

Newsletter

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'Sunflower', CoFe target on top of a magnetron sputtering source. Credit: Tianhan Liu (Florida State University, USA.)

Newsletter of the IEEE Magnetics Society

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Editor: Gareth Hatch



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From the President

By **Pallavi Dhagat**, *President of the IEEE Magnetics Society*

The past few weeks have seen a host of activities from starting discussions and planning for our Society's next annual budget (I will report more on that in my column later this Fall) to organizing another successful edition of the Summer School, as well as the Magnetic Frontiers conference.



Let me start with the Summer School held in early June at the Virginia Commonwealth University (VCU) in Richmond, Virginia (USA), which brought together approximately 80 graduate students in magnetism from all over the world. A five-day long event, the School featured lectures on the fundamentals of magnetism, magnetic measurement techniques, functional magnetic thin films and nanoparticles, and spintronics including MRAM and more exploratory spin-related device technologies.

Each afternoon also saw poster sessions where the students had the opportunity to present and to discuss their work with the speakers, as well as their peers. The final day culminated in a panel discussion with representatives from funding agencies, industries, and university and national laboratories on fellowship, internship and employment opportunities. The students also competed for two US\$5,000 grants to pursue collaborations identified during the week, with peers at the school.

It was truly heart-warming to be at the School, to witness firsthand the impact of this outreach event on building our community and the future of magnetism. The discussions and networking were plentiful, spilling easily over from the lecture room to the coffee breaks, the lunch and dinner tables, and the excursion to the National Institute of Standards and Technology and The Mall in Washington, DC. I thank Ravi Hadimani and his team at VCU, as well as the members of our Education Committee, for the outstanding technical program and meticulous planning of the logistics, from room and board to the social events. I also thank the speakers and panelists for their superbly organized presentations and their enthusiastic participation in the event.

Following close at the heels of the Summer School was the Magnetic Frontiers conference on magnetic sensors, held in Lisbon, Portugal in late June. Consistent with our Society's mission to continue to provide value to our members through the currency of our technical conferences (and publications), the Magnetic Frontiers conference was introduced in 2017 with

the aim of bringing our community together around a cutting-edge topic of fundamental or technological application interest. The conference is planned as a biennial event supported by the Society.

This year, the event focused on magnetic sensors for a variety of applications including in automobiles, medical diagnostics, space rovers, robotics and non-destructive or non-invasive sensing. The conference, attended by approximately 150 participants, combined the excellent technical program with very enjoyable social and networking opportunities. A rooftop banquet and a bus tour of the uniquely charming sights of Lisbon can hardly be bested!

My congratulations and heartfelt thanks to the program chairs, Susana Cardoso and Olga Kazakova, and all the members of the organizing committee for an absolutely first-class conference. Obrigado! If you were unable to attend the conference, I strongly suggest reading the 'Magnetoresistive Sensor Development Roadmap (Non-Recording Applications)' published in the *IEEE Transactions on Magnetics* in 2018.

Amidst all the good news, I must also sadly inform you of the passing of John Slonczewski. John, as many of you know, made many seminal contributions to the field of spintronics. He died peacefully in his sleep on May 31, 2019. He will be dearly missed.

In closing, as always, I encourage you to get involved in our Society's activities by volunteering, for example, with the local Chapter (where possible) or with conference committees. Please also send me your suggestions and ideas for how the Society can continue to offer value to its members.

Pallavi Dhagat can be contacted via email: dhagat@ieee.org.

Society Email Bulletin

By **Philip Pong**, *Publicity Committee Chair*

In May 2019 we launched the Society's first Email Bulletin, with the aim of enhancing and enriching our publicity channels, providing more useful information related to magnetism to Society members. In the past, our email broadcasts to members were text based; the new Email Bulletin is HTML-based, with embedded links and image content, and will be sent out regularly

Please also check out the icons for the Society's social media accounts at the top of each email, including IEEE.tv, Facebook, LinkedIn and Twitter. You can link up with many magnetism colleagues and professionals through our social-media platforms and stay tuned to our latest activities. The IEEE Magnetics Society channel on IEEE.tv carries videos of past Distinguished Lectures, and is a great place to learn more about magnetism.

I would also like to bring to your attention that our next major international magnetism conference is the 2019 MMM Conference, to be held during November 4-8, 2019 in Las Vegas, Nevada (USA). The **Web site** for the conference is www.magnetism.org; you can also look for @MMMConference on Facebook and @MMMConf on Twitter.

In Memory of John Slonczewski (1929-2019)

By James J Wynne

John Slonczewski, my long-time friend and colleague, passed away on May 31, 2019. He was a physicist who worked for IBM from 1955 until his retirement in 2002. He is best known and recognized for his theoretical work on computer memory and storage technology.

I first met John and his family upon arrival in Zurich in September 1969, to start my job at the IBM Zurich Research Laboratory (ZRL). My wife and I encountered the Slonczewski family at the hotel where we were all staying, prior to finding a place to live while we worked at the ZRL. This was my first job after completing my doctoral studies, and this was where John would spend a year on sabbatical leave from the IBM T. J. Watson Research Center. We became instant friends. When my wife had to return to the U.S. for several weeks to visit her father who was ill, the Slonczewskis 'adopted' me. During that time, I often had dinner at their apartment, where John's wife, Esther, fed me delicious meals, preventing me from suffering from malnutrition. This experience cemented our friendship for the rest of John's life.

