Newsletter
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Domain structure of an exemplary meander domain, recorded using CMOS-MagView. Source: Matesy GmbH. Usage pursuant to **CC BY-SA 3.0**.

Newsletter of the IEEE Magnetics Society

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Editor: Gareth Hatch

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From the President

*By **Masahiro Yamaguchi**, President of the IEEE Magnetics Society*

I spent the spring of 2022 in prayer for peace, because of the war in Ukraine. Many Society volunteers have been thinking seriously about what we can do for Ukraine, within IEEE policy. In this column, my comments will focus on this topic. Our first visible action was to express our willingness to help Ukraine. On March 17, 2022, the IEEE Magnetics Society published a message on the Society website, which reads: "*The IEEE Magnetics Society supports the global pursuit of peace. It will begin humanitarian efforts to provide support to displaced colleagues from Ukraine. Please return to this webpage for details in the near future.*"

Meanwhile, Bruno Meyer, IEEE Vice President for Technical Activities, delivered a message to the Technical Activities Board (TAB) leadership regarding the war in Ukraine. I picked up a few sentences from Bruno's message here: "*IEEE is a global organization. Through IEEE we bring together technologists from across the world - supporting collaboration and sharing across national boundaries, across ideologies and politics. IEEE's relationship is with our members, not their countries, their employers, or institutions - in fact our core policies insist that we do not discriminate based on nationality. Many are looking for ways to assist Ukrainian colleagues and the Ukrainian people. One of the best ways to do this is through personal contributions to international charitable relief organizations that are providing assistance to refugees of the Ukrainian conflict.*"

This said, our Society volunteers have had repeated discussions with the IEEE to establish what we can and cannot do. The guideline is that we can support Ukrainian research and development (R&D), not individuals. This can be R&D undertaken by an individual, but not humanitarian aid. Accordingly, on April 14, 2022, a Magnetism for Ukraine Initiative was developed and approved by the IEEE Magnetics Society Administrative Committee (AdCom) meeting, budget permitting. This will be discussed at the June series of IEEE meetings. I strongly hope that this motion will be approved at the IEEE Board of Directors (BoD) meeting.

I thank Andrii Chumak, Valentine Novosad and Oksana Chubykalo-Fesenko who initiated the discussion, Sara Majetich and Atsufumi Hirohata who developed the Motion for the AdCom meeting, Mark Kief, Ron Goldfarb and Sara Majetich who are working for the IEEE TAB meeting series, and Fred Schindler, IEEE Division IV Director, who voiced his support for this initiative and works together with the Society, as the sponsor of this initiative to the IEEE BoD meeting.

As always, please feel free to reach out to me by e-mail with feedback and suggestions for our Society.

*Masahiro Yamaguchi can be contacted via email: **masahiro.yamaguchi@ieee.org**.*

Call for Nominations for Administrative Committee Positions

Submitted by Pallavi Dhagat, Nominations Committee Chair

Nominations for positions on the Society's Administrative Committee (AdCom) are now open. The nominations are due July 22, 2022 and must be made using the form available at **https://ieeemagnetics.org/nominations.php**.

Each year, eight Society members are newly elected to the AdCom, which is responsible for decision-making related to the Society's operations. Based on the nominations received, members of the Nominations Committee will present a slate of candidates. The slate will strive to reflect the demographics of our Society's membership in terms of gender, geography and affiliation (industry, and academic and government research institutions). The elections will be coordinated by the IEEE by electronic vote and will open to all Society members.

Your active participation in submitting nominations is vital to ensuring that the AdCom represents the diversity and interests of all our members. If you need further information, please contact Pallavi Dhagat, Nominations Committee Chair (**dhagat@ieee.org**).

Masato Sagawa Awarded the 2022 Queen Elizabeth Prize for Engineering

Submitted via QEPrize press release

In February 2022 the Queen Elizabeth Prize for Engineering (QEPrize) was awarded to Japan's Masato Sagawa for his work on the discovery, development and global commercialization of the sintered neodymium-iron-boron (Nd-Fe-B) permanent magnet - the world's most powerful permanent magnet - which has been transformational in its contribution towards enabling cleaner, energy saving technologies.

