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Assistant Professor
Dept. of Electrical & Computer Engineering
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Research Interests

Self-assembling Computer Systems and Architecture, Nanoscale System Design & Simulation,
Nanoscale Circuit Design, Self-assembling Device Fabrication, DNA Self-assembly.

Education

University of North Carolina at Chapel Hill	Ph. D.	Computer Science	May 2003
University of North Carolina at Chapel Hill	M.S.	Computer Science	May 2000
Pennsylvania State University	B.S.	Computer Engineering	May 1998

Academic Positions

Assistant Professor, Duke University (7/04 – present)
Visiting Assistant Professor, Duke University (8/03 – 7/04)
Research Associate, University of North Carolina at Chapel Hill, (5/03 – 7/03)
Research Assistant, University of North Carolina at Chapel Hill, (8/98 – 5/03)

Awards

Presidential Early Career Award for Scientists and Engineers, 2009
Young Investigator Award, Army Research Office, 2009
DARPA Computer Science Study Group, 2009
Microsoft Research New Faculty Fellowship Finalist, 2006.

Journal and Conference Publications

1. C. Pistol, W. Chongchitmate, C. Dwyer, A. R. Lebeck. “Architectural Implications of Nanoscale Integrated Sensing and Computing”, Proceedings of the 14th International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS-XIV), 2009.
2. C. Pistol, C. Dwyer, A. R. Lebeck, “Nanoscale Optical Computing using Resonance Energy Transfer Logic”, IEEE Micro, vol. 28, no. 6, 7-19, 2008.

3. K. Skinner, C. Dwyer, M. R. Falvo, R. M. Taylor, S. Washburn, "Electrical and Mechanical Characterization of Au-CdSe-Au Heterostructured Nanowires", Proceedings of the Materials Research Society Spring Meeting, San Francisco, CA, 2008.
4. V. Mao, C. Dwyer, K. Chakrabarty, "Fabrication Defects and Fault Models for DNA Self-Assembled Nanoelectronics", International Test Conference (ITC), Paper 31.1, 2008.
5. K. Skinner, C. Dwyer, S. Washburn, "Quantitative Analysis of Individual Metal-CdSe-metal Nanowire Field-effect Transistors", Applied Physics Letters, vol. 92, no. 11, 112105, 2008.
6. C. Dwyer and A. Lebeck, *An Introduction to DNA Self-assembled Computer Design*, pp. 212, Artech House Publishing, 2008.
7. C. Dwyer, C. Pistol, A. R. Lebeck, "Energy Transfer Logic on DNA Nanostructures: Enabling Molecular-Scale Amorphous Computing", 4th Workshop on Non-Silicon Computing (NSC-4), ISCA 2007.
8. J. P. Patwardhan, V. Johri, C. Dwyer, A. R. Lebeck, "A Defect Tolerant Self-organizing Nanoscale SIMD Architecture", ACM Journal on Emerging Technologies in Computing Systems, vol. 3, no. 2, 1-33, July 2007.
9. C. Pistol and C. Dwyer, "Scalable, Low-cost, Hierarchical Assembly of Programmable DNA Nanostructures", Nanotechnology, vol. 18, 125305-9, 2007.
10. K. Skinner, C. Dwyer, S. Washburn, "Selective Functionalization of Arbitrary Nanowires", Nano Letters, vol. 6, no. 12, pp. 2758-2762, 2006.
11. J. P. Patwardhan, V. Johri, C. Dwyer, A. R. Lebeck, "A Defect Tolerant Self-organizing Nanoscale SIMD Architecture," Proceedings of the 12th International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS-XII), October 2006.
12. J. P. Patwardhan, C. Dwyer, A. R. Lebeck, "Self-Assembled Networks: Control vs. Complexity", 1st International Conference on Nanoscale Networks, (NANONET), September 2006.
13. J. P. Patwardhan, C. Dwyer, A. R. Lebeck, "Design and Evaluation of Fail-Stop Self-Assembled Nanoscale Processing Elements," IEEE International Workshop on Design and Test of Defect-Tolerant Nanoscale Architectures (NANOARCH '06), June 2006.
14. C. Pistol, A. R. Lebeck, C. Dwyer, "Design Automation for DNA Self-Assembled Nanostructures," Proceedings of the 43rd Design Automation Conference (DAC), July 2006.
15. J. P. Patwardhan, C. Dwyer, A. R. Lebeck, D. J. Sorin, "NANA: A Nano-scale Active Network Architecture," ACM Journal on Emerging Technologies in Computing Systems, vol. 2, no. 1, pp. 1-31, January, 2006.

