

Newsletter

January 2020

'Magnetic Turbulence': Spin-polarized low energy electron microscopy. Source: Gong Chen (University of California Davis, USA.)

Newsletter of the IEEE Magnetics Society

Volume 60 | Issue 1 | January 2020

Editor: Gareth Hatch



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From the President

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

I will start this column by wishing you a wonderful New Year! I hope it is filled with happiness, good health and success for each of you.

As I look forward to 2020, I cannot but reflect on our accomplishments in the year gone by. In particular, we closed our conference calendar in 2019 with a very successful MMM Conference in Las Vegas, Nevada. I extend my congratulations and heartfelt thanks to Shinji Yuasa, General Chair, and the members of his steering committee for their hard work and detailed planning in ensuring the conference program was well-rounded and brought attention to cutting-edge developments in the field of magnetism and magnetic materials from around the world. In more good news, I am delighted to share that four of our Society's members, Oliver Gutfleisch, Chris Leighton, Nian-xiang Sun and Bruce Terris, were recognized as IEEE Fellows. Congratulations fellas! I take this opportunity to remind you that the nomination window for the 2021 class of Fellows is now open. Information on eligibility and nomination deadlines are available at <https://www.ieee.org/membership/fellows/fellows-nomination.html>.



As is the habit of new years, 2020 too will mark some changes in our Society's volunteer team. Petru Andrei and Dan Wei will step down, respectively, as chairs of the Publications and Membership committees. Ron Goldfarb will assume responsibility as Publications Committee Chair and will in turn be replaced by Massimiliano d'Aquino as Chief Editor of *IEEE Magnetics Letters* (IML). In his 10 years as the founding Chief Editor of IML, Ron has been instrumental in ensuring the success of this journal. I am very grateful to Petru, Dan and Ron for their long and dedicated service to our Society and welcome Massimiliano to his new role. I also thank the outgoing elected Administrative Committee (AdCom) members—Dora Altbir, Yukiko Kubota, Chih-Huang Lai, Stéphane Mangin, Rubem Sommer and Jan Sykulski—for their service; and welcome Giovanni Finocchio, Jean Anne Incorvia, Lucian Prejbeanu, Montserrat Rivas and Yukiko Takahashi as the new members.

A very special thank you to Victorino Franco, Justin Shaw, Hari Srikanth and Hyunsoo Yang who, through their presentations worldwide as Distinguished Lecturers, served as outstanding ambassadors for our Society in 2019. Our Distinguished Lecturers for 2020 will be Mathias Kläui, Bert Koopmans, Tim Mewes and Masashi Shiraishi. You can find more information about the lecturers and lecture topics in the previous edition of the Newsletter.

Finally, as I always do, I encourage you to reach out to me with feedback and suggestions for initiatives that the Society can consider to continue to enhance its value to its members. Better still, consider helping us build and shape our Society by volunteering, for example, to serve in organizing local Chapter activities and on conference committees!

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

Magnetics Society New IEEE Fellows for 2020

Submitted by Ron Goldfarb, Publications Committee Chair

Four members of the IEEE Magnetics Society were recently elevated as 2020 Fellows:

- **Oliver Gutfleisch**, for contributions to the development of magnetic materials for sustainable energy applications;
- **Chris Leighton**, for contributions to the understanding of magnetic oxides, interfaces, and nanostructures;
- **Nian-xiang Sun**, for contributions to integrated magnetic and magnetoelectric materials and devices; and
- **Bruce Terris**, for contributions to high density magnetic recording and spintronic materials.

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

Submitted by Ron Goldfarb, Publications Committee Chair

A call for papers is now open for a special issue of *IEEE Journal on Exploratory Solid-State Computational Devices and Circuits* on "Exploratory Devices and Circuits for Compute-in-Memory." This special issue aims to cover recent research advances in compute-in-memory, spanning devices, circuits, and systems. Papers on the interaction and co-optimization of the materials and devices as well as circuits and architecture are solicited.

Prospective authors are invited to submit extended works based on conference presentations on various aspects of compute-in-memory.

Memory technologies of interest include static random-access memory (SRAM), dynamic random-access memory (DRAM), NOR/NAND Flash, and emerging non-volatile memory (eNVM) devices such as phase-change memory (PCM), resistive random-access memory / conductive-bridging random-access memory (RRAM/CBRAM), spin-transfer-torque / spin-orbit-torque magnetic random-access memory (STT-MRAM/SOT-MRAM) or other spintronic memories, ferroelectric field-effect transistor (FeFET) or other ferroelectric memory.

The following topics are specifically solicited:

- Materials and devices that can enable compute-in-memory;
- Integration of emerging technologies with silicon for compute-in-memory;
- Crossbar array design for compute-in-memory;
- Array-level demonstration for compute-in-memory;
- Peripheral circuit design for compute-in-memory;
- Architectural-level design for compute-in-memory;
- Algorithms and hardware co-design for compute-in-memory;
- Benchmark simulators for compute-in-memory; and
- New applications for compute-in-memory beyond deep learning.

