IEEE Magnetics Society
NEWSLETTER

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Gareth Hatch, Editor

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From the President

By Bruce Terris, President of the Magnetics Society

Probably the most significant event in the IEEE since the last newsletter was the vote on the constitutional amendment. Almost all society presidents were opposed to the amendment. I am glad to report that the IEEE elections results were recently announced and the amendment was not approved. I will speculate that this may not be the last attempt to modify the structure of the IEEE, so please continue to pay attention to this issue and be informed voters. Change can be good, but it needs to be done correctly and with care.

Time certainly flies, and I now find myself at the end of my term as Magnetics Society president and a couple of weeks away from chairing my last AdCom meeting. In reflecting back

continued on page 2

INSIDE THIS ISSUE...

The European Magnetics Association Honors John Chapman

By Robert Stamps, United Kingdom & Republic of Ireland Chapter Chair

John Chapman's extensive contributions as scientist and leader were formally recognized with a special event held during the 8th Joint European Magnetics Symposia, held in Glasgow, Scotland.

Prof. Chapman is well known as a pioneer in the field of Lorentz transmission electron microscopy with applications to nanoscience and magnetic materials. In addition to his numerous scientific contributions, he has also provided dynamic leadership for programs in the UK and Europe, and is a well respected and influential advocate for magnetics research.

The event was organized with support from the Institute of Physics Magnetics Group and the newly formed European Magnetics Association.

Kevin O'Grady, former President of the IEEE Magnetic Society, provided a synopsis of Prof. Chapman's many accomplishments and contributions, and presented pre-recorded personal testimonials from previous students and colleagues.

From The President

continued from page 1

on the past two years, I think the phrase "if it is not broken, don't fix it" is most appropriate. Thanks to the hard work of the people who preceded me in this office, the Society was in excellent shape when I assumed office and I only hope that I have left it that way for my successors.

There are a number of programs within the Society that are the envy of many other IEEE societies, including the Summer School program, the Distinguished Lecturers (DL) program (other IEEE Society presidents are always amazed at the number of DL talks we deliver every year), our thriving conferences and our robust publications, to name just a few. We should all be very proud of our Society. Our finances are healthy, and I expect the society will continue to thrive under the leadership of Manuel Vazquez and Pallavi Dhagat.

I would like to thank the officers (President-Elect Manuel Vázquez, Treasurer/Secretary Pallavi Dhagat, and Past President Liesl Folks) for all their support over the past two years. I also extend my thanks to all my committee chairs: Randy Victora (Conference Executive Committee Chair), Ron Goldfarb and Petru Andrei (Publications), Burkard Hillebrands (Honors and Awards), Mingzhong Wu (Finance), June Lau (Chapters), Laura Heyderman (Membership), Prem Piramanayagam (Technical Committee), Sara Majetich (Distinguished Lecturers), Philip Pong (Publicity) and Chih-Huang Lai (Education). Also, my sincere thanks are due to Gareth Hatch (Newsletter Editor) and finally, to Diane Melton, the Director of Operations, and all the staff at Simply Vintage, as without them the Magnetics Society would not run.

Bruce Terris can be reached via: ***bruce.terris@ieee.org***.

REPM 2016 Workshop Review

By Oliver Gutfleisch, REPM 2016 Conference Co-Chair

During Aug 28 - Sep 1, 2016, the Technische Universität Darmstadt in Germany (TUDa) hosted the 24th International Workshop on Rare-Earth and Future Permanent Magnets and their Applications (REPM 2016). The event was chaired by Prof. Oliver Gutfleisch from the Material Science Department at TUDa, and Dr. Matthias Katter from Vacuumschmelze (Hanau, Germany). In the more than 40-years-long history of the Workshop since its initiation by Karl J. Strnat, this was the third time that it was hosted in Germany; the first time was in Bad Soden in 1987, and the second time in Dresden in 1998.

The purpose of the Workshop was to bring together experts from research and industry to learn about, discuss and exchange recent results and ideas in permanent magnetism. The conference featured many topics such as raw materials, resource strategy and materials cycles, processing, advanced characterization coupled with multi-scale modeling and structure-property correlation of rare-earth and future permanent magnets.

