# Long Le

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**Research interests**: Computer systems, networks, mobile and wireless systems.

**Education**:

- Ph.D. in Computer Science, University of North Carolina at Chapel Hill, 2005.

- M.S. in Computer Science, University of North Carolina at Chapel Hill, 2003.

- Diploma degree in Electrical Engineering, Technische Universität Berlin, Germany, 1999.

**Honors and awards**:

- ACM SIGCOMM best student paper award.

- Erwin Stephan Prize for excellent graduates (Presidential award of Technische Universität Berlin).

- North Carolina Networking Initiative fellowship.

- Friedrich Ebert Foundation scholarship for talented students.

**Work experience**:

- 2006 - present: Research scientist at the Department of Electrical Engineering and Computer Science, Technische Universität Berlin, Germany.

  - Set up and maintained an experimental wireless mesh networks.
  - Modified the Multiband Atheros Driver for Wireless Fidelity (MadWifi) in Linux kernel to allow flexible and efficient control of IEEE 802.11 channel switching.
  - Led research in design and performance evaluation of MAC and routing protocols for multi-channel and multiradio wireless networks.
  - Led research in mobility management for multihoming moving networks (cars and aircrafts).

- 2005 - 2006: Postdoctoral researcher at the Department of Computer Science, North Carolina State University.

  - Performed research in design and performance evaluation of high-speed TCP variants.
  - Performed research in design and performance evaluation of MAC, routing, link scheduling, transport protocols, and cross-layer optimization for wireless ad hoc and sensor networks.

- 2000 - 2005: Research assistant of Distributed and Real-Time Systems Research Group at University of North Carolina at Chapel Hill.

  - Set up and maintained an experimental gigabit network that has more than 50 FreeBSD PCs.
  - Implemented a web traffic generator that uses HTTP/1.0 and HTTP/1.1 and can simulate thousands of web users.
  - Implemented active queue management algorithms in FreeBSD kernel: AFD (Approximate Fairness through Differential Dropping), ARED (Adaptive RED), AVQ (Adaptive Virtual Queue), PI (Proportional Integral Controller), REM (Random Early Marking), RIO-PS (RED In and Out with Preferential Treatment to Short Flows).

- – Invented and implemented an efficient active queue management algorithm for improvement of user performance: Differential Congestion Notification (DCN).
- – Invented and implemented an active queue management algorithm that simultaneously optimizes queue length and loss rate in routers: Loss and Queuing Delay controller (LQD).
- – Modified the device driver for 3Com 3c90x Etherlink NIC to allow flexible and efficient control of PCs' outgoing packet queues.

- 2003: Summer internship at Network Technology Office, Sun Microsystems, Menlo Park, CA. Implemented network and distributed applications for in-house use.

- 1999 - 2000: Researcher at the Competence Center for Global Networking of the Research Institute for Open Communication Systems, Berlin, Germany.

  - – Performed research in voice and video over IP.
  - – Performed research in active and programmable networks.
  - – Implemented the telnet protocol in C/C++ on Unix/Linux for in-house use.
  - – Designed and implemented a software module in C/C++ on Unix/Linux that remotely controls network devices via the telnet protocol.
  - – Extended the Linux traffic control software to control external routers from a workstation.

- 1999: Summer internship at Novedia Inc., Berlin, Germany.

  - – Participated in the development of an Internet conference system.
  - – Designed and implemented a class library in C++ that enables a platform independent input, output, and mixing of audio streams on Windows NT (using DirectX) and Linux.
  - – Implemented network applications on Linux.
  - – Extended functionalities of the Video Conference Tool (vic) on Linux to enable message exchange via a message bus.
  - – Designed and implemented a software module that controls the Robust Audio Tool (rat) and the Video Conference Tool (vic) via a message bus on Linux.

- 1998 - 1999: Diploma thesis research at the Research Institute for Open Communication Systems, Berlin, Germany.

  - – Implemented the Adaptive Packetization/Concealment (AP/C) algorithm in the Network Voice Terminal Tool (NeVoT). The AP/C algorithm uses the long-term correlation of speech signals to adapt the packetization intervals at the sender and to conceal lost packets at the receivers.
  - – Designed a loss resilient transmission method to support modern frame-based speech codecs for voice over IP.

- 1998 - 1999: Student employee in Department of Intelligent Networks, Siemens Inc., Berlin, Germany. Developed testing software for wired and wireless phone services.

- 1997 - 1998: Pre-diploma thesis research at the Research Institute for Open Communication Systems, Berlin, Germany. Designed and implemented a charging and accounting protocol that works with the Resource ReSerVation Protocol (RSVP). The charging and accounting protocol keeps track of network resources reserved by users, reliably exchanges accounting information between network nodes, and fairly shares the costs between users.

- 1997: Student employee at the Research Institute for Open Communication Systems, Berlin, Germany. Participated in the development of the Multicast Integrated Server, a Multicast Address Resolution Server for ATM clients with QoS support.

- 1996: Research assistant of the Telecommunication Networks Research group, Technische Universität Berlin, Germany. Implemented a C library in a real-time operating system for a wireless medium access control protocol.

**Teaching experience**:

- Instructor for a graduate-level course in computer networks at Technische Universität Berlin. Responsible for lecturing, grading, and guiding students' research projects.

