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Research and Consulting: Telecommunications, Network Communications, and Mobile Wireless Technologies

Scientist, educator, and technologist with 30 years of experience; co-authored over 25 scientific publications, journal articles, and peer-reviewed papers; named inventor of over 120 issued and filed patents; industry fellow and lecturer at UC Berkeley Engineering-Sutardja Center for Entrepreneurship and Technology (SCET).

EDUCATION

- **Ph.D.**, Computer Science specializing in networking and communications, UC Berkeley
- **M.Sc.**, Electrical Engineering, Tel Aviv University
- **B.Sc.**, Mathematics and Computer Science, Tel Aviv University

EXPERTISE

Network communications, telecommunications, Internet protocols, and mobile wireless:

- **Communication networks:** Internet protocols; TCP/IP suite; TCP; UDP; IP; Ethernet; network protocols; network software applications; data link, network, and transport layers (L2, L3, L4), data center network architecture
- **Internet software:** Internet software applications; distributed computing; cloud computing; Web applications; FTP; HTTP; Java; client-server; file transfer
- **Routing/switching:** LAN; WAN; VPN; routing protocols; RIP; BGP; MPLS; OSPF; IS-IS; multicast, DNS; QoS; switching; packet switching; network infrastructure; network communication architectures
- **Mobile wireless:** wireless LAN; 802.11; cellular systems; mobile devices; smartphone technologies
- **Unified Communications:** PSTN, circuit switching, IP telephony, VoIP, SIP, SS7, video and audio conferencing, streaming media, e-mail, instant messaging (chat)

ACCOMPLISHMENTS

- Served as Principal Investigator (PI) for three US Department of Defense (DARPA) projects
 - Directed networking computation project for the US Air Force Research Lab (AFRL)
 - PI of a wireless research project for an undisclosed US federal agency
- Led and developed the first network resource scheduling service for grid computing
- Managed and engineered the first demonstrated transatlantic dynamic allocation of 10Gbps Lambdas as a grid service
- Development and successful demonstration of the first wire-speed active network on commercial hardware
- Inventor of over 120 patents; over 60 prosecuted *pro se* in front of the USPTO
- Created and chaired Nortel Networks' EDN Patent Committee

PROFESSIONAL EXPERIENCE

University of California, Berkeley, Berkeley, California 2000-Present
Berkeley Industry Fellow, Lecturer, Visiting Scientist, Ph.D. Candidate, Nortel's Scientist Liaison

Some positions and projects were concurrent, others sequential

- Industry fellow and lecturer at the Sutardja Center for Entrepreneurship and Technology (SCET).
- Conducted research projects in data centers (RAD Labs), telecommunication infrastructure (SAHARA), and wireless systems (ICEBERG)
- Acted as scientific liaison between Nortel Research Lab and UC Berkeley, providing tangible value in advanced technologies
- Studied network services, telecommunication systems and software, communications infrastructure, and data centers
- Earned a Ph.D. in Computer Science with a specialization in communications and networking
- Developed long-term technology for the enterprise market, integrating communication and computing technologies

TelecommNet Consulting, Inc., Sunnyvale, California 2006-Present
Principal Scientist

- Consulting in the areas of network communications, telecommunications, Internet protocols, and smartphone mobile wireless devices
- Providing system architecture and technology analysis for computer networks, mobile wireless devices, and Internet web technologies projects
- Expert witness in network communications patent infringement lawsuits

Aybell, UC Berkeley, California 2016-Present
CEO/CTO

- Aybell transforms smartphones into visual menu systems, making the phone a frictionless point for user interactions with all features of customer service platforms. Empowers consumers to reach the right agents in call centers, overcoming customer service barriers
- Architecture, design and implementation of a cloud data center for connecting any smartphone user, to any company and/or service, by digitizing interactive voice systems, and exposing through cloud-service APIs to other applications
- The system is deployed as a cloud networking and cloud computing service on Amazon Web Services (AWS) and Google Cloud Platform (GCP)
- Technologies include Data Science analytics, Machine Learning (ML), Artificial Intelligence (AI), and Statistical Learning (SL). Building an NLP Parser using Python, NLTK, SpaCy and other NLP libraries and modules