Greater reliance on renewable energy sources and increased concern for energy efficiency in the total energy lifecycle has accelerated research in energy-related technologies. Magnetic materials play an important role in improving the efficiency and performance of devices in electric power generation, conditioning, conversion, transportation, and other energy-use sectors of the economy.

Permanent magnets are key components in many household and industrial devices, and they are especially critical within the renewable energy sector. Motors and generators for electric vehicles and wind turbines demand temperature stabilities of the magnets well-exceeding 100°C. These magnets are currently based on rare-earth elements such as neodymium and dysprosium, and to less extent terbium, which right now are almost exclusively mined in China (~95%). The heavy rare-earths provide the temperature stability, especially in the aforementioned climate-relevant applications.

A complex mélange of a monopolistic supply situation, export quota (and the subsequent suspension of these) and political-economical disputes triggered a price escalation of the rare earth elements in 2010/2011, often termed the "rare-earth crisis." Once global rare-earth production is diversified (again) the availability of light rare earths could be secured. However, it is likely that bottlenecks for the heavy rare earths will remain, as will challenges for light rare earths in the short term, especially as demand for magnets in green-energy technologies will increase.

With this perspective, there is an obvious and urgent need for a more efficient utilization of rare-earth elements in the production of various functional magnetic materials, including magnetocaloric compounds. In fact, the challenge goes further: there is the necessity to greatly reduce, and ultimately to

continued on page 7

2017 Distinguished Lecturers

The IEEE Magnetics Society selected four Distinguished Lecturers (DLs) for 2017. They are:

- Eiji Saitoh (Tohoku University, Japan);
- Xiaofeng Jin (Fudan University, China);
- Hendrik Ohldag (SLAC National Accelerator Laboratory, USA);
- Michael Farle (University of Duisberg-Essen, Germany and Immanuel Kant Baltic Federal University, Russia);

Each DL manages his own schedule, so contact them early via their respective institutions.

IEEE Magnetics Society 2017 Distinguished Lecture

Spin Current Physics and Applications

Eiji Saitoh, Tohoku University, Sendai, Japan

Spin current, a spin counterpart of electric current, refers to a flow of electrons' spin angular momentum in condensed matter. Spin current has been ignored in electromagnetism in matter for many years, since it disappears in a very short distance, typically at the sub-micrometer scale. However, recent developments in nanotechnology have enabled us to make minute structures. For example, in integrated circuits composed of nanoscale wires, spin current may become as important a quantity as electric current. Spin current can be detected using the inverse spin Hall effect: conversion of spin current into electricity in condensed matter. As a result, a lot of spin-current-related phenomena have been discovered.

In my talk, I will guide you around the world of spin current science. First, I will give an introduction to the basic concept of spin current, followed by a review of various phenomena discovered using spin current as a guiding principle, such as spin-Seebeck effects, other spin-caloritronics effects, and spin-mechanics effects. The physics and materials science behind these effects will also be discussed.

Eiji Saitoh received the B.S., M.S., and Ph.D. degrees from the University of Tokyo in 1996, 1998, and 2001, respectively. He was an assistant professor and a lecturer at the Department of Physics and the Department of Physico-Informatics, Keio University. In 2004 he was a visiting scholar at the Cavendish Laboratory, University of Cambridge. In 2009 he became a professor at the Institute for Materials Research, Tohoku University. He is also a professor at the World Premier International Advanced Institute for Materials Research (WPI-AIMR), Tohoku University.

Prof. Saitoh is currently acting as research director of the Exploratory Research for Advanced Technology (ERATO) Spin Quantum Rectification (SQR) project in the Japan Science and Technology (JST) Agency. He has published over 200 technical articles in peer-reviewed journals, including books and review articles, and has given more than 100 invited and plenary presentations at international conferences. He received the Japan Academy Medal in 2011 and the International Union of Pure and Applied Physics (IUPAP) Young Scientist Award in 2009. Prof. Saitoh's current research interest is physics of spintronics and nanoelectronics.

