

JAMES A. BAIN

Dept. of Electrical and Computer Engineering • Carnegie Mellon University • Pittsburgh PA 15213
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EDUCATION

Ph.D. in Materials Science and Engineering, Stanford University, June 1993.

Thesis: *Structural Characterization of Thin Metallic Films and Multilayers Using X-ray Diffraction.*

M.S. in Materials Science and Engineering, Stanford University, June 1991.

B.S. *cum laude* in Materials Science and Engineering, University of Pennsylvania, June 1988.

WORK HISTORY (U.S. CITIZEN)

Associate Professor: July 2002 - Present. Carnegie Mellon University, Pittsburgh, PA

Senior Research Scientist: July 2001 - July 2002. Carnegie Mellon University, Pittsburgh, PA

Research Scientist: July 1995 - June 2001. Carnegie Mellon University, Pittsburgh, PA

Postdoctoral Research Associate: May 1993 - July 1995. Carnegie Mellon University, Pittsburgh, PA.

Research Assistant: September 1988 - May 1993. Stanford University, Stanford, CA.

Product Support Engineer: May 1988 - September 1988. Advanced Drivetrain Co., Jamestown, NY.

Undergraduate Researcher: June 1987 - June 1988. The University of Pennsylvania, Philadelphia, PA.

PROFESSIONAL ACTIVITIES

Sigma Xi Membership Secretary, Carnegie Mellon Chapter, 2003 - present

Publications Chair, Intermag 2004, Anaheim CA

Technical Program Committee, 2nd Int'l Probe Storage Workshop, Pittsburgh, PA, Nov 2002

Co-organizer, Connexions Probe Storage Workshop, Twente, Netherlands, May, 2002

Editorial board, IEEE Transactions on Magnetics, 2001-present

Co-Editor, Proceeding of Intermag 2002

Scientific Program Committee, Intermag 2002

NSIC Tape Roadmap Heads Technology Team, 2001

Session chair, Joint Intermag/MMM 2001, conference, San Antonio, TX, Jan 2001

Graduate Education Committee Dept of ECE, CMU 1996-1999

Undergraduate Studies Committee, Dept of ECE, CMU: 1999-2001

Facilities Committee, Dept of ECE, CMU 1999-2000

University Radiation Safety Committee: 1999-present, vice-chair 2001, chair 2002

Leader Heads Recording Activity: DSSC, CMU (2002-present)

Leader Tape Recording Thrust: DSSC, CMU (1995-2001)

NSIC Tape Roadmap Executive Committee, 1997-1998

Co-organizer, MRS Symposium L: Materials for Data Storage, San Francisco, CA, Apr. 1998 (1997-1998)

Poster Session Chair, TMRC' 95, Pittsburgh PA 1995.

Referee: J. Appl. Phys, Appl. Phys Lett., Phys. Rev. Lett., IEEE Trans. Mag., MRS Symp. Proc., Dutch

Technology Foundation, JMEMS

Member: Materials Research Society (MRS), IEEE Magnetics Society

AWARDS

NSIC "Ironman" Award (Service Award) 2001-2002

National Science Foundation Graduate Fellowship

IBM Graduate Fellowship

National Merit Scholarship

RESEARCH INTERESTS:

Magnetic Thin Film Materials
Recording Heads

Device Processing
Magnetic Recording Physics

RESEARCH FUNDING:

