Chang-Ho Choi

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EDUCATION	**University of Minnesota**, Twin Cities, MN Ph.D. Computer Science, Aug 2007	GPA = 3.8 / 4.0
	Seoul National University(**Top University in Korea**), Seoul, Korea M.S. Computer Engineering, Feb 1998	GPA = 3.6 / 4.3
	Seoul National University(**Top University in Korea**), Seoul, Korea B.S. Computer Engineering, Feb 1996	GPA = 3.3 / 4.3

WORK EXPERIENCES

Cisco Systems, Inc   Oct 1, 2007 – Present
170 West Tasman Drive San Jose, CA 95134
Software Engineer – Research on future technology and develop prototypes

- Solved the security, audit trail and timely notification of events which leads to saving of over $10 million a year for a $400 million revenue healthcare provider by leveraging the intelligence of IP networks. Utilized deep packet inspection of imaging network traffic carried in DICOM format, real-time logging and indexing of transactions by leveraging commercial and open source software, and tie-ins with various Cisco's products such as CUCM and CS-MARS. Developed user friendly web UI leveraging wigets from Yahoo! UI library. Demonstrated this solution to numerous key Cisco customers and executive management. Successfully launched 3 customer trials with nearby healthcare providers.
- Led, researched, designed and setup a virtualization lab deploying software from leading desktop virtualization vendors. Extensively evaluated and documented key desktop virtualization solutions including Citrix, Kidaro, Qumranet KVM, MokaFive, etc over Cisco networks such as intranet, Internet, and VPN and firewalls. Successfully demonstrated desktop virtualization solutions to business development teams and people from other BUs. Represented Cisco in various virtualization technology forums. Studied virtualization technology papers and summarized recommendation reports with key trends/drivers and opportunities to executive management. Mentored and brought new members upto speed in this technology.
- Due to lack of access to healthcare, over 90,000 women per year in rural Pakistan are affected by breast cancer, only 10% of them are diagnosed, 75% of which die within 5 years. Architected and developed a Proof of Concept for Nomadic Imaging Service (NIS) leveraging my expertise wired/wireless network technology and DICOM using a hub-and-spoke model and Cisco human network collaboration. Successfully demonstrated to American Cancer Society(ACS) and senior executives including SVP CDO
- Scheduling meetings within and across enterprises is inefficient and inter-working with unified communication is primitive. Actively participated in system architecture and requirements for email and calendaring solution to complete Cisco unified communication solution. Researched and setup leading email and calendaring solutions such as Zimbra, Postpath, etc. and provided expert views which resulted in Postpath acquisition.
- Extensively researched a company developing mobile ad hoc network(MANET) routing protocols applying swarm intelligence machine learning algorithm as due diligence. Compared the company's technology to current MANET routing protocols and performed competitor analysis. Documented the company's technology and compared result and recommended next steps.
- Attended technology forums and research laboratory open house such as Microsoft, Intel, Yahoo, Stanford/MIT VLAB, and UC Berkeley. Documented and shared knowledge gained to increase awareness. Identified potential opportunities to Cisco for investments, acquisition and partnerships.

Honeywell International Inc.   Jun 2004 – Aug 2005
3660 Technology Drive Minneapolis, MN 55418
Internship - Developed Deterministic Network Protocol Simulation Modules in OPNET

- Implemented Avionics Full-Duplex (AFDX) Ethernet protocol simulation modules and integrated them into the OPNET simulator.
- Developed deterministic network framework/management algorithms based on AFDX Ethernet protocol in the OPNET simulator. Deterministic networks guarantee both end-to-end maximum latency requirements and message deliveries.

Samsung Electronics Co., Ltd   February 1998 - June 2000
Engineer
- Developed Bluetooth module driver in Windoes
- Developed a file transfer application on Windows.
- Developed power line communication software modules operating as TV remote controller and lights controller at home through signals transmitted via power lines by leveraging X.10 and LonWorks hardware modules

RESEARCH EXPERIENCES

University of Minnesota, Twin Cites   September 2000 – August 2007
Research Assistant - Computer Networking and Multimedia Research Group (Dr. Zhi-Li Zhang)
- Developed Bubble Routing Protocol (BRP), a scalable, robust and opportunistic routing protocol in multihop wireless networks. Designed, analyzed, and simulated the BRP in NS2.
- Developed Vault, a scalable, robust and secure binding service built on top of an overlay network. Developed client-server applications for Vault, and deployed/evaluated the service in the LAN and PlanetLab environments.
- Developed a network intrusion detection system that detects the network intrusion events using multi-step computer processes. Designed a profiling tool that classifies network hosts and their applications in order to identify malicious network activities. Researched on information theory and the data mining concept. Developed algorithms and programs verifying the algorithms.
- Developed Lightweight Internet Permit System (LIPS) implemented for the Linux Kernel to identify malicious traffic. Designed, implemented, and evaluated LIPS.
- Developed Secure Name Services (SNS) to protect critical Internet servers from DoS or DDoS attacks. Designed the SNS system. Implemented and evaluated SNS system in Linux Kernel.
- Designed QoS enhanced packet scheduling and resource management schemes under satellite communication systems with ATC Corp

Seoul National University   March 1996 – February 1998
Research Assistant – Multimedia Communications Research Group
- Simulated MPEG data transfer characteristics under various TCP protocol versions. Project involved understanding several different TCP protocol implementations and their design rationale.