Born in 1929, in New York City, John attended Worcester Polytechnic Institute, graduating in 1950, received his PhD in physics from Rutgers University in 1955, and then commenced his career as a theoretical physicist working for IBM in Poughkeepsie, New York. In 1960 he was among the first cohort of scientists and engineers who moved into the brand new T. J. Watson Research Center, where he spent the rest of his IBM career.

The impact of John's discoveries is felt in fields extending from theoretical physics to the electronics industry. Spin-transfer torque (STT) is widely recognized as a physical principle enabling various novel magnetic nano-devices. John's seminal work on STT in magnetic tunnel junctions and the prediction of STT-driven switching of nano-magnets rejuvenated the field of magnetic-device physics, and built a solid scientific foundation for today's STT magnetic random access memory (MRAM) technology. These discoveries sparked a tremendous body of work on spin-current transport and related device physics,

which continues to this day. The technology based on John's STT concept is currently being pursued by all major semiconductor foundries, with product starting to appear on the market as stand-alone memory, as well as more efficient embedded memory for microprocessors. All of this began with John's pioneering discovery of STT, a concept that continues to stimulate new thinking in transport and device physics, as well as new technologies. In 2016, the IBM T. J. Watson Research Center hosted a symposium honoring the 20th anniversary John's seminal paper on STT.

John's awards and honors include the 2006 International Union of Pure and Applied Physics Magnetism Award and Néel Medal, the 2012 IEEE Magnetics Society Achievement Award, and the 2013 American Physical Society's Oliver E. Buckley Condensed Matter Physics Prize.

John is survived by his wife Esther, three children, and three grandchildren.

Call for Papers: Special Issue of the *IEEE Journal on Exploratory Solid-State Computational Devices and Circuits*

Submitted by the IEEE Solid State Circuits Society

A call for papers is now open for the *IEEE Journal on Exploratory Solid-State Computational Devices and Circuits* (JXCDC) special topic on "Spin-Orbit Coupling Effects for Advanced Logic and Memory."

In the past few years, fascinating progress has been made in the science of spin-orbit coupling effects, and fundamental research in this field is continuing vigorously. On the other hand, information technology is facing a crisis of increasing power dissipation as computing devices are being scaled to ever smaller dimensions according to the Moore's law.

Every promising solid-state technology is being tried as a possible solution for this crisis. The time has come for spin-orbit physics to make an impact on practical computing applications. For this to happen, challenges such as the following must be addressed:

- Is spin-orbit torque memory competitive with spin-transfer torque memory?
- Can logic circuits with spin-orbit devices be demonstrated?
- What is the unique advantage of spin-orbit devices for non-traditional computing?

The editors will favor papers answering these questions. This special topic of the JXCDC will present original recent research involving spin-orbit coupling effects and span at least two levels

of hierarchies, such as: materials – devices – circuits – computing architectures; or design – fabrication – measurement – simulation.

Topics of interest include but are not limited to:

- Spin-orbit torque memory development;
- Spin-orbit logic devices – proposals and demonstrations;
- Spin-orbit and orbit-spin conversion in logic devices;
- Precessional spin-orbit switching;
- Electric control of spin-orbit coupling;
- Coupling of strain with spin-orbit effects;
- Thermal effect in spin-orbit devices;
- Unidirectional spin Hall magnetoresistance effect;
- Circuits for spin-orbit logic;
- Spin-orbit devices for analog, probabilistic, and neuromorphic computing;
- Spin-orbit effects for spin waves; and
- Spin-orbit applications to anti-ferromagnets.

Review papers on the topic are also welcome.

JXCDC is an open access only publication. The charge for authors is US\$1,350 per article. Article submissions must be made through the **ScholarOne** Manuscripts website. View the **guidelines** for papers and supplementary materials, as well as a paper template.

Important Dates:

- Submission Deadline: 31 August 2019.
- First Notification: 15 September 2019.
- Revision Submission: 15 October 2019.
- Final Decision: 15 November 2019.
- Publication Online: 1 December 2019.

The Guest Editor of the Special Issue is Dmitri Nikonov (Intel Corporation) and the Editor-in-Chief of JXCDC is Azad Naeemi (Georgia Institute of Technology.) All inquiries for the JXCDC journal should be sent to jxcdc@ieee.org. The IEEE Magnetics Society is a sponsor of JXCDC.

Call for Nominations for the IEEE Magnetics Society Distinguished Service Award

By Liesl Folks, Distinguished Service Award Selection Committee Chair

In 2016, the IEEE Magnetics Society Distinguished Service Award was established to honor outstanding service to the Society. Recipients are characterized by sustained voluntary service significantly beyond the typical. The award is presented at the INTERMAG Conference each year and consists of a certificate and a cash prize.

The selection committee will be chaired by Society past-president Liesl Folks. To nominate a worthy colleague (who must be a member in good standing with the IEEE) please use the **online form**.