AWARDED TO DATE

- “Experimental Evaluation of Rise Time and Viscosity Effects in High Density Recording,” National Storage Industry Consortium (NSIC) grant, PI: J.A. Bain, \$25K (Sep 1997- Mar 1998)
- “High Frequency Permeability Measurements of Fe Nitride Laminated Pole Materials,” Grant from DSSC Industrial Consortium, PI: J.A. Bain \$25K, (Jan 1997-June 1997).
- “Single Channel System Development Spin Valve Tape Heads,” Grant from DSSC Industrial Consortium. PI: J.A. Bain, \$200,000, (Jan 1997- Jan 2002)
- “Tape Systems Integration,” Source: Grant from DSSC Industrial Consortium, PI: J.A. Bain \$80,000 (Jan 1997- Jan 1999)
- “Focused Ion Beam Etching: Development of Processes for Thin Film Head Trimming,” Grant from DSSC Industrial Consortium, P.I. J.A. Bain, \$160,000 (Jan 1998- Jan 2002)
- “Frontiers of Magnetic Recording: Write Head Materials and Device Fabrication,” PI: J.A. Bain, NSIC/NSF, \$354,000 (Nov 1998 – Nov 2001)
- “Ultra-High Density Cache for Low Power Communications,” PI: G. Fedder, Co-PI: J.A. Bain, DARPA, \$3,393,166., Jun 1998 – Jun 2001
- “A Thin Film Deposition System for Storage Device Prototyping,” PI: R.M. White, Co-PI: J.A. Bain, NSF, \$600,000., Jul 1998 – Jul 1999
- “Proposal for Acquisition of a Chemical Mechanical Polishing System for the Purpose of Adding Planarization Capability to the Existing Advanced Thin Film Devices Prototyping Facility at Carnegie Mellon University” PI: J.A. Bain, NSF \$200,000. Nov 1999 - Nov 2000.
- "Understanding Deposition Kinetics In FeXN Sputtered Films," PI J.A. Bain, Seagate and NIST (through the ATP Program). \$202,968. Jun 1999-Sep 2000
- "Development Of Disk-Like Sputtered Tape Media" PI J.A. Bain, Co-PI: D.E. Laughlin, National Storage Industry Consortium (NSIC). \$240,000 March 2000-Feb 2004.
- "An Integrated Head for Optically Assisted (Hybrid) Magnetic Recording" PI: J.A. Bain, Co-PI: T.E. Schlesinger, NSF, \$270,000, 2001-2004
- "Heat Assisted Magnetic Recording (HAMR)" PI: M.H. Kryder, Co-PI J.A. Bain, Dept of Commerce ATP Program, \$20,000,000, 2001-2006
- "Methods to Assess the Probability of a Disk being recorded in a Disk Drive" PI: V. Bhagavatula, Co-PI J.A. Bain, TTSWG, \$400,000 (May 2002-May 2004)
- "Sputtered Thin Film Tape Media" PI J.A. Bain, Co-PI D.E. Laughlin, Imation Corp, \$300,000 (Jan 2003-Jan 2006)
- “Susceptibility of Magnetic Information Storage to Power Frequency Magnetic Fields”, PI: J.F. Hoburg, Co-PI J.A. Bain, EPRI, \$150,000 (Oct 2002-Dec 2003)
- “Examination of the feasibility of Delta-R Perovskites Films for Probe Storage”, PI J.A. Bain, Co-PI P. Salvador, Intel Corp. \$450000, (June 2003-June 2006)

PENDING

- “NIRT: One Bit per Particle Nanoscale Information Storage”, PI S. Majetich, Co-PI J.A. Bain, NSF. \$2,000,000, (June 2004-June 2008)

TEACHING AND ADVISING ACTIVITIES 1995-PRESENT

TEACHING

Carnegie Mellon University:

- ECE 18-316 "Introduction to Data Storage", Spring 1995 (assisted Professor Robert White)
- ECE 18-819, "Processes for Microfabrication", Fall 1997
- ECE 18-316, "Introduction to Data Storage", Spring 1998 (co-taught with Prof. Robert White: lab sec.)
- ECE 18-316, "Introduction to Data Storage", Fall 1998 (co-taught with Prof. Robert White: lab sec.)
- CIT 39-717, "Laboratory Methods in Data Storage Research", Fall 1998
- ECE 18-517, "Data Storage Systems Design", Spring 1999 (co-taught with Prof. Jimmy Zhu)
- CIT 39-717, "Laboratory Methods in Data Storage Research", Fall 1999
- ECE 18-517, "Data Storage Systems Design", Spring 2000 (co-taught with Prof. Jimmy Zhu)
- ECE 18-316, "Introduction to Data Storage", Fall 2000
- MSE 27-770, "Electrical, Magnetic and Optical Properties of Materials", Spring 2001
(co-taught with Professor Michael McHenry)
- ECE 18-715, "Physics of Applied Magnetism", Fall 2001
- ECE 18-517, "Data Storage Systems Design", Spring 2002
- ECE 18-202, "Mathematical Foundations of Electrical Engineering", Fall 2002
(co-taught with Prof. James Hoburg, rec. sec.)
- ECE 18-517, "Data Storage Systems Design", Spring 2003
- ECE 18-202, "Mathematical Foundations of Electrical Engineering", Fall 2003
- ECE 18-517, "Data Storage Systems Design", Spring 2004

ADVISING/PROJECT SUPERVISION

Technician Interns

- Dana Berer, Supervisor: Jan-Apr 1996 Graduated from ITT.
- Plashette Scarborough, Supervisor: May-Aug 1996 Graduated from Electronic Institutes.
- Chris Florentz: Supervisor: Sep-Dec 1996 Graduated from ITT.

Undergraduate Students:

- Joseph Yu Project Advisor, Summer 1995, EE UT Austin, Grad. 1996.
- Tonya Galgon Project Co-Advisor (with G. Spratt), Summer 1995, EE Univ of Rochester, Grad. 1996.
- Sidney Laurenceau Project Advisor, Summer 1996, EE, Univ of Rochester. Grad.1998
- Eli Depalma Project Advisor, Summer 1996, EE, Univ of Santa Cruz. Grad 1998.
- Anthony Boccio Project Advisor, Summer 1997, EE, Univ. of Rochester. Grad 1998.
- Jason Chow Project Advisor, Summer 1997, ECE, CMU. Grad 1999.
- Keith Rothschild Project Advisor, Summer 1997, ECE, CMU. Grad 1999.
- Jonathan Gimbel Project Advisor, Summer 1998, Mech E, Penn State. Grad 1999.
- Kelly Pellerin Project Advisor, Fall 1998/Spring 1999, Physics, CMU. Grad 1999.
- Winnie Yu Project Advisor, Fall 1998/Spring 1999, Physics/ECE, CMU. Grad 1999.
- Michael Scott Project Advisor, Fall 1999, ECE, CMU. Grad 1999.
- Kurt Edmiston Project Advisor, Summer 1999, Math & Computer Sci, Alfred Univ Grad 2000
- Kevin Roark Project Advisor, Summer 2000, Chemical Eng, Brown Univ , grad 2002
- Jim Salvia Project Co-Advisor Spring 2003 (with J.F. Hoburg) Exp Grad 2005
Project Co-Advisor Spring 2004 (with P. Yue) Exp Grad 2005
- Olivia Tsai Project Co-Advisor Summer 2003 (with J.F. Hoburg) Exp Grad 2004