Dr. Sagawa was announced as the winner of the 2022 QEPrize – awarded annually to celebrate the critical role that engineering plays in global society – by Lord Browne of Madingley, Chairman of the Queen Elizabeth Prize for Engineering Foundation.

Dr. Sagawa pioneered the development of a sintered rare-earth permanent magnet, the sintered Nd-Fe-B magnet. His breakthrough innovation was the creation of a new compound

formed by replacing scarce and expensive Co and Sm with more abundant and cheaper Fe and Nd, and at the same time introducing B to improve the magnetic properties – the first step in delivering high performance to a mass market.

Dr. Sagawa then led the research and development in the 1980s and early 1990s to successfully overcome the issues of sudden reduction of magnetic coercivity at high temperature, most notably by adding Dy to improve heat resistance. This resulted in the development of high-volume manufacturing techniques which successfully commercialised his innovation. For even wider applications, he continued to develop novel techniques for reducing the amount of Dy or even eliminating its use to help preserve natural resources.

The result was a new magnet for the mass market that almost doubled the performance of the previous best and successfully turned Nd-Fe-B magnets into a viable industrial material with wide applications. The new magnet has a significant advantage in high-efficiency and high-torque density applications, such as motors and generators for electric vehicles and wind power generation, and in more general applications where small powerful magnets are required, including robots, automation systems and domestic appliances.

Not only is the Nd-Fe-B market predicted to be worth over $19.3 billion by 2026, but this type of permanent magnet is also essential to the value chain of 8.5 million electric vehicles and hybrid electric vehicles in use globally, demonstrating a prolific impact on the entire economy.

Dr. Sagawa will be formally honoured at the QEPrize presentation ceremony later this year. He will receive £500,000 and a unique trophy, designed by the 2022 Create the Trophy winner Anshika Agarwal, aged 17 from India.

Dr. Sagawa received bachelors and masters degrees in electrical engineering from Kobe University (1966) in Japan and a doctoral degree in materials science from Tohoku University (1972). He began his career as a research engineer at Fujitsu Ltd in 1972, working on magnetic materials for electric relays. He worked on the Nd-Fe-B magnet as private research for five years, patenting it in the early 80s, before joining Sumitomo Special Metals Co in 1982.

In 1988 Dr. Sagawa founded Intermetallics Co. Ltd in Kyoto and became its president. He also founded NDFEB Corporation in 2013 for consultation services. Dr. Sagawa is now retired but works as a consultant to Daido Steel in order to put his latest new technology, which improves magnetic energy density and reduces the use of Dy for the thermal stability part of the process, into industrial production.

Dr Sagawa has received a number of awards for his work including the 2012 Japan Prize for "*developing the world's highest performing Nd-Fe-B type permanent magnet and contributing to energy conservation.*" He is also the recipient of the Osaka Prize (1984) and the American Physical Society International Prize for New Materials (1986).

Special Topic on "Energy-Efficient Compute-in-Memory with Emerging Devices" in *IEEE Journal on Exploratory Solid-State Computational Devices and Circuits* (JxCDC)

Submitted by Ron Goldfarb

JxCDC has announced a special topic on in-memory computation. Article submissions are invited on new materials and devices, integration of emerging technologies with silicon, crossbar array design and array-level demonstration, peripheral circuit design, architectural-level design, algorithms and hardware co-design, benchmarking simulators, new applications beyond deep learning (e.g., combinatorial optimization, general purpose computing). The submission deadline is 15 July 2022. More information is available here:

https://sscs.ieee.org/publications/ieee-journal-on-exploratory-solid-state-computational-devices-and-circuits-jcdc/special-topic-on-energy-efficient-compute-in-memory-with-emerging-devices

JxCDC is an open-access journal co-sponsored by the Magnetics Society.