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IEEE Magnetics Society 2017 Distinguished Lecture

Functionalized Hybrid Nanomagnets: New Materials for Innovations in Energy Storage and Medical Theranostics

Michael Farle, University of Duisburg-Essen, Germany,
and Immanuel Kant Baltic Federal University, Russia

Imagine a future in which food is used to activate specific immune reactions in a human body based on an external noninvasive magnetic stimulus. Dream of a material that stores and releases energy reversibly by temperature changes between day and night. These visions may be realized by using magnetic nanoparticles that are functionalized to be biocompatible, environmentally stable and recyclable, self-healing, and low-cost.

In this presentation I will discuss the basic concepts of magnetic nanomaterials and their magnetic properties with a focus on how to tune specific parameters in a controlled fashion to achieve the dreams of the future. I will highlight state-of-the-art experimental technologies that allow us to understand microscopic properties and interactions in relation to electronic structure changes caused by changes in size, shape, and composition of nanomaterials. Then I will discuss how this understanding is used when nanomagnets are functionalized for targeted drug delivery or composed to form macroscopic materials for new energy applications like magnetic refrigeration. I will demonstrate that the seemingly complex behavior of hybrid metal/metal, metal/oxide, or oxide/oxide interface materials can be understood from the three fundamental interactions in magnetism: magnetic exchange interaction due to orbital overlap, spin-orbit interaction due to inner- and intra-atomic relativistic corrections (e.g., crystal field effects) and the long-range magnetic dipolar interaction.

Several examples will be presented, including the formation of above-room-temperature ferromagnetic interface layers between low-temperature antiferromagnetic layers and the evolution of lattices of magnetic textures (skyrmions) in confined dimensions.

The talk will end with an episode in the life of an imaginary golf-playing couple in the year 2040 who use their "Smart Magnet" (SMAG) phone to energize and heal their bodies on the green.

Michael Farle received his diploma in experimental physics, his doctorate and his habilitation degrees from Freie Universität Berlin in 1984, 1989, and 1998, respectively. During this time he spent three and a half years as a senior researcher at Stanford University, California, and Université de Strasbourg, France. In 1999, he moved to Technische Universität Braunschweig, Germany, where he became a full professor. Since 2002, he has been working as a professor at the Universität Duisburg-Essen, Germany, where he has served as Vice-Rector for Research and Junior Scientific Staff. In 2016 he also became an adjunct professor at Immanuel Kant Baltic Federal University, Kaliningrad, Russia.

Prof. Farle has published over 220 technical articles in peer-reviewed journals, including book chapters and review articles, and has given more than 60 invited presentations. He coordinated two European Research Networks and served as the vice-spokesman of Collaborative Research Center: Magnetic Heterostructures (SFB 491). Since 2014 he is chairman of the Magnetism Section of the German Physical Society. For many years he has been active on the program committees of several international conferences on magnetism. He is a member of the IEEE Magnetics Society, the German Physical Society, and is a co-editor of Materials Research Letters and Journal of Magnetism and Magnetic Materials.

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IEEE Magnetics Society 2017 Distinguished Lecture

The Hall Effects Edwin Hall Never Imagined

Xiaofeng Jin, Fudan University, China

The anomalous Hall effect (AHE) is one of the oldest and most prominent transport phenomena in magnetic materials. However, the microscopic mechanism of the AHE has remained unresolved for more than a century because its rich phenomenology defies standard classification, prompting conflicting claims of the dominant processes. We differentiate these processes through temperature-dependent measurements on epitaxial Fe, Ni, Co, and NixCu1−x films of varying thickness [1], [2]. The results allow an unambiguous identification of both intrinsic and extrinsic mechanisms of the anomalous Hall effect.

The more recently discovered spin Hall effect (SHE) has attracted a great deal of attention because of its potential applications in spin current devices. Various methods have been developed to generate and detect the SHE and search for materials with large spin Hall angles. These efforts notwithstanding, reliable and accurate determination of spin Hall angle remains a challenge.

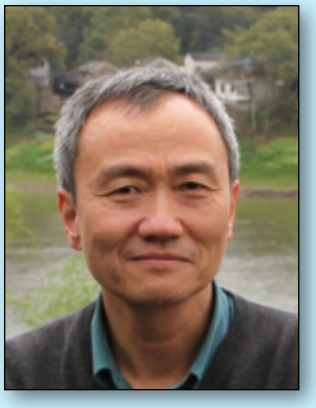
In this lecture I will first give a comprehensive discussion on the basic concepts of AHE and SHE. Exploiting the attributes of epitaxial magnetic thin films, I will then explain how to control independently the different scattering processes through temperature and layer thickness and how to identify unambiguously the intrinsic and extrinsic mechanisms of the AHE.