VisuMenu, Inc., Sunnyvale, California 2010-2016
Co- Founder and Chief Technology Officer (CTO)

- Led the software design and development of a visual IVR system for smartphones and mobile devices, based on an innovative use of wireless and network communications technologies
- Design of a search engine for IVR / PBX using Asterisk, SIP, and VoIP

Ixia, Santa Clara, California
Communications Consultant

2008 - 2008

- Researched and developed advanced network communications testing technologies:
- IxNetwork/IxN2X —IP routing and switching devices and broadband access equipment. Provided traffic generation and emulation for the full range of protocols: OSPF, RIP, EIGRP, BGP, IS-IS, MPLS, unicast, multicast, broadcast, layer 2/3 VPNs, IPsec, carrier Ethernet, broadband access, and data center bridging. Tested and validated IEEE, ITU and IETF RFC standards compatibility
- IxLoad — quickly and accurately modeled high-volume video, data, and voice subscribers and servers to test real-world performance of multiservice delivery and security platforms
- IxCatapult — emulated a broad range of wireless access and core protocols to test wireless components and systems that, when combined with IxLoad, provides an end-to-end solution for testing wireless service quality
- IxVeriWave — employed a client-centric model to test Wi-Fi and wireless LAN networks by generating repeatable large-scale, real-world test scenarios that are virtually impossible to create by any other means
- Test automation — provided simple, comprehensive lab automation to help test engineering teams create, organize, catalog, and schedule execution of tests

Nortel Networks, Santa Clara, California

1996 - 2007

Originally employed by Bay Networks, which was acquired by Nortel Networks

Principal Scientist, Principal Architect, Principal Engineer, Senior Software Engineer

Held scientific and research roles at Nortel Labs, Bay Architecture Labs, and in the office of the CTO

Principal Investigator for US Department of Defense (DARPA) Projects

- Conceived, proposed, and completed three research projects: active networks, DWDM-RAM, and a networking computation project for Air Force Research Lab (AFRL)
- Led a wireless research project for an undisclosed US federal agency

Academic and Industrial Researcher

- Analyzed new technologies to reduce risks associated with R&D investment
- Headed research collaboration with leading universities and professors at UC Berkeley, Northwestern University, University of Amsterdam, and University of Technology, Sydney
- Evaluated competitive products relative to Nortel's products and technology
- Proactively identified prospective business ideas, which led to new networking products
- Predicted technological trends through researching the technological horizon and academic sphere
- Designed software for switches, routers, and network communications devices
- Developed systems and architectures for switches, routers, and network management
- Researched and developed the following projects:
 - Data-Center Communications: network and server orchestration 2006-2007
 - DRAC: SOA-facilitated L1/L2/L3 network dynamic controller 2003-2007
 - Omega: classified wireless project for undisclosed US Federal Agency 2006-2006
 - Open platform: project for the US Air Force Research Laboratory (AFRL) 2005-2005
 - Network resource orchestration for Web services workflows 2004-2005
 - Proxy study between Web/grids services and network services 2004-2004
 - Streaming content replication: real-time A/V media multicast at edge 2003-2004

- DWDM-RAM: US DARPA-funded program on agile optical transport 2003-2004
- Packet capturing and forwarding service on IP and Ethernet traffic 2002-2003
- CO2: content-aware agile networking 2001-2003
- Active networks: US DARPA-funded research program 1999-2002
- ORE: programmable network service platform 1998-2002
- JVM platform: Java on network devices 1998-2001
- Web-based device management: network device management 1996-1997

Technology Innovator and Patent Leader

- Created and chaired Nortel Networks' EDN Patent Committee
- Facilitated continuous stream of innovative ideas and their conversion into intellectual property rights
- Developed intellectual property assets through invention and analysis of existing technology portfolios