IEEE AtC–AtG Magnetics Conference: Call for Abstracts

Submitted by May Inn Sim, Jan Mansell and Alberto de la Torre, AtC-AtG Organization Committee Members

It is our great pleasure to announce the IEEE Around-the-Clock Around-the-Globe Magnetics Conference 2022 (AtC–AtG), a virtual event hosted by the IEEE Magnetics Society covering the vast field of magnetism.

Following the immense success of the previous editions, this unique 24-hour, non-stop virtual conference will take place on August 3, 2022, with contributions from speakers spanning six continents.

AtC–AtG offers a diverse and inclusive virtual environment that foments collaboration between junior and senior researchers across the many subfields of magnetism. The invited speaker lineup includes junior and senior scientists with outstanding research contributions. For more information, visit the **conference website**.

Abstract submission is now open until **June 12, 2022**. Post-doctoral researchers and students are encouraged to submit abstracts for oral and poster presentations. The abstract template and submission form are available on our website.

Highlights:

• Invited talks from leading experts in magnetism;

• Talks and posters by early-stage researchers;

• Covers all continents and time zones;

• Interactive online broadcasting with questions & discussions;

• Best oral and poster presentation awards; and

• No registration fee.

Register by August 24, 2022 and join us on this one-of-a-kind event where you can meet researchers worldwide! We look forward to seeing you online!

APS–IEEE Magnetics Society Reception in Chicago

Submitted by Yi Li, IEEE Magnetics Society Chicago Chapter Chair

On the evening of March 16, 2022, the Society's Chicago Chapter hosted an APS–IEEE Magnetics Society Reception at the Marriot Marquis Hotel, next to the 2022 American Physical Society (APS) March Meeting venue at McCormick Place, in the city of Chicago.

Attendees at the APS–IEEE Magnetics Society Reception in Chicago.

The reception took advantage of the opportunity that, for the first time since the beginning of the COVID-19 pandemic, the APS March Meeting was hosted with in-person attendees in Chicago. The Reception aimed to gather scientists and engineers in the field of magnetics who were traveling to Chicago, to facilitate networking and collaboration.

The Reception attracted approximately 60 attendees, 40 of whom held IEEE membership. Attendees included university faculty members, students and researchers from national laboratories. In addition, there were also local representatives from companies such as Dexter Magnetic Technologies and Medix, who are interested in learning about frontier research in magnetics and potentially recruiting new employees.

Attendees enjoyed small-plate food and bartender-served drinks during the Reception. It lasted for 90 minutes, after which attendees teamed up for dinner.

The Reception was held in compliance with the COVID-19 policy of APS, which required that all attendees be fully vaccinated, have obtained a negative test result prior to the meeting, and have completed a daily attestation. The reception was sponsored by the IEEE Magnetics Society and APS.

Search for New Editor of the Newsletter

By Tom Thomson, Publications Committee Chair

The Newsletter of the IEEE Magnetics Society is published four times per year and includes articles on activities, conferences, workshops and other information of interest to Society members, and other people in the area of applied magnetics.

The Society's Publications Committee continues to conduct a search for the next Editor of the Newsletter. The qualified candidate should be a member of the IEEE and the Magnetics Society, and have a background in engineering, physics, materials science, or a related area; prior editorial experience is desirable.

The Editor manages the publication of the Newsletter, including the solicitation and editing of contributions to it. It is an unpaid, volunteer position.

The new Editor will have the full support of the outgoing Editor and the Publications Committee.

To apply, please submit a brief resume and letter outlining your qualifications and position statement to me via email at **thomas.thomson@manchester.ac.uk**. The current Editor, Gareth Hatch, is available to answer questions via **g.p.hatch@ieee.org**.