Finally, based on the understanding of the microscopic mechanisms of the AHE, I will describe how we developed a new method using H-patterned films to measure quantities inherent in the SHE.

[1] Y. Tian, L. Ye, and X. Jin, "Proper scaling of the anomalous Hall effect," Phys. Rev. Lett. 103, 087206 (2009), doi : 10.1103/PhysRevLett.103.087206.
[2] D.-Z. Hou, G. Su, Y. Tian, X. Jin, S. A. Yang, and Q. Niu, Phys. Rev. Lett. 114, 217203 (2015), doi: 10.1103/PhysRevLett. 114.217203.

Xiaofeng Jin received the B.S. and Ph.D. degrees in physics from Fudan University in 1983 and 1989, respectively. Concurrently, he was at Laboratoire pour l'Utilisation du Rayonnement Electromagnetique (LURE) in Orsay, France, from June 1987 to May 1988. He joined the Department of Physics, Fudan University, in 1989, and became full professor in 1995.

Prof. Jin has been a visiting scholar at many research institutes including University of California, Berkeley; Chalmers University of Technology, Goteborg; Max-Planck Institute for Microstructure, Halle; University of Utah; Institute for Materials Research, Tohoku University, Sendai; and Hong Kong University of Science and Technology. He has published over 100 technical articles in peer-reviewed journals, including book chapters and review articles, and has given more than 50 invited presentations at international conferences.



Prof. Jin served as the chair of the 21st International Colloquium on Magnetic Films and Surfaces (ICMFS) in 2012 and on the advisory committees and program committees of various international conferences on magnetism and spintronics. He is currently the chair of the International Union of Pure and Applied Physics (IUPAP) Magnetism Commission C9. He is a member of the IEEE Magnetics Society.

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IEEE Magnetics Society 2017 Distinguished Lecture

Ultrafast and Very Small: Discover Nanoscale Magnetism With Picosecond Time Resolution Using X-Rays

Hendrik Ohldag, SLAC National Accelerator Laboratory, Menlo Park, California, USA

Today's magnetic device technology is based on complex magnetic alloys or multilayers that are patterned at the nanoscale and operate at gigahertz frequencies. To better understand the behavior of such devices, one needs an experimental approach that is capable of detecting magnetization with nanometer and picosecond sensitivity. In addition, since devices contain different magnetic elements, a technique is needed that provides element-specific information about not only ferromagnetic but antiferromagnetic materials as well.

Synchrotron based X-ray microscopy provides exactly these capabilities because a synchrotron produces tunable and fully polarized X-rays with energies between several tens of electron volts up to tens of kiloelectron volts. The interaction of tunable X-rays with matter is element-specific, allowing us to separately address different elements in a device. The polarization dependence or dichroism of the X-ray interaction provides a path to measure a ferromagnetic moment and its orientation or determine the orientation of the spin axis in an antiferromagnet. The wavelength of X-rays is of the order of nanometers, which enables microscopy with nanometer spatial resolution. And finally, a synchrotron is a pulsed X-ray source, with a pulse length of tens of picoseconds, which enables us to study magnetization dynamics with a time resolution given by the X-ray pulse length in a pump-probe fashion.

The goal of this talk is to present an introduction to the field and explain the capabilities of synchrotron based X-ray microscopy, which is becoming a tool available at every synchrotron, to a diverse audience. The general introduction will be followed by a set of examples, depending on the audience, that may include properties of magnetic materials in rocks and meteorites, magnetic inclusions in magnetic oxides, interfacial magnetism in magnetic multilayers, and dynamics of nanostructured devices due to field and current pulses and microwave excitations.

Hendrik Ohldag received the Ph.D. in experimental physics from the Universität Düsseldorf, Germany in 2002. He joined the Stanford Synchrotron Radiation Light Source (SSRL) in 1999 as a research assistant as part of his Ph.D. research. After a postdoctoral fellowship at SSRL he became a permanent member of the research staff in 2005. Between 1999 and 2002 he was a visiting researcher at the Advanced Light Source (ALS) at Berkeley National Laboratory. Since 2014 he is a visiting researcher at New York University.