Aptel Communications, Netanya, Israel 1994-1995

Software Engineer, Team Leader

Start-up company focused on mobile wireless CDMA spread spectrum PCN/PCS

- Developed a mobile wireless device using an unlicensed band - Direct Sequence Spread Spectrum (DSSS); FCC part 15 - unlicensed transmitters
- Designed and managed a personal communication network (PCN) and personal communication system (PCS), which were the precursors of short text messages (SMS)
- Designed and developed network communications software products in C/C++
- Invented and implemented a two-way paging product

Scitex Ltd., Herzeliya, Israel 1990-1993

Software Engineer, Team Leader

Software and hardware company acquired by Hewlett Packard (HP)

- Developed system and network communications in C/C++
- Invented Parallel SIMD Architecture
- Participated in the Technology Innovation group

Shalev, Ramat-HaSharon, Israel 1987-1990

Start-up company

Software Engineer

- Developed real-time software and algorithms in C/C++ and Pascal

PROFESSIONAL ASSOCIATIONS

- IEEE senior member
- IEEE CNSV co-chair, Intellectual Property SIG (2013)
- President Next Step Toastmasters (an advanced TM club in the Silicon Valley) (2013-2014)
- Technical co-chair, IEEE Hot Interconnects 2005 at Stanford University
- Member, IEEE Communications Society (COMMSOC)
- Member, IEEE Computer Society
- Member, IEEE Systems, Man, and Cybernetics Society
- Member, IEEE-USA Intellectual Property Committee
- Member, ACM, ACM Special Interest Group on Data Communication (SIGCOM)
- Member, ACM Special Interest Group on Hypertext, Hypermedia, and Web (SIGWEB)
- Member, IEEE Consultants' Network (CNSV)
- Global Member, Internet Society (ISOC)
- President Java Users Group – Silicon Valley Mountain View, CA, 1999-2000
- Toastmasters International

FORMER ADVISORY BOARDS POSITIONS

- Quixey – search engine for wireless mobile apps
- Mytopia – mobile social games
- iLeverage – Israeli Innovations

PROFESSIONAL AWARDS

- Top Talent Award – Nortel
- Top Inventors Award – Nortel EDN
- Certified IEEE-WCET - Wireless Communications Engineering Technologies
- Toastmasters International - Competent Communicator (twice)
- Toastmasters International - Advanced Communicator Bronze

Patents and Publications

(Not an exhaustive list)

Patents Issued

US 9,831,881	Radar target detection system for autonomous vehicles with ultra-low phase noise frequency synthesizer	Link
US 9,762,251	Ultra-low phase-noise frequency synthesizer	Link
US 9,705,511	Ultra-low phase-noise frequency synthesizer	Link
US 9,690,877	Systems and methods for electronic communications	Link
US 9,660,655	Ultra-low phase-noise frequency synthesizer	Link
US 9,184,989	Grid proxy architecture for network resources	Link
US 9,521,255	Systems and methods for visual presentation and selection of IVR menu	Link
US 9,083,728	Systems and methods to support sharing and exchanging in a network	Link
US 9,021,130	Photonic line sharing for high-speed routers	Link
US 9,001,819	Systems and methods for visual presentation and selection of IVR menu	Link
US 8,949,846	Time-value curves to provide dynamic QoS for time sensitive file transfers	Link
US 8,929,517	Systems and methods for visual presentation and selection of IVR menu	Link
US 8,903,073	Systems and methods for visual presentation and selection of IVR menu	Link
US 8,898,274	Grid proxy architecture for network resources	Link
US 8,880,120	Device and method for providing enhanced telephony	Link
US 8,879,703	System method and device for providing tailored services when call is on-hold	Link
US 8,879,698	Device and method for providing enhanced telephony	Link
US 8,867,708	Systems and methods for visual presentation and selection of IVR menu	Link
US 8,787,536	Systems and methods for communicating with an interactive voice response system	Link
US 8,782,230	Method and apparatus for using a command design pattern to access and configure network elements	Link
US 8,762,963	Translation of programming code	Link
US 8,762,962	Methods and apparatus for automatic translation of a computer program language code	Link

