CV: Elliot Eichen
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Current Interests

Spectrum management and spectrum sharing, 5G/6G communications, quantum computer resistant cybersecurity

Experience:

Research Professor, Computer Science, University of Colorado Boulder, 3/2024 – present:

- Continued development and analysis of a Real-time Geospatial Spectrum Sharing system that enables wireless communications networks to share spectrum with satellite-borne passive remote sensing radiometers that collect data for weather forecasting and climate modeling.
- Leveraging shared secret key ecosystems for authentication to build networks that provide secure (authenticated, immutable, and confidential) communications that cannot be compromised by quantum computers (regardless of the number of qubits or coherence time).

IEEE-USA/AAAS Congressional Fellow, 2018-2019, Washington DC
Staff Member, Office of Senator Ron Wyden. Supported congressional oversight activates related to cyber security, telecommunications. Supported Senate Commerce Committee and House Space Science and Technology Committee in oversight of spectrum management and conflicts over 24 GHz New Spectrum Frontiers auction.

Director, New Product Development/Innovation: 2009 – 20017
Verizon Communications Inc., Waltham MA
Led a group of approximately 20 permanent and 5 temporary employees (graduate students and contractors) for ideation and development of new products and services. Responsible for developing products with annual revenue in excess of $100M/year; department budget (expense and capital) of $10-$25M/year.

- Launched Verizon OneTalk (www.onetalk.com) in 2016, based on proprietary and patented technology. Considered the most important product launch by Verizon Wireless in 2016; first year revenue of $60M and 80k subscribers. The product currently supports about 800k subscriber with revenue of ≈$400M/yr.
- Additional products developed include Vz SmartDock (mobile phone enterprise docking station), Vz Whiteboard (whiteboard analog of a conference bridge), and Vz Voice (similar to google voice).
- Over 100 patents issued to department members between 2009-2017. Personally author/co-author of approximately 35 patents, and 2 referred publications for work done over this period.

VoIP Director, Internet Services and Technology: 2007 –2009
Massachusetts Institute of Technology, Cambridge MA
Responsible for deployment and migration of the MIT community/campus' from circuit switched to Voice over IP.

Department Manager, Product Development: 2004 –2006 Verizon Communications, Waltham MA
Responsible for product development of Verizon's Hosted IP Communications service (IP Centrex) telephony and initial deployments. Verizon's flagship Enterprise Voice product.

Director, VoIP Engineering: 1999 –2004
GTE Internetworking/Genuity/Level 3: Woburn MA
Developed and deployed one of the first national Voice over IP transport and access networks, transitioned network and customers to Level3. Groups under my direction were responsible for:

- Development of a distributed soft-switch, and associated provisioning systems.
- Customer interoperability and support. Development of an integration testbed for interoperability testing with customer applications and peered networks. Co-development of earliest Session Border Controllers.

- Mediation and billing systems.
- Author/co-author for approximately 15 patents, and several referred publications.

- Program Co-Chair (2002) and Technical Program Committee (2003), Symposium on Multimedia and VoIP, IEEE International Conference on Communications

Principal Member of the Technical Staff, Optical Technology, 1982 –1998
GTE Laboratories, Waltham MA
Individual contributor and project lead for optoelectronics and optical communications research and development.

- Experimental confirmation of coherence properties of modulated and unmodulated semiconductor lasers using novel form of Fourier Transform Spectroscopy.
- Demonstration of optical switching using fiber amplifier and semiconductor amplifier switches. One of the first demonstrations of optical packet switching.
- Characterization of very wideband (> 20 GHz) photodetectors using optical white noise from Er3+ fiber amplifiers, and from harmonics generated by a frequency modulated semiconductor laser + Michaelson interferometer demodulator.
- First discussion (and demonstration) that optical communication systems operating in the region where optical amplifier noise dominates can be split without changing the signal-to-noise ratio (key to passive optical network architecture).
- Editor, IEEE Photonics Technology Letters (1990-1992), Program Committee and Chair of Optoelectronics for OSA/IEEE OFC (1987-1991), Program Committee and Conference Chair of IEEE/OFC Topical Conference on Optical Amplifiers (1990-1993).
- Principal Investigator for contract to develop an integrated optical semiconductor preamplifier from the Office of Naval Research. NSF grant review committee on optical switching.
- Authored approximately 30 referred publications and 20 patents.