Master's Students: (bold indicates primary advisor)

- Jason Wolfson Report Reader, 1996 Advisor M.H. Kryder; Grad 1996.
- Angela Kennedy Report Reader, 1996 Advisor G. Spratt; Grad 1996.
- Danny Lee Report Reader, 1997 Advisor S. Charap Grad 1997.
- Mehmet Keskinoz Project Co-Advisor: 1995-1997 (with V. Bhagavatula) Grad 1997**
- Shravan Bharthulwar Report Reader, 1998 Advisor D.N. Lambeth Grad 1998.
- Ming Ni Project Advisor, 1997-1999, Grad. 1999**
- Shingo Tamaru Project Co-Advisor 1998-1999 (with M.H. Kryder) Grad. 1999**
- Alex Roesler Report Reader, 2000 Advisor J.-G. Zhu Grad 2000.
- Cuthbert, Dave Report Reader, 2000 Advisor M.H. Kryder; Grad 2000.
- Winnie Yu Project Advisor, 1999-2001, Grad. 2001.**
- Vickie Guo Project Advisor 2002-Present, Grad 2002.**

Eric Hughes Report Reader, 2002 Advisor W. Messner; Grad 2002.
Shilpi Sahu Report Reader, 2002 Advisor V. Bhagavatula; Grad 2002.

Ph.D. Students: (bold indicates primary advisor)

Pei-hui Zheng Thesis Co-Advisor 1995-1997 (with M.H. Kryder)
Took industry position 1997

Wipul Jayasekara Thesis Committee, 1995-1998 Advisor M.H. Kryder; Grad 1998
Adrian Devasahayam Thesis Committee, 1995-1998 Advisor M.H. Kryder; Grad 1998
Wei Yi Thesis Committee, 1997-2000, Advisors R.M. White/J. Zhu; Grad 2000.

Jason Wolfson Thesis Advisor 1998-2002. Grad. May 2002
Fabian (Zhi-Ling) Lee Thesis Co-Advisor 1998-2002 (with M. E. McHenry) Grad. May 2002
Fatih Sarigoz Thesis Co-Advisor 1998-2002 (with V. Bhagavatula) Grad. May 2002
Pei Zou Thesis Advisor 1998-2002, Grad May 2002
Chang-Min Park Thesis Advisor 1998-2002, Grad. Dec 2002

Josh Park Thesis Committee, 1998, Advisor R. Carley; Grad 1998
Xiangdong Lin Thesis Committee, 1998-2001, Advisor J. Zhu; Grad 2001
Mike Lu Thesis Committee, 1998-2002, Advisor G. Fedder; Grad 2002.
Min Xiao Thesis Committee, 1999, Advisor M.H. Kryder; Grad 1999
Krishna Chowdary Thesis Committee, 1999-2001, Advisor S. Majetich, Grad 2001.
Yifei Yuan Thesis Committee, 2000, Advisor, V. Bhagavatula, Grad 2000.

Shingo Tamaru Thesis Co-Advisor 2000-Present (with M.H. Kryder) Exp Grad. 2003
Alex Roesler Thesis Committee, 2000-2001, Advisor J. Zhu; Grad 2001
Haiwen Xi Thesis Committee, 2000-2002, Advisor, R.M. White, Grad 2002
Rick Shi Thesis Committee, 2000, Advisor J. Zhu, Grad 2000.
Yumin Lee Thesis Committee, 2000-2001, Advisor J. Wickert, Grad 2001
Gang Li Thesis Committee, 1999-2000, Advisor J. Zhu, Grad 2000

Hwansoo Lee Thesis Co-Advisor 2000-Present (with D.E. Laughlin) Exp Grad. 2004
Li Zhang Thesis Co-Advisor 2000-Present (with J. Zhu) Exp Grad. 2004
Winnie Yu Thesis Advisor, 2001-Present, Exp Grad. 2004.

