Curriculum Vitae

Ki Hwan Yum

August 12, 2020

ADDRESS:
Department of Computer Science and Engineering
Dwight Look College of Engineering
Texas A&M University
H. R. Bright Building, Room 336
College Station, TX 77843
Email: yum@cse.tamu.edu

EDUCATION:
1997–2002: **The Pennsylvania State University**, University Park, Pennsylvania.
Ph.D. in Computer Science and Engineering (Academic advisor: Dr. Chita R. Das).
Thesis Title: Quality of Service Provisioning in Clusters.

1992–1994: **Pohang University of Science and Technology**, Pohang, Korea.
M.S. in Computer Science and Engineering (Academic advisor: Dr. Cheeha Kim).
Thesis Title: Motion-Classified Characterization of Video Codec Outputs.

1985–1989: **Seoul National University**, Seoul, Korea.
B.S. in Mathematics.

RESEARCH INTERESTS:
Computer Architecture, Parallel/Distributed Systems, Computer Networks, QoS Support in Cluster Networks and Internet.

WORK EXPERIENCE:
Texas A&M University (09/2009–Present), College Station, Texas.
Research Assistant Professor and Senior Lecturer, Department of Computer Science & Engineering.
- Spring 2020: CSCE 206, CSCE 611
- Fall 2019: CSCE 206
- Spring 2019: CSCE 206, CSCE 611 (Operating Systems)
- Fall 2018: CSCE 206 (Structured Programming in C)
- Summer 2018: CSCE 206 (Structured Programming in C)
- Spring 2017: CSCE 312 (Computer Organization), CSCE 206 (Structured Programming in C)
- Fall 2016: CSCE 312 (Computer Organization)
- Spring 2012: CSCE 206 (C Programming), CSCE 313 (System Programming), ENGR 112B (C++ Programming)

- Fall 2011: CSCE 313 (System Programming), CSCE 312 (Computer Organization)
- Fall 2009: CSCE 614 (Graduate Computer Architecture)

The University of Texas at San Antonio (09/2002–08/2009), San Antonio, Texas.
Assistant Professor, Department of Computer Science.
- Spring 2009: CS 3843 (Computer Organization), CS 3853 (Computer Architecturer)
- Fall 2008: CS 1073, CS 3843, CS 7213 (Doctoral Research)
- Spring 2008: CS 2733, CS 4753, CS 7213 (Doctoral Research)
- Fall 2007: CS 6983 (Master's Thesis), CS 7213 (Doctoral Research)
- Spring 2007: CS 2733, CS 4753
- Fall 2006: CS 2733, CS 5513
- Spring 2006: CS 2733, CS 4753
- Fall 2005: CS 2733, CS 5513
- Spring 2005: CS2733 (Computer Organization II - Undergraduate)
- Fall 2004: CS5513 (Computer Architecture - Graduate)
- Fall 2004: CS4933 (Intership in Computer Science)
- Summer 2004: CS4933 (Intership in Computer Science)
- Spring 2004: CS4753 (Computer Architecture - Undergraduate)
- Fall 2003: CS5513 (Computer Architecture - Graduate)
- Fall 2003: CS6953 (Independent Study)
- Fall 2003: CS4933 (Intership in Computer Science)
- Spring 2003: CS4753 (Computer Architecture - Undergraduate)
- Spring 2003: CS6953 (Independent Study)
- Spring 2003: CS5973 (Directed Research)
- Fall 2002: CS4753 (Computer Architecture - Undergraduate)

The Pennsylvania State University (08/1997–08/2002), University Park, Pennsylvania.
Research/Teaching Assistant, Department of Computer Science and Engineering.
- 01/2002-05/2002: Lecturer (CSE260 Discrete Mathematics - Undergraduate)
- 01/2001-12/2001: Research Assistant
- 08/2000-12/2000: Teaching Assistant (CSE532 Multiprocessor Architecture - Graduate)
- 06/1999-07/2000: Research Assistant
- 01/1999-05/1999: Teaching Assistant (CSE260 Discrete Mathematics - Undergraduate)
- 08/1998-12/1998: Teaching Assistant (CSE517 Performance Evaluation - Graduate)

Korea Telecom (1994–1997), Seoul, Korea.
Member of Technical Staff, Research and Development Group.
- Participated in designing and testing of large scale Asynchronous Transfer Mode (ATM) switches.
- Participated in testing of Centralized Automatic Message Accounting (CAMA) system.
- Participated in testing of Virtual Private Network (VPN).