- Instructor for a course in introduction to Java programming at University of North Carolina at Chapel Hill. Responsible for lecturing, grading, lecture notes, programming assignments, and exams.

**Publications:**

- Book chapter and journal papers:

  1. S. Ha, L. Le, I. Rhee, and L. Xu. Impact of Background Traffic on Performance of High-Speed TCP Variant Protocols, to appear in journal Computer Networks.

  2. L. Le, J. Aikat, K. Jeffay, and F. D. Smith. The Effects of Active Queue Management and Explicit Congestion Notification on Web Performance, to appear in ACM/IEEE Transactions on Networking.

  3. H. Sanneck, W. Mohr, L. Le, C. Hoene, and A. Wolisz. Quality of Service Support for Voice over IP over Wireless, Chapter 10 in Wireless IP and Building the Mobile Internet, Artech House, December 2002.

- Referred conference and workshop papers:

  1. L. Le, S. Albayrak, M. Elkotob, and A. C. Toker. Improving TCP Goodput in 802.11 Access Networks, to appear in IEEE International Conference on Communications (ICC 2007), Glasgow, Scotland, June 2007.

  2. L. Le, K. Jeffay, and F. D. Smith. A Loss and Queuing Delay Controller for Router Buffer Management, in IEEE International Conference on Distributed Computing Systems (IEEE ICDCS 2006), Lisboa, Portugal, July 2006 (acceptance rate: 13.9%).

  3. S. Ha, Y. Kim, L. Le, I. Rhee, and L. Xu. A Step toward Realistic Performance Evaluation of High-Speed TCP Variants, in International Workshop on Protocols for Fast Long-Distance Networks (PFLDnet 2006), Nara, Japan, February 2006.

  4. L. Le, J. Aikat, K. Jeffay, and F. D. Smith. Differential Congestion Notification: Taming the Elephants, in IEEE Conference on Network Protocols (IEEE ICNP 2004), Berlin, Germany, October 2004 (acceptance rate: 15.5%).

  5. L. Le, J. Aikat, K. Jeffay, and F. D. Smith. The Effects of Active Queue Management on Web Performance, (best student paper) in ACM SIGCOMM 2003, Karlsruhe, Germany, August 2003 (acceptance rate: 10.3%).

  6. K. Mayer-Patel, L. Le, and G. Carle. An MPEG Performance Model and Its Application To Adaptive Forward Error Correction in ACM Multimedia 2002, Juan-les-Pins, France, December 2002 (acceptance rate: 16%).

  7. H. Sanneck, L. Le, A. Wolisz and G. Carle. Intra-Flow Loss Recovery and Control for VoIP in Proceedings ACM Multimedia 2001, Ottawa, ON, September 2001 (acceptance rate: 16%).

  8. L. Le, G. Carle, H. Sanneck, and S. Zander. Deploying an Active Voice Application on a Three-Level Active Network Node Architecture in the Third International Working Conference on Active Networks (IWAN 2001), Pennsylvania, September 2001.

9. H. Sanneck, L. Le, M. Haardt and W. Mohr. Selective Packet Prioritization for Wireless VoIP in the Fourth International Symposium on Wireless Personal Multimedia Communication, Aalborg, Denmark, September 2001.

10. L. Le, H. Sanneck, G. Carle, and T. Hoshi. Active Concealment for Internet Speech Transmission in the Second International Working Conference on Active Networks (IWAN 2000), Tokyo, October 2000.

11. H. Sanneck, L. Le, and G. Carle. Effiziente Dienstqualitätsunterstützung für IP Telefonie durch selektive Paketmarkierung (in German) in First IP-Telephony Workshop, Berlin, April 2000.

12. H. Sanneck, L. Le, and A. Wolisz. Efficient QoS Support for Voice-over-IP Applications Using Selective Packet Marking in Special Session on Error Control Techniques for Real-time Delivery of Multimedia data, First International Workshop on Intelligent Multimedia Computing (IMMCN 2000), Atlantic City, NJ, February 2000.

13. H. Sanneck and L. Le. Speech Property-Based FEC for Internet Telephony Applications in Proceedings of the SPIE/ACM SIGMM Multimedia Computing and Networking Conference 2000 (MMCN 2000), San Jose, CA, January 2000.

- Theses:

  1. L. Le. Investigating the Effects of Active Queue Management on the Performance of TCP Applications, Ph.D. thesis, Department of Computer Science, University of North Carolina at Chapel Hill, 2005.

  2. L. Le. Development of a Loss-Resilient Internet Speech Transmission Method. Diploma thesis, Department of Electrical Engineering, Technische Universität Berlin, 1999.

  3. L. Le. Charging and Accounting Protocol for IP Multicast over ATM with QoS Support. Prediploma thesis, Department of Electrical Engineering, Technische Universität Berlin, 1998.

**Skills**:

- Programming languages: C/C++, Java, perl, awk, Pascal, and assembly language (x86 and MIPS).

- Experience in software development (participated in several mid to large-scale projects).

- Good understanding and programming experience in FreeBSD and Linux kernel, especially the networking protocol stack.

- Good knowledge in computer networks, operating systems, distributed systems, mobile and wireless systems.

- Languages: fluent in Vietnamese, German, and English.

**References**:

Professor Kevin Jeffay
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