<u>US 8,745,573</u>	<u>Platform-independent application development framework</u>	<u>Link</u>
<u>US 8,731,148</u>	<u>Systems and methods for visual presentation and selection of IVR menu</u>	<u>Link</u>
<u>US 8,688,796</u>	<u>Rating system for determining whether to accept or reject objection raised by user in social network</u>	<u>Link</u>
<u>US 8,619,793</u>	<u>Dynamic assignment of traffic classes to a priority queue in a packet forwarding device</u>	<u>Link</u>
<u>US 8,572,303</u>	<u>Portable universal communication device</u>	<u>Link</u>
<u>US 8,553,859</u>	<u>Device and method for providing enhanced telephony</u>	<u>Link</u>
<u>US 8,548,131</u>	<u>Systems and methods for communicating with an interactive voice response system</u>	<u>Link</u>
<u>US 8,537,989</u>	<u>Device and method for providing enhanced telephony</u>	<u>Link</u>
<u>US 8,341,257</u>	<u>Grid proxy architecture for network resources</u>	<u>Link</u>
<u>US 8,161,139</u>	<u>Method and apparatus for intelligent management of a network element</u>	<u>Link</u>
<u>US 8,146,090</u>	<u>Time-value curves to provide dynamic QoS for time sensitive file transfer</u>	<u>Link</u>
<u>US 8,078,708</u>	<u>Grid proxy architecture for network resources</u>	<u>Link</u>
<u>US 7,944,827</u>	<u>Content-aware dynamic network resource allocation</u>	<u>Link</u>
<u>US 7,860,999</u>	<u>Distributed computation in network devices</u>	<u>Link</u>
<u>US 7,734,748</u>	<u>Method and apparatus for intelligent management of a network element</u>	<u>Link</u>
<u>US 7,710,871</u>	<u>Dynamic assignment of traffic classes to a priority queue in a packet forwarding device</u>	<u>Link</u>
<u>US 7,580,349</u>	<u>Content-aware dynamic network resource allocation</u>	<u>Link</u>
<u>US 7,433,941</u>	<u>Method and apparatus for accessing network information on a network device</u>	<u>Link</u>
<u>US 7,359,993</u>	<u>Method and apparatus for interfacing external resources with a network element</u>	<u>Link</u>
<u>US 7,313,608</u>	<u>Method and apparatus for using documents written in a markup language to access and configure network elements</u>	<u>Link</u>
<u>US 7,260,621</u>	<u>Object-oriented network management interface</u>	<u>Link</u>
<u>US 7,237,012</u>	<u>Method and apparatus for classifying Java remote method invocation transport traffic</u>	<u>Link</u>
<u>US 7,127,526</u>	<u>Method and apparatus for dynamically loading and managing software services on a network device</u>	<u>Link</u>

