Abhishek **Dwaraki**

RESEARCH ENGINEER

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Education

University of Massachusetts, Amherst	*Amherst, MA USA*
PH.D IN COMPUTER ENGINEERING	*Sep 2012 - Aug 2019*

University of Massachusetts, Amherst	*Amherst, MA USA*
MASTERS. IN COMPUTER ENGINEERING	*Sep 2008 - Mar 2011*

Visveswaraya Technological University	*Belgaum, Karnataka, India*
BACHELOR OF ENGINEERING IN INFORMATION TECHNOLOGY	*Oct 2001 - Jun 2005*

Skills

Programming	Python, Java, C, C++
Networking and Distributed Systems	Layer-2/3 networking development experience
Networking Technologies	SDN/NFV, ONOS, OpenFlow, sFlow
Applied Research Skills	TensorFlow, Keras, NLTK, scikit-learn, sPacy, Prodigy
Tools	Git, Docker, Kubernetes, Maven, Bazel

Work Experience

McKelvey School of Engineering, Dept. of Computer Science, Washington University in St. Louis	*St. Louis, MO*
RESEARCH ENGINEER	*October 2019 - Present*

- Responsible for exploratory research and systems development in collaboration with various professors in the computer science department.
- Develop systems and frameworks across domains such as cyber-physical systems, networks and autonomous vehicles.
- Built a ZeroMQ-based framework for autonomous vehicular clients to communicate with their LGSVL controllers.
- Platforms - C/C++, Python, ROS, ZeroMQ

Deutsche Telekom Silicon Valley Innovation Center	*Mountain View, CA*
RESEARCH INTERN	*Jun - Sep 2015, Apr - Aug 2014*

- Designed and prototyped a versioning system for network state on the ONOS SDN controller. Also demonstrated that you can analyze flows and introduce accountability and provenance on the lines of Git for files.
- Developed a network flow tap application to replicate and redirect network flows based on assigned filters. This was prototyped on the OpenDayLight SDN controller.
- Platforms - ONOS, OpenDayLight, Java, NoSQL, Maven, Mininet

RSA, The Security Division of EMC2	*Bedford, MA*
DEVICE INTEGRATION ENGINEER, ENVISION CONTENT ENGINEERING	*May 2010 - Aug 2012*

- Added, normalized and remediated new and existing event source XMLs for network security devices.
- Performed risk assessments on security devices by looking for patterns and irregularities in network device events.
- Platforms - Python, XML, and Shell Scripting

Infosys Technologies Ltd *Bangalore, India*

SOFTWARE ENGINEER, OPTICAL ETHERNET DEVELOPMENT *May 2006 - Jul 2008*

- Implemented a feature that reduced Nortel MERS 3, 5 and 10-slot chassis' switches upgrade downtime by almost 40%.
- Implemented efficient code, spanning the command-line interface, co-processor and network processor to support an entire layer-2 sub-feature.
- Designed, developed and implemented functional, integration and regression test-plans for 802.11q and 802.11ad/h protocols, provider-backbone bridging, trunking and various other enterprise layer-2 protocols.
- Platforms - C, C++, Assembly Programming, Ixia, Spirent

Research Experience

Network Systems Lab, University of Massachusetts Amherst *Amherst, MA USA*

NETWORK MANAGEMENT USING NATURAL LANGUAGE PROCESSING *Sep 2012 - August 2019*

- Designed an novel approach that uses natural language processing to analyze system and network logs to identify network events with 98% accuracy.
- The framework extracts relevant information from the events and build a knowledge base, which provides a basis to build various analysis tools.
- Platform and Tools: Python, spaCy, Prodigy, Keras, NLTK, scikit-learn

PROGRAMMABLE NETWORKING

- Designed a versioning system to track changes across network flows.
- Prototype demonstrated how to bring accountability and provenance into a programmable networking environment.
- Platform and Tools: ONOS, Java, Mininet, SDNIP, BGP

NFV AND SERVICE-CHAINS

- Designed a path-finding algorithm for complex NFV service-chains.
- Prototype demonstrated that a multi-criteria approximation problem can be solved by restructuring the network graph and path-finding can be achieved using Djikstra's algorithm.
- Platform and Tools: Python, Mininet/Dockernet, sFlow

PACKET PACING ON SMALL-BUFFER NETWORKS

- Implemented an algorithm that demonstrated that congestion in the core can be tackled by active packet pacing on the edge of the network.
- Platform and Tools: NetFPGA, Python, Xilinx Virtex-2 Pro

Committees

The 28th IEEE International Conference on Network Protocols *Madrid, Spain*

TECHNICAL PROGRAM COMMITTEE MEMBER *2020*

ICNP, the IEEE International Conference on Network Protocols, is the premier conference covering all aspects of network protocol research, including design, analysis, specification, verification, implementation, and performance.