Research Assistant (grad student), Laser Fusion Group, summers 1977, 1978 Los Alamos Scientific Laboratories, Los Alamos NM

Academic Experience:

Adjunct Faculty, College of Engineering 2003 –2016
Northeastern University, Boston MA
Taught graduate course on IP Telephony (VoIP, IMS, Wireless Networks, etc.) annually. Also, occasionally a taught graduate course on Mobile App development. Nominated for graduate school teaching award. Many students have gone on to positions at network/communication equipment providers, carriers, and startups.

Visiting Industry Professor, Electro-Optics (EE Department): 1986 –1991
Tufts University, Medford MA
Taught graduate classes on Fourier Optics and Optical Communications.

Education:

- Ph.D Optics, Optical Sciences Center, University of Arizona (1982)
- M.B.A. Executive MBA Program, Boston University (sponsorship - GTE Laboratories, 1994-1995)
- B.S. Physics, SUNY Stony Brook (1974)
- High School of Music and Art (aka LaGuardia Arts), New York City (1970)

Arvind Aradhya, Oren Collaco, and Elliot Eichen, “Real Time Geofencing of Earth Exploration Satellite Services: 7.3 GHz Spectrum Sharing with 5G/6G, NSF NRDZ Partnership and Workshop Series, Catalyzing Coexistence via the National Radio Dynamic Zone, September 9-11, 2024, Green Bank Observatory, West Virginia, US

Elliot Eichen, “From Policy to Practice: Congress & Spectrum (invited)”, NSF NRDZ Partnership and Workshop Series, Catalyzing Coexistence via the National Radio Dynamic Zone, September 9-11, 2024, Green Bank Observatory, West Virginia, US

Elliot Eichen, Arvind Aradhya, and Ljiljana Simić, “RF-Flashlight Testbed for Verification of Real-Time Geofencing of EESS Radiometers and Millimeter-Wave Ground-to-Satellite Propagation Models”, 2024 IEEE International Conference on Communications, Denver, CO, USA, 2024, pp. 304-310, doi: 10.1109/ICCWorkshops59551.2024.10615734

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E.Eichen, “Performance of Real-Time Geospatial Spectrum Sharing (RGSS) between 5G Communication Networks and Earth Exploration Satellite Services,” 2021 IEEE International Symposium on Dynamic Spectrum Access Networks (DySPAN), 2021, pp. 73-79, doi: 10.1109/DySPAN53946.2021.9677268.

E. Eichen, “Real-Time Geographical Spectrum Sharing by 5G Networks and Earth Exploration Satellite Services,” 2019 IEEE International Symposium on Dynamic Spectrum Access Networks (DySPAN), 2019, doi: 10.1109/DySPAN.2019.8935715.

E. Eichen et al., " “Implementing multiple identities in IMS/VoLTE networks using implicit registration,” 2018 IEEE Wireless Communications and Networking Conference (WCNC), Barcelona, 2018, pp. 1-6., doi: 10.1109/WCNC.2018.8377019

Elliot Eichen et.al. , “Smartphone Docking Stations and Strongly Converged VoIP Clients for Fixed-Mobile Convergence,” IEEE Wireless Communications and Networking (WCNC) pp 3140-3144 (2012) 10.1109/WCNC.2012.6214346

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"Eichen, E.; Brooks, D.; Burch, D.; Chippada, R.; Cousins, S.,Gang, Fu; Lambert, G., Rong, R.; Ruban, G., “DSTS: An expert system for diagnosis of advanced digital subscriber services”, NOMS 98. 1998 IEEE Network Operations and Management Symposium. Conference Proceedings (Cat. No.98CH36158) Part vol.3 p.795-804 vol.3 (1998)

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Telecommunications Conference. Technical Program Conference Record (Cat. No.95CH35756) Part vol.3 p.1840-4 vol.3 (1995)

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