<u>US 7,047,536</u>	<u>Method and apparatus for classifying remote procedure call transport traffic</u>	<u>Link</u>
<u>US 7,039,724</u>	<u>Programmable command-line interface API for managing operation of a network device</u>	<u>Link</u>
<u>US 6,976,054</u>	<u>Method and system for accessing low-level resources in a network device</u>	<u>Link</u>
<u>US 6,970,943</u>	<u>Routing architecture including a compute plane configured for high-speed processing of packets to provide application layer support</u>	<u>Link</u>
<u>US 6,950,932</u>	<u>Security association mediator for Java-enabled devices</u>	<u>Link</u>
<u>US 6,850,989</u>	<u>Method and apparatus for automatically configuring a network switch</u>	<u>Link</u>
<u>US 6,845,397</u>	<u>Interface method and system for accessing inner layers of a network protocol</u>	<u>Link</u>
<u>US 6,842,781</u>	<u>Download and processing of a network management application on a network device</u>	<u>Link</u>
<u>US 6,772,205</u>	<u>Executing applications on a target network device using a proxy network device</u>	<u>Link</u>
<u>US 6,564,325</u>	<u>Method of and apparatus for providing multi-level security access to system</u>	<u>Link</u>
<u>US 6,175,868</u>	<u>Method and apparatus for automatically configuring a network switch</u>	<u>Link</u>
<u>US 6,170,015</u>	<u>Network apparatus with Java co-processor</u>	<u>Link</u>
<u>US 8,687,777</u>	<u>Systems and methods for visual presentation and selection of IVR menu</u>	<u>Link</u>
<u>US 8,681,951</u>	<u>Systems and methods for visual presentation and selection of IVR menu</u>	<u>Link</u>
<u>US 8,625,756</u>	<u>Systems and methods for visual presentation and selection of IVR menu</u>	<u>Link</u>
<u>US 8,594,280</u>	<u>Systems and methods for visual presentation and selection of IVR menu</u>	<u>Link</u>
<u>US 8,548,135</u>	<u>Systems and methods for visual presentation and selection of IVR menu</u>	<u>Link</u>
<u>US 8,406,388</u>	<u>Systems and methods for visual presentation and selection of IVR menu</u>	<u>Link</u>
<u>US 8,345,835</u>	<u>Systems and methods for visual presentation and selection of IVR menu</u>	<u>Link</u>
<u>US 8,223,931</u>	<u>Systems and methods for visual presentation and selection of IVR menu</u>	<u>Link</u>
<u>US 8,160,215</u>	<u>Systems and methods for visual presentation and selection of IVR menu</u>	<u>Link</u>
<u>US 8,155,280</u>	<u>Systems and methods for visual presentation and selection of IVR menu</u>	<u>Link</u>
<u>US 8,054,952</u>	<u>Systems and methods for visual presentation and selection of IVR menu</u>	<u>Link</u>
<u>US 8,000,454</u>	<u>Systems and methods for visual presentation and selection of IVR menu</u>	<u>Link</u>
<u>EP 1,905,211</u>	<u>Technique for authenticating network users</u>	<u>Link</u>

EP 1,142,213	Dynamic assignment of traffic classes to a priority queue in a packet forwarding device	Link
EP 1,671,460	Method and apparatus for scheduling resources on a switched underlay network	Link
EP 1,905,211	Technique for authenticating network users	Link
CA 2,358,525	Dynamic assignment of traffic classes to a priority queue in a packet forwarding device	Link

Patent Applications Published and Pending

(Not an exhaustive list)

US 20150058490	Grid Proxy Architecture for Network Resources	Link
US 20150010136	Systems and Methods for Visual Presentation and Selection of IVR Menu	Link
US 20140379784	Method and Apparatus for Using a Command Design Pattern to Access and Configure Network Elements	Link
US 20140105025	Dynamic Assignment of Traffic Classes to a Priority Queue in a Packet Forwarding Device	Link
US 20140105012	Dynamic Assignment of Traffic Classes to a Priority Queue in a Packet Forwarding Device	Link
US 20140012991	Grid Proxy Architecture for Network Resources	Link
US 20130080898	Systems and Methods for Electronic Communications	Link
US 20130022191	Systems and Methods for Visual Presentation and Selection of IVR Menu	Link
US 20130022183	Systems and Methods for Visual Presentation and Selection of IVR Menu	Link
US 20130022181	Systems and Methods for Visual Presentation and Selection of IVR Menu	Link
US 20120180059	Time-Value Curves to Provide Dynamic QOS for Time Sensitive File Transfers	Link
US 20120063574	Systems and Methods for Visual Presentation and Selection of IVR Menu	Link
US 20110225330	Portable Universal Communication Device	Link
US 20100220616	Optimizing Network Connections	Link
US 20100217854	Method and Apparatus for Intelligent Management of a Network Element	Link
US 20100146492	Translation of Programming Code	Link
US 20100146112	Efficient Communication Techniques	Link
US 20100146111	Efficient Communication in a Network	Link
US 20090313613	Methods and Apparatus for Automatic Translation of a Computer Program Language Code	Link
US 20090313004	Platform-Independent Application Development Framework	Link
US 20090279562	Content-aware dynamic network resource allocation	Link
US 20080040630	Time-Value Curves to Provide Dynamic QoS for Time Sensitive File	Link

