

# MICAH BECK

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## Education

- May 1992      Ph.D., Computer Science, Cornell University, Ithaca, New York.  
Dissertation: "Translating FORTRAN to Dataflow Graphs."  
Advisor: Keshav Pingali.
- May 1980      M.S., Computer Science, Stanford University, Palo Alto, California.  
Advisor: Forest Baskett
- June 1979      B.A. with honors, Mathematics and Computer Science, University of Wisconsin,  
Madison.

## Employment

- 1992 – present      Associate Professor, Department of Electrical Engineering and Computer Science,  
University of Tennessee, Knoxville, TN.
- 2018 – 2019      Program Director, National Science Foundation, Office of Advanced  
Cyberinfrastructure, Alexandria, VA.
- 2000 – 2005      Chief Scientist & Founder, Lokomo Systems, Stockholm, Sweden. Content delivery.
- 1991 – 92      Visiting Assistant Professor, School of Computer and Information Science, Syracuse  
University, Syracuse, NY.
- 1990 – 91      Software Engineer, Isis Distributed Systems, Ithaca, NY. Research and development  
in distributed operating systems and networking.
- 1985 – 86      Member of Technical Staff/Consultant, Bell Communications Research,  
Morristown, NJ. Research in distributed sorting.
- 1983 – 84      Consultant, Quantum Science Corporation, New York, NY. Analyzed computer  
technology and markets.
- 1979 – 83      Member of Technical Staff, Bell Laboratories, Murray Hill, NJ. Research in  
distributed operating systems.

## Awards

- 2016-17      Fulbright Teaching and Research Scholarship, awarded by US State Department,  
hosted by Strathmore University, Nairobi, Kenya
- 2024-25      Fulbright Research Scholarship, awarded by US State Department, hosted by  
Université de Picardi Jules Verne, Amiens, France

## Micah Beck: Publications

### Refereed Journals

- Micah Beck and Terry Moore, "Connecting the Unconnected," *Communications of the ACM*, 68(1), 2025, pp8-9. ACM.
- Micah Beck and Terry Moore, "Breaking Up a Digital Monopoly," *Communications of the ACM*, 66(6), 2023, pp38-41. ACM.
- Hatem Barghathi, Caleb Usadi, Micah Beck, and Adrian Del Maestro, "Compact unary coding for bosonic states as efficient as conventional binary encoding for fermionic states," *Physics Review B* 105(12), 2022, L121116, American Physical Society.
- Micah Beck, "On the Hourglass Model," *Communications of the ACM*, 62(7), 2019, pp48-57. ACM.
- M Asch, T Moore, R Badia, M Beck, P Beckman, T Bidot, F Bodin, F Cappello and A Choudhary, B de Supinski, E Deelman, J Dongarra, A Dubey, G Fox, H Fu, S Girona, W Gropp, M Heroux, Y Ishikawa, K Keahey, D Keyes, W Kramer, J-F Lavignon, Y Lu, S Matsuoka, B Mohr, D Reed, S Requena, J Saltz, T Schulthess, R Stevens, M Swany, A Szalay, W Tang, G Varoquaux, J-P Vilotte, R Wisniewski, Z Xu, I Zacharov, "Big data and extreme-scale computing: Pathways to Convergence-Toward a shaping strategy for a future software and data ecosystem for scientific inquiry," *The International Journal of High Performance Computing Applications*, 32(4), 2018, pp 435-479.
- Jian Huang, Huadong Liu, Micah Beck, Andrew Gaston, Jinzhu Gao, Terry Moore, "Dynamic Sharing of Large-Scale Visualization," *IEEE Computer Graphics and Applications*, 27(1), 2007, pp 20-25. IEEE.
- D.A. Batchelor, M. Beck, A. Becoulet, R.V.Budney, C.S.Change, P.H.Diamond, J.W.Dong, G.Y.Fu, A. Fukuyama T.S. Hahm, D.E. Keyes, Y. Kishimoto, S. Klasky, L.L.Lao, K.Li, Z.Lin, B.Ludaescher, J.Manickam, N.Nakajima, T.Ozeki, N.Podhorszki, W.M.Tang, M.A.Vouk, R.E.Waltz, S.J.Wang, H.R.Wilson, X.Q.Xu, M.Yagi, F.Zonca, "Simulation of Fusions Plasmas: Current Status and Future Direction," *Plasma Science and Technology*, 9(3), 2007, pp 312-387. IOP Publishing.
- Bassi, M. Beck, F. Chanussot, J.P. Gelas, R. Harakay, L. Lefevre, T. Moore, J. Plank and P. Primet, "Active and Logistical Networking for Grid Computing: the e-Toile Architecture," *Future Generation Computer Systems*, 21(1), January 2005, pp 1-246. Elsevier.
- Scott Atchley, Stephen Soltesz, James S. Plank, and Micah Beck, "Video IBPster," *Future Generation Computer Systems*, 19(6), August 2003, pp 861-870. Elsevier.
- Alessandro Bassi, Micah Beck, Terry Moore, James S. Plank, Martin Swany, Rich Wolski, and Graham Fagg, "The Internet Backplane Protocol: A Study in Resource Sharing," *Future Generation Computing Systems*, 19(4), May 2003, pp 551-561. Elsevier.
- Scott Atchley, James S. Plank, Micah Beck, and Ying Ding, "Algorithms for High Performance, Wide-Area Distributed File Downloads," *Parallel Processing Letters*, 13(2), June 2003, pp. 207-223. World Scientific Publishing Company.
- Micah Beck, Terry Moore, Leif Abrahamsson, Christophe Achouiantz, and Patrik Johansson, "Enabling Full Service Surrogates Using the Portable Channel Representation," *Computer*

