IEEE MAGNETICS NEWSLETTER

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Editor: Jia Yan Law

Featuring 2024 MagSoc **Award Winners** & **Newly Elevated Fellows**

Find out more on member benefits under President's Message .....

Newsletter Editorial Board

Jia Yan (Editor)

Jia Yan currently holds a tenure-track Emergia fellowship at University of Seville, Spain. Her research interests include functional high-entropy alloys, magnetocalorics, magnetic materials, and additive manufacturing. She has been an IEEE Senior Member and Editor of the IEEE Magnetics Society Newsletter since 2022.

Martin Lonsky (Associate Editor)

Martin currently works as a senior process engineer at Nexperia Germany where he focuses on power semiconductor devices. Previously, he was a research scientist at the University of Illinois at Urbana-Champaign and Goethe University Frankfurt. His interests lie in materials physics, magnetism, and spintronics. Aside from experimental research, he is interested in computational methods and how to incorporate them into undergraduate science and engineering curricula. In addition, he enjoys writing and communicating science. He is a member of the IEEE Magnetics Society since 2020.

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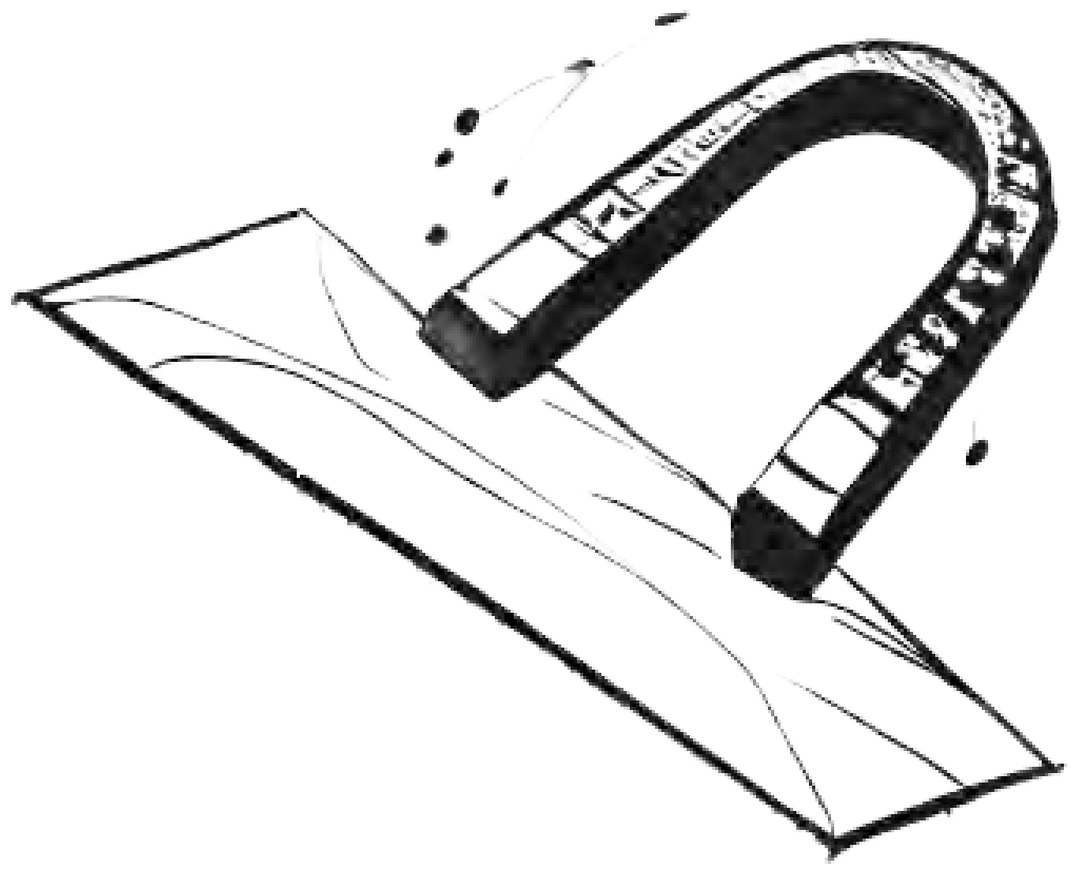
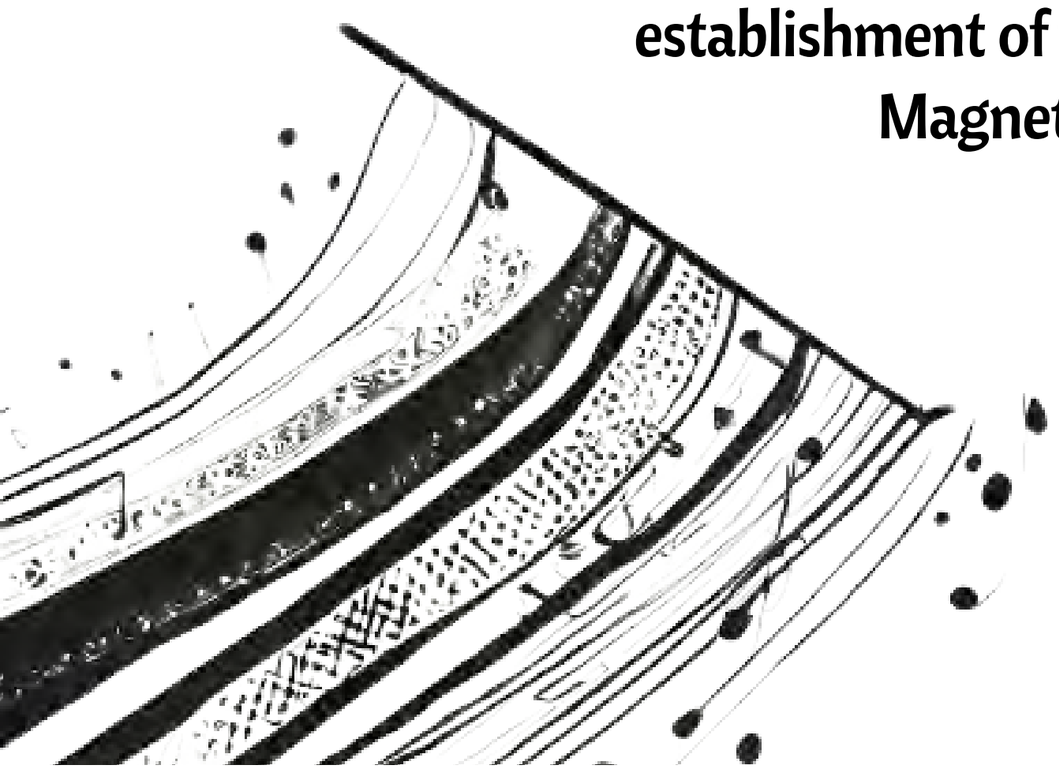
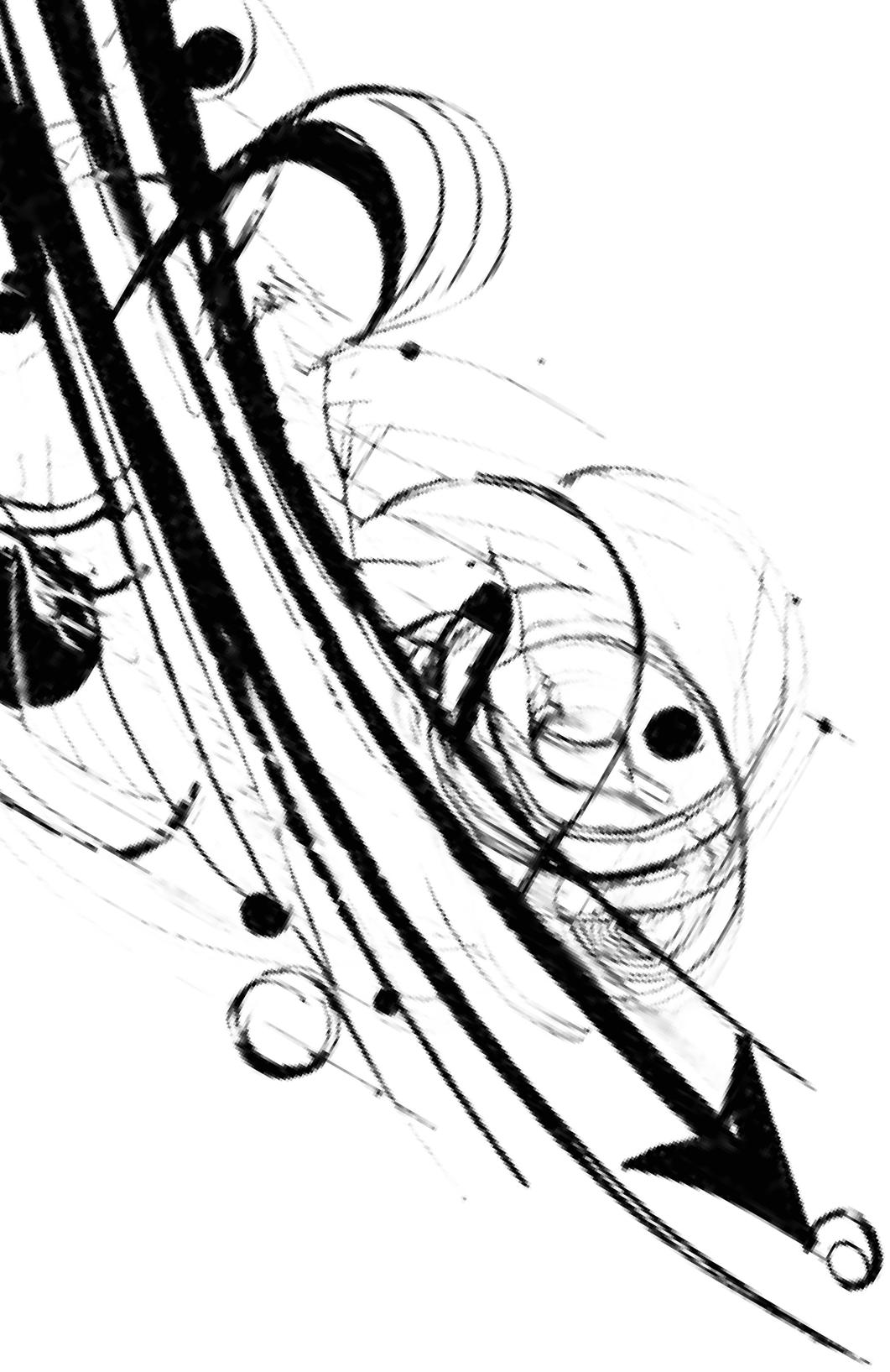


From the President

A Happy New Year to you all! I wish you and your family all the best for 2024. This year we had some delay in the selection of the Administrative Committee (AdCom), but we had finalized our new AdCom members (released in this newsletter). We appreciate your votes where the casting of votes was sent via the personalized link through email. I would like to thank our outgoing AdCom members—Paolo Bortolotti, Alison Flatau, Mathias Kläui, Nicola Morley, Shigeki Nakagawam, Larissa Panina, S. N. (Prem) Piramanayagam, and Laura Steren. Their contributions to our activities were immense, namely, on our recently introduced initiatives, including the establishment of the Students in Magnetism and the Magnetism in Ukraine programs.





At the beginning of the second year of my term, I would like to start my message by explaining the structure and operation of the IEEE Magnetics Society (MagSoc). Our society was initially created as the Magnetics Group in the IEEE on 26 August 1964 by Dr. Richard M. Bozorth and his colleagues based on the Magnetism and Magnetic Materials (MMM) organization started in 1955 and the Intermag conference in 1963. In the following year, the group started publishing IEEE Transactions on Magnetics. They were then upgraded to the Magnetics Society in 1972 and started the Joint MMM-Intermag conference in 1976. In 2010, the society created another journal, IEEE Magnetics Letters, and started the Magnetism Section in IEEE Access in 2020 [see more details in R. B. Goldfarb, IEEE Magn. Lett., vol. 1, 0000104, 2010].

The society is operated by three groups of volunteers: officers, AdCom, and (standing) committees, as listed in Fig. 1. Among the officers with a two-year term, the Secretary-Treasurer is selected by members' votes and is responsible for budgetary issues, in particular, initiatives and approval. The Secretary-Treasurer is typically approved by members' votes to become the President-Elect. The President-Elect chairs the Planning, Constitution and Bylaws Committee, which develops the mid-term (up to five years) operational plans. After two years, the President-Elect becomes the President, who is ultimately in charge of the societal activities. After the completion of the presidency, s/he becomes the Past-President, who chairs the Nominations Committee, which considers the slate of AdCom member and officer elections.