Phil Herget Thesis Committee, 2001-present, Advisor D. Stancil, Exp. Grad 2003
Jingfeng Liu Thesis Committee, 2001-2003, Advisor V. Bhagavatula, Grad 2003
Rany Tawfik Thesis Committee, 2002-Present, Advisor L.R. Carley, Exp. Grad 2003

Seungook Min Thesis Advisor 1998-Present (with D.W. Greve), Exp Grad 2003
Tim Rausch Thesis Committee, 2002-2003, Advisor T.E. Schlesinger, Grad 2003
Vickie Guo Thesis Advisor 2002-Present Exp Grad 2005
Ahmet Kaya Thesis Advisor 2002-Present Exp Grad 2005
Lin Wang Thesis Co-Advisor 2003-Present (with D.E. Laughlin) Exp Grad. 2006
Ding, Yi Thesis Committee, 2003-Present, Advisor S. Majetich, Exp Grad 2004
Fan, Zhaohui Thesis Committee, 2003-Present, Advisor D.E. Laughlin, Exp Grad 2004
Srinivasan, Kumar Thesis Committee, 2003-Present, Advisor D.E. Laughlin, Exp Grad 2005

Post-docs (bold indicates primary advisor):

Gwan Soo Park Project Supervisor, 1997-1998 Returned to Korean Maritime Univ., 1998
Chen Chen Project Supervisor 2001-2003
Changmin Park Project Supervisor 2003
Hwansoo Lee Project Supervisor, 2004

**JAMES A. BAIN
PUBLICATIONS AND TALKS**

ARCHIVAL PAPERS REFEREED BEFORE PUBLICATION

S. Tamaru, J. A. Bain, R. J. M. van de Veerdonk, T. M. Crawford, M. Covington and M. H. Kryder, "Measurement of Magnetostatic Mode Excitation and Relaxation in Permalloy Films Using Scanning Kerr Imaging," *Phys. Rev. B*, (2004, submitted).

D. Z. Bai, W. Yu, J. A. Bain and J.-G. Zhu, "Micromagnetic simulation of stress induced domain variations in soft magnetic thin films," *J. of Appl. Phys.*, (2004, in press)

J. A. Bain, M. L. Williams and R. H. Victora, "Analysis of Transition Shape and Adjacent Track Aging for 1 Tbit/in² Write Head Designs," *IEEE Trans. Mag.*, (2004, in press)

H. Lee, J. A. Bain and D. E. Laughlin, "The Application of Sputtered Thin Film in Advanced Recording Tape Media," *IEEE Trans. Mag.*, (2004, in press)

C.-M. Park, J. A. Bain, T. W. Clinton, P. A. A. van der Heijden and T. J. Klemmer, "Characterization of focused-ion-beam induced Ga implantation in two directions: depth direction and lateral direction," *Appl. Phys. Lett.*, (2004, in press)

Y. Yang, J. A. Bain, J.-G. Zhu and M. Asheghi, "Accurate Modeling of Temperature Rise in Giant Magnetoresistive (GMR) Sensor During an Electrostatic Discharge (ESD) Event," *IEEE Trans. Mag.*, (2004, in press)

L. Zhang, J. A. Bain, J.-G. Zhu, L. Abelmann and T. Onoue, "A Model for Mark Size Dependence on Field Emission Voltage in Heat Assisted Magnetic Probe Recording on CoNi/Pt Multilayers," *IEEE Trans. Mag.*, (2004, in press)

T. Rausch, J. A. Bain, D. D. Stancil and T. E. Schlesinger, "Thermal Williams's Comstock Model for Predicting Transition Lengths in a Heat-Assisted Magnetic Recording System," *IEEE Trans. Mag.*, vol. 40, pp 137-147 (2004)

T. Rausch, J. A. Bain, D. D. Stancil, T. E. Schlesinger, W. A. Challener, T. McDaniel, N. Deeman and C. Brucker, "Experimental effects of laser power on the writability and pulse width in a heat assisted longitudinal recording system," *Japanese Journal of Applied Physics*, vol. 42, pp 989-94 (2003)

H. Lee, L. Wang, J. A. Bain and D. E. Laughlin, "Use of room-temperature bias sputtering to decrease intergranular coupling in magnetic media deposited on polymeric substrates," *IEEE Trans. Mag.*, vol. 39, pp 3616-18 (2003)

H. Lee, D. E. Laughlin and J. A. Bain, "Recording properties of CoCrPt tape media sputter-deposited at room temperature on polymeric substrates," *J. of Appl. Phys.*, vol. 93, pp 7783-5 (2003)

C.-M. Park, J. A. Bain, T. W. Clinton and P. A. A. van der Heijden, "Effects of focused-ion-beam irradiation on perpendicular write head performance," *J. of Appl. Phys.*, vol. 93, pp 6459-61 (2003)

A. V. Itagi, D. D. Stancil, J. A. Bain and T. E. Schlesinger, "Ridge waveguide as a near-field optical source," *Appl. Phys. Lett.*, vol. 83, pp 4474-6 (2003)

F. Chen, A. Itagi, J. A. Bain, D. D. Stancil, T. E. Schlesinger, L. Stebounova, G. C. Walker and B. B. Akhremitchev, "Imaging of optical field confinement in ridge waveguides fabricated on very-small-aperture laser," *Appl. Phys. Lett.*, vol. 83, pp 3245-7 (2003)