*Networks*, 39(5), August 5, 2002, pp. 559-576. Elsevier.

- James S. Plank, Alexander Bassi, Micah Beck, Terence Moore, D. Martin Swamy, and Rich Wolski, "Managing Data Storage in the Network," *IEEE Internet Computing*, 5(5), September/October 2001, pp. 50-58. IEEE.
- James S. Plank, Henri Casanova, Micah Beck and Jack Dongarra, "Deploying Fault Tolerance and Task Migration with NetSolve," *Future Generation Computer Systems*, 15(5-6), October 1999, pp. 745-755. Elsevier.
- Micah Beck, Jack Dongarra, Graham Fagg, G. Al Geist, Paul Gray, Jim Kohl, Mauro Migliardi, Keith Moore, Terry Moore, Phil Papadopoulos, Stephen L. Scott, and Vaidy Sunderam, "HARNESS: A Next Generation Distributed Virtual Machine," *Future Generation Computer Systems*, 15(5-6), October 1999, pp. 571-582. Elsevier.
- Micah Beck, Henri Casanova, Jack Dongarra, Terry Moore, James S. Plank, Fran Berman, and Rich Wolski, "Logistical Quality of Service in NetSolve," *Computer Communications*, 22(11), July 1999, pp. 1034-1044. Elsevier.
- James S. Plank, Yuqun Chen, Kai Li, Micah Beck and Gerry Kingsley, "Memory Exclusion: Optimizing the Performance of Checkpointing Systems," *Software -- Practice and Experience*, 29(2), February 1999, pp. 125-142. J Wiley.
- Micah Beck and Terry Moore, "The Internet2 Distributed Storage Infrastructure Project: An Architecture for Internet Content Channels," *Computer Networks and ISDN Systems*, 30(22-23), 1998, pp. 2141-2148.
- James S. Plank, Micah Beck and Gerry Kingsley, "Compiler-Assisted Memory Exclusion for Fast Checkpointing," *IEEE Technical Committee on Operating Systems and Application Environments*, 7(4), Winter 1995, pp. 10-14. IEEE.
- Micah Beck and Anatole Beck, "Revenge of the Linear Search Problem," *SIAM Journal on Control and Optimization*, 30(1), 1992. SIAM.
- Micah Beck and Keshav Pingali, "From Control Flow to Dataflow," *Journal of Parallel and Distributed Computing*, Vol 12, 1991. Elsevier.
- Micah Beck, Keshav Pingali, and Alexandru Nicolau, "Static Scheduling for Dynamic Dataflow Machines," *Journal of Distributed and Parallel Computing*, 10(4), 1990. Elsevier.
- Micah Beck, T.K. Srikanth and Sam Toueg, "Implementation Issues in Clock Synchronization," *Fault Tolerant Distributed Computing*, LNCS, Vol 448, 1990. Springer Verlag.
- Micah Beck and A. Siegel, "TransFig: Portable Figures for TeX," *TUGboat*, 11(3), September 1990, pp. 373-380.
- Micah Beck, Dina Bitton and W. Kevin Wilkinson, "Sorting Large Files on a Backend Multiprocessor," *IEEE Transactions on Computers*, 37(7), July 1988, pp. 769-778.
- Micah Beck and Anatole Beck, "The Linear Search Problem Rides Again," *Israel Journal of Mathematics*, 53(3), 1986, pp. 365-372. Magnes Press.
- Micah Beck and Anatole Beck, "Son of the Linear Search Problem," *Israel Journal of Mathematics*, 48(2-3), 1984, pp. 109-122. Magnes Press.