Transfers

US 20070169171	Technique for authenticating network users	Link
US 20060123481	Method and apparatus for network immunization	Link
US 20060075042	Extensible Resource Messaging Between User Applications and Network Elements in a Communication Network	Link
US 20050083960	Method and Apparatus for Transporting Parcels of Data Using Network Elements with Network Element Storage	Link
US 20050076339	Method and Apparatus for Automated Negotiation for Resources on a Switched Underlay Network	Link
US 20050076336	Method and Apparatus for Scheduling Resources on a Switched Underlay Network	Link
US 20050076173	Method And Apparatus for Preconditioning Data to Be Transferred on a Switched Underlay Network	Link
US 20050076099	Method and Apparatus for Live Streaming Media Replication in a Communication Network	Link
US 20050074529	Method and apparatus for transporting visualization information on a switched underlay network	Link
US 20040076161	Dynamic Assignment of Traffic Classes to a Priority Queue in a Packet Forwarding Device	Link
US 20020021701	Dynamic Assignment of Traffic Classes to a Priority Queue in a Packet Forwarding Device	Link
WO 2006/063052	Method and apparatus for network immunization	Link
WO 2007/008976	Technique for authenticating network users	Link
WO2000/0054460	Method and apparatus for accessing network information on a network device	Link
WO/2016/203460	Ultra low phase noise frequency synthesizer	Link
WO/2005/033899	Method and apparatus for scheduling resources on a switched underlay network	Link
WO/2000/041368	Dynamic assignment of traffic classes to a priority queue in a packet forwarding device	Link
US 20140156556	Time-variant rating system and method thereof	Link

US 20140156758	Reliable rating system and method thereof	Link
US 20170085708	Systems and methods for visual presentation and selection of ivr menu	Link
US 20160373117	Ultra low phase noise frequency synthesizer	Link
US 20170322687	Systems and methods for electronic communications	Link
US 20170302282	Radar target detection system for autonomous vehicles with ultra-low phase noise frequency synthesizer	Link
US 20180019755	Radar target detection system for autonomous vehicles with ultra-low phase noise frequency synthesizer	Link
US 20170289332	Systems and methods for visual presentation and selection of ivr menu	Link
US 20170269797	Systems and methods for electronic communication	Link
US 20170099058	Ultra low phase noise frequency synthesizer	Link
US 20170099057	Ultra low phase noise frequency synthesizer	Link

Publications

(Not an exhaustive list)

