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Work Experience

- 2022 – present: **U. of Michigan**, Ann Arbor, MI **Research Professor and Lecturer**
– Build self-operating networks by creating dataset by automation and to train by ML
– Teach courses on Logic Design, Computational Social Sciences
- 2019 – Nov. 2023: **ViaSat**, San Jose, CA & Ann Arbor, MI **SDN Architect, Acting Manager**
– Close-loop network deployment and verification using Intent-based networking tools
– Root-cause analysis via automated dependency tracking and causal inference
– Build network automation software in micro-service architecture on kubernetes clusters
- 2015 – 2019: **Visa**, Foster City, CA **Chief Network Architect**
– Automate network verification for change management using Intent Based Networking tools
– Network change drift analysis and config generation from golden template
– Network tools rationalization - moving FCAPS features to micro-services
– Long term architectural evolution of backbone of the global financial network
– SD-WAN vendor evaluation and selection for equipment refresh on the access networks
- 2012 – 2015: **Huawei**, Santa Clara, CA **Principal Architect**
- 2010 – 2011: Boston, MA **Research Consultant**
– Created a multi-year program on IP/optical network management & OSS
– Recruited multiple software architects and built a global OSS software team of 60
– Led corporate-wide strategies, standards and implementations in the SDN core team
– Advised network planning & optimization research, doubled team to 30+ due to RoI
– Led algorithm research for IP & optical network planning solutions, innovated on areas in routing wavelength assignment optimization, ROADMS and regenerator modeling and placement, impairment-aware planning, packet and optical multi-layer network protection, mobile backhaul capacity budgeting and TCO comparison between OTN and MPLS, shared mesh path protection against dual failures, min-max fairness Traffic Engineering (TE) for DC Interconnects, traffic and network data analytics
- 2007 – 2009: **Juniper**, Sunnyvale, CA **Staff Engineer**
– Led software development of packet forwarding engine (PFE) on backbone T/TX routers
– Worked on the control and data plane interfaces, QoS/CoS, multicast and load balancing
- 2001 – 2007: **OPNET**, Santa Clara, CA & Cary, NC **Senior Software Engineer**
– Owned various IP/MPLS automated network design features and optimization solutions, i.e., IP network capacity planning, offline MPLS TE, topology design, fast reroute deployment, DiffServ-TE, and backbone CapEx optimization
– Owned graph models, routing & network flow algorithms, in C++
– Implemented more than half of design solutions for NP-Hard problems in Service Provider Guru product, which was OEMed by Cisco as the Network Planning Solution in 2005-08
– Worked with the strategic planning teams of top-tier carriers on network innovations
– OPNET was acquired by Riverbed in 2011 for \$1B for its APM & NPM capabilities.

Education

- 2001: Ph.D., University of Pittsburgh, in Information Science & Telecommunications
1996: M.E., Tsinghua University, in Communication & Electronic Systems
1993: B.E., Xi'an Jiaotong University, in Information Science & Technology

Selected Publications, Patents and Presentations

- [1] Apparatus for Detection and Correction of Network Problems with Machine Learning, *Victor Liu, et. al.*, US Patent Application, Nov., 2022
- [2] [Protection against dual failures for resilient two layer networks](#), *Victor Liu, Yufei Wang*, US Patent 9,973,377, 2018
- [3] [Shared backup path protection for dual link failures using successive survivable routing](#), *Victor Yu Liu*, US Patent 9,143,398, 2015
- [4] [Apparatus and method to find partially disjoint routes for dual fiber-cuts](#), *Victor Y Liu, Zhicheng Sui*, US Patent 9,007,892, 2015
- [5] [Apparatus and method for spare capacity allocation on dual link failures](#), *Victor Y Liu*, US Patent 9,001,648, 2015
- [6] [Finding partially disjoint paths in shared backup path protection for dual fiber cuts](#), *Victor Y Liu*, US Patent 8,995,827, 2015
- [7] [Protection Coordination for Dual Failure on Two-Layer Networks](#), *Victor Liu*, Design of Reliable Communications Network (DRCN), 2015
- [8] [Dual Failure Resiliency on Single Failure Protected Packet Optical Integrated Networks](#), *Zhicheng Sui, Victor Liu*, DRCN, 2015
- [9] [Stitching Layers and Domains for Enhanced Service Reliability](#), *Victor Liu*, MPLS SDN World Congress, Paris, France, 2015
- [10] [Capacity Budgeting for Packet Optical Integration](#), *Victor Liu*, IP+Optical Network iPOP2014, Tokyo, Japan, 2014
- [11] [Design and Optimization of Packet Optical Integration](#), *Victor Liu*, MPLS SDN World Congress, Paris, France, 2014
- [12] [Spare Capacity Allocation using Shared Backup Path Protection with Partially Disjoint Paths](#), *Victor Yu Liu, David Tipper*, DRCN, Budapest, 2013
- [13] [Spare capacity allocation using Shared Backup Path Protection for Dual Link Failures](#), *Victor Yu Liu, David Tipper*, Computer Communications, Vol. 36, No. 6., 2013
- [14] [Finding Partially Disjoint Routes for Dual Fiber-Cut Protection on Bi-Connected Networks](#), *Victor Yu Liu, Zhicheng Sui*, Optical Fiber Conference (OFC), 2012
- [15] [Traffic Grooming in WDM Mesh Networks with Loop-Free Paths](#), *Kwok Shing Ho, Victor Yu Liu*, OFC, 2012
- [16] Internet Backbone Evolution and Innovations, *Victor Yu Liu*, keynote at Huawei's First IP/Optical Summit, Xi'An, China, 2011
- [17] [Spare capacity allocation in two-layer networks](#), *Yu Liu, David Tipper, Korn Vajanapoom*, IEEE J. S. A. on Communications, 2007
- [18] [Approximating optimal spare capacity allocation by successive survivable routing](#), *Yu Liu, David Tipper, Peerapon Siripongwutikorn*, IEEE/ACM Trans. Networking, 2005
- [19] [Apparatus and method for spare capacity allocation](#), *Yu Liu, David Tipper*, US Patent 6,744,727 B2, 2001
- [20] [A Tandem Queue Model for Two-Server Resequencing System](#), *Yu Liu, Zhisheng Niu, Xiaokang Lin, Jianhua Lu*, Technical Report, Tsinghua University, 1996

Technical Knowledge and Skills

Software: Neo4j, Kubernetes, Helm, Jupyter, Antlr4, GraphQL, Jenkins, GNS3, golang, ansible, docker, openstack, Qt, boost, git, prototype, JQuery, Drupal, svn, CDN, JUNOS, Multicast, IGMP, CAM, OPNET, Clearcase, STL, design patterns, UML, python, OSPF, IS-IS, BGP, RSVP-TE, MPLS, VLAN, Java, VB, JavaScript, PHP, Perl, tcl/tk, shells, multi-thread, Motif, socket programming, csim, ns2, AMPL/cplex, CGI, XML, WebL, SPSS, multi-threading, cvs, apache, ssh, Unix/Linux/Windows/solaris admin; X.25, Intel 8031, Matlab, Mathematica, SS7, C/C++ , PASCAL, FORTRAN, LISP, Intel 8086, PC architecture, distributed operating systems, Dbase IV, SQL, BASIC, LOGO, Apple II DOS

References available upon request.

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