# CMSC 711: Spring 2005 Reading List

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May 1, 2005

This reading list may change slightly during the semester. In particular, I may add relevant papers by faculty candidates (if we are lucky enough to have networking candidates) or replace vague, difficult, and long papers with clearer ones. I expect I would give at least two weeks notice of changes.

Some of the readings will describe good ideas that have been implemented; most represent good or influential ideas that have not been well deployed. A few even describe bad ideas.

I'd like to recommend reading Strunk and White, "The Elements of Style" before you write anything else. It is online and I have a copy in my office. Your ability to write clearly is fundamental to your success in this class.

## Week 0: First Class

[no readings]

## Week 1: Introduction

Read Sections 1 and 2. and perhaps 4 and 5 of RFC2026 as needed to tell the difference between requirements for different RFC levels.

### Readings

[1] Brian E. Carpenter, editor. Architectural principles of the Internet. Internet Engineering Task Force Request for Comments RFC-1958, June 1996. URL http://www.ietf.org/rfc/rfc1958.txt.

[2] Jerome H. Saltzer, David P. Reed, and David D. Clark. End-to-end arguments in system design. *ACM Transactions on Computer Systems*, 2(4):277–288, November 1984. URL http://web.mit.edu/Saltzer/www/publications/endtoend/endtoend.pdf.

[3] David D. Clark. The design philosophy of the DARPA internet protocols. In *Proceedings of the ACM SIGCOMM Symposium on Communications Architectures and Protocols*, pages 106–104. Stanford, CA, August 1988. URL http://nms.lcs.mit.edu/6829-papers/darpa-internet.pdf.

[4] Scott Bradner. Key words for use in RFCs to indicate requirement levels. Internet Engineering Task Force Request for Comments RFC-2119, March 1997. URL http://www.ietf.org/rfc/rfc2119.txt.

[5] Scott Bradner. The Internet standards process – revision 3. Internet Engineering Task Force Request for Comments RFC-2026, October 1996. URL http://www.ietf.org/rfc/rfc2026.txt.

## Week 2: Engineering of Networked Systems

### Readings

[1] Butler W. Lampson. Hints for computer system design. *ACM Operating Systems Review*, 15(5):33–48, October 1983. URL http://research.microsoft.com/~lampson/33-hints/Acrobat.pdf.

[2] Christopher A. Kent and Jeffrey C. Mogul. Fragmentation considered harmful. In *Proceedings of the ACM SIGCOMM Conference on Applications, Technologies, Architectures, and Protocols for Computer Communication*, pages 390–401. Stowe, VT, August 1987. URL http://ftp.digital.com/pub/Digital/WRL/research-reports/WRL-TR-87.3.pdf.

[3] David R. Boggs, Jeffrey C. Mogul, and Christopher A. Kent. Measured capacity of an ethernet: myths and reality. In *Proceedings of the ACM SIGCOMM Symposium on Communications Architectures and Protocols*, pages 222–234. Stanford, CA, August 1988. URL http://www.hpl.hp.com/techreports/Compaq-DEC/WRL-88-4.pdf.

## Week 3: Sharing from the edges

### Readings

[1] Van Jacobson and Michael J. Karels. Congestion avoidance and control. *ACM Computer Communication Review*, 18(4):314–329, November 1988. URL http://www-nrg.ee.lbl.gov/papers/congavoid.pdf.

[2] Lawrence Brakmo and Larry Peterson. TCP Vegas: End to end congestion avoidance on a global Internet. *IEEE Journal on Selected Areas in Communication*, 13(8):1465–1480, October 1995. URL ftp://ftp.cs.arizona.edu/xkernel/Papers/jsac.ps.Z.

[3] Arun Venkataramani, Ravi Kokku, and Mike Dahlin. TCP Nice: A mechanism for background transfers. In *Symposium on Operating Systems Design and Implementation (OSDI)*. December 2002. URL http://www.usenix.org/events/osdi02/tech/full_papers/venkataramani/venkataramani.pdf.

## Week 4: Sharing from the middle

### Readings

[1] Alan Demers, Srinivasan Keshav, and Scott Shenker. Analysis and simulation of a fair queuing algorithm. In *Proceedings of the ACM SIGCOMM Symposium on Communications Architectures and Protocols*, pages 1–12. Austin, TX, September 1989. URL http://portal.acm.org/citation.cfm?id=75248.

[2] Sally Floyd and Van Jacobson. Random early detection gateways for congestion avoidance. *IEEE/ACM Transactions on Networking*, 1(4):397–413, August 1993. URL http://www.aciri.org/floyd/papers/early.twocolumn.pdf.

[3] Ratul Mahajan, Steven M. Bellovin, Sally Floyd, John Ioannidis, Vern Paxson, and Scott Shenker. Controlling high-bandwidth aggregates in the network (extended version). http://www.aciri.org/pushback/, July 2001.

