

CMRR Report

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Center for Magnetic Recording Research

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SUMMER 1988

New Sponsors Join CMRR

Four companies have recently signed contracts to become members of the growing list of CMRR sponsors. They are, in alphabetical order:

Apple Computers, Inc., Cupertino, CA. A publicly owned company, formed in 1977, Apple manufactures personal computers, printers, modems, floppy and hard disk drives, monitors, network products and other computer peripherals. Paul Wehrenberg, Manager, Optical Mass Storage Division, will be the Apple Computer representative to the CMRR Advisory Council.

Archive Corporation, Costa Mesa, CA. Formed in 1980, Archive is a publicly owned company which manufactures streaming cartridge tape drives. The advisory council member from Archive Corporation will be Ken Campbell, Vice President, Product Development.

Domain Technology, Milpitas, CA. Formed in 1981, Domain is a private company manufacturing thin film hard disks. Ken Lee, Vice President, Development will be the advisory council member for Domain.

Western Digital, San Jose, CA. Western Digital is the second largest 3 1/2" disk drive manufacturer in the world and has operations in Santa Ana, San Jose, and Singapore. Art Gefon will be the advisory council representative.

The current list of CMRR sponsors follows:

AMPEX CORPORATION
APPLE COMPUTERS
APPLIED MAGNETICS
ARCHIVE CORPORATION
CONTROL DATA CORPORATION
DEI/CARLISLE
DIGITAL EQUIPMENT CORPORATION
DOMAIN TECHNOLOGY
EASTMAN KODAK COMPANY
HEWLETT-PACKARD
HONEYWELL CORPORATION
IBM CORPORATION
NATIONAL SECURITY AGENCY
PFIZER, INC.
SEAGATE TECHNOLOGY
STORAGE TECHNOLOGY CORPORATION
SUNWARD TECHNOLOGIES
3M
UNISYS
VERBATIM CORPORATION
WESTERN DIGITAL



Daniele Rodé - Research Physicist at CMRR

Daniele Rodé graduated in 1979 with an M.S. in physics from the University of Geneva, Switzerland. In 1985 she received her Ph.D. in physics from UCSD, having worked with Professor Harry Suhl as her advisor.

In 1986 Rodé began working with Professor H. Neal Bertram as a post-doctoral student. In collaboration with Professor Donald Fredkin of UCSD's Department of Physics and Professor Bertram, she studied the effect of thermal agitation on small magnetic particles. They calculated the relaxation time for a system of two interacting particles by solving the corresponding Fokker-Planck equation. The results of this work were presented at the International Conference on Magnetism, April 1987, Tokyo.

For the past year, Daniele Rodé has worked at CMRR as an assistant research physicist, studying the role of head saturation on recording in particulate media. This work is sponsored largely by the Eastman Kodak Company and involves two main projects: calculation and characterization of the fields of a saturating head, and development of a simple recording model for thick particulate media.



From the Director

In the summer of 1988, CMRR attained its fifth year of age. It is indeed heartening to be able to report that, on our fifth anniversary, CMRR has become a success beyond even my expectations!

We have managed to hire, as professors, four experts of outstanding reputation and competence. We have built our building and virtually completed the task of outfitting and equipping the laboratories. We run three workshops and several classes annually, each of which draws, typically, fifty attendees. We have received massive and continuing support from the magnetic recording industry, with the number of sponsors increasing from ten to twenty-two. We have managed to attract substantial federal funding; currently our \$3,000,000 annual budget is 25% federal, 25% University of California and 50% industrial sponsors. In short, we have become the premier academic center of magnetic recording research in this country.

I look forward to the next five years as a period in which CMRR will expand into new activities. I will be delighted to receive your suggestions concerning the nature of those activities.

John C. Mallinson

Tribology Workshop

The fourth annual tribology workshop, chaired by Professor Frank Talke, was held at CMRR from March 14-16, 1988. More than forty-five people from eighteen sponsor companies attended the three-day workshop, and more than twenty-five papers covering on-going tribology were presented.