The deadline for nominations is 31 July 2019.

New Senior Members

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

June 2019: Yasushi Kanai, Pramod Kumar, Nobumasa Nishiyama, Viorel Pop and Qiuliang Wang.

For more information on elevation to Senior Member, visit the **IEEE Senior Member Grade** Web page.

Wohlfarth Memorial Lecture: Call for Nominations

By Nicola Morley, UK and Republic of Ireland Chapter Chair

Nominations are requested for next year's Wohlfarth Memorial Lecture, which will be held during the Magnetism 2020 conference in Sheffield, UK.

The Wohlfarth Memorial Lecture is an annual event, held to mark the significant contributions of E.P. Wohlfarth to the understanding of magnetism and magnetic materials. The lecture is traditionally presented as a plenary lecture at the principal conference on magnetism organised by the UK Institute of Physics (IOP).

The lecturer will have made significant contributions to the understanding of magnetism, and approaching the peak of their scientific career. Previous lecturers include Piers Coleman, Rolf Allenspach, Roy Chantrell, Dominique Givord, David Awschalom, Stephen Hayden, Tony Bland, Russell Cowburn, Wolfgang Wensdorfer, Amanda Petford-Long, Bob Stamps, Thomas Schrefl, Stuart Parkin, Caroline Ross, Matthias Bode, Stephen Blundell, Guido Meier, Chris Marrows, Steve Bramwell, Atsufumi Hirohata and Laura Heyderman.

The lecturer is chosen in alternate years by the IOP Magnetism Group and the UK and Republic of Ireland (UKRI) Chapter of the IEEE Magnetics Society. Nominations should include an outline of the contributions of the nominee and their significance, and explain why the candidate would make an excellent Wohlfarth Memorial Lecturer. The **full constitution** for the lecture may be of assistance in making a nomination.

The Executive Committee of the UKRI Chapter will review the list of nominations and choose this year's lecturer from the list.

Please e-mail your nomination to Nicola Morley at n.a.morley@sheffield.ac.uk no later than August 1, 2019.



Attendees of the 10th International Conference on Fine-Particle Magnetism held in Gijón, Spain during May 26-31, 2019.

10th International Conference on Fine-Particle Magnetism

By *Montserrat Rivas, Conference General Chair*

The 10th International Conference on Fine-Particle Magnetism (ICFPM2019) was held during May 26-31, 2019 in Gijón, Spain. Organized by the University of Oviedo, the event was co-chaired by Montserrat Rivas, Pedro Gorria, and Jesús A. Blanco.

This triennial conference has previously taken place in Rome (twice), Bangor, Barcelona, London, Pittsburgh, Uppsala, Perpignan, and Gaithersburg.

The topics, all related to magnetic nanoparticles, included synthesis and functionalization, theory and modeling, fundamental properties, experimental techniques, data storage, energy, and biomedical applications.

The IEEE Magnetics Society was a principal sponsor of ICFPM2019. Plenary speakers included Hari Srikanth (a 2019 Magnetics Society Distinguished Lecturer), Sarah Majetich, Maria Vallet-Regí, George Hadjipanayis, and Helmut Schober.

The conference had 195 participants (45% women and 27% students) from 26 countries. In addition to the scientific program, attendees enjoyed a welcoming reception, a Young Researchers Networking Bierstube, an Inspiring Women in Science event, and a conference banquet.

The success of ICFPM2019 generated great enthusiasm for the next ICFPM, which will be held in Yokohama, Japan, in June 2022, hosted by Yokohama National University.

Conference Calendar

By *Gareth Hatch, Newsletter Editor*

Frontiers in Biomagnetic Particles

5-7 August, 2019 - Telluride, Colorado, USA

11th International Conference on Magnetic and Superconducting Materials (MSM19)

17-24 August, 2019 - Seoul, South Korea

3rd International Baltic Conference on Magnetism (IBCM2019)

18-22 August, 2019 - Uppsala, Sweden

The Joint European Magnetic Symposia (JEMS2019)

26-30 August, 2019 - Uppsala, Sweden

European School on Magnetism (ESM 2019)

2-13 September, 2019 - Brno, Czech Republic

24th Soft Magnetic Materials Conference (SMM24)

4-7 September, 2019 - Poznan, Poland

7th European Conference on Molecular Magnetism (ECMM 2019)

15-18 September, 2019 - Florence, Italy

4th Ultrafast Magnetism Conference (UMC2019)

14-18 October, 2019 - York, UK

Conference on Magnetism and Magnetic Materials (MMM 2019)

4-8 November, 2019 - Las Vegas, Nevada, USA

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

About the Newsletter

The purpose of the Newsletter of the IEEE Magnetics Society is to publicize activities, conferences, workshops and other information of interest to Society members and other people in the area of applied magnetics.

Contributions are solicited from Society members, Officers & other volunteers, conference organizers, local chapters, and other individuals with relevant material. The Newsletter is published quarterly on the Society webpage at: <http://www.ieeemagnetics.org>

Please send all contributions via email to the Newsletter Editor, Gareth Hatch, at: g.p.hatch@ieee.org

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