## Week 5: Measurement Week: Topologies, Mapping, Interdomain

### Readings

[1] Lixin Gao. On inferring autonomous system relationships in the Internet. *IEEE/ACM Transactions on Networking*, 9(6):733–745, December 2001. URL http://www-unix.ecs.umass.edu/~lgao/ton.ps.

[2] Ramesh Govindan and Hongsuda Tangmunarunkit. Heuristics for Internet map discovery. In *Proceedings of the IEEE Joint Conference of the IEEE Computer and Communications Societies (INFOCOM)*, pages 1371–1380. Tel Aviv, Israel, March 2000. URL http://www.isi.edu/div7/publication_files/heuristics.pdf.

[3] Vern Paxson. Strategies for sound Internet measurement. In *Proceedings of the ACM SIGCOMM Internet Measurement Conference (IMC)*, pages 263–271. Taormina, Sicily, Italy, October 2004. URL http://www.icir.org/vern/papers/meas-strategies-imc04.pdf.

[4] Allen B. Downey. Using pathchar to estimate Internet link characteristics. In *Proceedings of the ACM SIGCOMM Conference on Applications, Technologies, Architectures, and Protocols for Computer Communication*, pages 241–250. Cambridge, MA, September 1999. URL http://allendowney.com/research/clink/downey.ps.gz.

## Week 6: How to debug the Internet

### Readings

[1] Ratul Mahajan, Neil Spring, David Wetherall, and Thomas Anderson. User-level Internet path diagnosis. In *Proceedings of the ACM Symposium on Operating Systems Principles (SOSP)*, pages 106–119. Bolton Landing, NY, October 2003. URL http://www.cs.washington.edu/research/networking/tulip/bits/sosp2003-tulip.pdf.

[2] Venkata N. Padmanabhan, Lili Qiu, and Helen J. Wang. Passive network tomography using bayesian inference. In *Proceedings of the ACM SIGCOMM Internet Measurement Workshop (IMW)*, pages 93–94. Marseille, France, November 2002. URL http://www.research.microsoft.com/~padmanab/papers/imw2002.pdf.

[3] Renata Teixeira and Jennifer Rexford. A measurement framework for pin-pointing routing changes. In *Proceedings of the ACM SIGCOMM Network Troubleshooting Workshop*, pages 313–318. Portland, OR, August 2004. URL http://www.cs.princeton.edu/~jrex/papers/omni.pdf.

[4] Ratul Mahajan, David Wetherall, and Thomas Anderson. Understanding BGP misconfiguration. In *Proceedings of the ACM SIGCOMM Conference on Applications, Technologies, Architectures, and Protocols for Computer Communication*, pages 3–16. Pittsburgh, PA, August 2002. URL http://www.cs.washington.edu/homes/ratul/bgp/bgp-misconfigs.pdf.

## Week 7: Wireless with some Evil

### Readings


[1] Vaduvur Bharghavan, Alan Demers, Scott Shenker, and Lixia Zhang. MACAW: A media access protocol for wireless LANs. In *Proceedings of the ACM SIGCOMM Conference on Communications Architectures, Protocols, and Applications*, pages 212–225. London, United Kingdom, August 1994. URL http://portal.acm.org/citation.cfm?doid=190314.190334.

[2] Stefan Savage, Neal Cardwell, David Wetherall, and Thomas Anderson. TCP congestion control with a misbehaving receiver. *ACM Computer Communication Review*, 29(5):71–78, October 1999. URL http://www.cse.ucsd.edu/~savage/papers/CCR99.pdf.

[3] Hari Balakrishnan, Venkata N. Padmanabhan, Srinivasan Seshan, and Randy H. Katz. A comparison of mechanisms for improving TCP performance over wireless links. *IEEE/ACM Transactions on Networking*, 5(6):756–769, 1997. URL http://research.microsoft.com/~padmanab/papers/ton97.pdf.

[4] Pravin Bhagwat, Bhaskaran Raman, and Dheeraj Sanghi. Turning 802.11 inside-out. In *Proceedings of the ACM Workshop on Hot Topics in Networks (HotNets)*, pages 33–38. Cambridge, MA, November 2003. URL http://doi.acm.org/10.1145/972374.972381.

[5] Daniel Aguayo, John Bicket, Sanjit Biswas, Glen Judd, and Robert Morris. Link-level measurements from an 802.11b mesh network. In *Proceedings of the ACM SIGCOMM Conference on Applications, Technologies, Architectures, and Protocols for Computer Communication*. Portland, OR, August 2004. URL http://www.pdos.lcs.mit.edu/~rtm/papers/p442-aguayo.pdf.