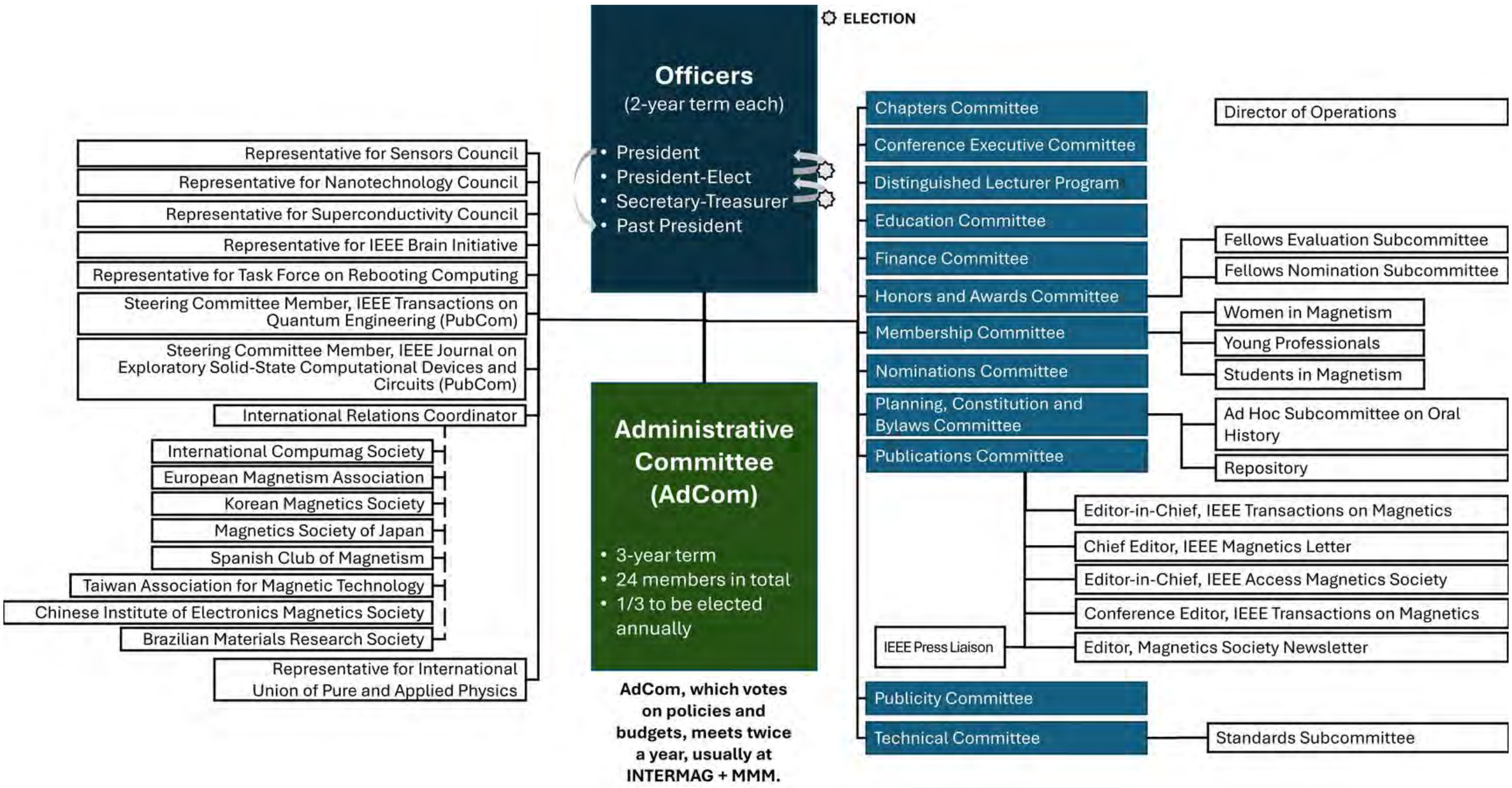


Fig. 1 Structure of the IEEE Magnetics Society.

The AdCom meets at least twice a year to discuss and approve issues by voting on various items on the societal operation agenda, ranging from the budget, conferences, and publications to initiatives. The AdCom consists of officers, committee representatives, chairs, and 24 members with a three-year term, 1/3 of whom are elected annually by the members. They represent their region(s) and research area(s) and can propose a new initiative and publicize their activities via a newsletter and so on. They can also nominate invited speaker(s) for conferences, distinguished lecturer(s), and senior member(s) and fellow(s). You are very welcome to contact them if you have any suggestions and comments on our activities.

The actual operations are performed by the corresponding committees. We have 12 standing committees, as highlighted in blue in Fig. 1, ad hoc committee(s), and representatives to the other societies/councils. The Chapters Committee consists of 48 chapters (24 Americas, 9 Europe, and 15 Asia), and it supports local activities by offering a ~$2–5k annual budget to each. In parallel, each local chapter belongs to a section, which belongs to a region (I will explain the IEEE structure in the next newsletter.) If you are interested in creating a new chapter, you need to have 12 MagSoc members and obtain approval from the Section to which you will belong.

The Conference Executive Committee ensures the smooth and high-standard operation of all our conferences. Our flagship conferences are Intermag, organized in April/May at a venue rotating in Asia, Europe, and the Americas (Rio de Janeiro this year), and MMM, which is held in October/November in North America (Palm Beach in 2025).

Every three years, the Joint MMM-Intermag is held in January (New Orleans in 2025).

This committee also financially and technically supports other conferences, such as The Magnetic Recording Conference (TMRC; University of California in 2024), Magnetic Frontiers Conference (Darmstadt in 2024), and Around-the-Clock Around-the-Globe Conference (AtC-AtG), etc.

The Distinguished Lecturer (DL) Program is one of the most successful activities we have been running. Four distinguished lecturers are selected annually. Their travel expenses are supported by the MagSoc to present about 40 talks on average all over the world with 20–100 attendees at each event, attracting over 800 participants per DL (similar size to a plenary talk at a conference but offering opportunities to students and young professionals to discuss possible collaborations and ask detailed questions).

The Education Committee (EdCom) organizes the Summer School annually, which is held at a rotating venue in three regions (Taipei this year). About 80 student members are financially sponsored to attend the school for one week and present their posters to the lecturers and DLs. The EdCom also selects tutorial talks at the Intermag conference and evaluates students' presentations at the Intermag and the MMM conferences.

The Finance Committee (FinCom) is the exchequer of the MagSoc. Operational and initiative budgets are allocated to our activities and approved together with the Secretary-Treasurer after the AdCom approval. As I explained in my article in the previous newsletter, the FinCom looks forward to hearing your new and creative ideas to continue/expand our activities.

The Honors and Awards Committee selects the recipients for our four awards: Achievement, Mid-Career, Early Career, and Distinguished Service Awards, each of which is assessed in the corresponding subcommittees based on nominations. The committee also nominates the Fellows of IEEE. Beginning this year, our Fellows Nomination Subcommittee will assist with a senior member's application. The applications are assessed and ranked by the Fellows Evaluation Subcommittee. Their recommendation is then sent to the Cohort Fellows Evaluation Committee in IEEE Division IV, to which the MagSoc belongs, for further discussion and ranking. This can be a lengthy process, so please allow sufficient time for your application.

The Membership Committee (MemCom) supports you. We currently have approximately 2,500 stable memberships (including student members) from all regions: 41% America, 21% Europe, and 28% Asia Pacific. This leads us to be categorized as a small society in the IEEE, giving us some disadvantages for the fellow evaluation process, among others. We need to recover at least 3,000 memberships (as we used to have) to avoid such a situation. In the MemCom, we have activities dedicated to diversity, equality, and inclusion, namely, Women in Magnetism (WiM), Young Professionals (YP), and Students in Magnetism (SiM), all of which have been organizing their events at our flagship conferences and beyond.

We would appreciate if you would encourage your colleagues to join the MagSoc (please refer to the benefits described as follows).

The Publications Committee is in charge of the abovementioned publications in addition to the newsletters. The Editors-in-Chief and editorial boards of these publications are members of the committee, as listed in Fig. 1.

They plan to offer more help for you to submit your work, such as a universal page for you to select the publication that best matches your work.

As described in my previous remarks, our publications offer the largest income (despite the decreasing trends) to the society, and we very much welcome your submissions!

The Publicity Committee makes announcements and posts advertising through social media (Facebook, LinkedIn, Twitter) and webpages. Please feel free to send your events and news items relevant to our members.

The Technical Committee discusses technical and scientific areas and recommends any emerging topics for our conferences. It also publishes a roadmap on these areas (five topics published in IEEE Trans. Magn.) and develops IEEE standards for five major fields in magnetics: (i) spintronics and recording, (ii) power, energy, machine, and environment, (iii) sensors, communications, instrumentation, and measurement, (iv) materials and phenomena, and (v) bio, interdisciplinary, and emerging topics.

We also have an Ad Hoc Committee on Oral History, which is the IEEE-wide project to record key achievements in our fields. To date, we have released five videos on our webpage with a three-minute summary of each. These videos illustrate the stories behind major achievements, covering subjects from perpendicular recording to NdFeB magnets.

In addition, we have five representatives and two steering committee members to the other societies/councils within the IEEE and one representative to the International Union of Pure and Applied Physics (IUPAP). We also have an international coordinator who maintains our close and mutually beneficial relationships with our eight sister societies, as listed in Fig. 1.

As you may have been appreciating, the benefits of becoming a MagSoc member are very broad and valuable, as summarized in Fig. 2.

We are grateful for your membership fee of $26 ($13 for a student). By matching with our operational budget and initiatives (please refer to my previous remarks for details), you immediately receive a $170 ($520 for a student) discount for the Intermag conference registration and an ~$100 discount for the article processing charge (APC) to publish in our journals. Please note that our conference registration fees for members, $680 for Intermag 2023 and $550 for Intermag 2024, are comparable with the other conferences in our community, €650 (~$700) for JEMS 2023 and €690 (~$750) for ICM 2024. Depending on your region, you are eligible for our community services, such as Magnetism in Ukraine and Magnetism in Latin America, as well as WiM training. Our student members can also enjoy travel support to attend our summer school.

Fig. 2 MagSoc member benefits

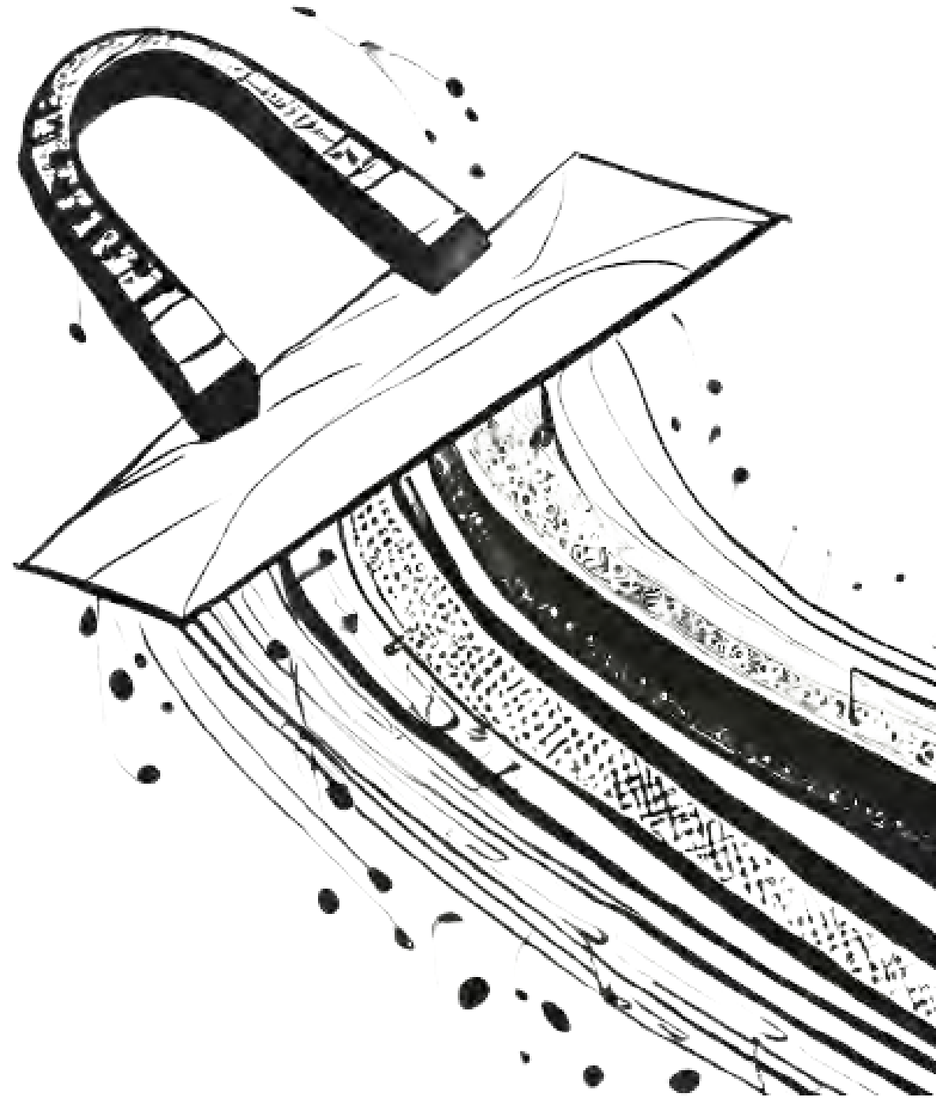
We also support networking events at our conferences, small conferences, and DL programs, which are open to non-members as well. We are proud of contributing to the magnetism community in such ways. By participating in these activities, you can receive an almost $800 benefit, a nearly 30 times return on investment. If you are a student or young professional, you can enjoy more benefits, as detailed in Fig. 2. Our members experiencing difficulties and/or under-representation can take advantage of additional regional programs. These benefits can cover your membership fee for the IEEE ($167 for regular membership, $27 for a student, and $36–97 for an electronic membership, available for the countries listed), which also offers membership benefits as listed at the bottom of Fig. 2. Note that you can also choose to be an affiliate member with the MagSoc membership fee, maximizing the value for money. Please also note in some countries, your membership can be tax exempt.

All the activities we organize are subject to review by the IEEE every five years. We had our review last November and received the panel's comments on January 6. The abovementioned operations team made efforts to respond to these comments by the end of January as requested. We understand our review will be approved at the coming IEEE Technical Activities Board (TAB) meeting on February 17 and 18. Even so, one item we still need to address is the development of our strategic plan as recommended by the panel. Our extended Planning Committee will meet between February 18 and 20 to discuss our five-year plan. I will report it in the next issue.

For smooth operations, we expanded our monthly online meetings at the beginning of this year to include not only the committee chairs but also AdCom members. We discuss various issues related to the society informally on the first Friday of every month.