D. Litvinov, J. Wolfson, J. A. Bain, R. W. Gustafson, M. H. Kryder and S. Khizroev, "Narrow-gap single-pole heads," *IEEE Trans. Mag.*, vol. 38, pp 2253-5 (2002)

D. Litvinov, A. Lyberatos, J. Wolfson, J. A. Bain and S. Khizroev, "Recording layer influence on the dynamics of a soft underlayer," *IEEE Trans. Mag.*, vol. 38, pp 1994-6 (2002)

- S. Khizroev, J. A. Bain and D. Litvinov, "Fabrication of nanomagnetic probes via focused ion beam etching and deposition," *Nanotechnology*, vol. 13, pp 619-22 (2002)
- P. Herget, T. Rausch, A. C. Sheila, D. D. Stancil, T. E. Schlesinger, J. G. Zhu and J. A. Bain, "Mark shapes in hybrid recording," *Appl. Phys. Lett.*, vol. 80, pp 1835-7 (2002)
- T. Rausch, P. Herget, A. Itagi, D. D. Stancil, J. A. Bain, J. G. Zhu and T. E. Schlesinger, "Effects of optical spot/magnetic head misalignment for perpendicular hybrid magnetic recording systems (invited)," *Transactions of the Magnetics Society of Japan*, vol. 2, pp 322-7 (2002)
- T. E. Schlesinger, T. Rausch, A. Itagi, J.-G. Zhu, J. A. Bain and D. D. Stancil, "An integrated read/write head for hybrid recording," *Japanese Journal of Applied Physics*, vol. 41, pp 1821-4 (2002)
- W. Yu, J. A. Bain, P. Yingguo and D. E. Laughlin, "Magnetization reduction due to oxygen contamination of bias sputtered Fe/sub 35/Co/sub 65/ thin films," *IEEE Trans. Mag.*, vol. 38, pp 3030-2 (2002)
- L. Zhang, J. A. Bain and J.-G. Zhu, "Dependence of thermomagnetic mark size on applied STM voltage in Co-Pt multilayers," *IEEE Trans. Mag.*, vol. 38, pp 1895-7 (2002)
- G. Ju, R. J. M. van de Veerdonk, S. Tamaru, T. M. Crawford, G. J. Parker, Y. Kubota, M. L. Wu, S. Batra, D. K. Weller and J. A. Bain, "High Frequency Dynamics of the Soft-Underlayer in Perpendicular Recording System," *J. of Appl. Phys.*, vol. 91, pp 8052-8054 (2002)
- C.-L. Lee, J. A. Bain, S.-Y. Chu and M. E. McHenry, "Separation of Contributions to Spin Valve Interlayer Exchange Coupling Field by Temperature Dependent Coupling Field Measurements," *J. of Appl. Phys.*, vol. 91, pp 7113-7115 (2002)
- H. Lee, D. E. Laughlin and J. A. Bain, "Controlling the Magnetic Properties of CoCrPt Thin Films by Means of Thin Hexagonal-close-packed Intermediate Layers," *J. of Appl. Phys.*, vol. 91, pp 7065-7067 (2002)
- H. Lee, J. A. Bain and D. E. Laughlin, "Improvement of preferred orientation of NiAl/CrMn underlayers deposited on prebaked tape substrates," *J. of Appl. Phys.*, vol. 91, pp 8736-8738 (2002)
- S. Min, J. A. Bain and D. W. Greve, "Control of Stress and Plasma-induced Heating During DC Magnetron Sputtering of Permalloy Films for Microelectromechanical Systems," *J. of Appl. Phys.*, vol. 91, pp 6824-6826 (2002)
- C.-M. Park and J. A. Bain, "Focused-Ion-Beam Induced Grain Growth in Magnetic Materials for Recording Heads," *J. of Appl. Phys.*, vol. 91, pp 6830-6832 (2002)
- S. Tamaru, J. A. Bain, R. J. M. van de Veerdonk, T. M. Crawford, M. Covington and M. H. Kryder, "Imaging of Quantized Magnetostatic Modes Using Spatially Resolved Ferromagnetic Resonance," *J. of Appl. Phys.*, vol. 91, pp 8034-8036 (2002)
- J. T. Wolfson, J. A. Bain, S. K. Khizroev and D. Litvinov, "Dynamic Kerr Imaging of Soft Underlayers for Perpendicular Magnetic Recording Applications (Invited)," *J. of Appl. Phys.*, vol. 91, pp 8665-8669 (2002)**
- C.-M. Park and J. A. Bain, "Local degradation of magnetic properties in magnetic thin films irradiated by Ga/sup +/ focused-ion-beams," *IEEE Trans. Mag.*, vol. 38, pp 2237-9 (2002)
- D. Litvinov, J. Wolfson, J. A. Bain, R. W. Gustafson, M. H. Kryder and S. Khizroev, "The role of the gap in single pole heads in perpendicular recording," *IEEE Trans. Mag.*, vol. 38, pp 1658-63 (2002)
- P. Zou and J. A. Bain, "Surface Nitrogen Concentration Dependence of the Nitrogen Incorporation in Reactively Sputtered Fe_xN Films," *J. of Appl. Phys.*, vol. 91, pp 6827-2829 (2002)
- P. Zou, W. Yu and J. A. Bain, "Effect of Stress on Stripe Domain Onset in Sputtered FeN and CoFe Films," *J. of Appl. Phys.*, vol. 91, pp 7830-7832 (2002)