Dr. Ohldag was awarded the David. A Shirley Award at the ALS in 2006 for "outstanding contribution in using photoemission electron microscopy for the study of magnetic materials." He is a member of the IEEE Magnetics Society and the chair of the Magnetic Interfaces and Nanoscale Device Division of the American Vacuum Society. He has authored or co-authored over 50 peer-reviewed papers and book chapters which have been cited over 2500 times. Dr. Ohldag has participated in the organization of 25 international conferences and workshops. His research focuses on the use of X-ray microscopy to study the dynamic and static properties of complex magnetic materials.

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REPM 2016 Workshop Review *continued from page 2*

Figure 1: Attendees of REPM 2016 (photo T. Gottschall, TU Darmstadt).

substitute altogether, the (heavy) rare-earth elements in permanent magnets. In other words, we need to move first to less Dy by microstructural engineering, i.e. grain boundary phase control on the nanoscale, and ultimately to Dy-less magnets.

Another topic with increasing relevance is the 'rare-earth balance' magnet, i.e. the development of Nd-Fe-B-type magnets which contain significant amounts of 'free' rare earths such as Ce or La. This could be a candidate magnet material to fill the gap between low-cost/low-performance ferrite and highest energy-density Nd-Fe-B magnets.

The conference brought together some 371 people (see Figure 1), including exhibitors, from 34 countries to address current and future challenges for high-performance magnets. It also provided a valuable networking opportunity and set the stage for further cooperation among scientists, engineers and producers. REPM 2016 reached its projected goal by hosting a record number of 349 participants. Germany, Japan, China, the US and France, had the highest participation rate (see Figure 2). Eastern European and South American countries also showed a strong interest in the conference. More than 240 abstracts for scientific contributions were presented and 95 full manuscripts published in the Proceedings. The conference was organized around ten themes, included 14 invited speakers, 55 contributed talks and 170 posters.

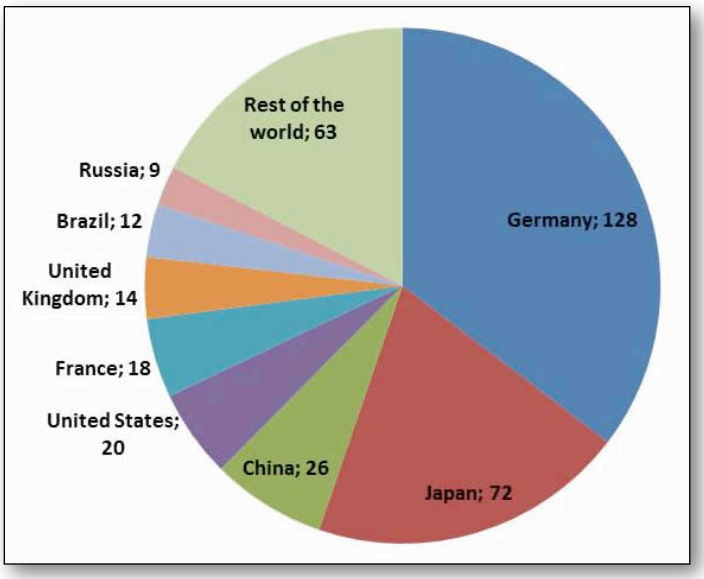

Figure 2: Participants of REPM 2016 in Darmstadt, by country.

Additionally, 17 companies exhibited, providing an unprecedented opportunity for researchers, end-users and suppliers to find out about the latest developments in permanent magnets and respective characterization techniques. Almost all the leading vendors in high-performance permanent magnets were present. The exhibition hall was buzzing with a good crowd of attendees throughout Monday to Thursday afternoon.

One highlight of the conference was the contribution by Dr. Sagawa of Intermetallics Co., Ltd., in Japan, one of the inventors of the Nd-Fe-B magnet, who described the "ultimate production technology" of Nd-Fe-B sintered magnets. This technology he called the New Press-less Process (NPLP). After the discovery of Nd-Fe-B sintered magnets, several compaction techniques including axial die pressing, transverse die pressing, cold isostatic pressing, rubber isostatic pressing, and press-less processing (PLP) have been developed.