Pohang University of Science and Technology (1992–1993), Pohang, Korea.
Research/Teaching Assistant, Department of Computer Science and Engineering.
- Multimedia Traffic Workload Characterization and Modeling.

Republic of Korea Air Force (1990–1991), Seoul, Korea.
Military Service.

PUBLICATIONS

Book Chapters

1. Y. Jin, K. H. Yum, and E. J. Kim, "Adaptive Data Compression for Low-Power On-Chip Networks," *Low Power Networks-on-Chip*, Edited by C. Silvano, M. Lajolo, and G. Palermo, Springer, 2011.

2. E. J. Kim, K. H. Yum, and C. R. Das, "Introduction to Analytical Models," *Performance Evaluation and Benchmarking*, Edited by L. K. John and L. Eeckhout, Taylor & Francis, 2006.

Refereed Journal Articles

1. K. H. Yum, Y. Jin, E. J. Kim, and C. R. Das, "Integration of Admission, Congestion, and Peak Power Control in QoS-Aware Clusters," *Journal of Parallel and Distributed Computing*, Vol. 70, No. 11, pp. 1087–1099, November 2010.

2. Y. Jin, E. J. Kim, and K. H. Yum, "Design and Analysis of On-Chip Networks for Large-Scale Cache Systems," *IEEE Transactions on Computers*, Vol. 59, No. 3, pp. 332–344, March 2010.

3. J. Iyer, H. Yu, H. Kim, E. J. Kim, K. H. Yum, and P. S. Mah, "Assuring K-Coverage in the Presence of Mobility and Wear-Out Failures in Wireless Sensor Networks," *International Journal of Sensor Networks (IJSNet)*, Vol. 5, No. 1, pp. 58–65, 2009.

4. H. Kim, E. J. Kim and K. H. Yum, "ROAL: A Randomly Ordered Activation and Layering Protocol for Ensuring K-Coverage in Wireless Sensor Networks," *Journal of Networks (JNW)*, Vol. 3, No. 1, pp. 43–52, January 2008.

5. H. K. Lee, V. Hall, K. H. Yum, K. I. Kim, and E. J. Kim, "Bandwidth Estimation in Wireless LANs for Multimedia Streaming Services," *Advances in Multimedia*, Vol. 2007, Article ID: 70429, 2007.

6. E. J. Kim, K. H. Yum, C. R. Das, M. Yousif, and J. Duato, "Exploring IBA Design Space for Improved Performance," *IEEE Transactions on Parallel and Distributed Systems*, Vol. 18, No. 4, pp. 498–510, April 2007.

7. E. J. Kim, G. M. Link, K. H. Yum, V. Narayanan, M. Kandemir, M. J. Irwin, and C. R. Das, "A Holistic Approach to Designing Energy-Efficient Cluster Interconnects," *IEEE Transactions on Computers*, Vol. 54, No. 6, pp. 660–671, June 2005.

8. E. J. Kim, K. H. Yum, and C. R. Das, "Performance Analysis of a QoS Capable Cluster Interconnect," *Performance Evaluation*, Vol. 60, No. 1-4, pp. 275–302, May 2005.

9. K. H. Yum, E. J. Kim, C. R. Das, and A. Vaidya, "MediaWorm: A QoS Capable Router Architecture for Clusters," *IEEE Transactions on Parallel and Distributed Systems*, Vol. 13, No. 12, pp. 1261–1274, December 2002.

Refereed Conference/Workshop Papers

1. J. Huang, R. R. Puli, P. Majumder, S. K. Kim, R. Boyapati, K. H. Yum, and E. J. Kim, "Active-Routing: Compute on the Way for Near-Data Processing," in *Proceedings of the 25th IEEE International Symposium on High-Performance Computer Architecture (HPCA)*, February 2019.

2. R. Boyapati, J. Huang, P. Majumdar, K. H. Yum, and E. J. Kim, "APPROX-NoC: A Data Approximation Framework for Network-on-Chip Architectures," in *Proceedings of International Symposium on Computer Architecture (ISCA)*, pp. 666–677, Toronto, Canada, June 2017.