- P. Zou, W. Yu and J. A. Bain, "Influence of stress and texture on soft magnetic properties of thin films," *IEEE Trans. Mag.*, vol. 38, pp 3501-20 (2002)
- C.-L. Lee, S. Chu, J. A. Bain and M. E. McHenry, "Analysis of angular dependent resistance measurements on IrMn-based spin valves using a finite pinning model," *IEEE Trans. Mag.*, vol. 38, pp 2694-6 (2002)
- D. Litvinov, R. Chomko, J. T. Wolfson, E. B. Svedberg, J. A. Bain, R. M. White, R. Chantrell and S. K. Khizroev, "Dynamics of Perpendicular Recording," *IEEE Trans. Mag.*, vol. 37, pp 1376-1378 (2001)
- J. T. Wolfson and J. A. Bain, "Kerr Imaging of Thin Film Magnetic Transducer to Measure Thin-Film Head Fields," *IEEE Trans. Mag.*, vol. 37, pp 2761-2763 (2001)
- J. P. van't Hof, J. A. Bain, J.-G. Zhu, and R. M. White, "An Undergraduate Laboratory for Data Storage," *IEEE Transactions on Education*, vol. 44, pp. 224-231, 2001.
- B. Bian, J. A. Bain, K. Soon-Ju and D. E. Laughlin, "High coercivity Co-alloy thin films on polymer substrates," *IEEE Trans. Mag.*, vol. 37, pp 1640-2 (2001)
- G. Ju, R. J. M. van de Veerdonk, E. B. Svedberg, K. W. Wierman, D. Weller, K. J. Howard, M. H. Kryder, S. Tamaru, J. T. Wolfson and J. A. Bain, "Sub-nanosecond non-Arrhenius magnetic switching in perpendicular multilayers," *IEEE Trans. Mag.*, vol. 37, pp 1570-2 (2001)
- R. J. M. van de Veerdonk, G. Ju, E. B. Svedberg, D. Weller, S. Tamaru, J. T. Wolfson and J. A. Bain, "Real-time observation of sub-nanosecond magnetic switching in perpendicular multilayers," *J of Mag. and Mag. Mat.*, vol. 235, pp 138-42 (2001)
- F. Sarigoz, B. V. K. Kumar and J. A. Bain, "Performance of Dropout Correction on Real Magnetic Tape Waveforms with Dropouts," *IEEE Trans. Mag.*, vol. 37, pp 639-645 (2001)
- F. Sarigoz, H. Song, B. V. K. Kumar and J. A. Bain, "Dropout-tolerant read channels," *IEEE Journal on Selected Areas in Communications*, vol. 19, pp 744-755 (2001)
- P. Zou and J. A. Bain, "Residual Stress Optimization in FeAlN Pole Materials," *IEEE Trans. Mag.*, vol. 36, pp. 2536-2537, 2000.
- F. Sarigoz, G. Li, B. V. K. Kumar, J. A. Bain, and J.-G. Zhu, "Analysis of Dropout Peakshift in Magnetic Tape Recording," *IEEE Trans. Mag.*, vol. 36, pp. 2170-2172, 2000.
- J. A. Bain, K. Pellerin, J. T. Chow, and P. Zou, "Growth Rate Dependence of Nitrogen Incorporation in Reactively Sputtered FeAlN Films for Recording Head Poles," *IEEE Trans. Mag.*, vol. 36, pp. 3472-3474, 2000.
- L. R. Carley, J. A. Bain, G. K. Fedder, D. W. Greve, D. F. Guillou, M. S. C. Lu, T. Mukherjee, S. Santhanam, L. Abelmann, and S. Min, "Single Chip Computers With MEMS-Based Magnetic Memory (Invited)," *J. of Appl. Phys.*, vol. 87, pp. 6680-6685, 2000.**
- L. Abelmann, J.-G. Zhu, J. A. Bain, K. Ramstock, and C. Lodder, "Micromagnetic Simulation of a Flux Guide for a Read Head with Sub 100-nm Resolution," *J. of Appl. Phys.*, vol. 87, pp. 5538-5540, 2000.
- L. Abelmann, S. K. Khizroev, D. Litvinov, J.-G. Zhu, J. A. Bain, M. H. Kryder, K. Ramstock, and C. Lodder, "Micromagnetic Simulation of an Ultra-small Single Pole Perpendicular Write Head," *J. of Appl. Phys.*, vol. 87, pp. 6636-6638, 2000.
- "Pulse Asymmetries and Write Non-linearities in the Write Equalization Process for Magnetic Tape Recording, G.S. Park, M. Ni, and J.A. Bain, *IEEE Trans Mag.*, vol. 35 (1999) pp. 2262-4.
- "Limitation to Track Following Imposed by Position Error Signal SNR Using a Multi-Tapped Magnetoresistive Servo Head," (Invited) James A. Bain, William C. Messner, John H. Steele II, Theodore A. Schwarz, William J. O'Kane, and Maura P. Connolly, *IEEE Trans. Mag.*, vol. 35 (1999) pp. 741-745**