- “R&D Models for Advanced Development & Corporate Research” Understanding Six Models of Advanced R&D - Ikhtlaq Sidhu, Tal Lavian, Victoria Howell - University of California, Berkeley. Accepted paper for 2015 ASEE Annual Conference and Exposition- June 2015
- “Communications Architecture in Support of Grid Computing”, Tal Lavian, Scholar's Press 2013 ISBN 978-3-639-51098-0.
- [“Applications Drive Secure Lightpath Creation across Heterogeneous Domains](#), Feature Topic Optical Control Planes for Grid Networks: Opportunities, Challenges and the Vision.” Gommans L.; Van Oudenaarde B.; Dijkstra F.; De Laat C.; Lavian T.; Monga I.; Taal A.; Travostino F.; Wan A.; IEEE Communications Magazine, vol. 44, no. 3, March 2006, pp. 100-106.
- [Lambda Data Grid: Communications Architecture in Support of Grid Computing](#). Tal I. Lavian, Randy H. Katz; Doctoral Thesis, University of California at Berkeley. January 2006.
- “Information Switching Networks.” Hoang D.B.; T. Lavian; The 4th Workshop on the Internet, Telecommunications and Signal Processing, WITSP2005, December 19-21, 2005, Sunshine Coast, Australia.
- [“Impact of Grid Computing on Network Operators and HW Vendors.](#)” Allcock B.; Arnaud B.; Lavian T.; Papadopoulos P.B.; Hasan M.Z.; Kaplow W.; IEEE Hot Interconnects at Stanford University 2005, pp.89-90.
- [DWDM-RAM: A Data Intensive Grid Service Architecture Enabled by Dynamic Optical Networks](#). Lavian T.; Mambretti J.; Cutrell D.; Cohen H.J.; Merrill S.; Durairaj R.; Daspit P.; Monga I.; Naiksatam S.; Figueira S.; Gutierrez D.; Hoang D.B., Travostino F.; CCGRID 2004, pp. 762-764.
- [DWDM-RAM: An Architecture for Data Intensive Service Enabled by Next Generation Dynamic Optical Networks](#). Hoang D.B.; Cohen H.; Cutrell D.; Figueira S.; Lavian T.; Mambretti J.; Monga I.; Naiksatam S.; Travostino F.; Proceedings IEEE Globecom 2004, Workshop on High-Performance Global Grid Networks, Houston, 29 Nov. to 3 Dec. 2004, pp.400-409.
- [Implementation of a Quality of Service Feedback Control Loop on Programmable Routers](#). Nguyen C.; Hoang D.B.; Zhao, I.L.; Lavian, T.; Proceedings, 12th IEEE International Conference on Networks 2004. (ICON 2004) Singapore, Volume 2, 16-19 Nov. 2004, pp.578-582.
- [A Platform for Large-Scale Grid Data Service on Dynamic High-Performance Networks](#). Lavian T.; Hoang D.B.; Mambretti J.; Figueira S.; Naiksatam S.; Kaushil N.; Monga I.; Durairaj R.; Cutrell D.; Merrill S.; Cohen H.; Daspit P.; Travostino F.; GridNets 2004, San Jose, CA., October 2004.
- [DWDM-RAM: Enabling Grid Services with Dynamic Optical Networks](#). Figueira S.; Naiksatam S.; Cohen H.; Cutrell D.; Daspit, P.; Gutierrez D.; Hoang D. B.; Lavian T.; Mambretti J.; Merrill S.; Travostino F.; Proceedings, 4th IEEE/ACM International Symposium on Cluster Computing and the Grid, Chicago, USA, April 2004, pp. 707-714.
- [DWDM-RAM: Enabling Grid Services with Dynamic Optical Networks](#). Figueira S.; Naiksatam S.; Cohen H.; Cutrell D.; Gutierrez D.; Hoang D.B.; Lavian T.; Mambretti J.; Merrill S.; Travostino F.; 4th IEEE/ACM International Symposium on Cluster Computing and the Grid, Chicago, USA, April 2004.
- [An Extensible, Programmable, Commercial-Grade Platform for Internet Service Architecture](#). Lavian T.; Hoang D.B.; Travostino F.; Wang P.Y.; Subramanian S.; Monga I.; IEEE Transactions on Systems, Man, and Cybernetics on Technologies Promoting Computational

Intelligence, Openness and Programmability in Networks and Internet Services Volume 34, Issue 1, Feb. 2004, pp.58-68.