Among the aforementioned technologies, Dr. Sagawa now defines NPLP as the "ultimate" process. The most prominent advantage of the new NPLP compaction method is that it can realize high productivity of Nd-Fe-B sintered magnets, with ultimately high homogeneity of the magnetic properties (see Figure 3). Importantly, Dr. Sagawa predicted a fivefold increase in the production of Nd-Fe-B magnet production from the current global level of ~100.000 tonnes per year, within the next 50 years, reflecting the hugely increased demand for

continued on page 8

REPM 2016 Workshop Review *continued from page 7*

automatization, robotics and energy technologies. He called this quite aptly, the "rare-earth iron age".

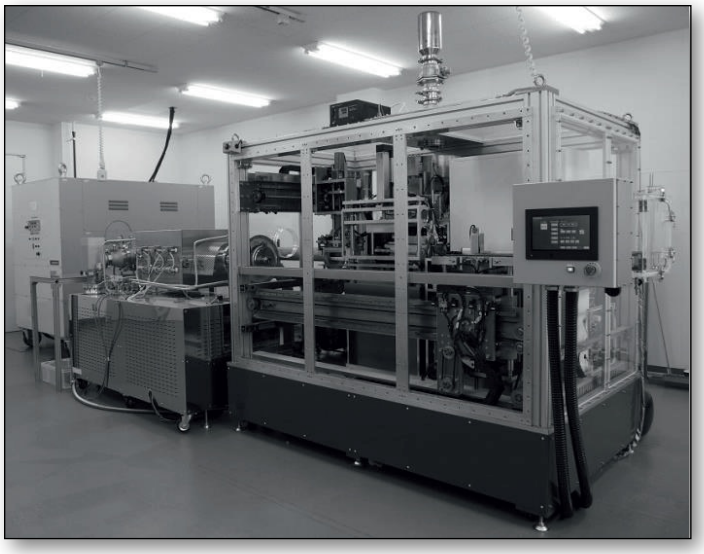

Figure 3: Automated NPLP equipment for the production of Nd-Fe-B sintered magnets [1].

Another highlight was the public plenary evening talk by Prof. Dominique Givord from Institut Néel CNRS Grenoble (France) on "Thirty years of material science applied to magnetism: discoveries and new applications", which looked beyond permanent magnets and reached out to a wider audience.

At the conference dinner, Prof. George Hadjipanayis from the University of Delaware (USA) was awarded the Karl Strnat Lifetime Achievement Award for his outstanding contributions to permanent magnetism, and to the success of the long series of previous REPM conferences (Figure 4).

Thanks to all those who attended REPM 2016 and helped to make it such a great success. Special thanks are extended to all sponsors and exhibitors as well as the Deutsche Forschungsgemeinschaft (DFG) and the LOEWE RESPONSE excellence program of the federal state of Hesse. for their financial support. More details on the conference, its programme and the International advisory committee can be found at **http://www.repm2016.tu-darmstadt.de/repm_2016/index.en.jsp.**

[1] *M. Sagawa et al., The ultimate production technology of Nd-Fe-B sintered magnets, Proceedings of the 24th International Workshop on Rare-Earth and Future Permanent Magnets and their Applications (REPM 2016), Darmstadt, Germany, 28 August – 1 September 2016. Edited by S. Sawatzki, pp.52-54.*

Figure 4: Presenting the Karl Strnat Lifetime Achievement Award. From left to right: O. Gutfleisch, G. Hadjipanayis (recipient), D. Niarchos and M. Katter (photo H. Burfeind, Groß-Gerau).

ICMM 2016 Conference Review

By Tim Mewes, ICMM 2016 Chair

The Fifth IEEE International Conference on Microwave Magnetics (ICMM) took place at the University of Alabama in Tuscaloosa (USA) during June 5-8, 2016. A total of 86 participants from 10 countries attended the conference. The conference program consisted of two plenary talks, 16 invited talks, 39 contributed oral presentations, and 31 poster presentations.

