

Chen-Nee Chuah

Electrical and Computer Engineering
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RESEARCH INTERESTS

Network measurements & modeling, Internet routing, traffic engineering, fault-tolerant systems, anomaly detection, overlay/peer-to-peer networks, mobile/wireless information systems, and opportunistic networking.

EDUCATION

- 2001 Ph.D. in Electrical Engineering & Computer Sciences, University of California, Berkeley, CA
Thesis: [A Scalable Framework for IP-Network Resource Provisioning](#)
- 1997 M.S. in Electrical Engineering & Computer Sciences, University of California, Berkeley, CA
Thesis: [Capacity of Multi-Antenna Array Systems](#)
- 1995 B.S. in Electrical Engineering, Rutgers University, Piscataway, NJ

PROFESSIONAL EXPERIENCE

- 2006-present Associate Professor, Electrical & Computer Engineering
Graduate Group Member, Computer Science
University of California, Davis, CA
- 2002-2006 Assistant Professor, Electrical & Computer Engineering
Graduate Group Member, Computer Science
University of California, Davis, CA
- 2001- 2002 Visiting Researcher (Leave of absence from UC Davis)
Sprint Advanced Technology Laboratories – IP Group, Burlingame, CA
- 1995-2001 Graduate Student Research and Teaching Assistant,
Electrical Engineering & Computer Sciences
University of California, Berkeley, CA
- June – August 1998 Research Intern
Lucent Technologies – UMTS Technology & Trials Group, UK
- June – August 1997 Research Intern
Lucent Technologies Bell Laboratories – Wireless Communications, Crawford Hill, NJ
- June – August 1994 Technical Associate
AT&T – Wireless Network Core Technologies, Whippany, NJ
- 1993 - 1995 Undergraduate Research Assistant
Wireless Information Laboratories (WINLAB),
Rutgers University, Piscataway, NJ

AWARDS/HONORS

- 2005 Narus Research Fellow
ACM Recognition of Service Award, in appreciation for co-organizing the First ACM Workshop on Vehicular Ad Hoc Networks (VANET) at ACM MobiCom 2004
- 2004 College of Engineering - Outstanding Junior Faculty Award, UC Davis
- 2003 National Science Foundation (NSF) CAREER Award
- 1998 Recognition Award, Lucent Technologies-UK
- 1998 IEEE Globecom'98 Student Travel Grant
- 1997 Schlumberger Foundation Graduate Fellowship
- 1995 Tau Beta Pi Graduate Fellowship Award
Helen Bangle and Earl Anthony Fellowship Award, UC Berkeley
Outstanding Engineering Scholar, College of Engineering, Rutgers University
John Smith Memorial Prize and James Leroy Potter Award, ECE Department, Rutgers University
- 1994 SWE/Hewlett Packard Annual Scholarship Award
- 1993 Outstanding Junior Initiate Award, Golden Key National Honor Society
- 1993-95 Engineering Merit Scholarship, Rutgers College of Engineering
- 1991 Individual and Team Gold Medal, Penang State Mathematics Olympiad, Malaysia

RESEARCH GRANTS

- National Science Foundation CT-ISG-0716831, "Collaborative Research: Accurate Sampling of the Internet for Effective Anomaly Detection," \$350,000, 2007-10, **Lead-PI: C-N. Chuah** (External collaborator: J. Xu, Georgia Institute of Technology).
- National Science Foundation CMMI-0700383, "Distributed Vehicular Traffic Management via DSRC-Enabled Vehicles," \$341,074, 2007-10, PI: M. Zhang, **co-PIs: C-N. Chuah** and D. Ghosal.
- National Science Foundation CAREER Award 0238348, "RoSE: Robust, Stable, and Secure Routing," \$427,333, 2003-08, **PI: C-N. Chuah**
- National Science Foundation NeTS-NBD Grant #0520320, "Automatic Validation, Optimization, and Adaptation of Distributed Firewalls for Network Performance and Security," \$400,000, 2005-08, **PI: C-N. Chuah**, co-PIs: H. Chen and Z. Su
- National Science Foundation NeTS-NBD Collaborative Research Grant#0520333, "Intelligent and Adaptive Networking for the Next Generation Internet," \$200,000, 2005-06, PI: S. J. Yoo, **co-PIs: C-N. Chuah**, B. Olshausen, S. Wu, K. Levitt. External collaborator: R. H. Katz (UC Berkeley)
- National Science Foundation Networking Research Testbed (NRT) Grant, "Unified Networking Research Testbed for the Next Generation Optical Network," \$300,000, 2003-05, PI: S. J. Yoo, **co-PIs: C-N. Chuah**, V. Akella, and J. Heritage
- Univ. of California Micro Program, "SAND: Accurate Sampling of the Internet for Effective Anomaly Detection," 2007-08, **PI: C-N. Chuah** (with matching funds from Sprint and Narus)
- Univ. of California Micro Program, "Mobile Infrastructure Enablers for Streaming Optimization & New Services-Year 3," 2006-07, **PI: C-N. Chuah** (with matching funds from Hewlett Packard)
- Univ. of California Micro Program, "Mobile Infrastructure Enablers for Streaming Optimization & New Services-Year 2," 2005-06, **PI: C-N. Chuah** (with matching funds from Hewlett Packard and Fujitsu)