3. K. H. Kim, R. Boyapati, J. Huang, Y. Jin, K. H. Yum, and E. J. Kim, "Packet Coalescing Exploiting Data Redundancy in GPGPU Architectures," in *Proceedings of the International Conference on Supercomputing (ICS)*, pp. 6:1–6:10, Chicago, IL, June, 2017.

4. R. Boyapati, J. Huang, N. Wang, K. H. Kim, K. H. Yum, and E. J. Kim, "Fly-Over: A Light-Weight Distributed Power-Gating Mechanism for Energy-Efficient Networks-on-Chip," in *Proceedings of International Parallel and Distributed Processing Symposium (IPDPS)*, pp. 708–717, Orlando, FL, May 2017.

5. W. Yuan, R. Boyapati, L. Wang, H. Jang, K. H. Yum, and E. J. Kim, "Intra-Clustering: Accelerating On-Chip Communication for Data Parallel Architectures," in *Proceedings of 6th Workshop on Applications for Multi-Core Architectures (WAMCA)*, Florianopolis, Brazil, October 2015. Selected as the best paper award.

6. H. Jang, J. Kim, P. Gratz, K. H. Yum, and E. J. Kim, "Bandwidth Efficient On-Chip Interconnect Designs for GPGPUs," in *Proceedings of 52nd Design Automation Conference (DAC)*, San Francisco, CA, June 2015.

7. L. Wang, J. Jayabalan, M. Ahn, H. Gu, K. H. Yum, and E. J. Kim, "A Case for Handshake in Nanophotonic Interconnects," in *IEEE International Parallel and Distributed Processing Symposium (IPDPS)*, pp. 177–188, Boston, MA, May 2013.

8. L. Wang, P. Kumar, K. H. Yum, and E. J. Kim, "APCR: An Adaptive Physical Channel Regulator for On-Chip Interconnects," in *Proceedings of International Conference on Parallel Architectures and Compilation Techniques (PACT)*, pp. 87–96, Minneapolis, MN, September 2012.

9. H. Jang, B. S. An, N. Kulkarni, K. H. Yum, and E. J. Kim, "A Hybrid Buffer Design with STT-MRAM for On-Chip Interconnects," in *Proceedings of ACM/IEEE International Symposium on Networks-on-Chip (NOCS)*, pp. 193–200, Copenhagen, Denmark, May 2012.

10. B. S. An, M. Lee, K. H. Yum, and E. J. Kim, "Efficient Data Packet Compression for Cache Coherent Multiprocessor Systems," in *Proceedings of the Data Compression Conference (DCC)*, pp. 129–138, Snowbird, Utah, April 2012.

11. B. S. An, K. H. Yum, and E. J. Kim, "Scalable and Efficient Bounds Checking for Large-Scale CMP Environments," in *Proceedings of International Conference on Parallel Architectures and Compilation Techniques (PACT-2011)*, Galveston Island, Texas, October 2011. (Poster Session)

12. L. Wang, P. Kumar, R. Boyapati, K. H. Yum, and E. J. Kim, "Efficient Lookahead Routing and Header Compression for Multicasting in Networks-On-Chip," in *Proceedigs of the 6th ACM/IEEE Symposium on Architectures for Networking and Communications Systems (ANCS 2010)*, pp. 1–10, La Jolla, CA, October 2010.

13. K. M. Su and K. H. Yum, "Simple and Effective Adaptive Routing Algorithms in Multi-Layer Wormhole Networks," in *Proceedings of the 27th International Performance Comput-*

ing and Communications Conference (IPCCC 2008), pp. 176–184, Austin, TX, December 2008.

14. Y. Jin, K. H. Yum, and E. J. Kim, "Adaptive Data Compression for High-Performance Low-Power On-Chip Networks," in *Proceedings of the 41st International Symposium on Microarchitecture (MICRO-41)*, pp. 354–363, Italy, November 2008.

15. I. Yeo, H. K. Lee, K. H. Yum, and E. J. Kim, "Effective Dynamic Thermal Management for MPEG-4 Decoding," in *Proceedings of IEEE International Conference on Computer Design (ICCD 2007)*, pp. 623–628, Lake Tahoe, CA, October 2007.