As always, please visit our society's website to learn more about our activities. You can also find the contact details of the officers, AdCom members, and committee chairs on the website. We welcome any comments and suggestions you may have, especially new initiatives! Please feel free to circulate this newsletter to your colleagues who are interested in becoming a member and/or volunteering for the community.

Atsufumi Hirohata can be contacted via email:
atsufumi.hirohata.d1@tohoku.ac.jp
(Please note the new email address)



Elected AdCom Members

IEEE Magnetics Society President Atsufumi Hirohata welcomes the following newly elected members of AdCom:

Andrii Chumak
Peter Fischer
Victorino Franco
J. Ping Liu
Denys Makarov
Nicola Morley
Hariharan (Hari) Srikanth
Gilvânia Lúcia da Silva Vilela

Magnetic Frontiers Conference on Magnetic Materials and Motors for Green Energy Applications

15-19 September 2024 Darmstadt (Germany)

Magnets are key enablers for the green energy transition. This IEEE Magnetic Frontiers Conference will focus on recent advances in the development and implementation of high-performance magnetic materials for energy applications. More specifically, topics of permanent magnets, soft magnets and magnetocaloric materials and their applications will be covered.

Both, fundamental material research in academia and developments in industry and in SMEs (transformers, motors, generators, cooling systems, etc.), will be covered; the workshop will also extend to the primary mining of rare earths, resource efficiency and magnet recycling in order to address closing-the-loop approaches and assess life cycle sustainability.

Please check our web page for confirmed keynote speakers so far!

WHERE

Lichtenberg House
Technical University of Darmstadt,
Darmstadt, Germany

@ CONTACT

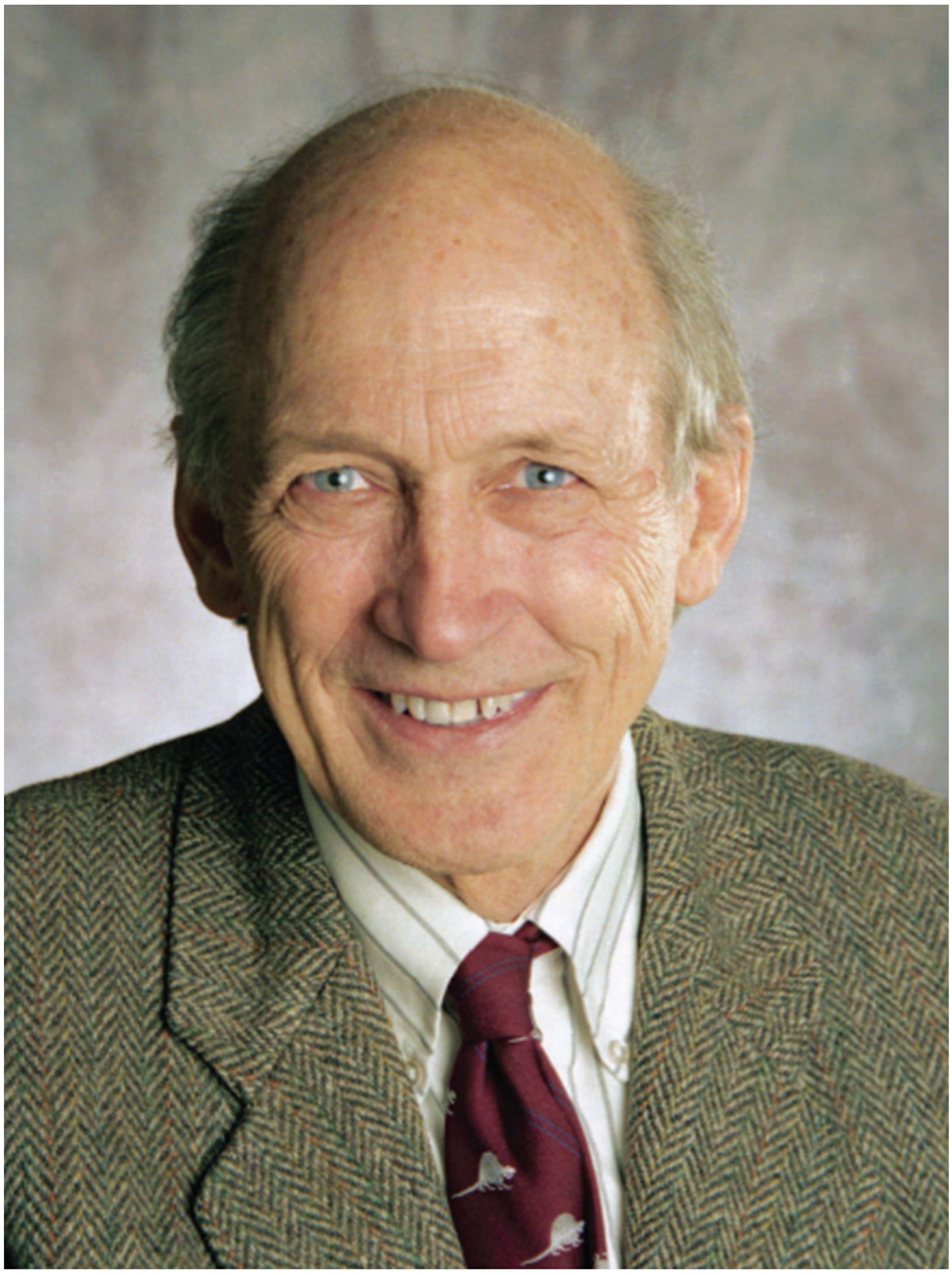
https://magneticfrontiers24.sciencesconf.org/

magneticfrontiers24@fm.tu-darmstadt.de

Anthony S. Arrott

1 April 1928 – 29 February 2024

by Calvin Winter



I hold in my hand a rare and valuable piece of history: *The Magnetization of Some Alloys of Nickel and the Collective Electron Theory of Ferromagnetism*, by A. Arrott, Laboratory of Magnetics Research, Department of Physics, Carnegie Institute of Technology, May 1954.

The manuscript is single spaced, typed with a manual typewriter and hand lettered where Greek symbols were required.

Reading through the carefully written Ph.D. thesis, I am reminded that Tony was not only a great scientist, but also a superb storyteller. He starts with the history of magnetic measurements, then leads the reader on to ever finer improvements in method. The reader keeps turning the pages, eager to learn the next step. Tony also included juicy details, such as the limitation of the current in a fine copper coil surrounding a sample in liquid helium when the insulation burned through and the coil shorted!

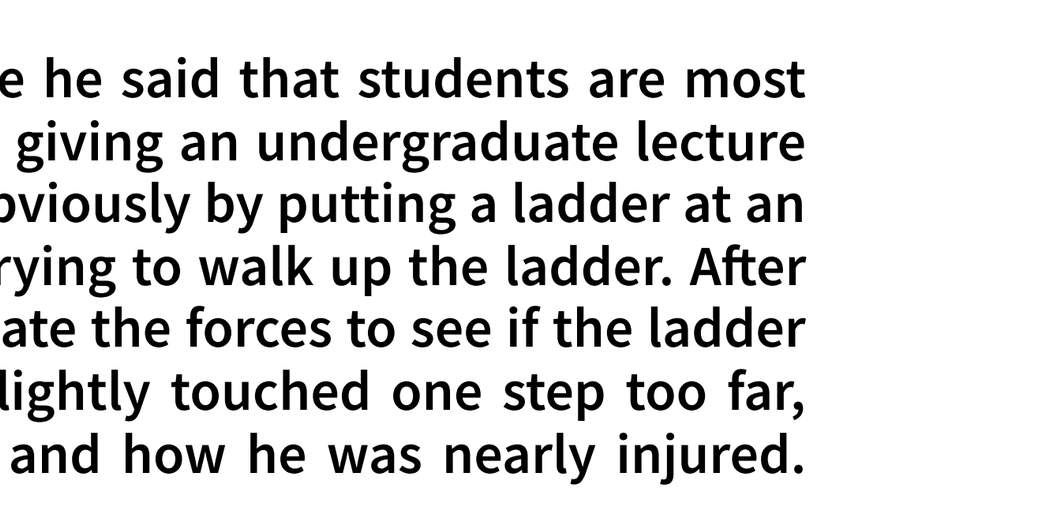
One of his passions was peace. He gave a series of lectures on the physics of peace, including insights such as that the Strategic Defense Initiative ("Star Wars") antiballistic missile system would not work simply because complex systems never work on the first try.

I often think of Tony and his valuable insights. Once he said that students are most engaged when their teacher's life is in peril. He was giving an undergraduate lecture on coefficients of friction. How to demonstrate it? Obviously by putting a ladder at an absurd angle against the classroom wall and then trying to walk up the ladder. After each step, he would go to the blackboard and calculate the forces to see if the ladder would support his weight. However, when he just lightly touched one step too far, even he was surprised at how quickly it collapsed and how he was nearly injured. Ever the experimentalist!

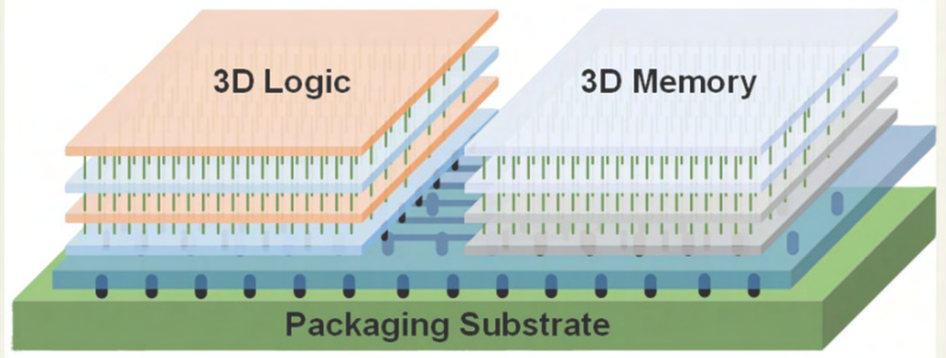
I am grateful to have had the honour and pleasure to have learned under the direction of one of the great scientists and peacemakers of our time.

Dr. Calvin Winter, Quantum Technology Corp., Squamish, BC, Canada, was Arrott's graduate student at Simon Fraser University from 1979 to 1983. The 1995 photograph of Arrott is reproduced from the front cover of IEEE Magnetics Letters, vol. 7, 2016; a short biography appears on the journal's back cover.

"He was a Being of significant note: He had an exceptional intellect, a deep sense of equality, a fearless approach, and a relentless impatience. We will miss him, but we are far richer for having traveled with him as our companion and guide." – Matthew Arrott



IEEE Journal on Exploratory Solid-State Computational Devices and Circuits
CALL FOR PAPERS



Special Topic on 3D Logic and Memory for Energy Efficient Computing

Topics of Interests

Prospective authors are invited to submit original works and/or extended works based on conference presentations on various aspects of 3D logic and memory design for energy-efficient computing. Topics of special interest include but are not limited to:

- Technology perspectives of 3D heterogeneous integration
- Emerging monolithic 3D logic and memory devices to improve energy efficiency of computation
- Advanced packaging for 2.5D and 3D integration to improve energy efficiency of computation
- Logic design and partition for a 3D system
- Network topology for 3D data movement
- 3D memory design and architectures to reduce the power consumption of data movement
- Signaling interface cross 3D modules
- Thermal cooling and management to address the increased power density of 3D integration
- Power delivery, thermal management, and reliability of 3D integrated circuits
- Power delivery, thermal management, and reliability of 3D integrated circuits
- Architectural innovations for energy-efficient 3D HI
- Prototypes of multitier logic and memory macros
- EDA tools for multidomain 3D integration

Important Dates

- Open for Submission: February 15, 2024
- Submission Deadline: May 31, 2024
- First Notification: June 30, 2024
- Revision Submission: July 15, 2024
- Final Decision: July 31, 2024
- Publication Online: August 15, 2024

Submission information:

- Information on submission guidelines can be found at the JxCDC page on the SSCS website.
- Paper submissions must be done through the IEEE Author Portal website.

Guest Editor
Yu Cao, University of Minnesota,
Jeff Zhang, Arizona State University

Editor-in-Chief
Azad Naeemi, Georgia Institute of Technology

2024 MagSoc Award Winners

Submitted by Honors and Award Committee:
Adekunle Adeyeye (Chair), Stephane Mangin,
Laura H. Lewis, Randall Victora and Fanny Béron

Early Career Award Winner

Professor Dr. Qi Wang of Huazhong University of Science and Technology will receive the prestigious 2024 Early Career Award from the IEEE Magnetics Society at the forthcoming 2024 International Magnetics Conference (INTERMAG) in Rio de Janeiro, Brazil, in May 2024. This award was established in 2016 to honor an individual, nominated not more than 5 years after completion of their Ph.D. degree, who has already shown outstanding scientific or technical achievements.

The citation for Professor Dr. Qi Wang's award reads:

For pioneering theoretical and experimental studies of linear and nonlinear spin waves in sub-100 nm conduits and the realization of the nanoscale magnonic integrated circuit.

Qi Wang completed his Ph.D. in the AG Magnetismus group at the University of Kaiserslautern in Germany, earning his degree in 2019. His research on linear and nonlinear spin waves in nanoscale structures garnered multiple accolades, including the prestigious "Preis des Freundeskreises" from the University of Kaiserslautern and the Chinese government's award for outstanding students abroad. Subsequently, Dr. Wang pursued postdoctoral research within the Nanomagnetism and Magnonics group at the University of Vienna, Austria.