NSF Innovation-Corps *Austin, TX*

ENTREPRENEURIAL LEAD *June 2017*

The National Science Foundation's Innovation Corps (I-Corps™) program uses experiential education to help researchers gain valuable insight into entrepreneurship, starting a business or industry requirements and challenges. I-Corps enables the transformation of invention to impact. The curriculum integrates scientific inquiry and industrial discovery in an inclusive, data-driven culture driven by rigor, relevance, and evidence. Through I-Corps training, researchers can reduce the time to translate a promising idea from the laboratory to the marketplace.

Publications and Patents

- Clayton Faber, Tom Plano, Samatha Kodali, Zhili Xiao, Abhishek Dwaraki, Jeremy Buhler and Roger Chamberlain, 2021, *Platform Agnostic Streaming Data Application Performance Models: Workshop on Redefining Scalability for Diversely Heterogeneous Architectures (RSDHA) In Proceedings of the International Conference for High Performance Computing, Networking, Storage and Analysis* St. Louis, Missouri, USA
- Abhishek Dwaraki, Shachi Kumar and Tilman Wolf, 2020, *Automated Event Identification from System Logs Using Natural Language Processing: In Proceedings of the International Conference on Computing, Networking and Communication (ICNC)*, Big Island, Hawaii, USA
- Abhishek Dwaraki, Sriram Natarajan, Tilman Wolf and Srini Seetharaman, 2019, *Versioning System for network states in a software-defined network: US Patent 1046930*
- Abhishek Dwaraki, Richard Freedman, Shlomo Zilberstein and Tilman Wolf, 2019, *Using Natural Language Constructs and Concepts to Aid Network Management: In Proceedings of the International Conference on Computing, Networking and Communication (ICNC)* Honolulu, Hawaii, USA
- Abhishek Dwaraki and Tilman Wolf, 2016, *Adaptive Service-Chain Routing for Virtualized Network Functions in Software-Defined Networks: ACM SIGCOMM Workshop on Hot Topics in Middleboxes* Florianopolis, Brazil
- Abhishek Dwaraki, Srini Seetharaman, Sriram Natarajan and Tilman Wolf, 2015, *GitFlow: Flow Revision Management for Software-Defined Networks: In Proceedings of the 1st ACM SIGCOMM Symposium of SDN Research* Santa Clara, California
- Sinan Hanay, Abhishek Dwaraki, Kekai Hu and Tilman Wolf, 2013, *High-performance implementation of in-network traffic pacing for small-buffer networks : Journal of Computer Communications*
- Abhishek Dwaraki and Tilman Wolf, 2012, *Service Instantiation in an Internet with Choices: In Proceedings of the IEEE 23rd International Conference on Computer Communications and Networks*, Nassau, Bahamas.
- Xinming Chen, Abhishek Dwaraki, Hao Cai and Tilman Wolf, 2012, *Specification and Composition of Network Services in Future Internet Architectures: In Proceedings of ACM CoNext Student Workshop*, Nice, France.
- Abhishek Dwaraki, 2011, *Hardware Implementation of Queue Length Based Pacing - A Masters Thesis*, Univ. of Massachusetts, Amherst USA.
- Sinan Hanay, Abhishek Dwaraki and Tilman Wolf, 2011, *High Performance In-network Traffic Pacing: In Proceedings of the IEEE 12th International Conference on High Performance Switching and Routing*, Cartagena, Spain.
- D. Unnikrishnan, R. Vadlamani, Y. Liao, A. Dwaraki, J. Crenne, L. Gao, R. Tessier., *Scalable network virtualization using FPGAs: ACM Sigda Intl. Symposium on Field Programmable Gate Arrays*, Monterey, CA, February 2010.

Honors & Awards

Sep 2015	**1st Place**,	NDNHack @ NDNComm, UCLA	*Los Angeles, CA*
Oct 2014	**1st Place**,	Juniper Networks/Comcast SDN Hackathon	*Westford, MA*
May 2014	**1st Place**,	Google Code For India Hackathon	*Mountain View, CA*
Jul 2011	**Best Paper Award**,	IEEE Conference on High Performance Switching and Routing (HPSR)	*Cartagena, Spain*