

Joseph D. Touch, Ph.D.

touch@isi.edu

+1 (310) 448-9151 (-9300 fax)

<http://www.isi.edu/touch/> (includes [this CV](#) and an [extended CV](#))

+1 (310) 560-0334 cell/SMS

Education

PhD. Computer and Information Science, University of Pennsylvania, 1992, advisor: David J Farber.

M.S. Computer Science, Cornell University, 1987.

B.S. Biophysics and Computer Science, University of Scranton, 1985 (*summa cum laude* with Honors).

Experience

Design, development and deployment of large scale network-based software/hardware systems, with major impact on widely-deployed applications and operating systems. Leading efforts in future Internet architecture designs. Experienced with Internet architecture and protocols, the IETF process, VPN issues, security performance and configuration, network mobility, routing, optical nets, and DNS.

USC / Information Sciences Institute (June 1992-present)

Director, Postel Center (Oct. 2000 – present)

Coordinates visiting scholars, graduate scholarships, facilities, and funding for a lab and center for network research in service to the Internet community.

Project Leader (Oct. 1995 – present)

Leads teams to design/implement large-scale software/hardware Internet systems for public distribution.

Develops Internet link, network, application, and operating systems concepts for virtual networking, optical nets, and high-performance network security. Designs/implements the architecture of large software systems, explored fine-grained network configuration control, DDOS protection, learning-based performance tuning, and embedded personal Internet devices. Designed and implemented hardware for components of an all-optical Internet router, a high-speed LAN network interface, and devices for high-performance checksums.

Active participant in Internet standards (IETF) since 1997; notably in link (PILC, INT, TRILL, SHIM6), network (IP, L3VPN), security (IPSEC, BTNS), and transport (TCPM, TSVWG, PMTUD) working groups.

Research Scientist (Jun. 1992 – Oct. 1995)

Developed Internet link, network, application, and operating systems concepts for latency reduction, multimedia, and high-speed networking.

Research Associate Professor (CS Associate Prof. Jun. 2002 – present, EE joint appointment Jun. 2003 – present, CS Assistant Prof. Feb. 1994 – Jun. 2002)

Advises Ph.D. and M.S. students, teaches graduate classes on networking and distributed systems.

Developed the Summer Graduate Research Experience Program (SGREP) at ISI (1999-2004).

US Air Force (October 2006-2010, IPA loan)

Network Chief

Advising Transformational Communications Satellite (TSAT) Program Office and Advanced Concepts Group.

Lehrman Group Council of Technology Advisors (Oct. 1999-present); Innocent Venture Capital (Nov. 2000-present)

Consultant. Assesses the technological feasibility of Internet, networking, and distributed systems ventures.

Bell Communications Research (Bellcore, now Telcordia) (Jun. 1987- Feb. 1988)

Consultant. Developed algorithms for flow control in multicast packet networks. Designed and implemented multistage packet switch simulation tools.

Technical Leadership and Management

DynaSat dynamic satellite networking (DARPA, 2011)

Leading a team of staff (~4.5 FTE) to develop a network protocol stack and related OS and file system architectures for a cluster satellite system.

RNA recursive network architecture (NSF, 2006-present)

Leading a team of students to develop an Internet architecture that natively supports overlays and recursion, collaborating with teams in Europe and Asia on its future Internet architecture implications.

X-Bone overlay deployment system (Linux RPM, FreeBSD & Cisco ports) (DARPA, NSF, NSA, 1998-2006)

Led a 19-member (~4-6.5 FTE) team over eight years to design and implement an Internet overlay (VPN) deployment system. Developed 13 public software releases in 2000-2006 (15,000 lines Perl), the most recent supporting global testbed deployment and stand-alone installation. The software was successfully “Red Team” analyzed for security considerations by Sandia National Laboratories. The system pioneered virtual network extensions to the Internet and is used at a number of universities and labs, and provides the basis for the EU 6Net testbed. Also resulted in patches to FreeBSD, MacOS/X, and Linux.

Tethernet Internet subnet rental system (stand-alone turnkey router) (DARPA, 2001-2004)

Led a 3-member (~2 FTE) team to design and implement a commercial-grade Internet subnet rental system (4,300 lines of Perl). Deployed the system at over a dozen DARPA and NSF meetings, supported hundreds of demos there and at the DARPA DISCEX conference, and provided Internet support to IEEE, ACM, and IFIP conferences. System currently on-loan to several universities worldwide, including DARPA and DHS.

LSAM multicast web push system (Linux RPM, FreeBSD port) (DARPA, 1996-1999)

Led a 17-member (~5 FTE) team over three years to design and implement a self-configuring multicast web push system. Provided demos semi-annually, publicly released four versions of software (5,000 lines C) and a separate push-only system (2,000 lines Perl and C). Resulted in patches to the Apache web server.

PC-ATOMIC high-speed network interface card (DARPA, 1994-1995)

Led a 7-member (~4 FTE) team over one year to develop a VL-bus PC network interface card for a 640-Mbps LAN. Designed the functional decomposition, data and control flow to support host-based and on-board CPU control, as well as DMA. Designed and programmed a PLD to perform a gigabit-per-second IP checksum during DMA. Also oversaw driver development and performance evaluation. Replicas were sent to several universities to support DARPA-funded research. Resulted in code used in Cisco’s IOS.

Professional Activities

ACM Distinguished Scientist, IEEE Senior member, Sigma Xi member.

Active as director/chair/committee members in IEEE Communications Society and ACM SIGCOMM

IEEE Network Editorial Board 1997-present

Elsevier Journal of Computer and Systems Sciences Editorial Board 2007-present

Elsevier’s Computer Networks (and ISDN Systems, formerly) 1999-2006

IANA Port Experts review team leader 2008-present, IETF Transport Area Directorate member 2008-present

Publication Summary

Total patents: 4 received, 2 pending

Books/chapters/tutorials: 9

Special issues: 5

Total journal papers: 18

Total conference papers: 43

Internet RFCs: 12, 10 pending

Research Summary

Link layer (2000-): link impact on Internet design, satellite impact on Internet design, bridge aggregation

Optical networks (1998-): optical burst router, optical IP router, optical TTL decremter, MAC/link issues

Overlays (1998-): X-Bone Internet overlay architecture, DynaBone multilayer overlays for fault tolerance

TCP/IP (1995-): TCP shared control performance, string-based IP forwarding, server performance

Internet security (1995-): MD5 speed, authentication-free security, TCP authentication, high-speed security

Web (1997-2002): HTTP performance, multicast web push

High-speed nets (1992-1998): Fast host router design, protocol parallization, web/file push

A full list of publications is available at <http://www.isi.edu/touch/pubs/>