As an accomplished scholar, Dr. Wang has authored approximately 50 publications, which have been cited over 1,500 times, earning him an h-index of 17 according to Google Scholar metrics. His pioneering work in magnonics over the past few years has led to several notable discoveries. Among these, his study on spin waves in coupled waveguides paved the way for the creation of a nanoscale spin-wave directional coupler, detailed in his paper published in Science Advances. Furthermore, Dr. Wang's innovation extended to the successful fabrication of this directional coupler at the nanoscale. His proposal of an integrated magnonic half-adder based on the directional coupler marked a significant advancement in the field, as evidenced by his publication in Nature Electronics. Dr. Wang's contributions have proven to be instrumental in shaping the future of magnonics and computational technologies.

Mid-Career Award Winner

Dr. Guohan Hu of the IBM T. J. Watson Research Center, Yorktown Heights, New York, will be presented with the 2024 Mid-Career Award at the 2024 IEEE International Magnetics Conference (INTERMAG) in Rio de Janeiro, Brazil, in May 2024. This award recognizes scientists and engineers at the midstages of their career for outstanding research and technological contributions in a field represented by the IEEE Magnetics Society. Eligible recipients are members of the IEEE Magnetics Society in the midstages of their career (typically between 10 to 20 years after award of the doctoral degree). This award fills a void between the Magnetic Society's Early Career Award, limited to a nominee within 5 years of completion of their doctorate, and the Achievement Award, which recognizes a nominee for research that has demonstrated unusually high impact, regardless of career stage.

The citation for Dr. Guohan Hu's award reads:

For pioneering advancements in the development and commercialization of spin-transfer torque magnetic random-access memory (STT-MRAM).

Dr. Guohan Hu's research contributions have enabled next-generation data storage based on the phenomenon of spin-transfer torque to realize magnetic random-access memory technology that offers high density, low power consumption, and exceptional data retention.

Dr. Hu received her Ph.D. degree in 2002 from Cornell University for contributions to the fundamental understanding of the origins of exceptional magnetic responses in manganite thin films and magnetic tunnel junctions. Following her postdoctoral fellowship investigating patterned media for ultrahigh-density magnetic recording at the IBM Almaden Research Center and later at Hitachi, Ltd., she advanced to the position of staff engineer/scientist at Hitachi, Ltd., and later became a research staff member at the IBM T. J. Watson Research Center. In recognition of her intellectual and managerial leadership, she became the manager of the Magnetic Random Access Memory (MRAM) Materials and Devices Group in 2013 and lead of the IBM–Samsung MRAM Alliance Program in 2020.

Achievement Award Winner

The citation for Professor Jian-Ping Wang's award reads:

For pioneering contributions to and inventions for magnetic materials, devices, and applications in information storage and computation, particularly on magnetic media, MRAM, and in-memory computing.

Professor Jian-Ping Wang has been selected as the recipient of the 2024 IEEE Magnetics Society Achievement Award, the highest technical honor of the IEEE Magnetics Society. Dr. Wang received his B.S. and M.S. degrees in physics from Lanzhou University and earned his Ph.D. degree from the Institute of Physics, Chinese Academy of Science, in 1995. He then joined the Data Storage Institute and the National University of Singapore, where he rose to research program manager of the Magnetic Media Department. He joined the University of Minnesota (UMN) in 2002, where he is currently a Distinguished McKnight University Professor and holds the Robert Hartman Endowed Chair. While at UMN, he led the Center for Spintronic Materials, Interfaces, and Novel Architectures (C-SPIN) and a follow-up Center for Spintronic Materials for Advanced infoRmation Technologies (SMART). He was named an IEEE Fellow in 2015 and a Fellow of the American Physical Society in 2020.

Wang's research focuses on the experimental investigation of magnetic materials for applications to magnetic devices. A significant early accomplishment was the first experimental demonstration of exchange-coupled composite media. This media had been theoretically predicted to allow lower switching field while retaining higher thermal stability than the perpendicular recording media of that time. This is important to magnetic recording on hard disk drives because it allows for smaller grains and thus higher user areal density. The success of Professor Wang's experimental materials helped to persuade industry to invest the necessary development effort to optimize the media for commercial usage, where it is now the basis for almost all applications, including cloud storage.

Most recently, Jian-Ping's efforts to fully understand the underlying physics and materials science of $Fe_{16}N_2$ have led to the development of a promising candidate for an environmentally friendly magnet, which is being manufactured by Niron Magnetics, Inc.

A second significant accomplishment was the experimental demonstration of a perpendicular spin-transfer-torque switchable device. This improved the switching current to thermal stability ratio of the magnetoresistive random access memory (MRAM) element because it eliminated the adverse effects of the demagnetization energy found in longitudinal MRAM. This design (developed simultaneously at HGST) is used in most MRAM products commercially produced today.

Permanent magnets are crucial to many technologies, including green energy, but currently the most powerful ones use rare earth elements such as Nd or Sm, which are difficult to extract, causing significant pollution. In contrast, Fe and N are plentiful and relatively clean. Although not yet available commercially, this FeN magnet has received substantial recognition, including mention in Time Magazine's "Invention of the Year" list.

Distinguished Service Award Winner

Dr. Liesl Folks is recognized with the 2024 Distinguished Service Award of the Magnetics Society. The Distinguished Service Award was established in 2015 and first awarded in 2016 to honor outstanding service to the Magnetics Society. It is characterized by sustained voluntary service significantly beyond the average performance of a person in that role.

The citation for Professor Liesl Folks' award reads:

For fostering a dynamic and diverse IEEE Magnetics Society by supporting, encouraging, and educating the human beings behind the scientists and engineers, especially students

Dr. Folks has served in numerous volunteer roles for the Magnetics Society over more than two decades, including as the first female President of the IEEE Magnetics Society (2013–2014).

She also served at various times as the society's Secretary-Treasurer, Finance Chair, and Nominations Chair. Dr. Folks has also served on the Strategic Planning Committee for the IEEE Technical Activities Board. In each of these roles, Dr. Folks has prioritized investments in the next generation of magnetics experts, and is particularly proud of helping to launch the Magnetics Society's Summer School for graduate students from around the world. She has been a strong advocate for ensuring that the Magnetics Society is truly global in its reach, with a focus on being accessible and welcoming to those working on magnetics in industry, government and academia everywhere.

Dr. Folks holds a BSc and a PhD in Physics from The University of Western Australia, in addition to an MBA from Cornell University. She currently holds the position of Vice President of Semiconductor Strategy and is a Professor of Electrical and Computer Engineering at the University of Arizona. From 2019 to 2023, Dr. Folks served as the provost of the university. Prior to her tenure at the University of Arizona, she served as the Dean of the School of Engineering and Applied Sciences at the University at Buffalo, NY. Prior to joining UB in 2012, she spent 16 years in R&D in support of the data storage industry in Silicon Valley. There, she worked at IBM Almaden Research Center, Hitachi Global Storage Technologies, and Western Digital.

Dr Folks has made significant contributions to research and development across various domains, including nanoscale magnetic metrology, bit-patterned media, microwave-assisted magnetic recording (MAMR), spin-transfer-torque sensors, and Hall cross sensors. As an internationally recognized expert in magnetic materials and devices, nanoscale metrology, and spin-electronic devices, Dr. Folks has secured 12 U.S. patents and authored over 60 peer-reviewed articles with a combined citation count exceeding 13,000. She co-authored the ASEE's Deans Diversity Statement, a landmark initiative announced by US President Obama in 2015.

Currently, Dr. Folks serves as the Committee Chair for the 2024 NASEM panel on Global Microelectronics: Models for the Department of Defense in Semiconductor Public-Private Partnerships. She is a Fellow of the National Academy of Inventors.

Get to Know Our 2024 MagSoc Newly Elevated Fellows

Elke Arenholz, Pacific Northwest National Laboratory (PNNL), USA

for contributions to X-ray magnetic spectroscopy

website

(1) What is your field of research/expertise?

My research is focused on magnetism and magnetic materials, which is exciting since we discover new physics as well as learn how to optimize materials for specific applications ranging from devices for quantum computing to permanent magnets for energy applications.

(2) What does it mean to you to be an IEEE Fellow?

It is an honor to be recognized by my peers for my contributions to my field of research.
It makes me happy :)

(3) What are your goals for 2024 and perhaps the next 5 years?

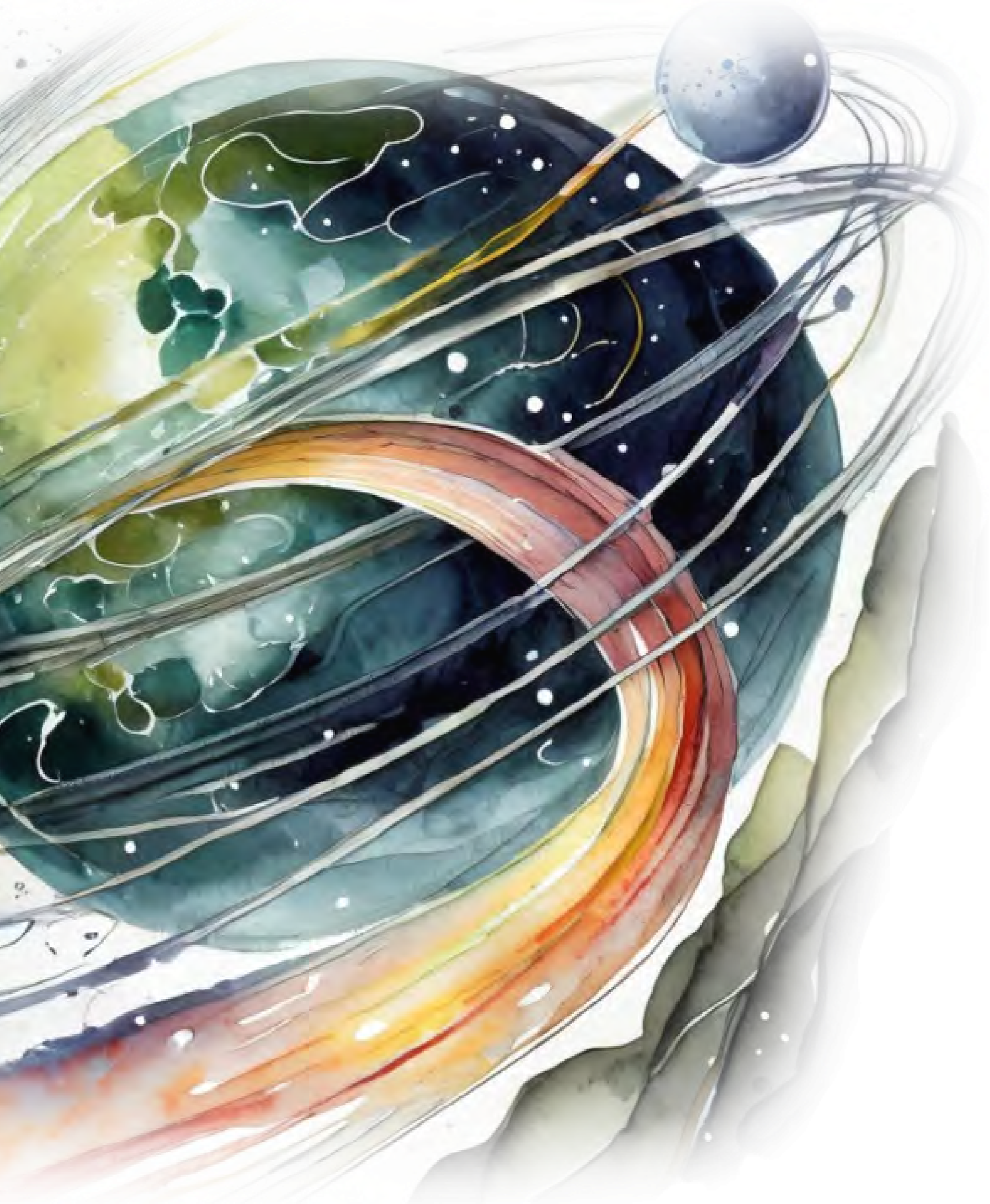
I want to continue to work with my colleagues to address the problems our planet is facing with creativity, reliable research, and rational approaches.

(4) Is there any advice for young scientists and engineers that you would liketo share?

Be curious, be daring, and be kind to others and yourself.

(5) Would you be open to sharing a fun fact about yourself?

I love cartoons; telling a story and making people think and/or laugh in a few panels can be magical.



Victorino Franco
Universidad de Sevilla, Spain

for contributions to the study of thermomagnetic phase transitions, soft magnets, and magnetocaloric materials

website

(1) What is your field of research/expertise?

I work on magnetic materials for energy applications, mainly soft magnetic materials and magnetocalorics. In addition, I have a strong interest in the development of new and/or optimized measurement techniques.

(2) What does it mean to you to be an IEEE Fellow?

When I started at University of Seville, it was not a place that was recognized for magnetism research. Over the years, this situation has changed and becoming a Fellow from within the Magnetics Society is the recognition that we do impactful research in this area. This is a significant achievement in my career and a great honor for which I am extremely thankful.

(3) What are your goals for 2024 and perhaps the next 5 years?

Being a physicist by training, my research is at the borderline between physics and materials science. My current goal is to bring my research closer to the society, implementing prototypes that attract industry to get onboard and improve our quality of life. Completing this goal will probably take me longer than that time.

(4) Is there any advice for young scientists and engineers that you would like to share?

My advice is twofold: dare to go out of your comfort zone and persevere in whatever you try.

(5) Would you be open to sharing a fun fact about yourself?

I still like to work in the lab, especially when it involves developing new measurement devices, programming data acquisition systems out of the ordinary, or even 3D printing parts for functional prototypes. And I like to combine these hobbies with visits to international labs, where I enjoy interacting with the local students in solving their experimental or simulation problems.

Yoichiro Tanaka
Tohoku University, Japan

for contributions to perpendicular magnetic recording technology for disk drives

website

(1) What is your field of research/expertise?

My research field is perpendicular magnetic recording and storage systems, which include multiscale technologies from magnetic nanomaterials to storage system architecture.