Important dates:

- **Submission deadline:** 1 February 2020;
- **First notification:** 1 March 2020;
- **Revision submission:** 1 April 2020;
- **Final decision:** 1 May 2020; and
- **Publication online:** 1 June 2020.

All inquiries for the JXDC journal, including requests for extension of the submission deadline, should be sent via email to jxcdc@ieee.org.

New Senior Members

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

October 2019: Xianghua Han.

November 2019: Alberto Bollero, Joseph Friedman, Khoa Hoang, Cosmin Radu, Raju Ramanujan, Yan Yao, Maciej Zborowski, and Barry Zink.

For more information on elevation to Senior Member, visit the [IEEE Senior Member Grade Web page](#).

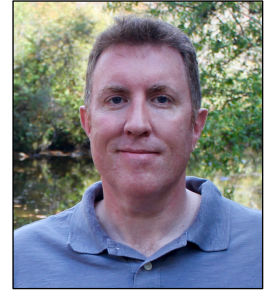
IEEE Magnetics Society 2020 Distinguished Service Award

Submitted by Jürgen Fassbender, Honours and Awards Committee Chair

In 2016 the IEEE Magnetics Society Distinguished Service Award was established to honor outstanding service to the Magnetics 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 cash prize.

The recipient for 2020 is **Gareth Hatch** of Strategic Materials

Advisors (SMAL) in the UK. He receives the 2020 Distinguished Service Award "in recognition of a decade of outstanding service as Editor of the Magnetics Society Newsletter, and in particular for transforming it into a modern and engaging communications vehicle that is available through multiple channels."



Gareth joined the IEEE in 1998 and since then has been a Member and Senior Member. He began editing the Magnetics Society Newsletter in 2009.

Gareth is co-founder of Innovation Metals, a Canadian company focused on the development of new hydrometallurgical separation processes for critical metals. He is Managing Director of SMAL and was co-founder of US-based Technology Metals Research, consulting and advisory firms operating in the critical-materials sector.

Gareth was previously Director of Technology at US-based Dexter Magnetic Technologies, where he began his career as an applications engineer, focused on the design and optimization of permanent-magnet components, devices and assemblies.

He earned the B.Eng. with Honours in materials science and technology and the Ph.D. in metallurgy and materials, both from the University of Birmingham. His current research interests include the separation and purification of critical metals such as rare-earth elements, lithium, nickel and cobalt via accelerated solvent-extraction techniques, and the sustainable development of the supply chain for permanent-magnet and battery materials.

Gareth has authored over two dozen scientific papers, holds five patents and has three patents pending. He is a Fellow of the Institution of Engineering and Technology, a Fellow of the Institute of Materials, Minerals and Mining and is a Chartered Engineer. Gareth is Advisory Board Chair of the Rare Earth Industry Association, a member of the NATO Science and Technology Organization group on rare earths, and a member of the Canadian Mirror Committee for ISO TC/298, focused on international standards for the rare-earths industry.

IEEE Transactions on Quantum Engineering

Submitted by Ron Goldfarb, Publications Committee Chair

IEEE has approved a new, all-electronic, open-access journal, *IEEE Transactions on Quantum Engineering* (TQE). There is no limit to the number of pages per article. The Magnetics Society is a co-sponsor. The editor-in-chief is Erik DeBenedictis, formerly

of Sandia National Laboratories, USA. Associate editors for magnetics are Peng Li (Auburn University) and Serkay Ölmez (Seagate Technology). Manuscripts may be submitted at <https://mc.manuscriptcentral.com/tqe-ieee>.

TQE publishes regular, review, and tutorial articles based on the engineering applications of quantum phenomena, including quantum computation, information, communication, software, hardware, devices, and metrology. Articles also address quantum-engineering aspects of superconductivity, magnetics, microwave techniques, photonics, and signal processing. See <https://tqe.ieee.org> for more information.

Joint Meeting of the Society's Spanish Chapter and the Spanish Magnetism Club

By Cristina Gómez-Polo, Spanish Chapter Secretary / Treasurer

During 17-18 October 2019, the Annual Meeting of the Society's Spanish Chapter was held in Pamplona, Spain. As in previous years, this meeting was held jointly with the annual meeting of our sister society, the Spanish Magnetism Club (CEMAG). In this edition, the events were held at the Public University of Navarre, co-organized by the InaMat (Institute for Advanced Materials).



Participants at the Joint Meeting in Pamplona, Spain.

