Information Services (UNIS) to represent topologies for large-scale multi-domain networks.
 - Designed and developed instrumentation and monitoring APIs and tools for GENI experiments and physical infrastructure.
 - *Technology used*: Java, Python, Tornado, MongoDB.
- Summer '10 **Summer Student**, *Lawrence Berkeley National Laboratory*, Berkeley, CA.
- Worked at the Center for Enabling Distributed Petascale Computing (CEDPS) project.
 - Designed and built system to collect, represent and analyze large scale monitoring data for high-speed data transfers in DOE networks.
 - *Technology used*: Java, Python, Tornado, MongoDB.
- Feb. '09 – July '09 **Software Engineer**, *Municipality of Gaza*, Gaza, Palestine.
- Designed a system to extract information, categorize and archive old, from late 1800s, building permits.
 - Designed new business process and the required software for issuing building permits in Gaza.
 - Lead a team of 50 civil engineers and 20 data entry persons to implement the project.
 - *Technology used*: Oracle RDBMS, Visual Basic .NET, Delphi.
- Dec. '08 – Mar. '09 **Independent Consultant**, *Palestinian National Internet Naming Authority (PNINA)*, Gaza, Palestine.
- Software quality assurance of in house built system for registering managing all .ps domain names; PNINA is the country code top-level domain (ccTLD) for Palestine.
 - Consulting on deployment and integration for new domain registration system.
 - *Technology used*: PHP, Perl, PostgreSQL, MySQL, BIND, Apache.
- Summer '08 **Student Developer**, *Google Inc. & Internet2*, Google Summer of Code 2008.
- This project is sponsored by Google and administrated by Internet2.
 - Designed and developed open source web based configuration tools for perfSONAR-PS.
 - *Technology used*: Perl, JavaScript, Apache, HTML, CSS.
- Sep. '07 – Mar. '08 **Software Engineer**, *AfkarIT*, Gaza, Palestine.
- Designed and developed operating system level virtual machines monitoring system for VMWare ESX Infrastructure.
 - *Technology used*: Python, C#.
- Sep. '04 – Oct. '05 **Contractor Software Engineer**, *Ard El-Insan*, Gaza, Palestine.
- Designed and developed patients follow-up management system in four clinics for a project sponsored by European Commission's Humanitarian Aid Office (ECHO).
 - *Technology used*: Visual Basic. NET, Microsoft SQL Server.

Activities and Services

- Reviewer: IEEE/ACM Transactions on Networking.
- Attended Par Lab Boot Camp – short course on parallel programming, UC Berkeley 2010.
- SCinet student volunteer, Supercomputing Conference 2010, 2011, 2012.
- President of Graduate Students Association for Computer and Information Science Department at University of Delaware, (Fall 2010 – Spring 2011)
- Attended From Lab to Market, Fulbright Enrichment Seminar, Austin TX, June 1st-5th 2009.