16. S. H. Park, C. Pistol, S. J. Ahn, J. H. Reif, A. R. Lebeck, C. Dwyer, T. H. Labean, "Finite-size, Fully-Addressable DNA Tile Lattices Formed by Hierarchical Assembly Procedures," *Angewandte Chemie*, vol. 45, pp. 735-739, January 2006.
17. C. Dwyer and A. R. Lebeck, "Self-Assembled Computer Architecture," *Systems Self-Assembly: multidisciplinary snapshots*, eds. N. Krasnogor, et al. (invited chapter), *in press*.
18. C. Dwyer, "Computer-Aided Design for DNA Self-Assembly: Process and Applications," *Proceedings of the IEEE/ACM International Conference on Computer Aided Design (ICCAD)*, pp. 662-667, November 2005. (invited paper)
19. J. P. Patwardhan, C. Dwyer, A. R. Lebeck, D. J. Sorin, "Evaluating the Connectivity of Self-Assembled Networks of Nanoscale Processing Elements," *IEEE International Workshop on Design and Test of Defect-Tolerant Nanoscale Architectures (NANOARCH '05)*, pp. 2.1-2.8, May 2005.
20. C. Dwyer, "A System-level Design Approach to the Evaluation of Self-assembled Computer Architectures," *Proceedings of the 2nd Conference on the Foundations of Nanoscience*, pp. 255-261, April 2005. (invited paper)
21. C. Dwyer, S. H. Park, T. LaBean, A. Lebeck, "The Design and Fabrication of a Fully Addressable 8-tile DNA Lattice," *Proceedings of the 2nd Conference on the Foundations of Nanoscience*, pp. 187-191, April 2005.
22. C. Dwyer, A. Lebeck, D. Sorin, "Self-assembled Architecture and the Temporal Aspects of Computing," *IEEE Computer*, vol. 38, pp. 56-64, January 2005.
23. C. Dwyer, L. Vicci, J. Poulton, R. Taylor, "DNA Self-assembled Parallel Computer Architectures," *Nanotechnology*, vol. 15, pp. 1688-1694, 2004.
24. C. Dwyer, L. Vicci, J. Poulton, D. Erie, R. Superfine, S. Washburn, R. M. Taylor, "The Design of DNA Self-Assembled Computing Circuitry," *IEEE Trans. on VLSI*, vol. 12, pp. 1214-1220, 2004.
25. C. Dwyer, V. Johri, M. Cheung, J. Patwardhan, A. Lebeck, D. Sorin, "Design Tools for a DNA-guided Self-assembling Carbon Nanotube Technology," *Nanotechnology*, vol. 15, pp. 1240-1245, 2004.
26. M. Cheung, C. Dwyer, D. Sorin, "Semi-empirical SPICE Models for Carbon Nanotube FET Logic," *Proceedings of the 4th IEEE Conference on Nanotechnology*, pp. 386-388, 2004.
27. J. Patwardhan, C. Dwyer, A. Lebeck, D. Sorin, "Circuit and System Architecture for DNA-Guided Self-Assembly of Nanoelectronics," *Proceedings of the 1st Conference on the Foundations of Nanoscience*, pp. 344-358, April, 2004.
28. C. Dwyer, R. Taylor, L. Vicci, "Performance Simulation of Nanoscale Silicon Rod Field-Effect Transistor Logic," *IEEE Trans. on Nanotechnology*, vol. 2, no. 2, pp. 69-74, 2003.

29. C. Dwyer, "Self-Assembled Computer Architecture: Design and Fabrication Theory," Ph.D. dissertation, supervised by Russell Taylor (adviser), Dorothy Erie, John Poulton, Richard Superfine, Leandra Vicci, and Sean Washburn, May 2003.
30. C. Dwyer, M. Guthold, M. Falvo, S. Washburn, R. Superfine, and D. Erie, "DNA-Functionalized Single-walled Carbon Nanotubes," *Nanotechnology*, vol. 13, pp. 601-604, 2002.
31. C. Dwyer, R. Taylor, L. Vicci, "Transport Simulation of a Nanoscale Silicon Rod Field-Effect Transistor," *Proceedings of the 2nd IEEE Conference on Nanotechnology*, pp. 401-404, 2002.