- Univ. of California Micro Program, “Mobile Infrastructure Enablers for Streaming Optimization & New Services-Year 1,” 2004-05, **PI: C-N. Chuah** (with matching funds from Hewlett Packard)
- Univ. of California Micro Program, “Improving Network Robustness and Survivability,” 2003-04, **PI: C-N. Chuah** (with matching funds from Fujitsu)
- Gift from Intel, “Wireless Management Overlay (WiMO),” \$140,000, 2005-07, **PI: C-N. Chuah**, co-PI: P. Mohapatra.
- Gift from Sprint Advanced Technology Laboratories, “Network Sampling and Anomaly Detection,” \$35,000, 2005-06, **PI: C-N. Chuah**
- Gift from Narus, Inc., “BGP Anomaly Detection,” \$30,000, 2005-07, **PI: C-N. Chuah**
- Gift from Hewlett-Packard, “Performance study of Overlay Networks and PlanetLab,” \$15,000, 2004-05, **PI: C-N. Chuah**
- CENIC, “High-Performance Networking and Collaborative Real-Time Visualization for the Next Generation CalREN,” \$38,000, June-Dec 2004, PI: S. J. Yoo, **co-PIs: C-N. Chuah**, B. Hamann, and O. Staadt
- Gift from Sprint Advanced Technology Laboratories, “Characterizing and Improving IP Network Availability,” \$40,000, 2003-04, **PI: C-N. Chuah**
- Univ. of California, Davis - Faculty Research Grant, “Network Infrastructure Support for Collaborative Virtual Reality Systems,” \$14,000, 2003-04, **PI: C-N. Chuah**
- Gift from Microsoft, “Smart Classroom II,” \$35,000, 2003-04, PI: S. J. Yoo, **co-PIs: C-N. Chuah**, B. Hamann, and O. Staadt
- Cisco Systems URP Program, “Inter-Domain Policy Distribution & Traffic Engineering,” \$72,000 (Cash) + \$168,000 (equipment), 2002-03, **PI: C-N. Chuah**.

EDUCATION/EQUIPMENT GRANTS

- Department of Education GAANN Program, “Resilient Information Systems targeting Societal-Scale Applications,” \$760,032, 2006-09, **PI: C-N. Chuah**, co-PIs: V. Akella and B. Levy
- Intel 2006 California Public Affairs Higher Education Equipment Grant, \$87,830, 2006-07, **PI: C-N. Chuah**, co-PIs: S. Ghiasi, P. Mohapatra, J. Owens, and K. Wilken
- Department of Education GAANN Program, “Networked Systems of Embedded Computers,” \$694,176, 2003-08, PI: A. Knoesen, **co-PI: C-N. Chuah**
- UC Davis Teaching Resource Center, Undergraduate Instructional Improvement Program, “Location-Aware Applications and Mobile Computing,” \$5,119, Spring 2005, **PI: C-N. Chuah**
 - Developed a senior-level undergraduate project-elective course, “EEEC173B/ECS152C: Design Projects in Communication Networks”, which is cross-listed between both the Department of Electrical & Computer Engineering and the Department of Computer Science at UC Davis.

JOURNAL, BOOK CHAPTERS, & MAGAZINE ARTICLES

- [J1] A. Markoupoulou, Y. Ganjali, G. Iannaccone, C-N. Chuah, S. Bhattacharyya, and C. Diot, “Failures in an Operational IP Backbone Network,” to appear in *ACM/IEEE Transactions on Networking*, 14 pp.
- [J2] R. Keralapura, C-N. Chuah, N. Taft, and G. Iannaccone, “Race Conditions in Coexisting Overlay Networks,” to appear in *IEEE/ACM Transactions on Networking (TON)*, 14pp.
- [J3] S. Nelakuditi, Z. Zhong, J. Wang, R. Keralapura, C-N. Chuah, “Mitigating Transient Loops Through Interface-Specific Forwarding,” to appear in *Elsevier Computer Networks*, 25pp.