[6] Ratul Mahajan, Maya Rodrig, David Wetherall, and John Zahorjan. Sustaining cooperation in multi-hop wireless networks. In *Networked Systems Design and Implementation (NSDI)*. May 2005. (to appear), URL http://www.cs.washington.edu/research/networking/catch/bits/catch.pdf.


## Week 8: Evil

### Readings


[1] Michael Burrows, Martin Abadi, and Roger Needham. A logic of authentication. *ACM Transactions on Computer Systems*, 8(1):18–36, 1990. ISSN 0734-2071. URL http://doi.acm.org/10.1145/77648.77649.

[2] Vern Paxson. Bro: A system for detecting network intruders in real-time. In *Proceedings of the USENIX Security Symposium*. January 1998. URL ftp://ftp.ee.lbl.gov/papers/bro-usenix98-revised.ps.gz.

[3] Nikita Borisov, Ian Goldberg, and David Wagner. Intercepting mobile communications: the insecurity of 802.11. In *Proceedings of the International Conference on Mobile Computing and Networking (MOBICOM)*, pages 180–189. Rome, Italy, 2001. URL http://doi.acm.org/10.1145/381677.381695.

[4] Stuart Staniford, Vern Paxson, and Nicholas Weaver. How to 0wn the Internet in your spare time. In *Proceedings of the USENIX Security Symposium*. 2002. URL http://www.icir.org/vern/papers/cdc-usenix-sec02/cdc.pdf.

## Week 9: Changing the Internet

### Readings


[1] Larry Peterson, Scott Shenker, and Jon Turner. Overcoming the Internet impasse through virtualization. In *Proceedings of the ACM Workshop on Hot Topics in Networks (HotNets)*. November 2004. URL http://www.cs.princeton.edu/nsg/papers/impasse_hotnets_04/impasse.pdf.

[2] Stefan Savage, David Wetherall, Anna Karlin, and Thomas Anderson. Practical network support for IP traceback. In *Proceedings of the ACM SIGCOMM Conference on Applications, Technologies, Architectures, and Protocols for Computer Communication*, pages 295–306. Stockholm, Sweden, August 2000. URL http://www.cs.ucsd.edu/users/savage/papers/Sigcomm00.pdf.

[3] Ion Stoica, Daniel Adkins, Shelley Zhuang, Scott Shenker, and Sonesh Surana. Internet indirection infrastructure. In *Proceedings of the ACM SIGCOMM Conference on Applications, Technologies, Architectures, and Protocols for Computer Communication*. Pittsburgh, PA, August 2002. URL http://www-2.cs.cmu.edu/People/bumba/filing_cabinet/papers/stoica-i3.pdf.

[4] David G. Andersen, Hari Balakrishnan, M. Frans Kaashoek, and Robert Morris. Resilient overlay networks. In *Proceedings of the ACM Symposium on Operating Systems Principles (SOSP)*, pages 131–145. Banff, Alberta, Canada, October 2001. URL http://nms.lcs.mit.edu/papers/ron-sosp2001.pdf.

[5] David Wetherall. Active network vision and reality: lessons from a capsule-based system. In *Proceedings of the ACM Symposium on Operating Systems Principles (SOSP)*. Kiawah Island Resort, SC, December 1999. URL http://www.cs.washington.edu/homes/djw/papers/anet-sosp99.pdf.


## Week 10: Naming

### Readings


[1] Peter B. Danzig, Katia Obraczka, and Anant Kumar. An analysis of wide-area name server traffic: a study of the Internet domain name system. In *Proceedings of the ACM SIGCOMM Conference on Communications Architectures and Protocols*, pages 281–292. Baltimore, MD, August 1992. URL http://portal.acm.org/citation.cfm?id=144301#.

[2] Paul Mockapetris and Keith Dunlap. Development of the Domain Name System. In *Proceedings of the ACM SIGCOMM Symposium on Communications Architectures and Protocols*. Stanford, CA, August 1988. URL http://www.cs.colostate.edu/~cs580/Papers/md88.pdf.

[3] Jaeyeon Jung, Emil Sit, Hari Balakrishnan, and Robert Morris. DNS performance and the effectiveness of caching. *IEEE/ACM Transactions on Networking*, 10(5), October 2002. Originally in IMW 2001, URL http://nms.lcs.mit.edu/papers/dns-ton2002.pdf.

## Week 11: "Power Laws" and other skew

### Readings


[1] Alec Wolman, Geoffrey M. Voelker, Nitin Sharma, Neal Cardwell, Anna Karlin, and Henry M. Levy. On the scale and performance of cooperative web proxy caching. In *Proceedings of the ACM Symposium on Operating Systems Principles (SOSP)*, pages 16–31. Kiawah Island Resort, SC, December 1999. URL http://www.cs.washington.edu/research/networking/websys/pubs/sosp99/sosp99.pdf.