(2) What does it mean to you to be an IEEE Fellow?

IEEE Fellow is the greatest recognition and a responsible lighthouse with which to navigate future technologies for human society.

(3) What are your goals for 2024 and perhaps the next 5 years?

My short goal is to unify data storage and computation as a computational-storage system for data-heavy applications. In the long run, establishing a brain-morphic analytics platform is my dream.

(4) Is there any advice for young scientists and engineers that you would like to share?

Provide innovation for quality of life to society. Please remember the process: careful observation, finding physics, engineering as a bridge to society, and then maintain that philosophy to drive the innovation to completion.

(5) Would you be open to sharing a fun fact about yourself?

I was a rally driver (motorsport) when I was younger.

Yiming Huai
Avalanche-Technology, USA

for contributions and leadership to STT MRAM and GMR recording head development and productization

website

(1) What is your field of research/expertise?

(a) Giant magnetoresistance (GMR) and tunneling magnetoresistance (TMR) recording heads for hard disk drive (HDD), (b) spin-transfer torque magnetic random-access memory (STT MRAM) and advanced spintronic memory, covering magnetic tunneling junction (MTJ) materials system, film deposition/characterization, and MTJ integration with CMOS at semiconductor fabricators for both embedded and stand-alone applications.

(2) What does it mean to you to be an IEEE Fellow?

Being recognized as an IEEE Fellow is a distinguished honor that comes with significant responsibilities. It entails a heightened commitment to volunteer contributions across various societal aspects and a dedication to mentoring young scientists and engineers in their career development.

(3) What are your goals for 2024 and perhaps the next 5 years?

My objectives include establishing STT MRAM as a widely adopted embedded solution beyond the 22 nm node and expanding stand-alone STT MRAM markets. Additionally, I aspire to advance STT/SOT MRAM developments for edge AI applications, focusing on achieving low power consumption, high-speed performance, and cost-effectiveness.

(4) Is there any advice for young scientists and engineers that you would like to share?

Place a strong emphasis on research and innovation as crucial bridges between fundamental studies and practical applications. Actively engage in innovative research that translates fundamental concepts into real-world solutions, ensuring that your contributions have a tangible impact on advancing technology and addressing practical challenges.

(5) Would you be open to sharing a fun fact about yourself?

I am fluent in French, a skill acquired during my studies at Shanghai Second Medical School and French-taught Montreal University in Quebec. This proficiency enabled me to interact with French university professors from France during my graduate studies (1985–1992), including Professor Albert Fert, the 2007 Physics Nobel Prize winner for the discovery of GMR. This unique experience enriched my subsequent career development in the field of spintronics.

(1) What is your field of research/expertise?

My research focuses on magnetic imaging, standards for MRI, and spin dynamics. The work ranges from developing microMRI to developing biomimetic phantoms and enabling more precise MRI-readable radiation dosimetry.

(2) What does it mean to you to be an IEEE Fellow?

I am very honored to be an IEEE fellow. I published one of my first papers in 1983 in IEEE Transactions on Electron Devices and have subsequently published in IEEE magnetics, superconductivity, sensor, and neuromorphic journals. IEEE has been a great home and community for me over the last 40 years, and I have greatly appreciated it.

(3) What are your goals for 2024 and perhaps the next 5 years?

My goal is to make breakthroughs in cell-level MRI and develop MRI as a metrology to quantitively measure biologic processes as well as effects of radiation.

Stephen Russek
National Institute of Standards and Technology (NIST), USA

for contributions to metrology of spintronic devices and standardization of magnetic resonance imaging

website

(4) Is there any advice for young scientists and engineers that you would like to share?

I would advise young scientists to develop their own vision and not be afraid to follow a unique path.

(5) Would you be open to sharing a fun fact about yourself?

For one of my undergraduate labs on NMR, I used the same equipment and samples used by Purcell and Pound (my lab instructor) for their Nobel prize work. I did not appreciate the significance of the old rickety equipment and samples until 30 years later.

AWARDS & NOMINATIONS CALENDAR

2024 NOMINATIONS DUE

IEEE FELLOW
FEBRUARY 7

DISTINGUISHED LECTURER
JUNE 17

ACHIEVEMENT AWARD
JULY 31

MID-CAREER AWARD
JULY 31

EARLY CAREER AWARD
JULY 31

DISTINGUISHED SERVICE AWARD
JULY 31

NOMINATIONS FORM

The Write Stuff:

Differences Between American and British English

by Ron Goldfarb
President Elect, IEEE Magnetics Society

To hear audio clips embeded, please refer to the online flipbook version of the newsletter

Some differences between American and British versions of English are charming: different conventions (*sincerely yours* vs. *yours faithfully*), different names for things (*truck* vs. *lorry*), and different pronunciations (*tomato* vs. *tomato*).

Less charming differences in spelling, punctuation, and usage in published papers make them candidates for examination by *The Write Stuff*. Let's first look at spelling.

Spelling differences began to be codified in 1828 with the publication of Noah Webster's *An American Dictionary of the English Language*. Among his other contributions, Webster, whose name eventually became generic, tried to simplify British spellings (e.g., *color* vs. *colour*, *center* vs. *centre*).

American science writers should be mindful of these spellings:

- *meter* and *liter*, not *metre* and *litre*
- *ammeter* (in both American and British English)
- *gram*, not *gramme*
- *acknowledgments*, not *acknowledgements* (a common error among American authors)
- *judgment*, not *judgement*
- *knowledgeable* (in both American and British English)
- *analog*, not *analogue*
- *aluminum*, not *aluminium*
- *sulfur*, not *sulphur*
- *artifact*, not *artefact*
- *gray*, not *grey*
- *usage*, not *useage*
- *realization*, not *realisation*

I used to be annoyed when British journal editors erroneously changed my spelling of *magnetize* to *magnetise*. The rule (even in the U.K.) is that words derived from the Greek take the *-ize*, not the *-ise*, suffix. This is referred to as the Oxford spelling (as in Oxford University and Oxford English Dictionary).

However, words like *analyse* and *catalyse*, which do not contain an *-ise* suffix, are legitimate British English verbs with Greek roots. Americans should use *analyze* and *catalyze*.

When I was young, I was intrigued by the ae spelling of *Encyclopaedia Britannica*, sometimes with a ligature (æ). Spellings with *ae* and *oe*, imported from Latin and often related to medicine (e.g., haemoglobin, oesophagus), are distinctly British, replaced in American English with *e*.

If you are a *traveler*, not *traveller*, you might want to go to the *theater*, not *theatre*, after which you may stop at a *bar*, not *pub* (short for *public house*), for a shot of Scotch *whisky*, Irish *whiskey*, or American *whiskey* (e.g., bourbon or rye), or a *U.S. pint* (473 mL), not an *imperial pint* (568 mL), of *draft*, not *draught*¸ beer.

An American playing Wordle is more likely to think of *favor* as the allowed five-letter answer than a Briton, who would be inclined to protest vigorously on social media in favor of *favour*.

Wordle was created by Josh Wardle and is published daily by *The New York Times*. Credit: The New York Times

Punctuation

American publishers place periods and commas before the closing “quotation mark,” whereas other punctuation is placed “outside”! This illogical practice originated with proportional type; its only merit is marginally improved visual appearance. (When an exclamation point or a question mark are part of the quote, it always goes inside, of course.)

Speaking of quotes, British publishers often use single quotes instead of double quotes. American newspapers have started to use single quotes in headlines because of their compactness. Stick with double quotes except when nesting a quote within a quote.

By and large, Britons do not use the serial comma, also known as the Oxford comma, which suggests that they really should use it (especially if they went to Oxford University). The serial comma is the one we place before *and* and/or *or* in a list of more than two. Here is an example: “I thank my parents, the Pope, and Mother Theresa.” Without the serial comma: “I thank my parents, the Pope and Mother Theresa”; probably not what we meant. The U.S. Government and I use the serial comma. I sometimes make an exception when the series consists of single words or numbers.

Speaking of numbers, some countries use points as decimal separators, some use commas. Fortunately, both the United States and the United Kingdom use decimal points. Also, both use commas to separate sequences of three digits, but as we SI practitioners know, non-breaking spaces (or half-spaces) are required, or at least preferred.

Usage

Some British words are simply not used in unpretentious American English. I'm thinking of *amidst* (instead of *amid*), *amongst* (instead of *among*), and *whilst* (instead of *while*). British spies pretending to be Americans who let slip "amongst" will have blown their cover.

Some words in the past tense may be regarded as alternative spellings in the U.K. but not real words in the U.S. I'm thinking of *burnt*, *dreamt*, *learnt*, *spelt* (not the wheat), and *spilt*.

Americans write *toward*, *forward*, *backward*, *upward*, and *downward*; not *towards*, *forwards*, *backwards*, *upwards*, and *downwards*.

The distinction between *that* and *which* is clear but subtle in American English. British English seems to have no use for *that*.

This sentence was in the 16 April 2022 issue of *The Economist* magazine, which is well acquainted with the King's English (at the time, the Queen's English): "They are specks of a material which fluoresces." An American would write, "They are specks of a material that fluoresces."

What if the original sentence were instead, "It is a speck of a material which fluoresces." An American would ask, "Do you mean that the speck fluoresces or that the material fluoresces?" If the former, both an American and a Briton would write, "It is a speck of a material, which fluoresces." If the latter, an American would write, "It is a speck of a material that fluoresces."

Summary: In British English, a *which* without a comma before it means *that*.

No *which*/*that* ambiguity exists when only *which* will do:

- **The degree to which …**
- **Which one?**
- **Every which way you lose.**
- **… two of which were …**
- **… that which …**

Speaking of *that* and *which*, use *who* instead when referring to people.
Examples:

- **"The scientists *that* had no knowledge of the subject felt compelled to opine nevertheless."**
  → "The scientists *who* had no knowledge of the subject felt compelled to opine nevertheless."
  (Those who had no knowledge opined.)
- **"The scientists, *which* had no knowledge of the subject, felt compelled to opine nevertheless."**
  → "The scientists, *who* had no knowledge of the subject, felt compelled to opine nevertheless." (All had no knowledge and opined.)

Adapted from The Write Stuff: Differences Between American and British English, *originally published in May 2022 in* For Good Measure, *the internal newsletter of the National Institute of Standards and Technology's Physical Measurement Laboratory*.

IEEE Magnetics Society Distinguished Lecturers for 2024

Spin-Transfer Effects in Structures With Different Magnetic Configurations

Alina Maria Deac

Dresden High Magnetic Field Laboratory, Helmholtz Zentrum Dresden-Rossendorf, Germany

Contact: a.deac@hzdr.de

Alina M. Deac obtained the undergraduate degree in Physics from Babes-Bolyai University (Cluj-Napoca, Romania) in 2000, and the Master's and Ph.D. degrees from Joseph Fourier University (Grenoble, France) in 2001 and 2005, respectively. The focus of her doctoral work was spin-momentum transfer-induced phenomena, which she carried out at SPINTEC. She continued her research in the same field as a Japan Society for the Promotion of Science Fellow at the National Institute of Advanced Industrial Science and Technology, Tsukuba (Japan), a Marie Curie Fellow at the National Institute of Standards and Technology, Boulder, Colorado (USA), at Forschungszentrum Jülich (Germany), and as an Ambizione Fellow at École Polytechnique Fédérale de Lausanne (Switzerland). Since October 2011, she is leader of the Spintronics Group at Helmholtz Zentrum Dresden-Rossendorf.

Since their initial prediction in 1996, spin-transfer induced or assisted phenomena have become one of the most relevant fields in magnetism, with valid industrial applications. Briefly, a spin-polarized current flowing through a ferromagnet exerts a torque on its magnetization at the nanoscale, thereby providing a means of manipulating it. In a nanosized magnet, spin-transfer torques can induce either magnetization reversal or steady-state precession. These phenomena can be exploited to design a range of devices ranging from more obvious applications, such as embedded magnetic memory (currently in production by several companies), to a more distant potential implementation as wireless radio-frequency oscillators for mobile communications, which could potentially cover the terahertz range, or for neuromorphic computing.

Currently, there remain countless aspects being investigated, from the very applied to the very fundamental. I will focus on fundamental issues, while still connecting to application-related requirements. The talk will cover experimental, theoretical, and micromagnetic analysis of spin-transfer driven precession in MgO-based tunnel junctions, versus basic metallic nanopillars, and spin-transfer switching and precession in junctions with non-collinear magnetization configurations. Other fundamental topics that I will briefly address include the potential of almost compensated ferrimagnets as active layers for spin-transfer driven oscillators in the terahertz range and whether thermal gradients naturally occurring in asymmetric structures, such as the nanopillars used for spin-torque devices, can be functionalized to assist torques induced by direct electrical bias, as predicted by ab-initio calculations.

Probabilistic Computing With p-Bits: Optimization, Machine Learning and Quantum Simulation

Kerem Çamsarı

Department of Electrical and Computer Engineering, University of California Santa Barbara, U.S.A.

Contact: camsari@ece.ucsb.edu

Kerem Çamsarı received the Ph.D. in Electrical and Computer Engineering from Purdue University in 2015, where he continued as a postdoctoral researcher before becoming Assistant Professor at the Department of Electrical and Computer Engineering at the University of California Santa Barbara in 2020. His doctoral work established a modular approach to connect a growing set of emerging materials and phenomena to circuits and systems, a framework adopted by others. In later work, he used this approach to establish the concept of p-bits and p-circuits as a bridge between classical and quantum circuits to design efficient, domain-specific hardware accelerators for the “beyond-Moore” era of electronics. He is a founding member of the Technical Committee on Quantum, Neuromorphic, and Unconventional Computing within the IEEE Nanotechnology Council where he currently leads the Unconventional Computing section. For his work on probabilistic computing, he has received the IEEE Magnetics Society Early Career Award, a Bell Labs Prize, an Office of Naval Research Young Investigator Award, and a National Science Foundation CAREER award. He is a senior member of the IEEE.