- [J4] D. Li, C-N. Chuah, G. Cheung, and S. J. B. Yoo, "Peer-to-Peer Assisted Video Streaming Over IEEE802.11 Wireless Local Area Networks," to appear in *Broadband Mobile Multimedia: Techniques and Applications*, Auerbach Publications, CRC Press, 20pp, March 2008.
- [J5] Y. Chen, C-N. Chuah, and Q. Zhao, "Network Configuration for Optimal Utilization Efficiency of Wireless Sensor Networks," to appear in *Elsevier Ad Hoc Networks Journal*, vol. 6, issue 1, pp. 92-107, January 2008.
- [J6] S. Raza and C-N. Chuah, "Interface Split Routing for Finer-Grained Traffic Engineering," *Performance Evaluation Journal*, vol. 64, issue 9-12, pp. 994-1008, October 2007.
- [J7] Z. Li, L. Yuan, P. Mohapatra, and C-N. Chuah, "On the Analysis of Overlay Failure Detection and Recovery," *Computer Networks Journal*, vol. 51, issue. 13, pp. 3838-3843, September 2007.
- [J8] S. Lee, Y. Yu, S. Nelakuditi, Z-L. Zhang, and C-N. Chuah, "Proactive vs. Reactive Approaches to Failure Resilient Routing," *IEEE/ACM Trans. On Networking*, vol. 15, no. 2, pp. 359-372, April 2007.
- [J9] J. Mai A. Sridharan, C-N. Chuah, T. Ye, and H. Zang, "Impact of Packet Sampling on Portscan Anomaly Detection," *IEEE Journal on Selected Areas of Communications – Special Issue on Sampling the Internet*, vol. 24, no. 12, pp. 2285-2298, December 2006.
- [J10] Y. Andreopoulos, R. Keralapura, M. van der Schaar, C-N. Chuah, "Failure-Aware, Open-Loop, Adaptive Video Streaming with Packet-Level Optimized Redundancy," *IEEE Transactions on Multimedia*, vol. 8, no. 6, pp. 1274-1290, December 2006.
- [J11] G. Cheung, D. Li, and C-N. Chuah, "On the Complexity of Cooperative Peer-to-Peer Repair for Wireless Broadcasting," *IEEE Communication Letters*, vol. 10, no. 11, pp. 742-744, November 2006.
- [J12] R. Keralapura, A. Moerschell, C-N. Chuah, G. Iannaccone, and S. Bhattacharrya, "A Case for Using Service Availability to Characterize IP Backbone Topologies," *Journal of Communications and Networks*, vol. 8, no.2, pp. 241-252, June 2006.
- [J13] D. Li, C-N. Chuah, G. Cheung, and S. B. Yoo, "MUVIS: Multi-Source Video Streaming Service over WLANs," *Journal of Communication Networks - Special Issue on Towards the Next Generation Mobile Communications*, vol. 7, no. 2, pp. 144-156, June 2005.
- [J14] Z. Zhong, R. Keralapura, S. Nelakuditi, Y. Yu, J. Wang, C-N. Chuah, and S. Lee, "Avoiding Transient Loops through Interface-Specific Forwarding," *Springer-Verlag Lecture Notes in Computer Science (LNCS) series*, vol. 3552, pp. 219-232, June 2005.
- [J15] Z. Li, P. Mohapatra, and C-N. Chuah, "Virtual Multi-Homing: On the Feasibility of Combining Overlay Routing with BGP Routing," *Springer-Verlag Lecture Notes in Computer Science (LNCS) series*, vol. 3462, pp. 1348-1352, May 2005.
- [J16] R. Keralapura, N. Taft, G. Iannaccone, C-N. Chuah, "Can ISPs and Overlay Networks form a Synergistic Co-Existence?" *Springer-Verlag Lecture Notes in Computer Science (LNCS) series*, vol. 3278, pp. 263-265, November 2004.
- [J17] S. Agarwal, C-N. Chuah, S. Bhattacharrya, and C. Diot, "The Impact of BGP Dynamics on Intra-Domain Traffic," *ACM SIGMETRICS Performance Evaluation Review*, vol. 32, no.1, pp. 319-330, June 2004.
- [J18] G. Iannaccone, C-N. Chuah, S. Bhattacharrya, and C. Diot, "Feasibility of IP Restoration in a Tier-1 Backbone," *IEEE Network*, vol. 18, no. 2, pp. 13-19, March 2004.
- [J19] C-N. Chuah, L. Subramanian, R. H. Katz, and G. J. Lee, "Detecting Malicious Flows via Collaborative Aggregate Policing," *ACM SIGCOMM Computer Communication Review*, vol. 33, no. 5, pp. 5-18, October 2003.
- [J20] C-N. Chuah, D. N. Tse, J. M. Kahn, and R. A. Valenzuela, "Capacity Scaling in Dual-Antenna-Array Wireless Systems," *IEEE Transactions on Information Theory*, vol. 48(3), pp. 637-650, March 2002.

- [J21] H. J. Wang, B. Raman, C-N. Chuah, and ICEBERG team, "ICEBERG: An Internet-core Network Architecture for Integrated Communications," *Proc. IEEE Personal Communications Special Issue on IP-based Mobile Telecommunications Networks*, vol. 7, No. 4, August 2000.

REFEREED CONFERENCE PUBLICATIONS

- [C1] H. Du, M. Zhang, C-N. Chuah, and D. Ghosal, "A Finer Resolution Cellular Automata Model for Inter Vehicle Communication Applications," to appear in *Transportation Research Board 2008 Annual Meeting*, 13 pp.
- [C2] S. Raza and C-N. Chuah, "Interface Split Routing for Finer-Grained Traffic Engineering," *IFIP International Symposium on Computer Performance, Modeling, Measurements, and Evaluation (Performance'07)*, Oct 2007.
- [C3] D. Gupta, D. Wu, C. Chen, C-N. Chuah, P. Mohapatra, and S. Rungta, "Experimental Study of Measurement Based Admission Control for Wireless Mesh Networks," *IEEE International Conference on Mobile Ad-hoc and Sensor Systems (MASS)*, Oct 2007.
- [C4] L. Yuan, C-N. Chuah, and P. Mohapatra, "ProgMe: Towards Programmable Network Measurement," *ACM SIGCOMM*, Aug 2007. (Acceptance rate: 13.8%)
- [C5] S. Raza, D. Li, C-N. Chuah, and G. Cheung, "Cooperative Peer-to-Peer Repair for Wireless Multimedia Broadcast," *IEEE International Conference on Multimedia & Expo (ICME)*, July 2007.
- [C6] B. Khorashadi, A. Chen, D. Ghosal, C-N. Chuah, and M. Zhang, "Impact of Transmission Power on the Performance of UDP in Vehicular Ad Hoc Networks," *IEEE Proc. International Conference on Communications (ICC)*, June 2007.
- [C7] H. Liu, H. Yu, X. Liu, C-N. Chuah, and P. Mohapatra, "Scheduling Multiple Partially Overlapped Channels in Wireless Mesh Networks," *IEEE Proc. International Conference on Communications (ICC)*, June 2007.
- [C8] J. LeBrun, C-N. Chuah, S. Bhattacharyya, and J. Bolot, "News-feed Subscription Management for Intermittently Connected Environments," *International Workshop on Improved Mobile User Experience (IMUx)*, co-located with *International Conference on Pervasive Computing*, May 2007.
- [C9] L. Yuan, K. Kant, P. Mohapatra, and C-N. Chuah, "A Proxy View of Quality of Domain Name Service," *IEEE INFOCOM*, May 2007. (Acceptance rate: 18%)
- [C10] H. Yang, Z. Zhu, B. Xiang, W. Jiang, V. Akella, C-N. Chuah, and S. J. B. Yoo, "Design and Experimental Demonstration of Novel Optical Router Controller Capable of Asynchronous, Variable-Length Packet Switching and Contentions Resolution," *IEEE/OSA Optical Fiber Communication Conference*, March, 2007.
- [C11] A. Nucci, S. Teoh, S. Ranjan, and C-N. Chuah, "BGP Eye: A new visualization tool for realtime detection and analysis of BGP Anomalies," *ACM International Workshop on Visualization for Computer Security*, November 2006.
- [C12] J. Mai, C-N. Chuah, A. Sridharan, H. Zang, and T. Ye, "Is Sampled Data Sufficient for Anomaly Detection?" *ACM Internet Measurement Conference*, October 2006. (Acceptance rate for long paper: 12.3%)
- [C13] H. Yang, V. Akella, C-N. Chuah, S. J. B. Yoo, "Design of Novel Optical Router Controller and Arbiter Capable of Asynchronous, Variable Length Packet Switching," *IEEE International Conference on Photonics in Switching*, October 2006.
- [C14] H. Yang, V. Akella, C-N. Chuah, S. J. B. Yoo, "Efficient Contention Resolution Algorithms for Recirculation Multicast Based Optical Router Switch Architecture," *IEEE International Conference on Photonics in Switching*, October 2006.