16. H. K. Lee, V. Hall, K. H. Yum, K. I. Kim, and E. J. Kim, "Design of an Active Set-Top-Box in a Wireless Network for Scalable Streaming Services," in *Proceedings of the 2007 International Conference on Image Processing (ICIP)*, Vol. 6, pp. VI-505-VI-508, San Antonio, TX, September 2007.

17. H. Kim, H. Yu, E. J. Kim, and K. H. Yum, "ROAL: A Randomly Ordered Activation and Layering Protocol for Ensuring K-Coverage in Wireless Sensor Networks," in *Proceedings of the Third International Conference on Wireless and Mobile Communications (ICWMC 2007)*, pp. 4–4, Guadeloupe, French Caribbean, March 2007.

18. Y. Jin, E. J. Kim, and K. H. Yum, "A Domain-Specific On-Chip Network Design for Large Scale Cache Systems," in *Proceedings of IEEE 13th International Symposium on High-Performance Computer Architecture (HPCA-13)*, pp. 318–327, Phoenix, AZ, February 2007.

19. H. Yu, J. Iyer, H. Kim, E. J. Kim, K. H. Yum, and P. S. Mah, "Assuring K-Coverage in the Presence of Mobility in Wireless Sensor Networks," in *Proceedings of IEEE Global Telecommunications Conference (GLOBECOM)*, pp. 1–5, San Francisco, CA, November 2006.

20. H. K. Lee, K. H. Yum, and E. J. Kim, "A PROactive Request Distribution (PRORD) Using Web Log Mining in a Cluster-Based Web Server," in *Proceedings of International Conference on Parallel Processing (ICPP)*, pp. 559–568, Columbus, OH, August 2006.

21. H. K. Lee, V. Hall, K. H. Yum, K. I. Kim, and E. J. Kim, "Bandwidth Estimation in Wireless LANs for Multimedia Streaming Services," in *Proceedings of the 2006 International Conference on Multimedia and Expo (ICME)*, pp. 1181–1184, Toronto, Canada, July 2006.

22. M. Lee, E. J. Kim, K. H. Yum, M. Yousif, "An Overview of Security Issues in Cluster Networks," in the Second International Workshop on Cluster Security (Cluster-Sec 2006), held in conjunction with the 6th IEEE/ACM International Symposium on Cluster Computing and the Grid (CCGrid), Singapore, May 2006.

23. Y. Jin, E. J. Kim, and K. H. Yum, "Peak Power Control for a QoS Capable On-Chip Network," in *Proceedings of the 2005 International Conference on Parallel Processing (ICPP-05)*, pp. 585–592, Oslo, Norway, June 2005.

24. M. Lee, E. J. Kim, K. H. Yum, and M. Yousif, "Instant Attack Stopper in InfiniBand Architecture," in the First International Workshop on Cluster Security (Cluster-Sec 2005), a Workshop held in conjunction with the 5th IEEE/ACM International Symposium on Cluster Computing and the Grid (CCGrid), Cardiff, UK, May 2005.

25. E. J. Kim, K. H. Yum, G. M. Link, N. Vijaykrishnan, M. Kandemir, M. J. Irwin, M. Yousif, and C. R. Das, "Energy Optimization Techniques in Cluster Interconnects," in *Proceedings of ACM International Symposium on Low Power Electronics and Design (ISLPED)*, pp.459–464, Seoul, Korea, August 2003.

26. E. J. Kim, K. H. Yum, C. R. Das, M. Yousif, and J. Duato, "Performance Enhancement Techniques for QoS Provisioning in InfiniBand$^{\text{TM}}$ Architecture," in *Proceedings of IEEE International Symposium on High-Performance Computer Architecture (HPCA-9)*, pp.253–262, Anaheim, CA, February 2003.

27. K. H. Yum, E. J. Kim, C. R. Das, M. Yousif, and J. Duato, "Integrated Admission and Congestion Control for QoS Support in Clusters," in *Proceedings of IEEE International Conference on Cluster Computing*, pp.325-332, Chicago, IL, September 2002.

28. E. J. Kim, K. H. Yum, and C. R. Das, "Calculation of Deadline Missing Probability in a QoS Capable Cluster Interconnect," in *Proceedings of IEEE International Symposium on Network Computing and Applications (NCA)*, pp.34-43, Cambridge, MA, February 2002.