[2] Michalis Faloutsos, Petros Faloutsos, and Christos Faloutsos. On power-law relationships of the Internet topology. In *Proceedings of the ACM SIGCOMM Conference on Applications, Technologies, Architectures, and Protocols for Computer Communication*, pages 251–262. Cambridge, MA, September 1999. URL http://www.cs.ucr.edu/~michalis/PAPERS/FFF.pdf.

[3] Lun Li, David Alderson, Walter Willinger, and John Doyle. A first-principles approach to understanding the Internet's router-level topology. In *Proceedings of the ACM SIGCOMM Conference on Applications, Technologies, Architectures, and Protocols for Computer Communication*, pages 3–14. Portland, OR, August 2004. URL http://netlab.caltech.edu/pub/papers/topology-sigcomm04.pdf.

[4] Réka Albert, Hawoong Jeong, and Albert-László Barabási. Error and attack tolerance of complex networks. In *Nature*, volume 406, pages 378–382. July 2000. URL http://www.nature.com/cgi-taf/DynaPage.taf?file=/nature/journal/v406/n6794/full/406378a0_fs.html&content_filetype=pdf.

[5] Allen Downey. Evidence for long-tailed distributions in the Internet. In *Proceedings of the ACM SIGCOMM Internet Measurement Workshop (IMW)*, pages 229–241. San Francisco, CA, November 2001. URL http://allendowney.com/research/longtail/downey01evidence.pdf.

[6] Neil Spring, Ratul Mahajan, and David Wetherall. Measuring ISP topologies with Rocketfuel. In *Proceedings of the ACM SIGCOMM Conference on Applications, Technologies, Architectures, and Protocols for Computer Communication*, pages 133–146. Pittsburgh, PA, August 2002. URL http://www.cs.umd.edu/~nspring/papers/sigcomm2002.pdf.


## Week 12: Circuits and Quality of Service

### Readings


[1] Pablo Molinero-Fernández, Nick McKeown, and Hui Zhang. Is IP going to take over the world (of communications)? In *Proceedings of the ACM Workshop on Hot Topics in Networks (HotNets)*. Princeton, NJ, October 2002. URL http://tiny-tera.stanford.edu/~nickm/papers/HotNets02-IP_conquest_of_the_world_with_authors.pdf.

[2] Lakshminarayanan Subramanian, Ion Stoica, Hari Balakrishnan, and Randy Katz. OverQoS: Offering internet QoS using overlays. In *Proceedings of the ACM Workshop on Hot Topics in Networks (HotNets)*. Princeton, NJ, October 2002. URL http://www.cs.berkeley.edu/~lakme/overqos-hotnets.ps.

[3] Bruce Davie. Deployment experience with differentiated services. In *Proceedings of the ACM SIGCOMM workshop on Revisiting IP QoS (RIPQoS)*, pages 131–136. Karlsruhe, Germany, August 2003. URL http://doi.acm.org/10.1145/944592.944598.

## Week 13: Multicast

### Readings

[1] Steven McCanne, Van Jacobson, and Martin Vetterli. Receiver-driven layered multicast. In *Proceedings of the ACM SIGCOMM Conference on Applications, Technologies, Architectures, and Protocols for Computer Communication*, pages 117–130. Palo Alto, CA, August 1996. URL http://doi.acm.org/10.1145/248156.248168.

[2] Stephen Deering, Deborah L. Estrin, Dino Farinacci, Van Jacobson, Ching-Gung Liu, and Liming Wei. The PIM architecture for wide-area multicast routing. *IEEE/ACM Transactions on Networking*, 4(2), 1996. URL http://lecs.cs.ucla.edu/lecs-reading/spring2001/pim96.pdf.

[3] Y. Chu, Sanjay G. Rao, and Hui Zhang. A case for end system multicast. In *Proceedings of the ACM SIGMETRICS International Conference on Measurement and Modeling of Computer Systems*. June 2000. URL http://esm.cs.cmu.edu/Sigmetrics2000/sigmetrics-2000.ps.

## Week 14: Grand Challenges

### Readings

[1] Computer Science and Telecommunications Board, National Research Council. *Looking Over the Fence at Networks: A Neighbor's View of Networking Research*. The National Academies Press, 2001. URL http://books.nap.edu/html/looking_over_the_fence/report.pdf.

[2] Sally Floyd and Vern Paxson. Difficulties in simulating the Internet. *IEEE/ACM Transactions on Networking*, 9(4):392–403, February 2001. URL http://www.icir.org/floyd/papers/simulate_2001.pdf.

[3] Sally Floyd and Eddie Kohler. Internet research needs better models. In *Proceedings of the ACM Workshop on Hot Topics in Networks (HotNets)*, pages 29–34. Princeton, NJ, October 2002. URL http://www.icir.org/models/hotnetsFinal.pdf.