Contributed Conference Presentations

32. "Multi-function DNA Self-assembled Contrast Agents," *Nanoscale Devices for Defense and Security (Nano-DDS)*, Washington DC, June 2007.
33. "Selective Functionalization of Hetero-structured Au-CdSe-Au Nanowires," *The 3rd Conference on the Foundations of Nanoscience*, April 2006.
34. "The Design and Fabrication of a Fully Addressable 8-tile DNA Lattice," *The 2nd Conference on the Foundations of Nanoscience*, April 2005.
35. "Semi-empirical SPICE Models for Carbon Nanotube FET Logic," *The 4th IEEE Conference on Nanotechnology*, August 2004.
36. "CAD Support for DNA-Guided Self-Assembly of Nanoelectronics," *The 1st Conference on the Foundations of Nanoscience*, April 2004.
37. "Parallel Computer Architectures Enabled by Self-Assembly," *The 1st Conference on the Foundations of Nanoscience*, April 2004.
38. "Transport Simulation of a Nanoscale Silicon Rod Field-Effect Transistor," *The 2nd IEEE Conference on Nanotechnology*, August 2002.
39. "Methodology for the DNA-Guided Self Assembly of Novel Computing Circuitry," *The 10th Foresight Conference on Molecular Nanotechnology*, October 2002.
40. "Self-assembled Carbon Nanotube Circuitry," *The 67th Meeting of the Southeastern Section of the American Physical Society*, November 2000.

Invited Presentations

41. "DNA Self-assembly and Computer System Fabrication"
 - University of Texas at Austin, March 2007
 - University of Washington, January 2007
 - The 73rd Meeting of the Southeastern Section of the American Physical Society, November 2006

- Tufts University, June 2006
 - Virginia Tech, March / May 2006
 - North Carolina Nanobiotechnology Conference, January 2006.
42. “Computer-Aided Design for DNA Self-Assembly: Process and Applications”
- The IEEE/ACM International Conference on Computer Aided Design (ICCAD), November 2005.
43. “A System-level Design Approach to Self-assembled Computer Architecture”
- The 2nd Conference on the Foundations of Nanoscience, April 2005
 - Duke Frontiers, May 2005.
44. “Circuit and System Architecture for the DNA-guided Self-assembly of Nanoelectronics”
- Air Force Research Laboratory, July 2004.
45. “Self-assembled Computer Architecture”
- University of California at Berkeley, April 2004
 - Brown University, April 2004
 - Duke University, July 2003 / April 2004
 - North Carolina State University, June 2003.
46. “The UNC nanoManipulator System Tutorial”
- Fitzpatrick Center for Photonics and Communication Convocation, April 2001
 - 7th Foresight Conference on Molecular Nanotechnology, March 1999.

Professional Activities

<i>Scientific Review Panel Member:</i>	NSF 2006/07/08/09, SFI (Science Foundation Ireland) 2005/06
<i>Conference Organization:</i>	(General co-chair) IEEE Nano-nets 2006, Lausanne, Switzerland (Program chair) 4 th Workshop on Non-silicon Computing (NSC-4), at ISCA 2007.
<i>Conference Program Committee:</i>	JCIS-2005, NanoArch-2005/06/07, IEEE Nano-nets 2006, Computing Frontiers 2007, ICCAD 2007.
<i>Conference / Publication Reviewer:</i>	IEEE-VR2004, IPDPS-2004, ICPADS-2004, ISPASS-2005, DAC 2006, IEEE Trans. on Nanotechnology, IEEE Trans. on Electron Devices, IOP Nanotechnology, ACM Journal on Emerging Technologies in Computing Systems, IEEE Trans. on Nanobiotechnology, Elsevier’s Journal on Natural Computing.
<i>Guest Journal Editor:</i>	IEEE Trans. on Nanotechnology, ACM Journal on Emerging Technologies in Computing Systems
<i>Book:</i>	Introduction to DNA Self-Assembled Computer Design
<i>Professional Societies:</i>	ACM, ACS, AAAS, IEEE, ISNSCE
<i>Research Sponsors:</i>	DARPA, Army Research Office, National Science Foundation, Air Force Research Laboratory, Microsoft Research, and Agilent Technologies.