## Book Chapters

- Svetlana Y. Mironova, Michael W. Berry, Scott Atchley, Micah Beck, Tianhao Wu, Lars E. Holzman, William M. Pottenger, Daniel J. Phelps, “Advancements in Text Mining,” In *Data Mining: Next Generation Challenges and Future Directions*, H. Kargupta, A. Joshi, K. Sivakumar, and Y. Yesha (Eds.), AAAI/MIT Press, Menlo Park, CA, 2003.
- Micah Beck, Terry Moore, James S. Plank and Martin Swany, “Logistical Networking: Sharing More Than the Wires,” In *Active Middleware Services*, Salim Hariri, Craig A. Lee, and Cauligi S. Raghavendra (Eds.), Kluwer Academic, Norwell, MA, 2000.

## Refereed Conference Papers

- Micah Beck and Terry Moore, “Is Universal Broadband Service Impossible?,” *19th IEEE International Conference on Mobile Ad-Hoc and Smart Systems (MASS 2022)*, Denver, Colorado, November 2022.
- Micah Beck, “Deployment Scalability in Exposed Buffer Processing,” *17th IEEE International Conference on Mobile Ad-Hoc and Smart Systems (MASS 2020)*, Delhi, India, December 2020.
- Micah Beck, Nancy French, Ezra Kissel, Martin Swany, Terry Moore, “Data Logistics: Toolkit and Applications,” *GOODTECHS 2019 - 5th EAI International Conference on Smart Objects and Technologies for Social Good*, Valencia, Spain, September 2019.
- Micah Beck, Terry Moore, Piotr Luszczek, Anthony Danalis, “Interoperable Convergence of Storage, Networking and Computation,” *Future of Information and Communication Conference*, San Francisco, March 2019.
- Chris Brumgard, Micah Beck, “Substituting Disk Failure Avoidance for Redundancy in Wide Area Fault Tolerant Storage Systems”, *IEEE International Conference on Cluster Computing*, Beijing, China, September 2012. Jian Huang et al 2006 J. Phys.: Conf. Ser. 46 079.
- Jian Huang, Huadong Liu, Micah Beck, Jinzhu Gao, Terry Moore, “A distributed execution environment for large data visualization”, *SCIDAC 2006*, Denver, June 2006.
- Huadong Liu, Micah Beck, Jian Huang, “Dynamic Co-Scheduling of Distributed Computation and Replication,” *IEEE International Symposium on Cluster Computing and the Grid*, Singapore, May 2006.
- Jonghyun Lee, Robert Ross, Scott Atchley, Micah Beck, Rajeev Thakur, “MPI-IO/L: Efficient Remote I/O for MPI-IO via Logistical Networking,” *IEEE Parallel and Distributed Processing Symposium*, Rhodes Island, Greece, April 2006.
- Micah Beck, Jack Dongarra, and James S. Plank. NetSolve/D: A Massively Parallel Grid Execution System for Scalable Data Intensive Collaboration. *19th IEEE International Parallel and Distributed Processing Symposium (IPDPS'05)*, Vol. 11., Washington, DC, 2005,
- Jason Zurawski, Martin Swany, Micah Beck and Ying Ding, “Logistical Multicast for Data Distribution,” *Workshop on Grids and Advanced Networks*, Cardiff, UK, May, 2005.
- Viraj Bhat, Scott Klasky, Scott Atchley, Micah Beck, Doug McCune and Manish Parashar, “High Performance Threaded Data Streaming for Large Scale Simulations,” *5th IEEE/ACM*