The presentations were divided in sessions on Microwave Materials, Microwave Devices, Spin Waves, Magnetization Dynamics & Damping, and Spin Current, Spin Torque, and other Spin Effects. Plenary Lectures were given by Axel Hoffmann on "Driving Magnetization Dynamics in Insulators Using Spin Hall Effects" and Shin-ichi Ohkoshi on "High Frequency Millimeter Wave Absorption and Unique Functionalities in ε-Fe_2O_3 Nanomagnets".

The ICMM 2016 honored Prof. Bret Heinrich for his contributions to the field of high-frequency and microwave magnetics. While Prof. Heinrich was unable to attend the

continued on page 9

ICMM 2016 Conference Review *continued from page 8*

conference, a video of his acceptance speech was played during the conference banquet, which was held at the Alabama Museum of Natural History on the evening of June 7. One of his current graduate students accepted the award on his behalf. Best poster awards were awarded to Jinjun Ding, Alison Elizabeth Farrar, Tao Liu and Shingo Tamaru.

The Organizing Committee consisted of the General Chair Tim Mewes (University of Alabama), Treasurer Patrick Kung (University of Alabama), Technical Program Chair Mingzhong Wu (Colorado State University), Publication Committee Chair Yang-Ki Hong (University of Alabama), Local Arrangements Chair Claudia Mewes (University of Alabama), and Organizing Committee and Technical Program Committee Members Jamileh Beik Mohammadi (University of Alabama), Haifeng Ding (Nanjin University), Scooter Johnson (Naval Research Laboratory), Peng Li (Seagate Technologies), Hans Nembach (National Institute of Standards and Technology), Yan Nie (Huazhong University of Science and Technology), Helmut Schultheiss (Helmholtz-Zentrum Dresden-Rossendorf), Oleksandr Serha (Technische Universität Kaiserslautern), Justin Shaw (National Institute of Standards and Technology), Rubem Luis Sommer (Centro Brasileiro de Pesquisas Físicas), and Alexey Ustinov (St. Petersburg Electrotechnical University).

Speakers were permitted to submit five-page manuscripts for publication in *IEEE Magnetics Letters*. A total of 15 manuscripts were submitted, of which six were accepted for publication.

The ICMM 2016 received technical and financial sponsorship from the IEEE Magnetics Society. Financial sponsorship was also provided by the Center for Materials for Information Technology (MINT), the Department of Physics & Astronomy, the Office for Research & Economic Development, the College of Engineering, the College of Arts & Sciences and the College of Continuing Studies of the University of Alabama.

Additional financial support was provided by Tuscaloosa Tourism & Sports and the Alabama Museum of Natural History.

The next ICMM will be held at the University of Exeter (UK) in 2018.

Society Participation in the IEEE Brain Initiative

By John Moreland, IEEE Brain Initiative Core Committee Member

The IEEE is developing a Brain Initiative program in response to the global efforts across government, academia, and industry in the development of neurotechnology. Work is currently underway within the Brain Initiative Core Committee to identify key areas and activities that would support commercialization and standards as well as broaden the scope of IEEE.

The long-term goal is to take a multidisciplinary approach, focused on all aspects of electrical engineering and neurotechnology, with an initial focus on the brain computer interface (BCI) including neural sensors, machine interface and software, and effectors for nerve stimulation. Several workshops and conferences have occurred recently and many more are planned – please visit the website for more information (**http://brain.ieee.org**).

The next meeting is the IEEE Workshop on Advanced NeuroTechnologies for BRAIN Initiatives, November 10-11, 2016 in San Diego (USA). This is a satellite meeting to Neuroscience 2016, which begins November 12, 2016 also in San Diego.

Also, in an effort to identify Magnetics Society member interests in the IEEE Brain Initiative, we would like to organize a session at an upcoming INTERMAG or MMM meeting, focused on topics related to the Brain Initiative and BCI. If you are interested in participating in a session or joining the Brain Initiative Core Committee, please contact:

John Moreland via **moreland@boulder.nist.gov**,
Jianping Wang via **jpwang@umn.edu** or
Prem Piramanayagam via **prem@ntu.edu.sg**.

Magnetic North V Conference Review

By Karen Livesey, Magnetic North V Organizing Committee Member

Magnetic North V was the fifth in a series of small workshops in magnetism, and the first to be held outside of Canada. The theme of the conference was magnetism at surfaces, interfaces and in nanostructures.

