SUPRATIK BHATTACHARYYA

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EDUCATION

- **PhD Computer Science**. University of Massachusetts Amherst, USA. August 1999.
  Advisors: Jim Kurose, Don Towsley.
  Dissertation: Flow and Congestion Control for Multicast Communication in the Internet.

EXPERIENCE

- **Principal Member of Technical Staff, IP and Wireless Research, Sprint Advanced Technology Labs** September 1999-present.

  Responsibilities:
  - Define and lead projects in the areas of Internet performance monitoring and security, routing and traffic engineering, wireless communication and services.
  - Develop innovative technologies and services for Sprint.
  - Develop and manage Sprint-funded university collaborations.
  - Generate intellectual property for Sprint.
  - Publish extensively in reputed conferences and journals.

SIGNIFICANT PROJECTS (with selected publications)

- **Opportunistic Wireless Communication.** *Dec 2004 – present*
  This project aims to develop support for high-bandwidth but delay-tolerant applications on mobile devices equipped with multiple radio interfaces, large storage capacity and powerful processors. The goal is to enable these devices to make opportunistic use of one or more available access networks such as wireless WANs, intermittent wireless LANs and short-distance PANs. A Java-based prototype system has been developed to support functionality such as automatic discovery of available networks, parallel connections via multiple network interfaces, resilience to sudden disconnections and intermittent connectivity, and approximate in-order delivery of data. Current work investigates issues such as energy efficiency, policy-based connection/disconnection decisions and the use of error-correcting codes.
  - "Opportunistic Data Transfer over Heterogeneous Access Networks". Sprint ATL Research Report RR05-ATL-063000.

- **Continuous Monitoring for Network Security.** *Jan 2003-present.*
  The goal of this project is to build an "always-on" packet-level monitoring platform (CMON) for high-speed IP backbone links, and then use the packet stream for detecting anomalies, unusual events and malicious activities. The monitoring platform has been designed, implemented and deployed at a few points in Sprint's IP backbone. Novel algorithms have been developed for profiling traffic based on data-mining and information- theoretic concepts, and for detecting worm scanning activities. On-going work focuses on algorithms to process and summarize packet payload characteristics at line speeds, and on improving resource management, configurability and adaptability of the monitoring platform itself.
  - "CMON: A general-purpose continuous IP backbone traffic analysis platform" *Sprint ATL research report RR04-ATL-110309*.
  - "Profiling Backbone Traffic: Behavior Models and Applications" *ACM SIGCOMM 2005*.
  - "Reducing Unwanted Traffic in a Backbone Network" *Workshop on Steps to Reducing Unwanted Traffic in the Internet (SRUTI), 2005*.

- **Network Availability and Failure Resilience.** *Sep 2001-Sep 2003*.
  This project analyzed the failure characteristics of Sprint's IP backbone and developed techniques and recommendations to improve failure resilience and availability. Contributions include the design of a novel IGP weight selection algorithm that is robust to link failures, a novel deflection routing algorithm to counter sudden link overloads and a detailed characterization of link failures and their probable causes. In addition, a detailed study of IGP convergence behavior led to a large reduction in IGP convergence times in Sprint's network and recommendations to Cisco on router software modifications.
  - "IGP Link Weight Assignment for Transient Link Failures." *18th International Teletraffic Conference (ITC) 2003*.
  - "Characterization of Link Failures in an IP Backbone." *IEEE Infocom 2004*.
  - "An Approach to alleviate link overload as observed on an IP backbone." *IEEE Infocom 2003*.

- **Routing and Traffic Engineering.** *Jun 2001 – Dec 2003*.
  This work was aimed at understanding and improving the performance of IP routing protocols and traffic engineering practices in Sprint's network. Contributions include the development of new techniques for estimation traffic between backbone Points of Presence (PoP) and the analysis of the interactions between BGP, IGP and traffic dynamics.
  - "Traffic Matrix Estimation: Existing Techniques and New Directions." *ACM Sigcomm 2002*.
  - "The Impact of BGP Dynamics on Intra-Domain Traffic." *ACM Sigmetrics 2004*.
  - "Measuring the Shared Fate of IGP Engineering and Inter-Domain Traffic." *ICNP 2005*.

STANDARDS ACTIVITIES

- **Co-chair**. IETF **Source Specific Multicast (SSM) working Group.**
- Lead **author.** "An overview of Source-Specific Multicast (SSM)*"* ***IETF Request for Comments (RFC) 3569.***

PATENT APPLICATIONS

- Method for assigning link weights in a communication network.
- Method for deflection routing to alleviate link overload.
- System and method for trace replay using parallelized streams.
- Connectionless port scan detection on a network.

INVITED TUTORIALS

- Availability and Survivability in IP Networks. *ICNP 2003*.
- Network Monitoring and Measurements: Techniques and Experiences. *ACM SIGMETRICS 2002*
- Source-Specific Multicast: Deployment and Development Status. *NGC 2001*.

PROFESSIONAL SERVICE

- **National Science Foundation (NSF) review panels 2004-2005.**
- **Technical Program Committees** IEEE Infocom, Internet Measurement Conference (IMC), ICNP, ACM Multimedia, Global Internet and Next Generation Networks (GINGN), IWQoS, ACM SIGCOMM Workshop on Delay Tolerant Networks (WDTN), Workshop on Passive and Active Measurements (PAM).

REFERENCES Available on request.