- [C15] R. Keralapura, C-N. Chuah, and Y. Fan, "Optimal Strategy for Graceful Network Upgrade," *ACM SIGCOMM Workshop on Internet Network Management*, September 2006.
- [C16] A. Chen, B. Khorashadi, C-N. Chuah, D. Ghosal, and M. Zhang, "Smoothing Vehicular Traffic Flow Using Vehicular-Based Ad Hoc Networking and Computing Grid (VGRID)," *IEEE Conference on Intelligent Transportation Systems (ITSC)*, September 2006.
- [C17] D. Li, C-N. Chuah, G. Cheung, and S. J. Ben Yoo, "Energy-Aware Multi-Source Video Streaming," *IEEE ICME*, July 2006.
- [C18] L. Yuan, K. Kant, P. Mohapatra, and C-N. Chuah, "Dox: A Peer-to-Peer Antidote for DNS Cache Poisoning Attacks," *IEEE ICC*, June 2006.
- [C19] L. Yuan, J. Mai, Z. Su, H. Chen, C-N. Chuah, and P. Mohapatra, "FIREMAN: A Toolkit for Firewall Modeling and Analysis," *IEEE Symposium on Security and Privacy*, pp. 199-213, May 2006. (Acceptance rate of long paper: 9.2%)
- [C20] D. Li, Q. Zhang, C-N. Chuah, and S. J. Ben Yoo, "Multi-Source Multi-Path Video Streaming over Wireless Mesh Networks," *IEEE International Symposium on Circuits and Systems (ISCAS)*, May 2006.
- [C21] C. Dana, D. Li, D. Harrison, and C-N. Chuah, "BASS: BitTorrent Assisted Streaming System for Video-On-Demand," *IEEE International Workshop on Multimedia Signal Processing (MMSP)*, October 2005.
- [C22] Y. Chen, C-N. Chuah, and Q. Zhao, "Optimal Sensor Placement for Maximizing Lifetime per Unit Cost," *IEEE Military Communication Conference (MILCOM)*, October 2005.
- [C23] R. Keralapura, C-N. Chuah, N. Taft, and G. Iannaccone, "Can co-existing overlays inadvertently step on each other?" *Proc. IEEE ICNP*, pp. 201-214, November 2005. (Acceptance rate: 17%)
- [C24] Z. Zhong, R. Keralapura, S. Nelakuditi, Y. Yu, J. Wang, C-N. Chuah, and S. Lee, "Avoiding Transient Loops through Interface-Specific Forwarding," *Proc. IFIP/IEEE International Workshop on Quality of Service (IWQoS)*, June 2005. (Acceptance rate 19-21%)
- [C25] K. Zhang, S. Teoh, S. Tseng, R. Limprasittipom, C-N. Chuah, K.-L. Ma, and S. F. Wu, "Performing BGP Experiments on a Semi-Realistic Internet Testbed," *Proc. IEEE International Workshop on Security in Distributed Computing Systems (SDCS)*, June 2005.
- [C26] H. Yang, V. Akella, C-N. Chuah, and S. J. Yoo, "Scheduling Optical Packets in Wavelength, Time, and Space Domains for All-Optical Packet Switching Routers," *Proc. IEEE International Conference on Communications (ICC)*, June 2005. (Acceptance rate: 29%)
- [C27] J. LeBrun, C-N. Chuah, and D. Ghosal, "Knowledge-Based Opportunistic Forwarding in Vehicular Wireless Ad Hoc Networks," *Proc. IEEE Vehicular Technology Conference*, May 2005.
- [C28] J. Anda, J. LeBrun, D. Ghosal, C-N. Chuah, and H. M. Zhang, "VGrid: Vehicular Ad Hoc Networking and Computing Grid for Intelligent Traffic Control," *Proc. IEEE Vehicular Technology Conference*, May 2005.
- [C29] Z. Li, P. Mohapatra, and C-N. Chuah, "Virtual Multi-Homing: On the Feasibility of Combining Overlay Routing with BGP Routing," *Proc. IFIP Networking Conference*, May 2005.
- [C30] Z. Zhong, S. Nelakuditi, Y. Yu, S. Lee, J. Wang, and C-N. Chuah, "Failure Inferencing based Fast Rerouting for Handling Transient Link and Node Failures," *Proc. IEEE Global Internet*, March 2005.
- [C31] D. Li, C-N. Chuah, G. Cheung, and S. J. Yoo, "Proxy-driven rate-distortion optimized video streaming over wireless network using asynchronous clocks," *Proc. IEEE Packet Video Workshop*, December 2004.
- [C32] R. Keralapura, N. Taft, C-N. Chuah, and G. Iannaccone, "Can ISPs take the heat from Overlay Networks?" *Proc. ACM Workshop on Hot Topics in Networks (HotNets-III)*, pp. 29-34, November 2004. (Acceptance rate: 18.5%)