"Multi-Tapped Magnetoresistive Heads for Magnetic Tape Tracking Servo," J.H. Steele II, W.C. Messner, J.A. Bain, T.A. Schwarz, W.J. O'Kane, and M.P. Connolly, IEEE Trans. Mag., V. 34 (1998) pp. 1904-1906.

"High Frequency Initial Permeability of NiFe and FeAlN," W.P. Jayasekara, J.A. Bain, and M.H. Kryder, IEEE Trans. Mag., V. 34 (1998) pp. 1438-1440.

"MFM Quantification of Magnetic Fields Generated by Ultra-Small Single Pole Perpendicular Heads," S.K. Khizroev, W. Jayasekara, J.A. Bain, R.E. Jones, Jr., and M.H. Kryder, IEEE Trans. Mag., V. 34 (1998) pp. 2030-2032.

"A Reactive Ion Milling Process for Patterning Narrow Track Iron Nitride Recording Head Poles at the Wafer Level," W.P. Jayasekara, J. Grant, J.A. Bain, M.H. Kryder and A.E.T. Kuiper, IEEE Trans. Mag., vol. 33 (1997) pp. 2830-2832.

"Considerations in the Design of Probe Heads for 100Gbit/in² Recording Density," S.K. Khizroev, J.A. Bain and M.H. Kryder, IEEE Trans. Mag., vol. 33 (1997) pp. 2893-2895.

"Magnetic Properties of FeAlN Films at Elevated Temperatures," P. Zheng, J. Bain and M.H. Kryder, J. of Appl. Phys., vol. 81, (1997) pp. 4498-4197.

"Narrow Track Dual Magnetoresistive Read Heads For Tape," I. Trindade, A. Kennedy, J.A. Bain and M.H. Kryder, J. Appl. Phys., vol. 81 (1997) pp. 4524-4526.

"The Effect of Nitrogen Partitioning on the Soft Magnetic Properties of FeAlN Films," P. Zheng, J.A. Bain and M.H. Kryder, IEEE Trans. Mag., vol. 32 (1996) pp. 4541-4543.

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INVITED SEMINARS AND TALKS

"The Future of Probe Storage: Conclusions of the International Probe Storage Workshop II," presented at INSIC Annual Meeting (Invited), Monterey, CA, June 24, 2003.

- "Data Storage Technology: Opportunities in Nanotechnology Education," presented at Nanoengineering Education Workshop (Invited), Santa Clara CA, January 2003.
- "Heads for thermally assisted recording: density and data rate issues," presented at IDEMA Diskcon (Invited), San Jose, CA, September 18, 2002.
- "The Future of Probe Storage: Conclusions of the Connexions Workshop," presented at National Storage Industry Consortium (NSIC) Annual Meeting (Invited), Monterey, CA, June 18, 2002.
- "Probe-based storage: A new platform for mechanically accessed non-volatile storage," presented at Connexions International Probe Storage Workshop (Invited), Twente, NETHERLANDS, May 3, 2002.
- "Beyond 1Tbit/in²: Assisted Magnetic Recording," presented at Dept. of ECE, Carnegie Mellon University (Invited), Pittsburgh, PA, April 18, 2002.
- "A Systematic Approach to Engineering Magnetically Soft Crystalline Thin Films," presented at Seagate Research (Invited), Pittsburgh, PA, March 18, 2002.
- "A Systematic Approach to Engineering Magnetically Soft Crystalline Thin Films," presented at MINT Center, University of AL (Invited), Tuscaloosa, AL, February 14, 2002.
- "Nanotechnology Issues in Thermally Assisted Recording," presented at Workshop in Nanotechnology Research (Invited), Pittsburgh, PA, September, 2001.
- "Center for Highly Integrated Information Processing and Storage Systems: Technology, Vision and Progress," presented at HP Corporation (Invited), Palo Alto, April, 2001.
- "Center for Highly Integrated Information Processing and Storage Systems: Technology, Vision and Progress," presented at Intel Corporation (Invited), Santa Clara, CA, April, 2001.
- "A Systematic Approach to Engineering Magnetically Soft Crystalline Thin Films," presented at Dept of MSE Seminar, Carnegie Mellon University (Invited), Pittsburgh, PA, May, 2001.
- "Heads for thermally assisted recording: density and data rate issues," presented at International Storage Symposium (Invited), Kalamata, GREECE, September, 2001.
- "Sputtered thin film media for tape recording," presented at International Storage Symposium (Invited), Kalamata, GREECE, September, 2001.
- "Probe-based storage: a new platform for mechanically accessed non-volatile storage," presented at IDEMA Diskcon (Invited), San Jose, September, 2001.
- "Systems issues in the pursuit of 1 Tbit/in²," presented at DSSC Annual Retreat (Invited), Pittsburgh, May 19, 2000.
- "The March to 1Tbit/in²: Issues in Recording Head Design and Fabrication," presented at Dept. of ECE, Carnegie Mellon University (Invited), Pittsburgh, May, 2000.
- "NSIC Magnetic Tape Systems and Technology Roadmap: An Update for 2000," presented at National Storage Industry Consortium (NSIC) Annual Meeting (Invited), Monterey, CA, June, 2000.
- "Focused-Ion-Beam Processing of Magnetic Materials for Magnetic Disk Recording: the Grain Growth Problem," presented at Seagate (Invited), Normandale, MN, February 20, 2000.
- "Hybrid recording challenges at 1 Tbit/in²," presented at NSIC 1 Terabit Workshop (Invited), San Jose, CA, August, 2000.
- "High Moment Pole Materials for High Density Data Storage," presented at Seoul National University (Invited), Seoul, KOREA, May, 1999.