TEACHING ASSISTANT

University of Minnesota
- Data Communications and Computer Networks (Csci5211)
  Graduate level course teaching details of data communications including computer networks.
- Advanced Internet Programming (Csci5131)
  Graduate level course teaching cutting-edge Internet programming techniques including Python, JAVA, MS .NET, mySQL, Apache server, and so forth.
- Computer Architecture (Csci4203, Csci5201)
  4203: Senior level course teaching the introduction of computer architecture including CPU, cache, and virtual memory system.
  5201: Graduate level course teaching details of computer architecture such as CPU, cache, virtual memory, pipeline, and parallel processing.
- Analysis of Numerical Algorithms (Csci 5302)
  Graduate level numerical analysis course teaching linear, nonlinear equations, polynomial interpolation, linear least Squares, and optimization problems.
- Introduction to Computer Networks (Csci 4211)
  Senior level course teaching fundamental concepts, principles, protocols, and applications of computer networks including layered network architectures such as OSI 7-layer, emerging high-speed networks, network programming interfaces, management, security, and applications.

Seoul National University
- System Administrator in Computer Center
- Advanced Multimedia Systems

PATENT
- Varun Chandola, Eric Eilertson, Haiyang Liu, Mark Shaneck, **Changho Choi**, Gyorgy Simon, Yongdae Kim, Vipin Kumar, jaideep Srivastava, Zhi-Li Zhang, *Detection of multi-step computer processes such as network intrusions*, U.S. Application Number No. 11/794,941

PUBLICATIONS	▪ **Changho Choi** and Zhi-Li Zhang, "BRP: Bubble Routing Protocol without Graphs", *Technical Report*, CS, UMN, 2007

- ▪ Yingfei Dong, **Changho Choi** and Zhi-Li Zhang, "LIPS: A Lightweight Permit System for Packet Origin Accountability", *Computer Networks*, Volume 50, Issue 18, 21 December 2006
- ▪ Guor-Huar Lu, **Changho Choi** and Zhi-Li Zhang, "Vault: A Secure Binding System", *In Proc. of IEEE International Conference on Network Protocols (ICNP'06)*, Santa Barbara, CA, Nov 2006
- ▪ Guor-Huar Lu, **Changho Choi** and Zhi-Li Zhang, "Vault: A Secure Binding Service", *Technical Report*, CS, UMN, 2006
- ▪ Mark Shaneck, Varun Chandola, Haiyang Liu, **Changho Choi**, Gyorgy Simon, Eric Eilertson, Yongdae Kim, Zhi-li Zhang, Jaideep Srivastava, Vipin Kumar, "A Multi-Step Framework for Detecting Attack Scenarios", *Technical Report*, CS, UMN, 2006
- ▪ **Changho Choi**, Yingfei Dong and Zhi-Li Zhang, " LIPS: Lightweight Internet Permit System for Stopping Unwanted Packets", *in Proc. of IFIP Networking 2005*, Waterloo, Canada, May, 2005
- ▪ Yingfei Dong, **Changho Choi** and Zhi-Li Zhang, " Secure Name Service: A Framework for Protecting Critical Internet Resources", In Proc. of *IFIP Networking 2004*, Athens, Greece, May 2004., *Lecture Notes in Computer Science (LNCS)*, Vol. 3042, 2004, XXXIII , pp. 783-794.
- ▪ Yingfei Dong, **Changho Choi** and Zhi-Li Zhang, "A Security Framework for Protecting Traffic between Collaborative Domains", *Journal of Microprocessors and Microsystems*, Volume 28, Issue 10, Secure Computing Platforms, 1 December 2004, Pages 547-559.
- ▪ **Changho Choi** and Yanghee Choi, "MPEG Data Transfer Characteristics of TCP", *Journal of Korea Information Science Society*, Vol. 25, No. 12, Dec. 1998

SKILLS	▪ Proficient in C/C++, Python, Perl, PHP, Java script, JSP, Solr (Lucene), and Web UI

- ▪ Expert in Java, SQL, MATLAB, Verilog, VHDL, Apache server, and Apache Tomcat
- ▪ Expert in Linux kernel programming
- ▪ Expert in Cisco IOS
- ▪ Expert in routing protocols on the Internet and wireless networks
- ▪ Expert in Wireless Mesh networks
- ▪ Expert in TCP/IP and network programming on Unix/Linux/Windows
- ▪ Proficient in Wireless LAN MAC protocol (802.11)
- ▪ Proficient in IP security (IPsec) Protocol, Cryptographical Hashing
- ▪ Proficient in MPEG Data Structure and Processing
- ▪ Proficient in Digital Imaging and Communications in Medicine (DICOM)
- ▪ Proficient in OPNET simulator
- ▪ Experience with Real-time Transport Protocol (RTP)
- ▪ Experience with Virtualization solutions

AWARDS AND ACTIVITIES	▪ Active member of Toast Masters

- ▪ **Leader of several projects and many seminars** including nomadic imaging services and design patterns in Cisco
- ▪ **MobiCom** 2006 **Student Travel Award**
- ▪ **Academic Graduate Fellowship** from Chang Hyun Educational Scholarly Foundation
- ▪ **President** of Hephzibah Campus Missionary at Seoul National University Chapter

PROFESSIONAL ACTIVITIES	▪ **Technical Referee of top conferences**:

- ▪ ACM International Symposium on Mobile Ad Hoc Networking and Computing (ACM MobiHoc, 2008)
- ▪ IEEE Conference on Computer Communications (IEEE INFOCOM, 2007, 2006)
- ▪ IEEE International Symposium on a World of Wireless, Mobile and Multimedia Networks (IEEE WoWMoM, 2007)
- ▪ ACM/IEEE International Workshop on Mobility in the Evolving Internet Architecture (MobiArch, 2006)
- ▪ IEEE International Conference on Broadband Networks (IEEE BroadNets, 2005)

PROFESSIONAL AFFILIATION	▪ **ACM Professional Member** ▪ **IEEE Member**