- [C33] R. Keralapura, N. Taft, G. Iannaccone, C-N. Chuah, "Can ISPs and Overlay Networks form a Synergistic Co-Existence?" *Proc. IEEE/IFIP Distributed Systems: Operations and Management (DSOM)*, November 2004. (Acceptance rate: 22%)
- [C34] P. Cheng, X. Liu, and C-N. Chuah, "Energy-aware Node Placement in Wireless Sensor Networks," *Proc. IEEE Globecom*, November 2004. (Acceptance rate: 25-30%)
- [C35] A. Zeitoun, C-N. Chuah, S. Bhattacharrya, and C. Diot, "An AS-Level Study of Internet Path Delay Characteristics," *Proc. IEEE Globecom*, November 2004. (Acceptance rate: 25-30%)
- [C36] H. C. Chang, H. Du, J. Anda, C-N. Chuah, D. Ghosal, and M. Zhang, "Enabling Energy Demand Response with Vehicular Mesh Networks," *Proc. IEEE/IFIP Intl Conference on Mobile and Wireless Communication Networks (MWCN)*, October 2004.
- [C37] D. Li, G. Cheung, C-N. Chuah and S. J. Yoo, "Joint Server/Peer Receiver-Driven Rate-Distortion Optimized Video Streaming Using Asynchronous Clocks," *Proc. IEEE International Conference on Image Processing (ICIP)*, October 2004.
- [C38] R. Keralapura, C-N. Chuah, G. Iannaccone, and S. Bhattacharrya, "Service Availability: A New Approach to Characterizing Network Topologies," *Proc. IEEE International Workshop on Quality of Service (IWQoS)*, pp. 232-241, June 2004. (Acceptance rate 19.5%)
- [C39] S. Agarwal, C-N. Chuah, S. Bhattacharrya, and C. Diot, "The Impact of BGP Dynamics on Intra-Domain Traffic," *ACM SIGMETRICS Joint Intl Conference on Measurement and Modeling of Computer Systems*, June 2004. (Acceptance rate: 12.4%)
- [C40] G. Cheung, C-N. Chuah, and D. Li, "Optimizing Video Streaming Against Transient Failures and Routing Instability," *Proc. IEEE International Conference on Communications (ICC)*, June 2004.
- [C41] A. Banerjee, N. Singhal, J. Zhang, D. Ghosal, C-N. Chuah, and B. Mukherjee, "A Time-Path Scheduling Problem (TPSP) for Aggregating Large Data Files from Distributed Databases using an Optical Burst-Switched Network," *Proc. IEEE International Conference on Communications (ICC)*, June 2004.
- [C42] S. Agarwal, C-N. Chuah, S. Bhattacharrya, and C. Diot, "The Impact of BGP Dynamics on Router CPU Utilization," *Proc. Passive & Active Measurement (PAM) Workshop*. Also appear in *Springer-Verlag Lecture Notes in Computer Science (LNCS) series* vol. 3015, pp. 278-288, April 2004. (Acceptance rate: 17.5%)
- [C43] A. Markopoulou, G. Iannaccone, S. Bhattacharrya, C-N. Chuah, and C. Diot, "Characterization of Failures in an IP Backbone," *Proc. IEEE INFOCOM*, March 2004. (Acceptance rate: 18.4%)
- [C44] S. Lee, Y. Yu, S. Nelakuditi, Z-L. Zhang, and C-N. Chuah, "Proactive vs. Reactive Approaches to Failure Resilient Routing," *Proc. IEEE INFOCOM*, March 2004. (Acceptance rate: 18.4%)
- [C45] S. Agarwal, C-N. Chuah, and R. H. Katz, "OPCA: Robust Interdomain Policy Routing and Traffic Control," *Proc. IEEE OPENARCH*, pp. 55-64, April 2003.
- [C46] G. Iannaccone, C-N. Chuah, R. Mortier, S. Bhattacharrya, and C. Diot, "Analysis of Link Failures in an IP Backbone," *Proc. ACM SIGCOMM Internet Measurement Workshop*, pp. 237-42, November 2002.
- [C47] C-N. Chuah and R. H. Katz, "Characterizing Packet Audio Streams from Internet Multimedia Applications," *Proc. IEEE International Conference on Communications (ICC)*, April 2002.
- [C48] C-N. Chuah, J. M. Kahn, G. J. Foschini, R. A. Valenzuela, D. Chizhik, and J. Ling, "Capacity Growth of Multi-element Arrays in Indoor and Outdoor Wireless Channels," *Proc. IEEE Wireless Communications and Networking Conference (WCNC)*, September 2000.
- [C49] C-N. Chuah, L. Subramanian, R. H. Katz and A. D. Joseph, "QoS Provisioning Using A Clearing House Architecture," *Proc. IEEE/IFIP Intl. Workshop on Quality of Service (IWQoS)*, pp. 115-124, June 2000. (Acceptance rate 25%)

- [C50] C-N. Chuah, J. M. Kahn and D. N. Tse, "Capacity of Multi-Antenna Array Systems in Indoor Wireless Environment," *Proc. IEEE Globecom*, vol. 4, pp.1894-9, November 1998.
- [C51] C-N. Chuah and R. Yates, "Evaluation of Minimum Power Handoff Algorithm", *Proc. 6th International Symposium in Personal Indoor-outdoor Mobile Radio Communications (PIMRC)*, pp. 814-818, September 1995.
- [C52] C-N. Chuah, R. Yates, and D. J. Goodman, "Integrated Dynamic Radio Resource Management," *Proc. IEEE International Vehicular Technology Conference (VTC)*, vol. 2, pp. 584-588, July 1995.