- [DWDM-RAM: An Architecture for Data Intensive Service Enabled by Next Generation Dynamic Optical Networks](#). Lavian T.; Cutrell D.; Mambretti J.; Weinberger J.; Gutierrez D.; Naiksatam S.; Figueira S.; Hoang D. B.; Supercomputing Conference, SC2003 Igniting Innovation, Phoenix, November 2003.
- [Edge Device Multi-Unicasting for Video Streaming](#). Lavian T.; Wang P.; Durairaj R.; Hoang D.; Travostino F.; Telecommunications, 2003. ICT 2003. 10th International Conference on Telecommunications, Tahiti, Volume 2, 23 Feb.-1 March, 2003 pp. 1441-1447.
- [The SAHARA Model for Service Composition Across Multiple Providers](#). Raman B.; Agarwal S.; Chen Y.; Caesar M.; Cui W.; Lai K.; Lavian T.; Machiraju S.; Mao Z. M.; Porter G.; Roscoe T.; Subramanian L.; Suzuki T.; Zhuang S.; Joseph A. D.; Katz Y.H.; Stoica I.; Proceedings of the First International Conference on Pervasive Computing. ACM Pervasive 2002, pp. 1-14.
- [Enabling Active Flow Manipulation in Silicon-Based Network Forwarding Engines](#). Lavian T.; Wang P.; Travostino F.; Subramanian S.; Duraraj R.; Hoang D.B.; Sethaput V.; Culler D.; Proceeding of the Active Networks Conference and Exposition, 2002.(DANCE) 29-30 May 2002, pp. 65-76.
- [Practical Active Network Services within Content-Aware Gateways](#). Subramanian S.; Wang P.; Durairaj R.; Rasimas J.; Travostino F.; Lavian T.; Hoang D.B.; Proceeding of the DARPA Active Networks Conference and Exposition, 2002.(DANCE) 29-30 May 2002, pp. 344-354.
- [Active Networking on a Programmable Network Platform](#). Wang P.Y.; Lavian T.; Duncan R.; Jaeger R.; Fourth IEEE Conference on Open Architectures and Network Programming (OPENARCH), Anchorage, April 2002.
- [Intelligent Network Services through Active Flow Manipulation](#). Lavian T.; Wang P.; Travostino F.; Subramanian S.; Hoang D.B.; Sethaput V.; IEEE Intelligent Networks 2001 Workshop (IN2001), Boston, May 2001.
- [Intelligent Network Services through Active Flow Manipulation](#). Lavian T.; Wang P.; Travostino F.; Subramanian S.; Hoang D.B.; Sethaput V.; Intelligent Network Workshop, 2001 IEEE 6-9 May 2001, pp.73 -82.
- [Enabling Active Flow Manipulation in Silicon-based Network Forwarding Engine](#). Lavian, T.; Wang, P.; Travostino, F.; Subramanian S.; Hoang D.B.; Sethaput V.; Culler D.; Journal of Communications and Networks, March 2001, pp.78-87.
- [Active Networking on a Programmable Networking Platform](#). Lavian T.; Wang P.Y.; IEEE Open Architectures and Network Programming, 2001, pp. 95-103.
- [Enabling Active Networks Services on a Gigabit Routing Switch](#). Wang P.; Jaeger R.; Duncan R.; Lavian T.; Travostino F.; 2nd Workshop on Active Middleware Services, 2000.
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- [Lambda Data Grid: An Agile Optical Platform for Grid Computing and Data-intensive Applications](#).
- [Web Services and OGSA](#)
- [WINER Workflow Integrated Network Resource Orchestration](#).
- [Technology & Society](#)
- [Abundant Bandwidth and how it affects us?](#)
- [Active Content Networking\(ACN\)](#)
- [DWDM-RAM:Enabling Grid Services with Dynamic Optical Networks](#)
- [Application-engaged Dynamic Orchestration of Optical Network Resources](#)
- [A Platform for Data Intensive Services Enabled by Next Generation Dynamic Optical Networks](#)
- [Optical Networks](#)
- [Grid Optical Network Service Architecture for Data Intensive Applications](#)
- [Optical Networking & DWDM](#)
- [OptiCal Inc.](#)
- [OptiCal& LUMOS Networks](#)
- [Optical Networking Services](#)
- [Business Models for Dynamically Provisioned Optical Networks](#)
- [Business Model Concepts for Dynamically Provisioned Optical Networks](#)
- [Optical Networks Infrastructure](#)
- [Research Challenges in agile optical networks](#)
- [Services and Applications' infrastructure for agile optical networks](#)
- [Impact on Society](#)
- [TeraGrid Communication and Computation](#)
- [Unified Device Management via Java-enabled Network Devices](#)
- [Active Network Node in Silicon-Based L3 Gigabit Routing Switch](#)
- [Active Nets Technology Transfer through High-Performance Network Devices](#)
- [Programmable Network Node: Applications](#)
- [Open Innovation via Java-enabled Network Devices](#)
- [Practical Considerations for Deploying a Java Active Networking Platform](#)
- [Open Java-Based Intelligent Agent Architecture for Adaptive Networking Devices](#)

- [Java SNMP Oplet](#)
- [Open Distributed Networking Intelligence: A New Java Paradigm](#)
- [Open Programmability](#)
- [Active Networking On A Programmable Networking Platform](#)
- [Open Networking through Programmability](#)
- [Open Programmable Architecture for Java-enabled Network Devices](#)
- [Integrating Active Networking and Commercial-Grade Routing Platforms](#)
- [Programmable Network Devices](#)
- [To be smart or not to be?](#)