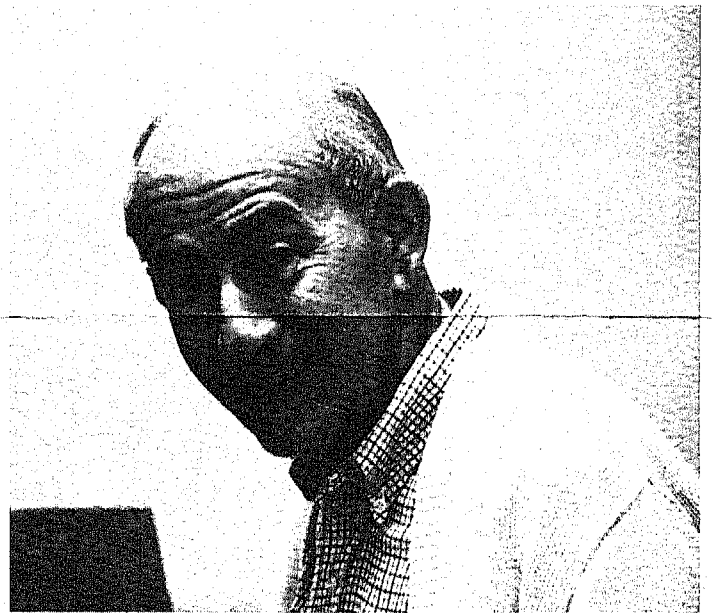
The morning session of March 14 addressed instrumentation of the head/disk interface. Discussion of the laser Doppler instrumentation was the main topic together with a presentation of recent work on atomic friction by R. McClelland of IBM. In the afternoon seminar, wear and friction of carbon overcoats were discussed and analytical characterization was employed to study the relationship between structure and wear performance. Lubricants and boundary lubrication was discussed on March 15, followed by flexible media tribology. Air bearing technology was discussed on March 16 and an open forum with NSF tribology Director Jorn Larssen-Basse concluded the meeting.

The next tribology workshop will be held in March of 1989. People interested in further details should address their questions to Professor Talke (619/534-3646) at CMRR.

National Academy Elects New Members

James U. Lemke and David A. Thompson have been invited to become members of the National Academy of Engineering. Both Thompson and Lemke are well-known magneticians. Dr. Lemke was the leading force in the founding of the Center for Magnetic Recording Research and currently is president of Recording Physics, Inc., a San Diego based company involved in magnetic recording systems studies. Dr. Thompson has been with IBM since 1968 and is currently Director of the Magnetic Recording Institute and Director of the Compact Storage Laboratory at the Almaden Research Center in San Jose.

Both Lemke and Thompson will be honored at the NAE Annual meeting to be held September 27 in Washington, D.C.



Ami Berkowitz

CMRR Receives Equipment Grant from IEEE Magnetics Society

CMRR was awarded an equipment grant of \$10,000 from the IEEE Magnetics Society in 1987. The proposal was prepared by the Center's Professor Ami Berkowitz. This grant was applied to the purchase of an electron console for operating the Mossbauer Magnet System. The Mossbauer Magnet System consists of a 7 Tesla superconducting magnet with a variable temperature absorber. The electronic console includes a magnet power supply, sweep generator, temperature controller, and helium and nitrogen level meters. This equipment will be particularly useful in ongoing programs investigating surface magnetization and its modification by various coatings in film and particulate media.

Magnetic Recording Short Course

A four-day short course on magnetic recording technology was held at CMRR from May 2-5, 1988. The course was designed for technical managers, engineers, scientists and consultants whose work involves the application or design of information storage devices. Over sixty participants attended the course which was offered through UCSD's Extension Program.

The course outline and faculty follows:
Magnetism and Magnetic Recording Media
Geoffrey Bate, University of Santa Clara

Physics of Magnetic Recording
H. Neal Bertram, CMRR, University of California,
San Diego

Magnetic Thin Films for Heads and Media
Jack Judy, University of Minnesota

Magnetic Recording Heads: Theory and Practice
Fred Jeffers, Kodak Research Laboratory,
San Diego

Analog Recording Systems and Noise
John Mallinson, CMRR, University of California,
San Diego

The Digital Magnetic Recording Channel
Mike Haynes, IBM, Tucson, Arizona

Magneto-Optical Recording
Mark H. Kryder, Carnegie-Mellon University

Systems and Attributes: Future Trends
Al Hoagland, University of Santa Clara

Dial-in Access to Library Holdings

The Melvyl® Online Catalog is a partial listing of books held at all nine University of California campuses and the California State Library. Since 1981, the University Library system has been creating machine-readable records for all material catalogued. A considerable amount of retrospective conversion has also been completed for material acquired before 1981.

Melvyl® also lists the titles of journals owned by the University of California libraries, the California State University and College system, the University of Southern California and the Center for Research Libraries. It does NOT currently contain listings for individual articles in journals nor does it contain records for non-book materials. The system presently contains over six million records for books and over one million records for journals. All of the material held at CMRR's Information Center is included.

Recent developments have made it possible for outside users to dial in to the UCSD LAN (local area network) and log on to a campus computer from which a connection to the Melvyl® catalog can be established. Any standard ASCII terminal or microcomputer which emulates a terminal, equipped with either a 300, 1200 or 2400 baud modem may be used. If your company is a level 2 or 3 sponsor of CMRR, you may obtain a password from Dawn Talbot, CMRR, (619) 534-6213.

There is no cost to members for this service other than the cost of the telephone connection you will need to make to dial-in to our computer.