The meeting program began on 17 October 2019, with a scientific session of young researchers in magnetism, organized with the sponsorship of the Doctoral School (EDONA) of the Public University of Navarre. The session consisted of 24 contributions (15 oral presentations of 10 minutes each and 9 posters), presented by Ph.D. students from different research groups in Spanish universities and research centers.

The talks covered a wide range of current research topics in magnetism, from multifunctional materials, to spintronics and biomagnetic applications. This session of young researchers, which was established two years ago on the initiative of our previous president, Prof. Victorino Franco of the University of Seville, is becoming a great success. On the one hand, we

manage to attract young people to the Chapter, where we observe with satisfaction how the number of members grows steadily every year. On the other hand, these talks are in many cases the first opportunity for students to present their work in an environment similar to that of an international conference.

The day was completed with the celebration of the Annual Assembly of the Society's Spanish Chapter, attended by 30 members. In the assembly, the Chapter's president Alfredo García Arribas from the University of the Basque Country and the Secretary-Treasurer Cristina Gómez-Polo (Public University of Navarre) informed the members of the account balance of the Chapter and summarized the numerous activities carried out during the year, among them 11 talks of IEEE Magnetism Society Distinguished Lecturers celebrated throughout the geography of Spain.

On 18 October 2019, we held another scientific session with lectures by Prof. Hyunsoo Yang (National University of Singapore, 2019 Society Distinguished Lecturer), "Spin-orbit technologies: from magnetic memory to Terahertz generation" and by Dr. Arantxa Fraile (University of Barcelona) "Tuning magnetic phenomena at the nanoscale by nanostructuring and proximity effects". Next, the Salvador Velayos Prize was awarded to Professor José Rivas (University of Santiago de Compostela), who gave a lecture entitled "Nature-inspired nanostructured magnetic scaffolds for bone tissue engineering".

At the end of the meeting, the Assembly of the Spanish Magnetism Club was held, among whose agreements included the organization of a School of Magnetism in Llanes (Asturias) next summer, where the Spanish Chapter of the Magnetism Society will actively collaborate.

New Chief Editor for *IEEE Magnetism Letters*

By Ron Goldfarb, Publications Committee Chair

Massimiliano d'Aquino, Associate Professor of Electrical Engineering at the University of Naples "Parthenope," Italy, has taken on the role of Chief Editor of *IEEE Magnetism Letters* (IML). Massimiliano served as an Editor of IML since 2018. He was an Associate Editor from 2016 to 2018. Since 2011 he was a member, and then senior member, of the Editorial Review Board.

He has also served as a guest editor for conference-related papers published in *IEEE Transactions on Magnetism*,





Participants at the 11th MRAM Global Innovation Forum in San Francisco.

Journal of Applied Physics, Physica B: Condensed Matter, and AIP Advances.

Massimiliano's research interests are in micromagnetic modeling, spintronics, computational micromagnetics, hysteresis modeling, and electrodynamics of materials. He is the author of more than 90 papers in the areas of electrical engineering and applied physics.

IML, a rapid-publication journal, covers the physics and engineering of magnetism, magnetic materials, applied magnetics, design and application of magnetic devices, bi-magnetics, magneto-electronics, and spin electronics. It is now in its 11th year of publication.

The Chief Editor manages the operations of the journal, recruits Associate Editors and members of the Editorial Review Board, examines incoming manuscripts for originality and scope, assigns them to Associate Editors to manage the reviews, and examines accepted articles prior to publication.

Please contact Massimiliano at: daquino@uniparthenope.it.

11th MRAM Global Innovation Forum

By Jean Anne Incorvia

The 11th Annual MRAM Global Innovation Forum took place on 12 December 2019, following the IEEE International Electron Devices Meeting (IEDM) in San Francisco, California. Over 275 participants registered for the day-long event, entirely supported by Samsung Semiconductor and the IEEE Magnetics Society. A poster session, organized by the IEEE Magnetics Society, also took place the day before during IEDM to highlight recent research related to MRAM.

Ten invited talks from industry and academia covered topics from the latest progress and inventions in MRAM to current and future applications in artificial intelligence. Comparing to previous years, this year showed a focus on applications where MRAM can make a strong impact, including normally-off

computing, edge computing, and embedded MRAM. Discussions included a tribute to John Slonczewski, how resistance-area product affects MRAM performance, and challenges and promises of emerging spin-orbit torque MRAM.

Conference Calendar

By **Gareth Hatch**, Newsletter Editor

Magnetics 2020

11-12 February 2020 - Orlando, Florida, USA.

The International Magnetics Conference (INTERMAG 2020)

4-8 May 2020 - Montreal, Quebec, Canada.

International Conference on Microwave Magnetics (ICMM 2020)

21-24 June 2020 - Beijing, China.

26th International Workshop on Rare Earth and Future Permanent Magnets and their Applications (REPM2020)

24-27 August 2020 - Baltimore, Maryland, USA.

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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