INVITED PAPER

- [C53] A. Chen, B. Khorashadi, D. Ghosal, C-N. Chuah, "Impact of Transmission Power on TCP Performance in Vehicular Ad Hoc Networks," *the 4th Annual Conference on Wireless On Demand Network Systems and Services*, pgs. 7, January, 2007. (Invited)
- [C54] D. Li, Q. Zhang, C-N. Chuah, and S. J. Ben Yoo, "Error-Resilient Concurrent Video Streaming over Wireless Mesh Networks," *Packet Video Workshop*, April 2006 (Invited).
- [C55] B. Reynolds, D. Ghosal, C-N. Chuah, and S. F. Wu, "Vulnerability Analysis and A Security Architecture for IP Telephony," *Proc. IEEE GlobeCom Workshop on VoIP Security – Challenges and Solutions*, November 2004 (Invited).
- [C56] L. Yuan, C. Gui, C-N. Chuah, and P. Mohapatra, "Applications and Design of Heterogeneous and/or Broadband Sensor Networks," *Proc. IEEE Workshop on Broadband Advanced Sensor Networks (BASENETS)*, October 2004 (Invited).
- [C57] C-N. Chuah, S. Bhattacharrya, G. Iannaccone, and C. Diot, "Analysis of Link Failures and Their Impact on Traffic," *Proc. IEEE Computer Communication Workshop (CCW) – Internet Traffic and Topology Session*, October 2002 (Invited).
- [C58] D. Tse, C-N. Chuah and J. M. Kahn, "Capacity Scaling in Dual Antenna Array Wireless Systems," *Proc. 34th Asilomar Conf. on Signals, Systems and Computers*, October 2000 (Invited).
- [C59] D. Tse, C-N. Chuah and J. M. Kahn, "Capacity Scaling in Dual Antenna Array Wireless Systems," *Proc. IEEE Wireless Communications & Networking Conf. (WCNC)*, September 2000 (Invited).

POSTER PAPERS

- [C60] J. LeBrun and C-N. Chuah, "Feasibility Study of Bluetooth-based Content Distribution Kiosks on Public Transit Systems," *ACM Workshop on Decentralized Resource Sharing in Mobile Computing and Networking (MobiShare)*, in conjunction with *ACM Mobicom*, September 2006. (Short paper)
- [C61] D. Gupta, J. LeBrun, P. Mohapatra, and C-N. Chuah, "A WDS-Based Layer-2 Routing Scheme for Wireless Mesh Networks," *ACM Workshop on Wireless Testbeds, Experimental Evaluation, and Characterization (WiNTECH)*, in conjunction with *ACM MobiCom*, September 2006. (Poster paper)
- [C62] C-N. Chuah, L. Subramanian, R. H. Katz, and A. D. Joseph, "Resource Provisioning Using a Clearing House Architecture," *Poster Session, ACM SIGCOMM*, September 2000.

TUTORIAL

- [1] C-N. Chuah, "Overlay Networks: Indirection and Virtualization," *DIMACS Tutorial on Algorithms for Next Generation Networks*, August 2007.

SELECTED TALKS

- [2] C-N. Chuah, "Vehicular Ad Hoc Networks and Opportunistic Communications," Invited talk at *Hewlett Packard Labs-Tokyo, Japan*, September 2007.

- [3] C-N. Chuah, "Measuring and Managing Distributed Networked Systems," *Fall 2006 Complex Systems Seminars*, Computational Science and Engineering, UC Davis, December 2006; Invited talk at *Hewlett Packard Labs-Palo Alto, CA*, April 2007.
- [4] C-N. Chuah, "Measuring and Validating the Global Internet – System Behavior and End-to-End Properties," (Invited) *Google, Inc.*, Aug 2006.
- [5] C-N. Chuah, "Context and Peer-to-Peer based Mobile Services," *IEEE International Workshop on Mobile Commerce and Wireless Services Panel Session*, June 2006.
- [6] C-N. Chuah, "Validating System Behavior of Large-Scale Networked Computers," *NSF Workshop on Theory of Networked Computation*, March 2006.
- [7] C-N. Chuah, "Opportunistic Communications, Data Propagation, and Ad Hoc Grid Computing," (Invited) *Intel Research Cambridge Labs*, Cambridge, UK, Sep 2005.
- [8] C-N. Chuah, "Understanding Network Dynamics: The Race is On!" (Invited) *Computer Science Colloquium*, Princeton University, NJ, Aug. 2005.
- [9] C-N. Chuah, "Robust and Ubiquitous Networking", (Invited) *Motorola Labs Seminar*, Schaumburg, IL, May 2005. Also, *UCDavis Network Lab Workshop*, April 2005.
- [10] C-N. Chuah, "Internet Routing Dynamics and Their Implications", (Invited) *UC Berkeley Networking, Communications, and DSP Seminar*, November 2004.
- [11] K. Zhang, S. Teoh, S. Tseng, C-N. Chuah, K. Ma and F. Wu, "Performing BGP Experiments on a Semi-Realistic Internet Environment," *NANOG32 Meeting*, Reston, VA, October 2004.
- [12] C-N. Chuah, "VMesh-Distributed Data Sensing, Relaying, and Computing via Vehicular Wireless Mesh Networks," (Invited) *Intel Research Lab. at Berkeley - Weekly Seminar*, CA, May 2004. Also at the *CITRIS Workshop on Sensors, Sensor Networks, and Sensor Applications*, U. C. Davis, June 2004.
- [13] C-N. Chuah, "Robust and Ubiquitous Networking," *UC Davis Second Network Lab Research Review Workshop*, Davis, CA, April 2004.
- [14] C-N. Chuah, "Trends in Communication Networks," (Invited) general meeting of *Tau Beta Pi Student Chapter* at U. C. Davis, February 2004.
- [15] C-N. Chuah, "Information Dissemination and Retrieval via Vehicular Mesh Networks," (Invited) the *California Institute for Energy Efficiency (CIEE)*, Oakland, CA, July 2003.
- [16] C-N. Chuah, "Towards Improving Network Survivability," (Invited) *Fujitsu Laboratories of America, Inc.* Sunnyvale, CA, February 21, 2003.
- [17] S. Agarwal, C-N. Chuah, S. Bhattacharria, and C. Diot, "Impact of BGP Dynamics on Intra-Domain Traffic Patterns in the Sprint IP Backbone," *NANOG27 Meeting*, Phoenix, AZ, Feb 2003.
- [18] C-N. Chuah, "Analysis of Link Failures in an IP Backbone Network," (Invited) *NTT DoCoMo USA Labs weekly seminar*, San Jose, CA, October 25, 2002.
- [19] C-N. Chuah, S. Bhattacharria, G. Iannaccone, and C. Diot, "Analysis of Link Failures and Their Impact on Traffic," (Invited) *IEEE Computer Communications Workshop*, Sante Fe, NM, October 13-16, 2002.
- [20] C-N. Chuah, "A Tier-1 ISP Perspective: Design principals & observations of routing behavior" (Invited) the *SAHARA Retreat, U. C. Berkeley Networking & System Groups' Biannual Meeting*, June 10-12, 2002.
- [21] C-N. Chuah, S. Bhattacharria, and C. Diot, "Design Principles of a Tier-1 IP Backbone: Are there routing problems in the Internet," (Invited) *Internet Routing and Topology*, part of *IPAM Workshop on Large-Scale Communication Networks: Topology, Routing, Traffic and Control*, March 18-22, 2002.
- [22] C-N. Chuah, "Next Generation Internet: QoS Provisioning and Route Management," the *Industrial Affiliates meeting*, UC Davis, January 25, 2002.