Japan Initiative at NSF

In an effort to improve American scientists' and engineers' relationships with their Japanese colleagues and Japanese institutions, the National Science Foundation (NSF) is implementing a "Japan Initiative" in 1988. The goals of the initiative are:

- to increase the number of scientists and engineers in the U.S. who can operate with ease in Japan's research community and follow developments in the Japanese science and engineering literature;
- to increase American recognition of the potential benefits of cooperation with Japanese institutions, and
- to build relations between the U.S. and Japanese research communities.

In order to accomplish these goals, NSF will:

1. Provide funds for scientists and engineers to undertake long-term research stays (six to fifteen months) in Japan.

Recipients of long-term research grants will receive a monthly stipend, round-trip airfare (for themselves and up to three dependents) to Japan, and a modest dependent's allowance. Although the program is primarily aimed at scientists and engineers embarking on their research careers, it will also consider proposals from senior researchers for sabbaticals or other long-term research visits to Japan.

2. Provide fellowships for scientists and engineers at the graduate, post-graduate, and senior levels to study the Japanese language; help develop better curricula and course materials for teaching Japanese to such students.

NSF will support Japanese language study aimed at facilitating a researcher's stay in Japan or developing the ability to read Japanese technical literature. The application deadlines are May 15 and December 15; a forthcoming program announcement will give further details. NSF will also accept proposals to develop improved course materials for teaching technical Japanese.

3. Identify and secure opportunities for American researchers at Japanese research institutes, including corporate facilities.

NSF will assist U.S. researchers in arranging long-term stays at Japanese laboratories. The NSF office in Tokyo will continue to elicit commitments from Japanese companies to accept qualified American researchers. The office can also contact Japanese labs, both national and private, to facilitate replies to applications from U.S. scientists and engineers.

4. Fund survey teams to visit Japan, to report on the state of the art in specific disciplines, with an emphasis on opportunities offered in Japan for U.S. researchers to advance their work.

For 1988, the budget for these program is \$800,000. NSF hopes to send ten to fifteen researchers to Japan in this first year. They plan to gradually extend the long-term fellowship program. Language fellowships could be offered to fifty persons in this first year with an increase to twice that number possible.

For further information, contact NSF at the following address:

Division of International Programs
National Science Foundation
Washington, D.C. 20550
Attn: Japan Initiative

Calendar

This section includes forthcoming conferences, meetings, symposia, special courses, etc. related to magnetic recording. Please send notices of meetings, etc. to the editor.

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| September 4-10, 1988 | 4th International Conference on Physics of Magnetic Materials, Szczyrk-Bila, Poland
For info: Dr. Marek Gutowski, Institute of Physics, Polish Academy of Sciences, Al. Lotnikow 32/46, PL-02-668 Warsaw, Poland | September 25-30, 1988 | International Symposium on Polymers in Information Storage Technology
For info: Dr. Armand Lewis, The Kendall Co. Research Dept., Walpole, MA 02081 |
| September 13-15, 1988 | Datastorage '88, San Jose, CA
For info: Cartledge & Associates, 1101 S. Winchester Blvd., Suite M259, San Jose, CA 95128 | September 27-29, 1988 | Conference on Optical Storage of Documents and Images, Arlington, VA
For info: TOC, P.O. Box 14817, San Francisco, CA 94114 (415) 681-3700 |
| September 19-23, 1988 | SPIE/EPS/ANRT International Conference on Optical Science and Engineering, Hamburg, Germany
For info: International Society for Optical Engineering, P.O. Box 10, 1022 19th Street, Bellingham, WA 98227-0010 | October 4-5, 1988 | Tape Head Interface Committee (THIC), Trevese, PA
For info: Gary Feuer (215) 441-2890 |
| September 20-21, 1988 | Diskcon '88, Santa Clara, CA
For info: SHO Inc., (415) 949-2050 or FAX (415) 941-9462 | October 17-19, 1988 | ASME/STLE Tribology Conference, Baltimore, MD
For info: T. A. Dow, Mechanical Engineering Dept., North Carolina State University, Raleigh, NC 27695 (919) 737-3024 |
| September 22-25, 1988 | European Conference on Optics, Optical Systems and Applications—OPTICS/Ecoosa '88, Birmingham, UK
For info: The Meetings Officer, The Institute of Physics, 47 Belgrave Square, London SW1X 8QX | October 31—November 4, 1988 | Optics '88, Santa Clara, CA
For info: OSA, 1918 Jefferson Place, N.W., Washington, D.C. (202) 223-8130 |
| September 24-30, 1988 | 1988 World Materials Congress, Chicago, IL
For info: American Physical Society, 335 East 45 St., New York, NY 10017 | November 9-11, 1988 | 4th Annual Conference on Optical Storage for Small Systems, Los Angeles, CA
For info: TOC, P.O. Box 14817, San Francisco, CA 94114 (415) 681-3700 |
| | | November 28—December 2, 1988 | Materials Research Society Fall Meeting, Boston, MA
For info: J. B. Ballance, MRS, 9800 McKnight Rd., Suite 327, Pittsburgh, PA 15237 |

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