The slowing down of Moore’s Law growth has coincided with escalating computational demands from machine learning and artificial intelligence. An emerging trend in computing involves building physics-inspired computers that leverage the intrinsic properties of physical systems for specific domains of applications. Probabilistic computing with probabilistic bits (p-bits) has emerged as a promising candidate in this area, offering an energy-efficient approach to probabilistic algorithms and applications [1]-[4].

Several implementations of p-bits, ranging from standard complementary metal oxide semiconductor (CMOS) technology to nanodevices, have been demonstrated. Among these, the most promising p-bits appear to be based on stochastic magnetic tunnel junctions (sMTJs) [2]. Such sMTJs harness the natural randomness in low-barrier nanomagnets to create energy-efficient and fast fluctuations, up to gigahertz frequencies [4]. In this talk, I will discuss how magnetic p-bits can be combined with conventional CMOS to create hybrid probabilistic-classical computers for various applications. I will provide recent examples of how p-bits are naturally applicable to combinatorial optimization, such as solving the Boolean satisfiability problem [3], energy-based generative machine learning models like deep Boltzmann machines, and quantum simulation for investigating many-body quantum systems. Through experimentally informed projections for scaled p-bit computers using sMTJs, I will demonstrate how physics-inspired probabilistic computing can lead to graphics-processing-unit-like success stories for a sustainable future in computing.

[1] S. Chowdhury, et al., IEEE J. Expl. Solid-State Comp. Dev. Cir. 9, 1-11 (2023).

[2] W. A. Borders, et al., Nature 573, 390-393 (2019).

[3] N. A. Aadit, et al., Nature Electronics 5, 460–468 (2022).

[4] N. S. Singh, et al., Hardware Demonstration of Feedforward Stochastic Neural Networks with Fast MTJ-based p-bits, IEEE Int. Electron Dev. Meeting, In Press, (2023).

Brain-Inspired Computing Using Magnetic Domain Wall Devices

S. N. Piramanayagam

School of Physical and Mathematical Sciences, Nanyang Technological University, Singapore

Contact: prem@ntu.edu.sg

S. N. (Prem) Piramanayagam got the Master's degree in Physics from the University of Kerala, India, in 1988 and the Ph.D. from the Indian Institute of Technology, Bombay, India, in 1994. He carried out further research at Shinshu University, Japan (1995 1999) and worked in the Data Storage Institute (DSI), Singapore (A*STAR). He is currently an Associate Professor at Nanyang Technological University (NTU), Singapore. He has 30 years of experience in magnetism, with research topics including amorphous magnetic alloys, permanent magnetic materials, and thin films and nanostructures for recording and spintronics applications. His current interest lies in the interdisciplinary areas of magnetism, electronics, and nanotechnology.

Prem has received an award for teaching excellence from NTU Singapore and several awards for outstanding research from DSI Singapore. He is a Senior Member of IEEE and has been an active volunteer in the IEEE Magnetics Society, including chair of Technical Committee, elected member of the Administrative Committee, chair of the Singapore Chapter, and co-chair of the 2018 Intermag Conference in Singapore. He has published about 200 journal articles and has filed several patent applications. He serves as an editor of *IEEE Transactions on Magnetics* and as editor-in-chief of *Nano* (World Scientific). He co-edited the book, *Developments in Data Storage: Materials Perspective* (Wiley-IEEE Press, 2011).

Neuromorphic computing or brain-inspired computing is considered as a potential solution to overcome the energy inefficiency of the von Neumann architecture for artificial intelligence applications [1] [4]. In order to realize spin-based neuromorphic computing practically, it is essential to design and fabricate electronic analogues of neurons and synapses. An electronic analogue of a synaptic device should provide multiple resistance states. A neuron device should receive multiple inputs and should provide a pulse output when the summation of the multiple inputs exceeds a threshold.

We have been carrying out investigations on the design and development of various synaptic and neuron devices in our laboratory. Domain wall (DW) devices based on magnetic tunnel junctions (MTJs), where the DW can be moved by spin-orbit torque, are suitable candidates for the fabrication of synaptic and neuron devices [2]. Spin-orbit torque helps in achieving DW motion at low energies whereas the use of MTJs helps in translating DW position information into resistance levels (or voltage pulses) [3]. This talk will summarize various designs of synthetic neurons synaptic elements and materials [4]. The first half of the talk will be at an introductory level, aimed at first-year graduate students. The second half will provide details of the latest research.

[1] K. Roy, et al., Naure 575, 607-617 (2019).

[2] W. L. W. Mah, et al., Appl. Phys. Lett. 123, 092401 (2023).

[3] D. Kumar, et al., ACS Nano 17, 6261-6274 (2023).

[4] R. Maddu, et al., Phys. Stat. Sol. RRL 17, 2200493 (2023).

Pumping Iron: Revealing Counterintuitive Mechanisms of Magnetization Dynamics

Satoru Emori

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Contact: semori@vt.edu

Thin-film magnetic metals are workhorses in nanomagnetic devices, including sensors, memory, and oscillators. Yet, even for the most widely used ferromagnets, we still do not fully understand the mechanisms of key phenomena – such as magnetic damping and spin-orbit torques – for critical device applications.

This lecture will highlight progress in revealing rather counterintuitive mechanisms of magnetization dynamics in thin films, especially those based on iron. Depending on the audience, I will delve into one or both of the following recent findings: (1) a fundamental damping mechanism from "procrastinating" electrons in clean iron films; (2) spin-orbit torque from subtle symmetry breaking in iron-nickel alloy films. I aim to convey that even seemingly mundane magnetic metals can exhibit intriguing foundational science, offering fresh perspectives on materials for nanomagnetic devices.

Satoru Emori received the B.S. in Materials Science and Engineering at the University of California Irvine in 2008 and the Ph.D. in Materials Science and Engineering at the Massachusetts Institute of Technology in 2013. Following his postdoctoral work at Northeastern University and Stanford University, he joined the faculty of Virginia Tech in fall 2017, where he is currently Associate Professor in the Department of Physics. His research aims to understand and control the physics of magnetization and flowing spins in magnetic thin films, which have the potential to enable energy-efficient memory and computers. He received a National Science Foundation CAREER Award in 2022. In the Nanoscience Program of the Academy of Integrated Science at Virginia Tech, he has developed interdisciplinary courses that connect basic science with technological applications in accessible ways. His service to the magnetics community includes serving as Member-at-Large of the American Physical Society's Topical Group on Magnetism and Its Applications (GMAG) and an organizer for the Magnetism and Magnetic Materials Conference and March Meetings of the APS.

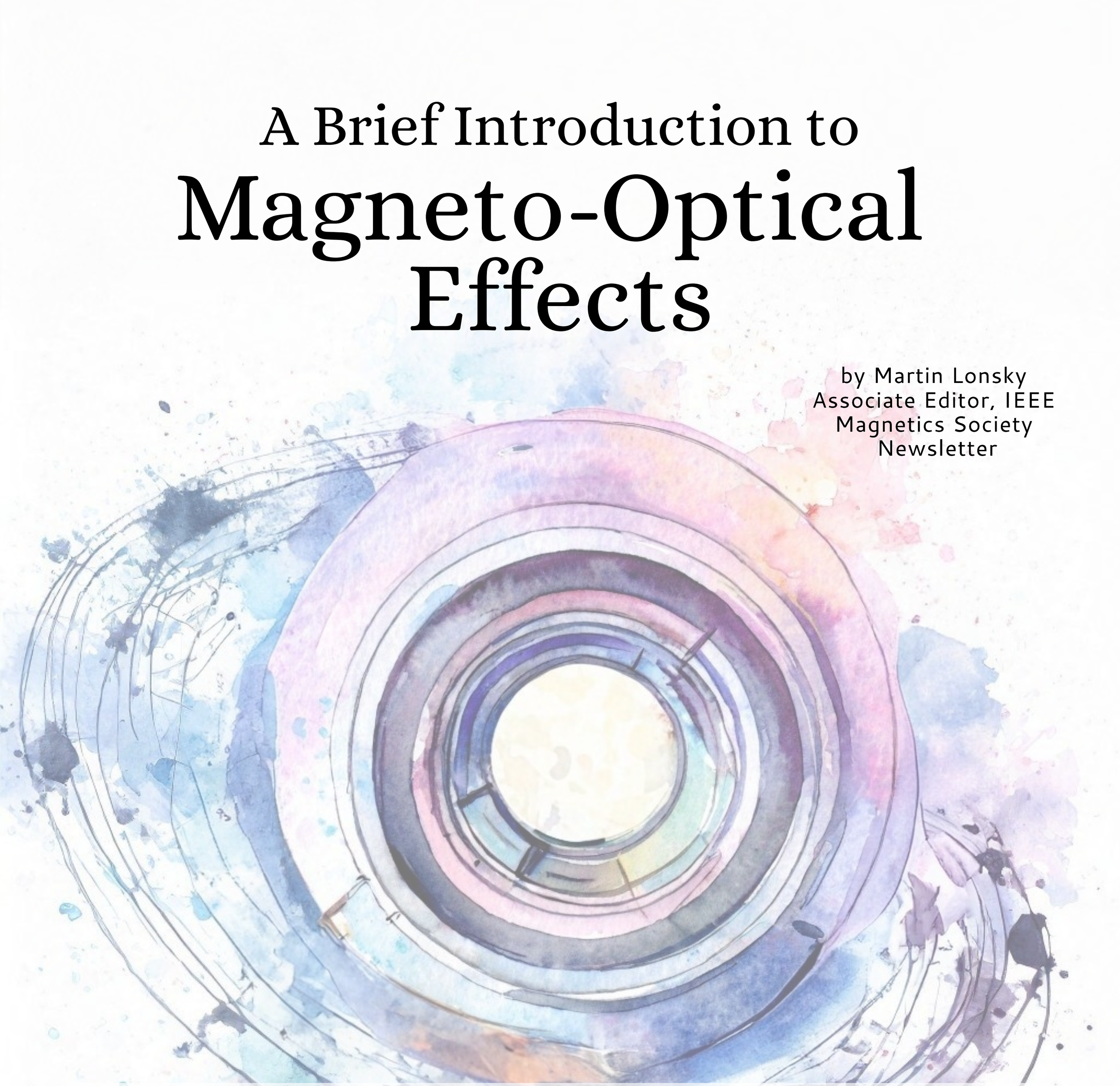
New Senior Members

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

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

A Brief Introduction to Magneto-Optical Effects

by Martin Lonsky
Associate Editor, IEEE Magnetics Society Newsletter



In this technical article for the current IEEE Magnetics Society Newsletter, we focus on the interaction of light with magnetic materials. The main point is that both the intensity and polarization of light can be altered when it is reflected from or transmitted through a magnetic medium, particularly in the visible spectrum. Magneto-optical microscopy techniques have been developed and are used today as powerful research tools to visualize complex magnetic configurations as well as their dynamic properties.

Historically, the two central magneto-optical effects were discovered by Michael Faraday and John Kerr in the 19th century. Depending on whether one considers the case of reflecting or transmitting light, the phenomenon is referred to as the Kerr or Faraday effect, respectively. In the following, our focus shifts to reflecting light, as the two effects are strongly related, and the Kerr effect is of superior importance. While detailed discussions of the interaction between light and magnetization are beyond the scope of this article, it should be emphasized that these magneto-optical effects are most easily recognized when using linearly polarized light, where polarization will simply rotate by a well-defined angle, known as Kerr rotation. Aside from the polarization, the reflected intensity may also change. Note that the Kerr effect is highly surface-sensitive and, therefore, does not allow the magnetic configuration deep inside bulk materials to be studied. Instead, the information depth typically corresponds to a few tens of nanometers for metallic materials.

To study magnetic thin films and multilayers, the magneto-optical Kerr effect (MOKE) is frequently used in (wide-field) MOKE microscopes or laser-based magnetometry experiments. Different geometries can be considered, since the orientation between the magnetization vector, the plane of incidence, and the reflecting surface of the material strongly impacts the observed behavior, as depicted in Fig. 1.

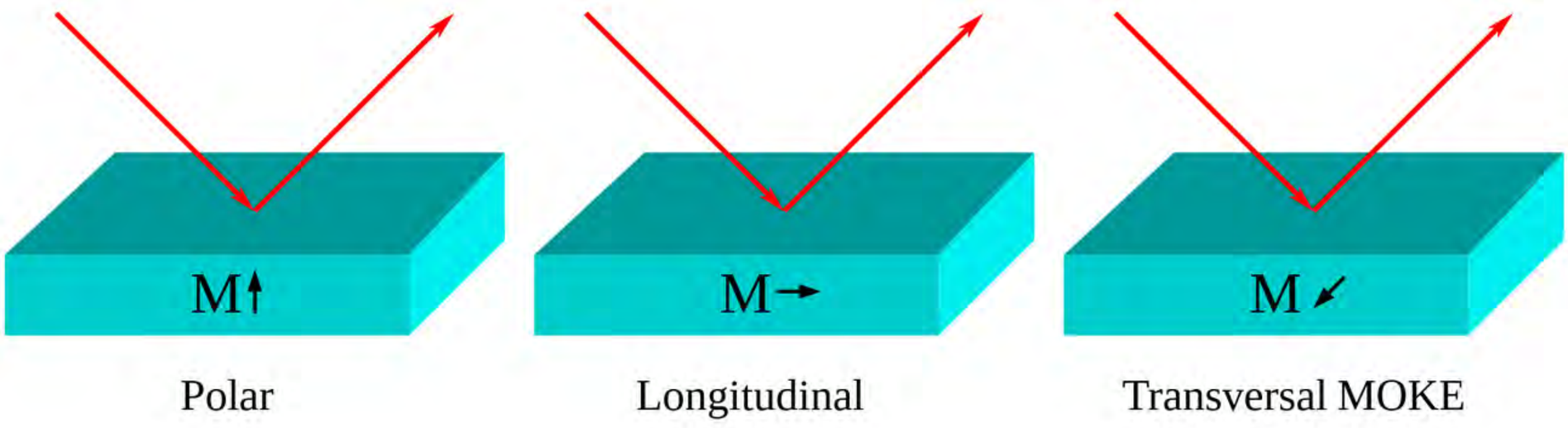


Fig. 1. Polar, longitudinal, and transversal MOKE geometries with characteristic orientation between plane of incidence, magnetization vector, and reflecting surface. Source: https://en.wikipedia.org/wiki/Magneto-optic_Kerr_effect, accessed on Jan 28, 2024 (published under a CC0 1.0 license).

