

Proceedings of the 50th Annual Conference on Magnetism & Magnetic Materials

San Jose, California, 30 October–3 November 2005

Publications Chair

Michael E. McHenry
Carnegie Mellon University, Pittsburgh, PA

Editors

Axel F. Hoffmann
Argonne National Laboratory, Argonne, IL

Hariharan Srikanth
University of South Florida, Tampa, FL

Michael J. O'Shea
Kansas State University, Manhattan, KS

Jan-Ulrich Thiele
Hitachi Global Storage Technol., San Jose, CA

Mark R. Pederson
Naval Research Laboratory, Washington, DC

Matthew A. Willard
U.S. Naval Research Laboratory, Washington, DC

Jointly Sponsored by

Physics Conferences Incorporated
and
IEEE Magnetics Society

In Cooperation with

The American Ceramic Society
U.S. Office of Naval Research
The American Physical Society
ASTM International
The Minerals, Metals & Materials Society

Journal of Applied Physics
Volume 99, Issue 8, Parts 2 and 3, 15 April 2006



International Standard Serial Number: 1087-3848

International Standard Book Number: 0-7354-0334-1

Copyright © 2006 American Institute of Physics. All rights reserved.

Published by
American Institute of Physics
Suite 1NO1
2 Huntington Quadrangle
Melville, NY 11747-4502, USA

Printed in the United States of America.

All papers in this volume, and in previous Proceedings of the Conference on Magnetism and Magnetic Materials published in this series, have been reviewed for technical content. The selection of referees, review guidelines, and all other editorial procedures are in accordance with standards prescribed by the American Institute of Physics.

50th MMM Annual Conference

Conference Organization

Steering Committee

Randall H. Victora, *Chair*
University of Minnesota, Minneapolis, MN

Yves U. Idzerda, *Past Chair*
Montana State University, Bozeman, MT

Julie A. Borchers, *Chair-Elect*
NIST, Gaithersburg, MD

Jeffrey R. Childress, *Treasurer*
Hitachi Global Storage Technol., San Jose, CA

Program Co-Chairs

Juan Fernandez-de-Castro
Seagate Technology, Bloomington, MN

Daniel H. Reich
Johns Hopkins University, Baltimore, MD

Members

T. F. Ambrose	B. Higgins	K. Liu	I. K. Schuller
K. Barmak	A. F. Hoffmann	B. Lu	J. E. Shield
J. Bass	Y. U. Idzerda	A. MacDonald	R. D. Shull
V. Chandrasekhar	A. Jander	S. A. Majetich	H. Srikanth
Y. Chen	S. J. Jiang	M. E. McHenry	K. Tang
G. Choe	M. Johnson	J. S. Moodera	K. Takano
J. M. D. Coey	R. Kawakami	O. Myrasov	O. Tchernyshyov
P. A. Crowell	A. Kikitsu	A. Nazarov	J.-U. Thiele
P. Dhagat	K. B. Klaassen	M. R. Pederson	D. Weller
P. P. Freitas	S.-H. Lee	M. R. Pufall	M. A. Willard
A. F. Hebard	C. Leighton	S. Russek	G. Xiao
	D. L. Leslie-Pelecky	P. E. Schiffer	J.-G. Zhu

Publications Chair

Michael E. McHenry
Carnegie Mellon University, Pittsburgh, PA

Editors

A. F. Hoffmann
M. J. O'Shea

M. R. Pederson
H. Srikanth

J.-U. Thiele
M. A. Willard

50th MMM Annual Conference

Steering Committee (continued)

Shane Stadler, *Exhibits Chair*
Southern Illinois University, Carbondale, IL

J. Douglas Lavers, *IEEE Rep.*
University of Toronto, Toronto, ON, Canada

Mark Tondra, *Publicity*
NVE Corporation, Eden Prairie, MN

Martin L. Burke, *PCI Rep.*
Physics Conferences Inc., Melville, NY

James C. Eckert,
Student Support Coordinator
Harvey Mudd College, Claremont, CA

P. James Viccaro, *Editor*
Journal of Applied Physics

Conference Management—Courtesy Associates

D. Melton

AIP Coordinators

J. Bennett

C. Gehlbach

Advisory Committee

Yves U. Idzerda, *Chair*
Montana State University, Bozeman, MT

**Diane Melton, *Executive Secretary
& Treasurer***
Courtesy Associates, Washington, DC

Jeffrey R. Childress, *Secretary*
Hitachi Global Storage Technol., San Jose, CA

Term Expires December 2005

J. A. Bain
C.-L. Chien
W.-Y. Ching
Y. U. Idzerda
R. S. Indeck
D. P. Landau
J. D. Lavers
K. D. O'Grady
R. H. Victora
D. K. Weller

Term Expires February 2007

J. A. Borchers
R. D. Gomez
B. A. Gurney
V. G. Harris
B. T. Jonker
Y.-K. Kim
L. H. Lewis
J. M. MacLaren
M. Pasquale
C. A. Ross
W. B. Yelon