*International Workshop on Grid Computing*, Pittsburgh, PA, November, 2004.

- M. Beck, Y. Ding, T. Moore and J. Plank, "Transnet Architecture and Logistical Networking for Distributed Storage," *Workshop on Scalable File System and Storage Technologies*, Sept, 2004.
- Micah Beck, Jean-Patrick Gelas, Dustin Parr, James S. Plank and Stephen Soltesz, "LoDN: Logistical Distribution Network," *Workshop on Advanced Collaborative Environments*, Nice, France, Sept, 2004.
- Bassi, M. Beck, F. Chanussot, J.P. Gelas, R. Harakay, L. Lefevre, T. Moore, J. Plank and P. Primet, "Active and Logistical Networking for Grid Computing: the e-Toile Architecture," *Intl. Conf. on Computational Science*, Krakow, Poland, June, 2004.
- Jin Ding, Jian Huang, Micah Beck, Shaotao Liu, Terry Moore, and Stephen Soltesz, "Remote Visualization by Browsing Image Based Databases with Logistical Networking," *SC 2003*, Phoenix, AZ, November 2003.
- Micah Beck, James S. Plank, Jeremy Millar, Scott Atchley, Stephen Soltesz, Alessandro Bassi, Huadong Liu, "Information Security on the Logistical Network: An End-to-End Approach", *IEEE Security in Storage Workshop*, Washington, D.C., USA, October, 2003
- Micah Beck, Terry Moore and James S. Plank, "An End-to-End Approach to Globally Scalable Programmable Networking," *FDNA-03: Workshop on Future Directions in Network Architecture, in conjunction with ACM SIGCOMM 2003*, Karlsruhe, Germany, August 2003.
- Micah Beck, Ying Ding, Erika Fuentes and Sharmila Kanherla, "An Exposed Approach to Reliable Multicast in Heterogeneous Logistical Networks," *Workshop on Grids and Advanced Networks*, Tokyo, Japan, May 12-15, 2003.
- Alessandro Bassi, Micah Beck, Terry Moore, and James S. Plank, "The Logistical Backbone: Scalable Infrastructure for Global Data Grids," *Asian Computing Science Conference 2002*, Hanoi, Vietnam, December 2002.
- Micah Beck, Terry Moore, and James S. Plank, "An End-to-End Approach to Globally Scalable Network Storage," *ACM SIGCOMM 2002 Conference*, Pittsburgh, PA, August 19-23, 2002.
- Micah Beck and Terry Moore, "Toward a Scalable Architecture for Logistical Management of Active Content," *Workshop on Distributed Computing Architectures for Digital Libraries*, Vancouver, Canada, August 18-21, 2002.
- Alessandro Bassi, Micah Beck, Jean Patrick Gelas and Laurent Lefevre, "Logistical Storage in Active Networking: a promising framework for network services," *3rd International Conference on Internet Computing (IC 2002)*, Las Vegas, NV, June 24-27, 2002.
- James S. Plank and Micah Beck, "The Logistical Computing Stack -- A Design For Wide-Area, Scalable, Uninterruptible Computing," *Workshop on Scalable, Uninterruptible Computing, DSN 2002: Dependable Systems and Networks*, Bethesda, Maryland, June 2002.
- Micah Beck and Terry Moore, "Logistical Networking: When Institutions Peer," *2nd International Workshop on Global and Peer-to-Peer Computing on Large Scale Distributed Systems, CCGrid 2002*, Berlin, Germany, May 21-24, 2002.
- Alessandro Bassi, Micah Beck, Graham Fagg, Terry Moore, James S. Plank, Martin Swany, and Rich Wolski, "The Internet Backplane Protocol: A Study in Resource Sharing," *International Symposium on Cluster Computing and the Grid*, Berlin, Germany, May 2002.