TEACHING

- Winter 2003-present: Developing and teaching graduate and undergraduate computer networks classes in the Department of Electrical & Computer Engineering, University of California, Davis, CA.
 - *EEC70 Computer Structures and Assembly Language*: Sophomore/junior-level, required course
 - *EEC 173A Computer Networks*: Junior/senior-level technical elective
 - *EEC 173B Design projects in Communication Network*: Senior-level project elective in the area of wireless/mobile computing
 - *EEC 273 Computer Networks*: Graduate-level course on computer networks
 - *EEC 274 Internet Measurements, Routing, and Traffic Engineering*: Graduate-level seminar on new topics such as network measurements, and disruption tolerant networking.
- Spring 1998: Teaching Assistant in the Department of Electrical Engineering & Computer Sciences, University of California, Berkeley, CA
 - Senior-level class *EE121: Introduction to Digital Communication*
- March 1996: Voluntary Instructor, Science and Mathematics Conference, Mills College, Oakland, CA
 - *Expanding Your Horizons* outreach program to introduce science and mathematics to elementary school and junior high students
- 1994-05: Tutor, Mathematics and Science Center, Rutgers University, Piscataway, NJ

PROFESSIONAL ACTIVITIES

- **Conference Executive Committee:**
 - Steering Committee, IEEE IWQoS 2008 & 2009
 - Co-Chair of Technical Program Committee, IEEE IWQoS 2007
 - Vice-Chair of Technical Program Committee, IEEE Globecom 2006
 - Publicity Chair, ACM Second Workshop on Vehicular Ad Hoc Networks (VANET) 2005, in conjunction with ACM MobiCom 2005
 - Co-Chair of the Technical Program Committee, ACM VANET 2004 (in conjunction with ACM MobiCom 2004)
- **Conference Technical Program Committee:**
 - ACM: MOBICOM, SIGCOMM, SIGCOMM Poster Review, CHANTS, VANET, IM4WiN
 - IEEE: INFOCOM, IWQoS, SECON, ICC, ICON/COQODS
 - IEEE/IFIP: MWCN
- **Conference Session Chair:** IEEE INFOCOM, IEEE IWQoS, IEEE ICC, ACM MobiCom, ACM CHANTS, ACM VANET, UC Davis CITRIS Workshop (Sensors, Sensor Networks, and Sensor Applications, 2004)
- **Reviewer:**
 - Journals: IEEE/ACM Transactions on Networking, IEEE Journal on Selected Areas in Communications, IEEE Transactions on Wireless Communications, IEEE Transactions on Signal Processing, IEEE Network, ACM Computing Surveys, Elsevier Computer Networks Journal, Wireless Networks
 - Conferences/Workshops: IEEE INFOCOM, IEEE ICC, IEEE Global Internet, ACM Internet Measurement Workshop
- **Proposal Reviewer:**
 - NSF NeTS & CyberTrust panels, UC MICRO & Discovery programs

- **Professional societies:**
 - Senior member of IEEE and ACM
 - Member of Tau Beta Pi and Eta Kappa Nu

COMMITTEE SERVICE AT UC DAVIS

2007-present: Steering Committee, Center for Future Information Technology (CFIT)
 2006-present: GAANN Project Director, Electrical & Computer Engineering
 Fall'06: Panelist at campus-wide and College of Engineering New Faculty Workshops
 2006-07: Alternate Graduate Advisor, Electrical & Computer Engineering Graduate Program
 2006-07: Chair's Search Committee, Electrical & Computer Engineering
 2006-07: Chair's Nomination Committee, Graduate Group of Computer Science
 2005-07: Executive Committee, Electrical & Computer Engineering Graduate Program
 2005-07: UCD Graduate Council Support and Welfare Committee
 2005, 2007: Preliminary Oral Exam
 2005-06: Undergraduate Program Committee, Electrical & Computer Engineering
 2004-present: Executive Committee, Graduate Group of Computer Science
 2004-05: Industrial Affiliates Committee, Electrical & Computer Engineering
 2003-04: Faculty Search Committee for Communications area
 2003: Sub-committee to review nomination for the Anil Jain Memorial Prize 2001/02
 2002-04: Graduate Study Committee, Electrical & Computer Engineering Graduate Program