In these three cases, the MOKE is linearly proportional to the magnetization, but there also exist higher-order, nonlinear effects. The magnitude of the Kerr rotation is typically very small (often significantly less than 1°) and depends on the material. Furthermore, the angle by which the polarization rotates also depends on the wavelength of the utilized light.

Researchers exploit the MOKE to spatially image the magnetic configuration in thin films and multilayers; see Fig. 2 for an example. To achieve this, a simple optical microscope can be modified by adding some polarizers, a suitable (ultrabright) light-emitting diode (LED), low-noise complementary metal-oxide-semiconductor (CMOS) camera, and a few other minor components to become sensitive to minuscule changes in the so-called Kerr angle. Such a setup is named a Kerr microscope. Due to the relatively small magnitude of the Kerr rotation, sophisticated background subtraction, image stabilization, and contrast stretching must be employed.

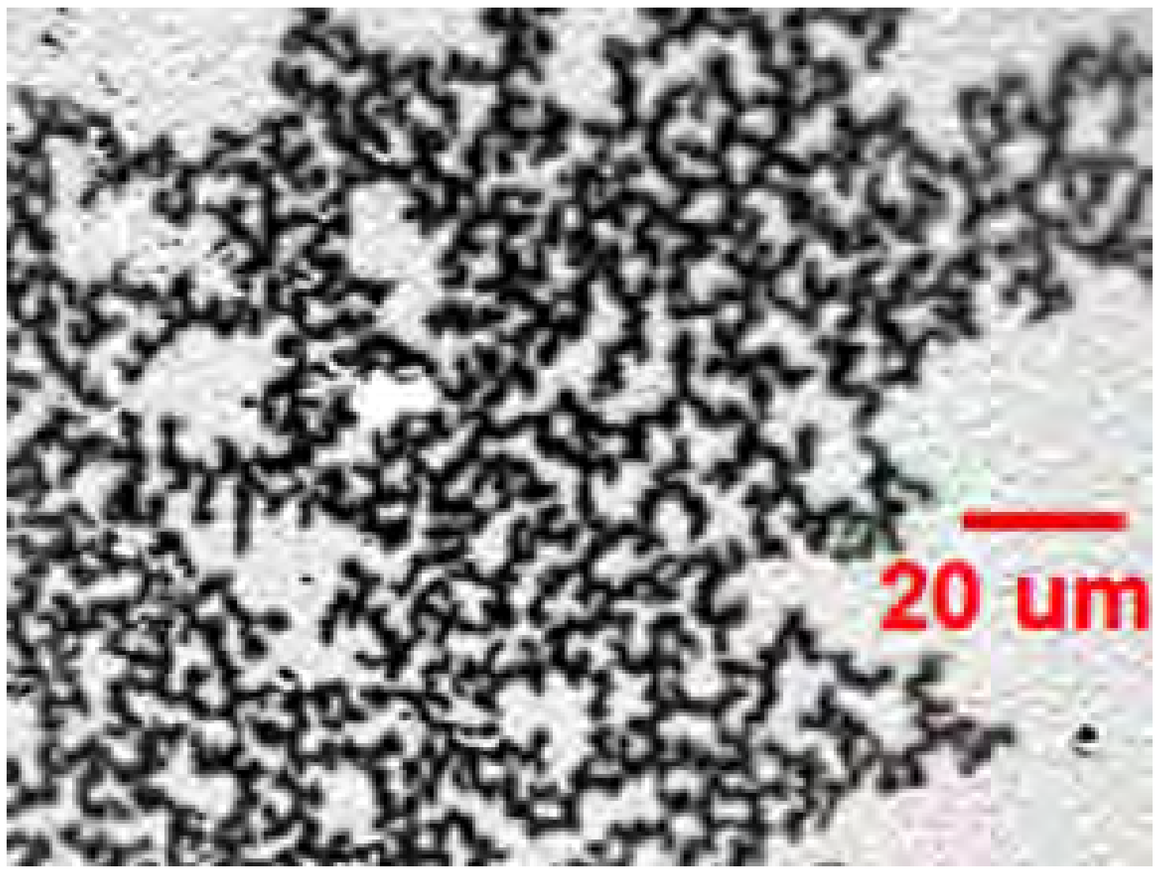


Fig. 2. Magnetic domain pattern in a Pt/Co/Mn multilayer sample, as observed in a MOKE microscope. Black and white colors represent regions with opposing magnetization (into the plane and out of the plane, respectively).

Other types of experimental setups utilize a laser to measure the MOKE on a focused spot of the sample. If desired, the sample can be scanned by moving the laser spot by means of mirrors installed on the optical table. In general, using a laser as a light source will improve the sensitivity of magneto-optical experiments. One can even go a step further and utilize intense light sources such as free electron lasers, which provide polarized light in the extreme ultraviolet and x-ray spectral ranges.

The samples under investigation can be exposed to external influences such as applied magnetic fields, low temperatures, and mechanical stress while performing MOKE microscopy. In principle, the average image intensity in a selected area of the sample can be calculated and plotted against the external field to obtain a magnetic hysteresis loop. Recent studies have focused on the investigation of the electric current–driven motion of domain walls and skyrmions, motivated by the prospects of realizing so-called magnetic racetrack memories.

To study (ultra-)fast magnetization dynamics, the time-resolved TR-MOKE technique has been developed.

Moreover, three-dimensional magnetic structures, currently in the focus of research groups globally, can be spatially visualized by means of scanning transmission x-ray microscopy (STXM). Such experimental studies are based on the x-ray magnetic circular dichroism (XMCD) effect. In essence, the transmitted x-ray intensity is mapped as a function of sample position. Just as TR-MOKE, STXM can also detect the magnetization dynamics when operated in a stroboscopic scheme. Apart from the contents of this article, there certainly exist many more interesting phenomena of and applications for light that interacts with magnetic materials. For instance, all-optical magnetic switching is an approach that allows ultrafast magnetization control without the need for an external magnetic field.

To summarize, magneto-optical effects provide a meaningful approach to investigating the static and dynamic magnetic properties of materials, particularly thin films and multilayers. We expect that further developments in time-resolved MOKE approaches as well as improved extreme ultraviolet and x-ray light sources will lead to new and exciting scientific results.

Further reading:

Two excellent review articles are "The 2022 magneto-optics roadmap" by A. Kimel et al., J. Phys. D: Appl. Phys. 55, 463003 (2022), as well as "Progress in magnetic domain observation by advanced magneto-optical microscopy" by J. McCord, J. Phys. D: Appl. Phys. 48, 333001 (2015). Readers are also encouraged to explore the following book chapter: R. Schäfer, "Investigation of domains and dynamics of domain walls by the magneto-optical Kerr-effect" in Handbook of Magnetism and Advanced Magnetic Materials, Springer Nature (2007).

TMRC 2024

The 35th Magnetic Recording Conference

August 5-7th, 2024

CALL FOR NOMINATIONS

The 35th Magnetic Recording Conference will be held at University of California, Berkeley on August 5-7, 2024. The focus of TMRC 2024 is **Solid State Magnetic Memory and Recording Technologies for >3 Tbits/in2**

Approximately 36 invited papers of the highest quality will be presented orally at the conference and will later be published in the IEEE Transactions on Magnetics. Poster sessions will also be held following the oral sessions and will feature posters from the invited speakers and accepted contributed posters. Presenters of invited & contributed papers are encouraged for publication.

Topics of interest include:

Solid State Memory – Devices and Applications

- Spin Transfer Torque-Magnetic Random Access Memory (MTJ cell, MRAM chip manufacturing and roadmap)
- MRAM– New Physics & Materials (MRAM architecture, VC-MRAM, SOT-MRAM, TI & 2D materials)
- New Architectures and Applications for In-Memory and Near Memory Compute, Advanced Memory Bus Architectures, AI, ML and Neuromorphic Compute, 2.5 and 3D applications, Harsh environments

Advanced Generation Recording Technologies

- Heat Assisted Magnetic Recording (HAMR System, Head/Media and HDI)
- Microwave-Assisted Magnetic Recording (MAMR)
- Alternative Magnetic Recording Technologies (EAMR, SMR, TDMR, HIMR, Heated-dot, Tape, All Optical Switching)
- Advanced Magnetic Recording for > 3 Tbits/in^2 including Readers, Writers, Servo, Tribology, HDI, Signal Processing

Recording and Memory Fundamentals (Metrology, Tooling, Device Processing, Materials, Recording Physics)

By completing this online form, nominations for invited speakers are submitted to the Program Chairs. The deadline to submit nominations is March 10, 2024

TMRC 2024 is sponsored by the IEEE Magnetics Society and co-sponsored by the Computer Mechanics Laboratory (UC Berkeley) and DSSC (CMU)

IEEE

IEEE MAGNETICS

Women's Workshop for Emerging Leaders in Science

By Montserrat Rivas on behalf of the Women in Magnetism committee

“Let's break down stereotypes and show the world what a woman leader in science is,” says Montserrat Rivas about her motivation to organize the Women’s Workshop for Emerging Leaders.

In November 2024, our society's Women in Magnetism committee held the "Women's Workshop for Emerging Leaders in Science." The activity was divided into two sessions of two and a half hours each, offered two different times each day to reach attendees from all over the world.

Sixty women attended the workshop. The meetings were lively and dynamic. I never thought an online event could be so engaging, but it was!

We had a follow-up anonymous survey. To the question, “What is for you the most important take-away from this training?” our participants answered, for example, that “good, effective leadership is about supporting those around you and achieving this through working on improving yourself,” “there are different types of leaderships, and I can fit in some of them, which I never thought I did,” and one of my favorites, “the conversation with Pallavi Dhagat.” I agree with that one!

The wrap-up comments included: “I really enjoyed this (and I don’t normally enjoy these kinds of things!)” “Thank you for this opportunity; The sacrifice of getting up early was totally worth :).” “I never imagined Diana was a ballerina! She is amazing.”

Navigating the progression of one's scientific career often entails taking on other tasks we have not been trained for, as well as many managerial responsibilities inherently tied to the position. While some have been "fortunate" to have had excellent role models in this regard, many have lacked such opportunities or aspire to improve their skills and grow in their roles.

We discussed cultivating leadership skills, building a new leadership style within science, understanding group roles and dynamics, giving constructive feedback, navigating difficult conversations, and addressing the crucial aspects of emotional intelligence and work-life balance.
The engaging discussions emphasized how good, flexible, and empathetic leadership helps advance science and contributes to a more inclusive and impactful research culture.

Sonal, Sai, Lourdes, Elizabeth, Cindi, Yuko, and I have come together as a team with a shared passion for empowering women in the field of magnetism and contributing positively to our society.

For this activity, we had the professional support of Sofía, who was enthusiastic about the interviews with Pallavi Dhagat and Diana Leitão. Our two admired leaders in magnetism shared with us their professional development, experience, aspirations, and plans. They left a profound impact on us, exceeding our initial expectations and creating a deep human connection.

The workshop took us on a journey to reflect on our past experiences, realize our aspirations as leaders, and identify the skills we need to refine this role. The fact that there is no singular approach to leadership, particularly within research groups characterized by

a dynamic, multicultural environment, underscores the importance of flexibility and self-awareness.

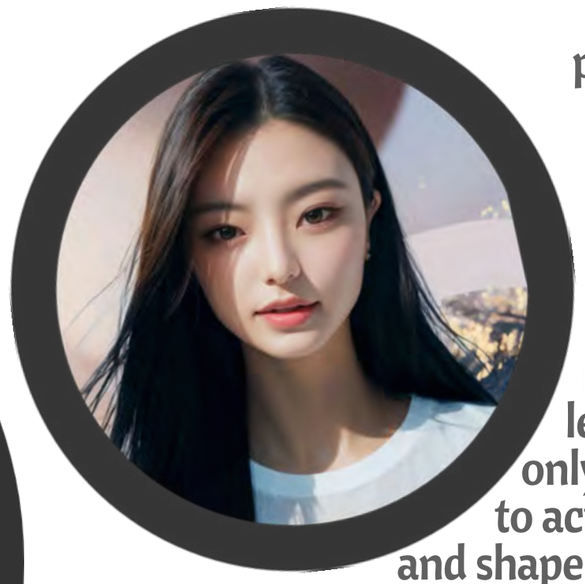
In a world where diversity is increasingly recognized in the scientific community, empowering women scientists and technologists with leadership skills is not just a matter of individual growth but a means to enrich the entire field. We believe that women's leadership in magnetism can foster diversity of thought and pave the way for groundbreaking discoveries and positive changes in the research culture. We are thankful to the IEEE Magnetics Society and our magnetics community for supporting this activity.

▲ Yuko Ichiyanagi is a professor at Yokohama National University. She investigates magnetic nanoparticle application to theranostics. “We are not alone because we have fantastic colleagues.”