UK & Ireland Chapter News

Submitted by Liam O'Brien (Chapter Chair), Paul Nutter (Chapter Treasurer) and Nicola Morley (Chapter Secretary)

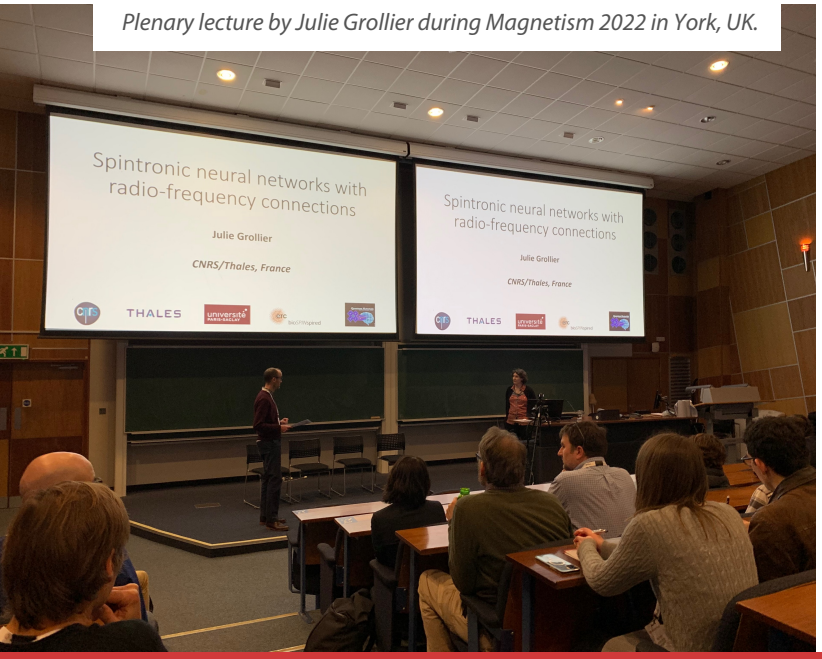
The IEEE Wohlfarth Lecture and the Annual General Meeting (AGM) of the IEEE Magnetics Society UK & Ireland Chapter took place at Magnetism 2022 in York, UK, during March 28-29, 2022.

The conference marked a return to in-person activities for the UK & Ireland magnetism community, with researchers joining the hybrid event from 20 different countries across Europe, USA and Asia. Returning to the University of York, Magnetism 2022 saw over 190 attendees take part in the two-day event. The opportunity to meet, once again, face-to-face with colleagues was warmly received, with over 50 oral presentations, including 11 invited speakers, and lively discussions held both in-person and through the online live stream.

The conference was co-chaired by Gonzalo Vallejo-Fernandez (University of York, UK) and Christoforos Moutafis (University of Manchester, UK), who noted: "*Magnetism 2022 at York marked a return to in-person events for the conference series (with a hybrid component) and we were very happy to see so many colleagues attending and presenting on-site. It was fantastic to welcome the UK & Ireland magnetism community plus many colleagues from further afield for the first time since restrictions were lifted. After a couple of years dominated by working from home and virtual meetings, it seems clear that the community enthusiastically embraced going back to 'normal' and we are pleased that Magnetism 2022 could be a welcoming space for the community to come together.*"

A highlight for the first day of the conference was a plenary lecture given by Julie Grollier (CNRS Thales, France) on the applications of magnetic materials and spintronics towards artificial neural networks. Dr. Grollier gave a fascinating overview of how the technology behind magnetic tunnel junctions – a key component of hard disk drive read head sensors – can be applied to the problem of energy efficient neuromorphic computation, mimicking neurons and synapses in the brain, and highlighted promising applications in complex RF signal classification.

Conference dinner reception at Magnetism 2022 in York, UK.



Plenary lecture by Julie Grollier during Magnetism 2022 in York, UK.

In keeping with the outstanding calibre of speakers, the conference was also an opportunity to see IEEE Magnetics Society Distinguished Lecturers Michael Flatté (University of Iowa, USA), discussing magnonics and applications quantum information science; Aurélien Manchon (Aix-Marseille Université, France), on the topic of exploring the potential of spin-orbitronics; and Jingsheng Chen (National University of Singapore, Singapore), who spoke on symmetry breaking for spin-orbit torque technology. The conference organising committee were thankful to them for attending the conference in-person and delivering three fantastic presentations.