29. E. J. Kim, K. H. Yum, and C. R. Das, "An Analytical Model for a QoS Capable Cluster Interconnect," in *Proceedings of International Conference on Measurement, Modeling and Evaluation of Computer and Communication Systems (MMB)*, pp.9-24, Aachen, Germany, September 2001.

30. K. H. Yum, E. J. Kim, and C. R. Das, "QoS Provisioning in Clusters: An Investigation of Router and NIC Design," in *Proceedings of ACM International Symposium on Computer Architecture (ISCA)*, pp.120-129, Göteborg, Sweden, June 2001.

31. K. H. Yum, A. Vaidya, C. R. Das, and A. Sivasubramaniam, "Investigating QoS Support for Traffic Mixes with the MediaWorm Router," in *Proceedings of IEEE International Symposium on High-Performance Computer Architecture (HPCA-6)*, pp.97-106, Toulouse, France, January 2000.

Technical Reports

1. K. M. Su and K. H. Yum, "Simple and Effective Adaptive Routing Algorithms Using Multi-Layer Wormhole Networks," Technical Report CS-TR-2008-003, Department of Computer Science, University of Texas at San Antonio, 2008.

2. Y. Jin, H. Kim, E. J. Kim, and K. H. Yum, "Peak Power Control for a QoS Capable On-Chip Network," Technical Report 2004-11-2, Department of Computer Science, Texas A&M University, November, 2004.

3. E. J. Kim, K. H. Yum, N. Kim, C. R. Das, and M. Yousif, "Peformance Enhancement Techniques for QoS Provisioning in InfiniBand$^{\text{TM}}$ Architecture," Technical Report CSE-02-005, Department of Computer Science and Engineering, The Pennsylvania State University, February 2002.

4. K. H. Yum, E. J. Kim, C. R. Das, M. Yousif, and J. Duato, "Integrated Admission and Congestion Control for QoS Support in Clusters," Technical Report CSE-01-26, Department of Computer Science and Engineering, The Pennsylvania State University, October 2001.

5. K. H. Yum, E. J. Kim, and C. R. Das, "QoS Provisioning in Clusters: An Investigation of Router and NIC Design," Technical Report CSE-01-005, Department of Computer Science and Engineering, The Pennsylvania State University, March 2001.

6. E. J. Kim, K. H. Yum, and C. R. Das, "Performance Analysis of a QoS Capable Cluster Interconnect," Technical Report CSE-01-001, Department of Computer Science and Engineering, The Pennsylvania State University, January 2001.

7. K. H. Yum, E. J. Kim, V. Shirodkar, S. Hanabe, and C. R. Das, "Design and Analysis of a Versatile Router for Supporting Integrated Traffic in Clusters," Technical Report CSE-00-021, Department of Computer Science and Engineering, The Pennsylvania State University, October 2000.

8. K. H. Yum, A. Vaidya, C. R. Das, and A. Sivasubramaniam, "Investigating QoS Support for Traffic Mixes with the MediaWorm Router," Technical Report CSE-99-012, Department of Computer Science and Engineering, The Pennsylvania State University, August 1999.

Miscellaneous

1. Poster Presentation. "Peak Power Control for a QoS Capable On-Chip Network," the 4th Annual Austin Conference on Energy-Efficient Design 2005 (ACEED 2005), Austin, TX, March 2005.

PAPER PRESENTATIONS:

- "Peak Power Control for a QoS Capable On-Chip Network," International Conference on Parallel Processing (ICPP), Oslo, Norway, June 2005.

- "Quality of Service Provisioning in Clusters," Pohang University of Science and Technology (POSTECH), Pohang, Korea, July 2004.

- "Quality of Service Provisioning in Clusters," Department of Electrical and Computer Engineering, Michigan State University, East Lansing, MI, February, 2003.

- "Integrated Admission and Congestion Control for QoS Support in Clusters," IEEE International Conference on Cluster Computing, Chicago, IL, September 2002.

- "Quality of Service Provisioning in Clusters," School of Electrical and Computer Engineering, Purdue University, West Lafayette, IN, April, 2002.

- "Quality of Service Provisioning in Clusters," Department of Computer Science, Michigan State University, East Lansing, MI, February, 2002.

- "Quality of Service Provisioning in Clusters," Department of Electrical and Computer Engineering, Iowa State University, Ames, IA, January, 2002.

