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Born
November 4, 1967
Miami, FL, USA

Education

Washington University, St. Louis, Missouri

1996: Doctor of Science in Electrical Engineering

Thesis: *Fundamental Limits on the Storage Capacity of Magnetic Recording Media*

Thesis Advisor: Dr. Joseph A. O'Sullivan

Research Advisors: Drs. Joseph A. O'Sullivan, Ronald S. Indeck, and Marcel W. Muller

1993: Master of Science in Electrical Engineering

Thesis: *Physically Based Models for Magnetic Recording Channels*

1990: Bachelor of Science in Electrical Engineering
Bachelor of Science in Computer Science
Cum Laude

Employment

1996 – present: NAS-NRC Postdoctoral Fellow
Information Technology Laboratory, National Institute of Standards and Technology.

1991 – 1996: Research Assistant
Magnetics and Information Science Center, Electronic Systems and Signals Research Laboratory, Washington University.

Summary of Research Activities

1996 – present: Object-Oriented MicroMagnetic computing Framework (OOMMF)

- Co-developer of OOMMF, an extensible, portable, problem-solving environment for micromagnetic simulation.
  - Developed extension which adds event-driven objects to the Tcl language.
  - Developed a Tcl Extension Manager to handle multiple versions of multiple Tcl extensions within an application.
  - Developed a library of Tcl routines to support network communications among distributed applications.
  - Developed a help browser application which displays HTML hypertext.
  - Developed portable system for configuring and building OOMMF applications from source code.
  - Developed graphical user interface to micromagnetic solver module.
  - Tcl/Tk, C++, CVS

- Determined an analytical solution for the switching field of a single-domain magnetic particle following Landau-Lifshitz-Gilbert dynamics in the limit of zero-damping, which is useful for verification of numerical simulations.

1991 – 1996: Storage Limits of Magnetic Recording Media

- Joint research project of the Magnetics and Information Science Center (applied physics) and the Electronic Systems and Signals Research Laboratory (communication and information theory).
  - Developed models of polycrystalline, thin-film magnetic recording media amenable to information theoretic analysis.
  - Implemented computer simulations of those models.
  - Simulated recording and playback operations, demonstrating medium noise repeatability in agreement with experimental observations, but not predicted by statistical models of magnetic recording channels.
  - Computed technology-independent fundamental limits on areal storage density imposed by the innate physics of magnetic recording media.
  - C++, MATLAB, Perl, GeomView.
- Supervised undergraduate research projects.
- Unix system administrator for laboratory workstations.
  - Created automated system for recording backups of laboratory data onto magnetic tape.
  - SunOS, Solaris, Perl.
- World Wide Web administrator
  - Created web-accessible database of bibliographic references and preprints of laboratory publications.
  - HTML, CGI, Perl, BibTeX.

1989 – 1991: High-Resolution Radar Imaging

- Developed computer simulation of Inverse Synthetic Aperture Radar (ISAR) signal collection and image generation
- Assisted in implementation of maximum likelihood radar imaging algorithms.
- C, C++, MATLAB.

Publications

Journal Publications

D. G. Porter, "Analytical Determination of the LLG Zero-Damping Critical Switching Field," *IEEE Transactions on Magnetics*, vol. 34, no. 4, pp. 1663-1665, July 1998.

D. G. Porter, E. Glavinas, P. Dhagat, J. A. O'Sullivan, R. S. Indeck, and M. W. Muller, "Irregular Grain Structure in Micromagnetic Simulation," *Journal of Applied Physics*, vol. 79, no. 8, pp. 4695-4697, April 1996.

P. Dhagat, E. Glavinas, A. Jander, D. G. Porter, R. S. Indeck, and M. W. Muller, "Trackwidth Dependence of Transition Jitter," *Journal of Applied Physics*, vol. 79, no. 8, pp. 5652-5654, April 1996.

D. G. Porter, J. A. O'Sullivan, R. S. Indeck and M. W. Muller, "Physically Based Information Science of Magnetic Recording II. Physical Sources of Medium Noise," *IEEE Transactions on Magnetics*, vol. 30, no. 6, pp. 4266-4268, November 1994.

J. A. O'Sullivan, D. G. Porter, R. S. Indeck and M. W. Muller, "Recording Medium Properties and Capacity Bounds," *Journal of Applied Physics*, vol. 75, no. 10, pp. 5753-5755, May 1994.

J. A. O'Sullivan, D. G. Porter, R. S. Indeck and M. W. Muller, "Physically Based Information Science of Magnetic Recording I. Information Capacity of a Medium Model," *IEEE Transactions on Magnetics*, vol. 29, no. 6, pp. 4036-4038, November 1993.