Term Expires February 2008

J. R. Childress
E. D. Dahlberg
J. Fernandez-de-Castro
J. Fidler
C. J. Gutierrez
F. Hellman
R. D. McMichael
D. H. Reich
J. J. Rhyne
B. D. Terris

50th MMM Annual Conference

Sponsoring Society Representatives

Martin L. Burke
Physics Conferences Incorporated

J. Douglas Lavers
IEEE Magnetics Society

Cooperating Society Representatives

Wai-Yim Ching
The American Ceramic Society

Sungho Jin
The Minerals, Metals, & Materials Society

Charles D. Graham, Jr.
ASTM Committee A6 on Magnetic Properties

Contributors

American Institute of Physics
Asylum Research
Canon ANELVA Corporation
CAPRES A/S
Elsevier
GMW Associates
Heraeus, Inc.
IEEE
Imago Scientific Instruments Corp.
IOP Publishing Limited

Lake Shore Cryotronics, Inc.
Magnetics Magazine
Nanomagnetics Instruments Limited
NEOARK
Princeton Measurements Corporation
Quantum Design
Shb Instruments, Inc.
SwissProbe Ltd.
Walker LDJ Scientific, Inc.
Williams Advanced Materials

Best Student Presentation Award Winner

Clarina R. Dela Cruz

University of Houston, Houston, TX

GE-06: Evidence for strong spin-lattice coupling in multiferroic RMn_2O_5 ($R=Tb, Dy, Ho$) via thermal expansion anomalies

Best Poster Award Winners

CU-10: Temperature dependence of laser induced magnetization dynamics in a GdFeCo film: The role of angular momentum compensation

pulsed-current induced domain wall motion in a spin valve device

FV-16: Domain size relevance in exchange biased nanostructures

DP-11: Fabrication and testing of deep submicron ring shape vertical MRAM with enhanced magnetoresistance

GR-02: Planar-Hall-effect MRAM

ES-06: Effects of artificial domain well traps in

HR-01: Behavior of three-phase induction motor with variable in stator coil winding pitch

Preface: Proceedings of the 50th Annual Conference on Magnetism and Magnetic Materials, 30 October–3 November 2005, San Jose, California

Randall H. Victora

General Chair, 50th Annual Conference on Magnetism and Magnetic Materials

(Presented on 28 April 2006; published online 16 May 2006)

[DOI: [10.1063/1.2208567](https://doi.org/10.1063/1.2208567)]

The Conference on Magnetism and Magnetic Materials celebrated its 50th anniversary at the Fairmont Hotel in San Jose, CA, from 30 October to 3 November 2005. There were 1548 registrants, making it the largest stand-alone Conference in the history of MMM. In fact, the attendance exceeded most Joint Conferences with the notable exception of the San Francisco MMM-Intermag in 1998. The program was also unusually large, with 1405 contributed papers (out of 2142 submitted), 5 symposia, 1 tutorial, and 28 individual invited speakers. A feature unusual to this MMM was a plenary session featuring five distinguished speakers, each discussing an important achievement that corresponded (roughly) to each decade of the Conference. These talks included basic science, new discoveries in materials, and future directions. Listed chronologically, they were:

- (1) **Magnetism and magnetic fluctuations in one, two, and three dimensions**, Robert J. Birgeneau, *University of California, Berkeley*
- (2) **Computational quantum magnetism: then and now**, Arthur J. Freeman, *Northwestern University*
- (3) **Innovation via insurrection: Nd-Fe-B permanent magnets**, Jan F. Herbst, *General Motors*
- (4) **Early development of thin film heads**, David A. Thompson, *IBM (retired)*
- (5) **From GMR to the nascent fields of spintronics**, Albert Fert, *Université Paris-Sud*

The session filled the Fairmont's largest ballroom and included two attendees of the original MMM Conference 50 years ago: Anthony S. Arrott and Marcel W. Muller. (There was no MMM Conference in 1985, owing to the San Fran-

cisco ICM that year.) After the talks, champagne, cake, appetizers, and other beverages were used to celebrate the occasion. Souvenir pub glasses were provided to all attendees, hopefully encouraging good memories of the occasion.

In an effort to reduce registration fees, several innovations were introduced. The Conference became all electronic, thus dispensing with the added expense of overhead projectors. The default registration included a CD-ROM of the proceedings rather than the traditional two-volume set. The Tuesday Bierstube was sponsored by one of our supporting companies, thus alleviating that expense. The overall effect was to reduce the full advance registration fee by approximately 10%.

This year's meeting retained several ideas introduced at recent MMM Conferences. In particular, best student presentation awards were given, and there was also an award for best poster presentation at each of the seven poster sessions. This was the first Conference operating fully under the new IEEE-PCI (AIP) Memorandum of Understanding that allowed the previous (49th) Conference to forward its surplus to this Conference: These funds partly supported the expense of the 50th anniversary celebration.

Finally, the success of this Conference stems largely from the approximately 80 volunteers who contributed their time and energy and from the dedicated staff at AIP and Courtesy Associates. On behalf of the Conference, I would like to thank these workers for their efforts. I am also thankful for the opportunity to lead this special Conference, and I look forward to its continued success for many years to come.