- "QoS Provisioning in Clusters: An Investigation of Router and NIC Design," ACM International Symposium on Computer Architecture (ISCA), Göteborg, Sweden, June 2001.

- "Investigating QoS Support for Traffic Mixes with the MediaWorm Router," IEEE International Symposium on High Performance Computer Architecture (HPCA), Toulouse, France, January 2000.

PROFESSIONAL ACTIVITIES:

Reviewer
Adcom '99, HiPC '99, ICPP '00, ICPP '01, NCA '01, ISCA '01, HPCA '01, HPCA '02, HPCA '03, IPDPS '03, ISCA '03, ICCCN '04, ACM SAC '04, ACM SAC '05, EUROPAR 2005, Globecom 2005, ACM SAC '06, ACM SC '06, ACM ICS 2007, ACM ICS 2008, IPDPS 2008, ISCA 2009, Journal of Parallel and Distributed Computing, Simulation: Transactions of The Society for Modeling and Simulation, Computer & Electrical Engineering An International Journal, Microprocessor and Microsystems Journal, Computer and Communication Journal, IEEE Transactions on Computers, and IEEE Transactions on Parallel and Distributed Systems.

Program Committee Member
Thirteenth International Conference on Computer Communications and Networks (ICCCN '04).

Publicity and Publications Chair
12th IEEE International Symposium on High-Performance Computer Architecture (HPCA-12), 2006.

Program Committee Member
Sixteenth International Conference on Computer Communications and Networks (ICCCN '07).

Program Committee Member
Seventeenth International Conference on Computer Communications and Networks (ICCCN '08).

Proposal Review Panel
NSF MRI/IMR 2005, NSF DMR/MRI 2006, NSF PHY/MRI 2006, NSF DMR/MRI 2007, NSF MRI/IMR 2008, NSF CCF 2008.

SERVICE ACTIVITIES:

UTSA Graduate Students Committee Member
Fall 2007 – Spring 2008.

UTSA Scholarship Committee Member
Fall 2006 – Spring 2007.

UTSA Library Liaison of the Department of Computer Science
Fall 2002 – Spring 2004, Fall 2005 – Fall 2006.

UTSA Making Questions for Ph. D. Qualifying Exams
Aug. 2003, Jan. 2004, Aug. 2004, Jan. 2005, Aug. 2005, Dec. 2005, Aug. 2006, Dec. 2006, Aug. 2007.

UTSA Faculty Search Committee Member
Fall 2003 – Spring 2005.

AWARDS:

Best Graduate Research Assistant Award for Outstanding Research
Department of Computer Science and Engineering, Penn State University, 2002.

RESEARCH GRANTS:

SHF: Small: High Performance On-Chip Interconnects Design for Multicore Accelerators
NSF Computing & Communication Foundation (CCF),
07/15/2014 ∼ 06/30/2017, E. J. Kim (PI, Texas A&M) and K. H. Yum (Co-PI).
Amount: $ 450,000, Funded.

Research on the Transfer and Play Method of Scalable Multimedia Streams in Wireless LAN Environments
Electronics and Telecommunications Research Institute (ETRI),
07/01/2007 ∼ 12/31/2007, E. J. Kim (PI, Texas A&M) and K. H. Yum (Co-PI).
Amount: $ 10,000, Funded.

Collaborative Research: Design and Analysis of High-Performance, Energy-Efficient, and Secure Clusters
NSF Computing & Communication Foundation (CCF)
Foundations of Computing Processes and Artifacts (CPA) Program,
04/15/2006 ∼ 03/31/2009, K. H. Yum (PI).
Requested Amount: $ 60,000, Funded.

Design and Analysis of Embedded Software Solutions in Wireless Environments
Electronics and Telecommunications Research Institute (ETRI),
05/16/2005 ∼ 12/15/2005, E. J. Kim (PI, Texas A&M) and K. H. Yum (Co-PI).
Amount: $ 30,000, Funded.

STUDENTS SUPERVISED:

Vinod Putchala, MS, "Analysis of Network on Chip Architectures (NoC)," (Non-Thesis) August 2004.

Namwook Kang (Samsung Electronics), MS, Thesis Title: "Congestion Control and Clustering Mechanisms in Wireless Sensor Networks," December 2007.