70 participants came from six nations for the workshop. Events included single-session oral sessions, two poster sessions, an excursion to Garden of the Gods, a banquet sponsored by the IEEE Magnetics Society, and two tutorials to open the conference on Sunday afternoon.

New Joint Richmond Chapter

A new Chapter has been opened in Richmond, Virginia (USA) as a joint venture between the IEEE Magnetics and Engineering in Medicine and Biology Societies. This partnership will bring together scientists and engineers in the fields of physics, biology and medicine in the hopes of fostering collaborations focused on improving human life with advances in magnetics. The local chapter Chair, Dr. Ravi Hadimani, is an assistant professor in the Department of Mechanical and Nuclear Engineering at Virginia Commonwealth University, where he leads the Biomagnetics group. Dr. Dianne Pawluk of VCU is the Co-Chair, while Dr. Ahmed El-Gendy of VCU is the Treasurer. The Richmond chapter has already hosted two seminars by internationally renowned engineers and, with its growing number of members, is well on its way to becoming a leading organization in the city.

Seoul Chapter News

By Jongill Hong, Seoul Chapter Chair

In the past year, the Seoul Chapter of the Society hosted 2016 Distinguished Lecturer Dr. Kazuhiro Hono, from National Institute for Materials Science, Japan (NIMS), for his lecture on 'Materials challenges for next-generation, high-density magnetic recording: media and read heads" at Korea University. The Chapter also hosted 2016 Distinguished Lecturer Prof. Josep Fontcuberta, from Institut de Ciència de Materials de Barcelona (Spain), for his lecture on "The magnetism of oxides", at the Korean Magnetic Society winter meeting.

The Seoul Chapter has supported several seminars and invited talks, and has encouraged IEEE members to participate in such opportunities to learn about emerging topics in magnetism and spintronics in 2016. The Chapter will hold an international symposium titled "Emerging Spintronic Materials and Devices" within the Korean Magnetic Society winter meeting, on November 24, 2016 in Jeju, Korea. There are seven invited speakers: S. Rohart (Université Paris-Sud), S. H. Yang (IBM Almaden Research Center), S. Mitani (NIMS), K. Kim (Kyoto Univ.), H.-W. Lee (Postech), C.-Y. You (DGIST) and B.-G. Park (KAIST). They will discuss recently developed spintronics including spin-orbit torques, Dzyaloshinskii-Moriya interaction, and domain wall motion in various magnetic structures.

Conference Calendar

Oct 31 - Nov 4, 2016	61st Annual Conference on Magnetism & Magnetic Materials (MMM 2016) New Orleans, LA, USA http://www.magnetism.org
Jan 18-19, 2017	Magnetics 2017 Orlando, FL, USA http://www.magneticsmagazine.com/conferences/
Apr 3-4, 2017	Magnetism 2017 York, UK http://magnetism2017.iopconfs.org
Apr 24-28, 2017	INTERMAG Europe 2017 Dublin, Ireland http://www.intermag2017.com
Sep 3-6, 2017	18th Int. Symposium on Applied Electromagnetics & Mechanics (ISEM2017) Chamonix, France http://www.isem2017.org

To list your conference in the Newsletter Conference Calendar, please contact the Editor

New Senior Members

The following members of the IEEE Magnetics Society were recently elevated to the grade of Senior Member.

July 2016: Rukmi Dutta.

September 2016: Seyed Ehsan Abdollahi, David Mckinnon and Jan Zimon.

For further information, visit the IEEE Web site at:

www.ieee.org/membership_services/membership/grade_elevation.html

About the Newsletter

The purpose of the IEEE Magnetics Society Newsletter is to publicize activities, conferences, workshops and other information of interest to the Society's members and other technical people in the general area of applied magnetics. Manuscripts are solicited from Magnetics Society members, conference organizers, Society Officers & other volunteers, local chapters, and other individuals with relevant material.

The Newsletter is published in January, April, July and October electronically on the Magnetics Society webpage at www.ieeemagnetics.org.

Submission deadlines are January 1, April 1, July 1, and October 1 respectively.

Please send articles, letters & other contributions via email to the Newsletter Editor, Gareth Hatch, at g.p.hatch@ieee.org.