EXTRA-CURRICULAR/OUTREACH ACTIVITIES

2007 Panelist, Sprint's Research Retreat
 2006 & 04 Faculty Panelist, Society of Women Engineers - Little Sister's Day
 2005 Panelist, IEEE INFOCOM Student Workshop 2005
 2003-07 Faculty Mentor, Engineering Undergraduate Research Program, U. C. Davis
 1996-07 Co-president, WICSE – Women in Computer Science & Electrical Engineering, U. C. Berkeley
 1995-96 Secretary, WICSE – Women in Computer Science & Electrical Engineering, U. C. Berkeley
 1994-95 Secretary, Eta Kappa Nu, Rutgers University
 1993-94 Major representative, Society of Women Engineers (SWE), Rutgers University
SWE Certificate of Outstanding Contribution, Rutgers chapter of SWE, Spring 1994.
 1994-05 Tau Beta Pi, Rutgers University (Co-Author of "Hitchhiker's Guide to Unix and Internet")

NAMES OF GRADUATE ADVISORS

- Ph.D. Advisor: Professor R. H. Katz, Electrical Engineering and Computer Sciences, University of California, Berkeley, CA
- M.S. Advisors: Professors J. M. Kahn and D. N. Tse, Electrical Engineering and Computer Sciences, University of California, Berkeley, CA

GRADUATE STUDENT SUPERVISION

- **Completed Doctoral Students**
 - R. Keralapura (2007), *Characterizing Internet Routing Dynamics for Enhanced Network Management*, currently a Senior Member of Technical Staff at Narus, Inc., CA.

- D. Li, *Hybrid Infrastructure/P2P Approach to Optimize Performance of Multimedia Streaming over Heterogeneous Networks* (co-supervised with Prof. S. J. Yoo), currently at Cisco, CA
- **Current Doctoral Students**
 - J. Mai, *Network Measurements for Anomaly Detection* (advanced to candidacy in fall 2005)
 - L. Yuan, *Collaborative Overlays for Securing IP-Networks*, co-supervised w/ Prof. Mohapatra (advanced to candidacy in fall 2005)
 - J. LeBrun, *Opportunistic Networking Architectures for Delay/Disruption-Tolerant Applications* (advanced to candidacy in spring 2006)
 - H. Liu, *Efficient Resource Allocation in Wireless Mesh Networks*, co-supervised w/ Prof. Liu (advanced to candidacy in winter 2007)
 - S. Raza, *Fault Resilient Routing and Traffic Engineering* (advanced to candidacy in spring 2007)
 - D. Gupta, *Managing 802.11s Wireless Mesh Networks: A Measurement-based Approach* (advanced to candidacy in summer 2007)
 - First year PhD students: G. Huang, B. Liu, Leo X. Liu, A. Nazir, Y. Zhu
- **Completed Masters Students**
 - A. Chen (Feb 2007), *Vehicular Network Simulation Platform for Highway Traffic Management and Wireless Applications*, currently an engineer at Intel Folsom, CA
 - C. Dana (Sep 2005), *BitTorrent Assisted Streaming System for Video-On-Demand Services*, currently an engineer with Boeing, CA.
 - H. Chang (Sep 2004), *Architecture and Routing Design for Enabling Energy Demand Response with Vehicular Mesh Networks*, currently an engineer with Sun Microsystems, CA
 - P. Cheng (Sep 2004), *Energy Conservation in Wireless Sensor Networks*, currently an engineer with Cisco Systems, CA.
 - C. Carde (June 2004), *A Framework for the Rapid Design and Implementation of Distributed CAN Control Networks for Prototype Vehicles*, currently an engineer with Daimler-Chrysler Research and Technology North America (RTNA), Inc., Palo Alto, CA
- **Current Masters Students**
 - J. Wagoner, TBD
 - C. Smith, TBD
- **Other Student Guidance Committees**
 - Served on 12 other PhD dissertation committees, 15 other M.S. thesis/exam committees, and 34 PhD oral qualifying examination committees for students in both Electrical & Computer Engineering and Computer Science Graduate Programs

OTHER ADVISEES

- **UC Davis Undergraduate Research Program, EEC192 internship, or EEC199 Special Study**
 - C. Chen, *Monitoring Framework for Wireless Mesh Networks*, Winter 2007
 - B. Rodriguez, *Web Interface for Student Database and Messaging System*, Winter 2007
 - A. Stromberg and M. Siegenthaler, *CollaborActive Transfer System (CATS)*, Spring 2006
 - B. Iskikian, M. Pignati, and S. Wilson, *Exploring Wireless Ad-Hoc, Peer-to-Peer Connectivity for Delay/Disruption-Tolerant Applications*, Winter 2005

- A. Moerschell, *Characterizing Service Availability IP-Backbone Networks in the Presence of IGP Failures and Routing Instability*, Summer 2004
- K. Widjaja, *Hierarchical representation of PlanetLab Monitoring Data*, co-supervised by Matt Massie (UC Berkeley), Summer 2004
- P. Satarzadeh, *Improving Transport Protocols for Wireless Networks*, Summer/Fall 2003
- Y. Chin and T. Nguyen, *Router Testbed*, Summer 2003
- **Summer interns at Sprint Advanced Technology Laboratories**
 - S. Agarwal, *The Impact of BGP Dynamics on Intra-Domain Traffic and Router CPU load*, Summer/Fall 2002, currently PhD candidate, University of California, Berkeley
 - A. Zeitoun, *An AS-Level Study of Internet Path Delay Characteristics*, currently PhD candidate, Summer/Fall 2002, University of Michigan, Ann Arbor
- **Undergraduate research project, UC Berkeley**
 - G. J. Lee, *Detecting Misbehaving Flows via Collaborative Aggregate Policing (DCAP): Implementation on Click Router*, co-supervised with L. Subramanian, Summer/Fall 2000

(Updated: Oct-07)