J. A. O'Sullivan, D. L. Snyder, D. G. Porter and P. Moulin, "An Application of Splines to Maximum Likelihood Radar Imaging," *International Journal of Imaging Systems and Technology*, vol. 4, pp. 256-264, 1992.

Selected Conference Publications

D. G. Porter and J. A. O'Sullivan, "Physical Limits on the Storage Capacity of Magnetic Recording Media," in *Proceedings 1995 IEEE International Symposium on Information Theory*, p. 248, IEEE Information Theory Society, September 1995.

J. A. O'Sullivan, D. Agrawal, D. G. Porter, R. S. Indeck and M. W. Muller, "Magnetic Recording System Design to Reduce Medium Noise Through Signal Precompensation," in *Proceedings of the 28th Conference on Information Science and Systems*, pp. 1152-1155, (Princeton, NJ), Department of Electrical Engineering, Princeton University, 1994.

J. A. O'Sullivan, D. G. Porter, R. S. Indeck and M. W. Muller, "A Physically Based Approach to Information Theory for Thin Film Magnetic Recording," in *Proceedings of the 30th Allerton Conference on Communication, Control, and Computing*, pp. 792-798, 1992.

Presentations

Two contributed talks

7th Joint MMM-Intermag Conference, San Francisco, CA, January 1998.

Seminar

Magnetics and Information Science Center, Washington University, May 1997.

Seminar

Institute for Magnetics Research, The George Washington University, February 1997.

Contributed talk

41st Annual Conference on Magnetism & Magnetic Materials , Atlanta, GA, 14 November 1996.

Invited speaker

1st International Symposium on Hysteresis Modeling and Micromagnetics, The Institute for Magnetics Research, George Washington University Virginia Campus, Ashburn, VA, 20 May 1996.

Poster

40th Annual Conference on Magnetism & Magnetic Materials , Philadelphia, PA, 6 November 1995.

Short talk

1995 IEEE International Symposium on Information Theory, Whistler, B. C., Canada, 18 September 1995.

Poster

The 6th Joint MMM-Intermag Conference, Albuquerque, NM, 22 June 1994.

Contributed talk

38th Annual Conference on Magnetism & Magnetic Materials , Minneapolis, MN, 15 November 1993.

Poster

INTERMAG '93 , Stockholm, Sweden, 16 April 1993.

Contributed talk

Thirtieth Annual Allerton Conference on Communication, Control, and Computing , Robert Allerton Park, IL, 30 September 1992.

Honors

- NRC/NIST Postdoctoral Research Associateship, 1996–1998
- Research Assistantship funded by National Storage Industries Consortium and National Science Foundation, 1993–1996
- US Department of Education Graduate Assistance in Areas of National Need Fellowship, 1990–1993
- Washington University Computer Science Departmental Award for Professional Excellence, 1990
- Elected to Tau Beta Pi, 1989
- Elected to Eta Kappa Nu, 1988
- The Paric Corporation Scholarship, 1988–1990
- Calvin M. Woodward Fellowship, 1986–1990
- National Merit Scholarship, 1986–1987

Professional Activities

Positions/Offices Held

Steering committee member - Micromagnetic Modeling Activity Group (muMAG), April 1997 – present.

Session Chairman - Computational Micromagnetics at the **7th Joint MMM-Intermag Conference**, San Francisco, CA, January 1998.

Session Chairman - Modeling of Magnetic Machines at **INTERMAG '97**, New Orleans, LA, April 1997.

Chapter President - Eta Kappa Nu, Washington University, 1989-1990.

Chapter Corresponding Secretary - Eta Kappa Nu, Washington University, 1988-1989.

Journal Referee

IEEE Transactions on Magnetics
Journal of Applied Physics
Physica B

Memberships

Institute of Electrical and Electronics Engineers
Magnetics Society; *Computer Society*; *Information Theory Society*

Teaching/Grading

Guest Lecturer
EE512: Magnetic Recording Technology, Washington University, 1995.

Guest Lecturer
EE379: Signal Analysis for Electronic Systems and Circuits, Washington University, 1994.

Co-presenter
Seminar series on signal space coding, Washington University, 1994.

Grader
EE552: Detection and Estimation Theory, Washington University, 1992-1993.

Consultant
EE280: Introduction to Electrical Networks, Washington University, 1991; led weekly help sessions.

Head Grader
CS135: Introduction to Computer Science, Washington University, 1989-1990; duties included laboratory instruction, grader supervision, consulting and textbook editing.

Grader
EE/CS360: Digital Computers I: Organization and Logic Design, Washington University, 1988.

February 1998

Note: A hypertext version of this document is available on the World Wide Web at URL: `http://math.nist.gov/mcsd/Staff/DPorter/vita/`