- Alessandro Bassi, Micah Beck, Erika Fuentes, Terry Moore, and James S. Plank, “Logistical Storage Resources for the Grid,” *International Conference on Computational Science*, Amsterdam, The Netherlands, April 21-24, 2002.
- Scott Atchley, Stephen Soltesz, James S. Plank, Micah Beck, and Terry Moore, “Fault-Tolerance in the Network Storage Stack,” *IEEE Workshop on Fault-Tolerant Parallel and Distributed Systems*, Ft. Lauderdale, FL, April 15-19, 2002.
- James S. Plank, Micah Beck, and Terry Moore, “Logistical Networking Research and the Network Storage Stack,” *USENIX FAST 2002 Conference on File and Storage Technologies, work in progress report*, Monterey, CA, January 28-30, 2002.
- Micah Beck, Terry Moore and James S. Plank, “Exposed vs. Encapsulated Approaches to Grid Service Architecture,” *2nd International Workshop on Grid Computing*, Denver, CO, November, 2001.
- Micah Beck, Dorian Arnold, Alessandro Bassi, Jack Dongarra, Terence Moore, James S. Plank, Martin Swany, Sathish Vadhiyar, Rich Wolski, Fran Berman, Henri Casanova, and Graziano Obertelli, “Logistical Computing and Internetworking: Middleware for the Use of Storage in Communication,” *Third Annual International Workshop on Active Middleware Services (AMS 2001)*, San Francisco, CA, August 06, 2001.
- Alessandro Bassi, Micah Beck, and Terry Moore, “Mobile Management of Network Files,” *Third Annual International Workshop on Active Middleware Services (AMS 2001)*, San Francisco, CA, August 06, 2001.
- James S. Plank, Micah Beck, Wael Elwasif, Terence Moore, Martin Swany and Rich Wolski, “The Internet Backplane Protocol: Storage in the Network,” *NetStore '99: Network Storage Symposium*, Internet2, Seattle, WA, October 1999.
- Wael Elwasif, James S. Plank, Micah Beck and Rich Wolski, “IBP-Mail: Controlled Delivery of Large Mail Files,” *NetStore '99: Network Storage Symposium*, Internet2, Seattle, WA, October 1999.
- M. Beck, R. Chawla, B. Dempsey and T. Moore, “Portable Representation of Internet Content Channels in I2-DSI,” *4th Intl WWW Caching Workshop*, San Diego, CA, May 1999.
- James S. Plank, Micah Beck, Gerry Kingsley and Kai Li, “Libckpt: Transparent Checkpointing under Unix,” *Winter 1995 Technical Conference*, New Orleans, LA, January 1995, pp. 213--223.
- Keshav Pingali, Micah Beck, Richard Johnson, Mayan Moudgill, and Paul Stodghill, “Dependence Flow Graphs: An Algebraic Approach to Program Dependencies,” *1991 Symposium on the Principles of Programming Languages*, Orlando, Florida, January 1991.