The second day of the conference opened with the award of the prestigious 2022 Wohlfarth Lecture. This year the recipient was Peter Wadley (University of Nottingham, UK) for contributions to controlling and utilising antiferromagnetic order. Dr. Wadley described recent advances in the control, imaging and reading of antiferromagnetic metals, particularly the functional antiferromagnetic metal CuMnAs, towards spintronic applications of antiferromagnets.

The Wohlfarth Lecture is an annual seminar given by a rising star across the worldwide magnetism community and is named in honour of Peter Wohlfarth in recognition of his contributions to the field of magnetism. It is co-sponsored by the Society's UK & Ireland Chapter and the UK & Ireland Institute of Physics Magnetism Group.

This year's conference was sponsored by Qnami, Attocube, Oxford Instruments and Quantum Design (UK & Ireland). This

New Senior Members

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

February 2022: Perumal Alagarsamy, Julie Borchers, Patrick Braganca, Silvio Dutz, Loay Elbasyouni, Matthias Engels, Jouni Ikaheimo, Piya Kovintavewat, Romolo Marcelli, Daniel Marcsa, Chi-Feng Pai, Ioan Lucian Prejbeanu and Bo Zhang.

April 2022: William Frix, Frederic Goora, Jonas Noeland, Montserrat Rivas, Eric Severson and Hongxin Yang.

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

included a sponsored student poster session prize, won by Yingzheng Gao (École Superieure De Physique Et De Chimie Industrielles De La Ville De Paris, France) with runners up Katie Lewis (University of Exeter, UK) and Ioannis Charalampidis (University of Leeds, UK) also highly commended.

The conference was also the venue for the IEEE Magnetics Society UK & Ireland chapter AGM. There the following committee members were elected: Chair, Liam O'Brien (University of Liverpool, UK); Secretary, Nicola Morley (University of Sheffield, UK); Treasurer, Paul Nutter (University of Manchester, UK).

Conference Calendar

*By **Gareth Hatch**, Newsletter Editor*

Please check the conference websites shown below for the latest information on COVID-19-related schedule or format changes.

Magnetic Frontiers: Quantum Technology

6-9 June 2022 - New York, New York, USA.

13th International Conference on the Scientific and Clinical Applications of Magnetic Carriers

14-17 June 2022 - London, UK.

7th International Conference on Microwave Magnetics (ICMM 2022)

19-22 June 2022 - online.

4th International Advanced School on Magnonics (MAGNEFON)

18-22 July 2022 - Porto, Portugal.

The Joint European Magnetic Symposia (JEMS2022)

24-29 July 2022 - Warsaw, Poland and online.

7th Workshop on Magnonics (Magnonics 2022)

31 July - 4 August 2022 - Southern California, USA.

12th International Conference on Magnetic and Superconducting Materials (MSM22)

28 August - 2 September 2022 - Duisburg, Germany.

33rd Magnetic Recording Conference (TMRC 2022)

29-31 August 2022 - Milpitas, California, USA.

IEEE Around-the-Clock Around-the-Globe Magnetics Conference (AtC–AtG 2022)

31 August 2022 - online.

Trends in Magnetism 2022 (TMAG 2022)

4-9 September 2022 - Venice, Italy.

The European School on Magnetism 2022 (ESM2022)

11-23 September 2022 - Saabrücken, Germany.

Spin Dynamics at the Nanoscale and its Applications: A Symposium in Honor of Andy Kent

23-24 September 2022 - New York, New York, USA.

International Conference on Fine Particle Magnetism (ICFPM 2022)

16-21 October 2022 - Yokohama, Japan.

67th Annual Conference on Magnetism and Magnetic Materials (MMM 2022)

31 October - 4 November 2022 - Minneapolis, Minnesota, USA.

INTERMAG 2023

15-19 May 2023 - Sendai, Japan.

To list your conference in the Newsletter Conference Calendar in a future edition, 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