"High Moment Pole Materials for High Density Data Storage," presented at Korean Institute of Science and Technology (KIST) (Invited), Seoul, KOREA, May, 1999.

"High Moment Pole Materials for High Density Data Storage," presented at Korean Advanced Institute of Science and Technology (KAIST) (Invited), Taejeon, KOREA, May, 1999.

"The NSIC Tape Roadmap Technology Section Summary," presented at IEEE Mass Storage Symposium (Invited), San Diego, CA, March, 1999.

"High Moment Pole Materials for High Density Data Storage," presented at Samsung (Invited), Seoul, KOREA, May, 1999.

"Tape Tracking Research At DSSC," presented at IEEE Chapter Meeting (Invited), Minneapolis, MN, March, 1998.

"The NSIC Tape Roadmap Technology Section Summary," presented at National Storage Industry Consortium (NSIC) Annual Meeting (Invited), Monterey, CA, July, 1998.

"Limitations to Track Following Imposed by Position Error SNR Using a Multi-Tapped Magneto-resistive Servo Head," presented at TMRC 98 (Invited), Boulder, CO, August, 1998.

"Recent Work on Tape Recording Heads at the DSSC," presented at Seagate Corporation (Invited), Londonderry, N. Ireland, October 31, 1997.

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"High Moment Write Heads for Ultrahigh Density Recording," presented at Quantum Corporation (Invited), Shrewsbury, MA (simultaneously televised to Louisville, CO and Milpitas, CA), July 25, 1996.

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"The Processing of FeAlN for Recording Head Applications," presented at Fe-based Nanocrystalline Alloys for Recording Heads Workshop (Invited), Tusculooa, AL, April 15, 1996.

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F. Sarigoz, B. V. K. Kumar, and J. A. Bain, "Characterization and equalization of dropouts in the magnetic tape recording channel," Proceedings of 2000 International Conference on Acoustics, Speech and Signal Processing, vol. 6, pp. 3554-3557, 2000.

"Structural Characterization of Pt/Co Multilayers for Magneto Optic Recording Using X-ray Diffraction," J.A. Bain, B.M. Clemens and S. Brennan, MRS Conference Proceedings, vol. 313 (1993) pp. 799-804.

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"Strain Relaxation During Growth of Epitaxial Fe on Cu (001)/MgO(001)," B.J. Daniels, N.M. Rensing, J.A. Bain, S. Brennan, B. Lairson, A.P. Payne and B.M. Clemens, MRS Conference Proceedings, vol. 312 (1993) pp.101-106.

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“Coherency Stresses in Mo/Ni multilayer Films,” J.A. Bain, L.J. Chyung, S. Brennan and B.M. Clemens, MRS Conference Proceedings, vol. 221, (1992) pp. 477-482.

“Interfacial Composition and Structure in Pt/Ni and Pt/Nb Multilayer Thin Films,” J.A. Bain and B.M. Clemens, MRS Conference Proceedings, vol. 187 (1990), pp. 315-320.

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A. V. Itagi, T. E. Schlesinger, J. A. Bain and D. D. Stancil, "Analytical Evaluation of the Electromagnetic Fields of a Near-Field Circular Aperture in a Real Conductor at Optical Frequencies," in Proceedings of 2003 International Symposium on Optical Memory, (2004)

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“Fine Grain Barium Thin Films with Perpendicular C-axis Orientation,” Y. Chen, J.A. Bain and M.H. Kryder, 4th Perpendicular Magnetic Recording Conference (PMRC), October 20-23, Akita, Japan, 1997.

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X. Sui, J. A. Bain and M. H. Kryder, "Method of enhancing the c-axis perpendicular orientation of barium hexaferrite thin films and barium hexaferrite thin film recording media produced thereby", US Patent: 5,863,661 (1999)