### **Other Publications**

- Micah Beck and Terry Moore. “How We Ruined the Internet,” arXiv:2306.01101, June 2023. *Submitted to Communications of the ACM*.
- Micah Beck. “Exposed Buffer Architecture,” arXiv:2204.11300, June 2022.
- Micah Beck and Terry Moore. “Universal Digital Services Through Basic Broadband,” arXiv:2107.12269, July 2021.
- Mark Asch, Francois Bodin, Micah Beck, Terry Moore, Michela Taufer, Jean-Pierre Vilotte.

“Cybercosm: New Foundations for a Converged Science Data Ecosystem”, arXiv:2105.10680, May 2021.

- French, N. H., M. Swany, M. Beck, S. Janiszewski, J. Musser, A. Poley, J. Zerick and B. Schmidt. “Accessing geospatial data in wildland fire operations: Review of the Wildfire Data Logistics Network and data ferry prototype,” Presentation at AGU Fall 2020. Virtual, American Geophysical Union (2020).
- Micah Beck, “The Programmable Network Stack”, White paper included in *the US-Japan Workshop on Programmable Networking*, November 2020
- Micah Beck, Terry Moore, “Clark's ‘Funnel’ Reconsidered,” White paper included in the report of the *FABRIC Community Visioning Workshop*, April 2020, Chicago IL,
- Micah Beck, Martin D. Swany, “Location, Location, Location: The Exposed Buffer Approach to Problems of Data Logistics,” White paper presented at the *Large Scale Networking (LSN) Workshop on Huge Data*, April 2020, Chicago IL
- Micah Beck, Terry Moore, "Pervasively Distributed CyberInfrastructure for Yottascale Data Ecosystems," White paper included in the *ASPLOS 2018 Workshop on Interdisciplinary Research Challenges in Computer Systems*, 3/24-25/2018.
- Micah Beck, Huadong Liu, Terry Moore, Yong Zheng, “Pipelining and Caching the Internet Backplane Protocol,” UT-CS-04-529, University of Tennessee Computer Science Department, September, 2004.
- Micah Beck, Terry Moore, “Locating Interoperability in the Network Stack ,” UT-CS-04-520, University of Tennessee Computer Science Department, February, 2004.
- Micah Beck, “Why Logistical Networking is not a Content Sharing Service,” UT-CS-04-516, University of Tennessee Department of Computer Science, December, 2003.
- Scott Atchley, Micah Beck, Hunter Hagewood, Jeremy Millar, Terry Moore, James S. Plank, and Stephen Soltesz, “Next Generation Content Distribution Using the Logistical Networking Testbed,” Technical Report CS-02-498, University of Tennessee Department of Computer Science, December 30, 2002.
- Scott Atchley, Micah Beck, Jeremy Millar, Terry Moore, James S. Plank, and Stephen Soltesz, “The Logistical Networking Testbed,” Technical Report CS-02-496, University of Tennessee Department of Computer Science, December 16, 2002.
- Scott Atchley, Stephen Soltesz, James S. Plank, Micah Beck, “Video IBPster,” Technical Report CS-02-490, University of Tennessee Department of Computer Science, October 31, 2002.
- James S. Plank, Scott Atchley, Ying Ding, and Micah Beck, “Algorithms for High Performance, Wide-Area, Distributed File Downloads,” Technical Report CS-02-485, University of Tennessee Department of Computer Science, October 8, 2002.
- Micah Beck, Terry Moore and James S. Plank, “Scalable Sharing of Wide Area Storage Resources” Technical Report CS-02-475, University of Tennessee Department of Computer Science, January 2002.
- Micah Beck, James S. Plank, Terry Moore, “The Initial IBP Tech Report,” Technical Report CS-98-407, University of Tennessee Department of Computer Science, November 1998.