“We need more great women leaders in STEM to inspire younger women, bridge the gender gap, and promote diversity of thought." Vanessa Pilati studies magnetic nanoparticles. She is a research collaborator at University of Brasilia and a postdoctoral fellow at University of Oviedo.

Lourdes Marcano is at CIC biomaGUNE. “Driven by my passion for scientific discovery and research, I am committed to empowering women in science, particularly in the captivating field of magnetism."

Elizabeth Martin-Jefremovas is at Johannes Gutenberg University working on spintronics. She thinks that “paving the way for equality is a shared commitment.”



“I am thrilled to be part of IEEE WiM, where our initiatives, such as the recent leadership workshop, are not only transformative but also a call to action for more women to join and shape the future of magnetics," says Sai Li. She works at Beihang University on neuromorphic computing and spintronics.

“A leap from surviving to thriving in any profession requires mentorship and leadership,” says Sonal Shreya. Sonal works on spintronics at Aarhus University.

“Looking outside the box” is Sofia Facal’s motto for life. She leads Skills4science and coaches the Women’s Workshop for Emerging Leaders.

MMM 2023 Special Session Presents

Students in Magnetism Networking session

by Students in Magnetism (SiM)

As a graduate student–centric entity of the IEEE Magnetics Society, the SiM team was once again graced with the honor to organize a networking session at the MMM 2023 Conference in Dallas, Texas. The gathering, which welcomed more than 50 participants, served as a vibrant nexus where graduate students could forge connections and exchange ideas. The atmosphere buzzed with intellectual energy as participants engaged in lively discussions, shared insights from their diverse research efforts, and established connections that extend beyond the confined conference venue. Amidst this dynamic exchange, a lineup of games, giveaways, and light snacks infused the event with a lively energy. Whether you missed our event or are simply reminiscing about the fun moments, the following paragraphs take a deep dive into the event's specifics, allowing you to stroll down memory lane!

May Inn, Chair of SiM, arriving on-site to MMM2023 to network...

As the graduate students trickled into the room and helped themselves to a delightful assortment of snacks, featuring various flavors of popcorn, pretzel bites, juicy fruit snacks, chocolate chip cookies, chips, crackers, candies, and iced tea, they received a quick introduction presented by the chair of SiM, May Inn Sim. Following this, we kicked off the event with SiM's signature bingo game! The students went on the quest of completing the bingo card, asking each other peculiar questions from their bingo sheets, and searching for someone who fit the bill! Unanimously, the most challenging bingo cell to complete was "finding someone with a TikTok account." As dedicated graduate students immersed in the pursuit of magnetics knowledge, this aspect added an amusing twist to the game.

The excitement in the room heightened as the next activity unfolded. Participants were given an opportunity to hone their artistic skills that could be useful for crafting plots and figures for their future publications. The participants were divided into four groups, each armed with a whiteboard and marker. Similar to the games Pictionary and Skribbl.io, each group designated an artist in each round. This artist, given a term from the extensive glossary of magnetism, then channeled their inner Picasso while their teammates tried to decipher the depicted term. Competition ensued as the groups vied to be the first that correctly guessed terms such as magnetotactic bacteria, skyrmion, or superparamagnetic nanoparticle. We were all treated to a captivating showcase of various abstract art pieces. The networking event concluded on a high note with complimentary giveaways, featuring SiM T-shirts, stickers, and Texas-themed fridge magnets.

The delightful goodies for all at Student Networking Event in MMM2023. Did you collect them all?

We sincerely hope that all attendees of our SiM student networking session enjoyed the event as much as we did. If you missed out on the freebies and games, catch us at the next SiM Networking session at Intermag 2024 in Rio de Janeiro, Brazil! In addition, join us at the bimonthly SiM Virtual Coffee Hours, where we catch up and hang out virtually. You can find more information here!

Lastly, stay updated with our in-person student networking sessions and Virtual Coffee Hours by following our Twitter/X feed @SiM_IEEEMagSoc for updates about our ongoing activities!

2023 IEEE

Around-the-Clock Around-the-Globe Magnetics Conference

by Hans Nembach and Matt Pufall,
AtC–AtG Steering Committee

The 2023 IEEE Around-the-Clock Around-the-Globe (AtC-AtG) Magnetics Conference was held on September 27, 2023, and was another great success. We, the Steering Committee, the Technical Committee, the Advisory Committee, and especially the group of postdoctoral researchers and students, who organized the conference, are very grateful for the financial sponsorship by the Conference Executive Committee (CEC) of the IEEE Magnetics Society. The organizers did a great job putting together an excellent program of tutorials, invited talks, contributed talks, and a poster session. The members of the Advisory Board, who organized the conference in 2022, shared their experiences with the 2023 organizers and were always available to help. They were able to also leverage the expertise of the Technical Committee, where many organizers from past years have been a very valuable resource.

The 2023 AtC-AtG attracted 594 registrations, with 34% from Europe, the Middle East and Africa (EMEA), 37 % from Asia Pacific (APAC) and 29% from the Americas. 33% of the participants were female. The largest group of participants were graduate students with 43%, followed by 17% postdoctoral researchers. 24% of the registered participants were IEEE members and 74% (67% in 2022) participated for the first time. This very diverse participation from around the world shows that a virtual conference can attract a very broad audience. A total of 30 (88) contributed talks (posters) were given. The 88 posters represented a 30% increase from the previous year. The largest number of talks were from the USA, followed by Japan and India with 19%, 15% and 9%, respectively. 21% of the speakers were female. The best talks and poster presentations received an award. In addition, the conference featured 12 invited talks and tutorials by senior members of the magnetics community. The speakers were selected based on their field of research, regional and gender diversity. Special emphasis was put on the effort to identify up- and raising-scientists and not to invite only well-established speakers, whose invited talks can be followed at many conferences. 5 of the 12 invited speakers were women. The poster session was organized in *gathertown*, which also served as a platform to enable networking, an important component of conferences.

Insights from the 2023 IEEE AtC-AtG Magnetics Conference:

How We Learned to Collaborate and Organize a Global Magnetics Conference from Scratch!

Cody Trevillian [1,*], Julia Majcherkiewicz [2,*], Shugo Yoshii [3,*], Mariia Efremova [4,#], Mingzhen Feng [5,#], Anna Maria Friedel[6,#], Santhosh Sivasubramani [7,#]

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Near the end of every summer since 2020, the IEEE Around-the-Clock Around-the-Globe (AtC-AtG) Magnetics Conference has been a beacon of innovation and worldwide collaboration in magnetics. Organized by dedicated graduate and postdoctoral students of the global magnetics community (with generous financial support from the IEEE Magnetics Society, which finances our collaborative tools, the conference platforms and website, and a suite of awards!), AtC-AtG stands out as a virtual conference that genuinely lives up to its name. This unique global 24 hour event exclusively features contributions from graduate and postdoctoral students and invited talks from early-career and senior scientists (selected by the graduate and postdoctoral student-run organizing committee!), showcasing oral talks and poster presentations from the global magnetics community!

Beyond Pandemics: The Evolution of AtC-AtG

The conference has evolved beyond its original purpose of responding to the challenges of the global pandemic. It has begun addressing pre-existing issues, such as the environmental impact of travel and financial barriers to international participation. AtC-AtG has become a platform that fosters the exchange of scientific ideas and tackles these broader issues in the academic and scientific communities.

A Virtual Odyssey Around the World: The AtC-AtG Conference Format

AtC-AtG takes pride in its format, embracing the virtual realm to create a truly global and inclusive experience. The conference spans 24 hours, allowing participants from around the globe to engage in real-time oral talks and poster sessions via Zoom and *gather.town*, respectively. The absence of parallel sessions ensures that attendees can catch all the presentations, fostering a seamless flow of scientific discussions.

Virtual Poster Sessions: Connecting Across the Remote Gap

A notable feature is the virtual poster sessions conducted through a *gather.town* space (where you directly access the Zoom room for the oral talks, too!). Of course, nothing can completely replicate the in-person experience, but this format comes remarkably close. Participants navigate as 2D avatars with video chats popping up as their avatars approach each other, creating a dynamic and engaging environment for interaction—a far cry from the typical static virtual poster sessions.

Behind the Scenes: International Collaboration, Friendships, and Organizing the 2023 AtC-AtG

We asked the 2023 AtC-AtG Organizing Committee to share the unique experience and benefits of organizing AtC-AtG. Here's what they had to say:

Insights from the Regional Program Committee Co-Chairs

Shugo Yoshii
(Asia-Pacific Co-Chair):

"I think the most invaluable experience of working on the AtC-AtG committee is making research friends worldwide. To me, definitely the funniest moment is when I meet other committee members at some conference. I didn't feel that was the first time we met in person, because we had already deeply discussed many tasks and spent condensed time collaborating. So, we were already comrades and brothers with the same experience…If you are interested in working on the committee, trust our experience and jump in with us."

Julia Majcherkiewicz
(Europe, Middle-East, Africa Co-Chair):

“The work is dynamic, but thanks to the nice team and a great atmosphere, there are no stupid questions…always have valuable advice from the advisory committee. The chair's role is more multitasking; however, it's extremely enriching! To name just a few important things during the experience: you meet very nice hard-working people and establish new personal & professional connections, you learn what the organization of the conference looks like, and you develop many new skills…If you're wondering if you can do it, the answer is YES: you try, you learn, you do it!”

Cody Trevillian
(Americas Co-Chair):

“Organizing the 2023 IEEE AtC-AtG Magnetics Conference was an absolute blast. It was more rewarding & fun than I could have anticipated when we started our work as 2023 AtC-AtG’s organizing committee earlier this year…our collective effort reflected directly in the engaging & high-quality conference experience of the 2023 IEEE AtC-AtG Magnetics Conference. I welcome you to apply to be a part of the 2024 AtC-AtG’s organizing committee!"

Committee Member Perspectives

Anna Maria Friedel (Europe,
Middle-East, Africa Program):

“Being part of the program committee for the 2023 IEEE AtC-AtG Magnetics Conference was both challenging and fulfilling. All program committee members were spread across different institutes around the globe…It was fun to work with many strangers on a common goal: the successful organization of this year’s conference edition…I expanded my skill set and formed a new network of connections in the field.”

Mariia Efremova
(Europe, Middle-East, Africa Program):

“Joining the IEEE AtC-AtG conference 2023 organization committee was my cup of tea. I genuinely think that the experience of organizing a conference is helpful for all young scientists, regardless of their future career trajectory… Multicultural communication: We worked in a big team from Asia & Pacific, Europe & Middle East, and the Americas. Teamwork: defining your role, and subordination… “Trying on various hats”… communication with invited speakers, evaluating and selecting abstracts, a bit in advertising and proofreading, and chairing an online Zoom session with 50+ participants. Where else can one get such training for free in less than half a year?”

Mingzhen Feng
(Americas Program):

“I thoroughly enjoyed my experience working with the exceptional team at the IEEE AtC-AtG conference. As a Ph.D. student, my prior engagement was limited…My curiosity about the behind-the-scenes organization of such events and a desire to contribute to the IEEE Magnetic Society led me to join the organizing committee…I encourage anyone interested in this field to consider applying for the 2024 IEEE AtC-AtG conference.”

Santhosh Sivasubramani (Asia-Pacific Technical):

“This AtC-AtG conference has its impact amongst all stakeholders (particularly as I'm aware of the Indian context). This played a crucial role as the opportunity to interact and network amongst top brains in the magnetic community… Being part of an organizing team or being part of the conference itself is a privilege associated with benefits for the quality of time invested in it. Gather [gather.town] was a cherry on the final day show with a first-of-its-kind virtual participation, unlike traditional virtual conferences.”

Participant Testimonials: A Platform for Students

Hannah Bradley (Oakland University):

“I loved participating in the 2023 IEEE AtC-AtG Magnetics Conference! It's incredible to see students driving the organization, creating a perfect platform for sharing our work freely. The diverse range of student projects showcased is just fantastic!"

Omar Bishop (Virginia Commonwealth University):

“Participating in the AtC-AtG was a wonderful experience as a young professional. I have limited experience in my grad school career to give presentations, specifically due to Covid and the complications that come in today’s world with traveling and safety…The User Interface for the conference was so cute and fun…I highly recommend this experience to all my young professional peers…”

Save the Date: The 2024 IEEE AtC-AtG Magnetics Conference is October 2, 2024!

As we reflect on the success of the 2023 conference, we extend an invitation to enthusiastic young scientists interested in the future of AtC-AtG as we continue to foster an environment of insightful dialogue and knowledge exchange in magnetism. The 2024 AtC-AtG Magnetics Conference is set for October 2, 2024! If you are passionate about magnetics and global collaboration, don't miss the chance to contribute to a unique global experience and forge connections that transcend borders. We welcome your contributions to the 2024 IEEE AtC-AtG Magnetics Conference! Keep an eye on our website for updates, and look for our email announcements from info@atc-atg.org. Follow us on social media to learn more, and stay tuned!

Manuel Vázquez, A life Dedicated to Magnetic Materials: From Macro to Nano

Submitted by José Miguel García-Martín, Instituto de Micro y Nanotecnología–Consejo Superior de Investigaciones Científicas (IMN-CSIC), Spain
Photos by Carlos (Morgan) Arroyo, Instituto de Ciencia de Materiales de Madrid-CSIC (ICMM-CSIC), Spain

On November 22, 2023, we celebrated a day of tribute to Professor Manuel Vázquez at the Instituto de Ciencia de Materiales de Madrid (ICMM), where he worked in the 21st century. The event, titled "A life dedicated to magnetic materials: From macro to nano," was also sponsored by the IEEE Magnetics Society and the Spain Chapter, and it was attended by a hundred people, while many others followed its online broadcast. The Organizing Committee was composed of Agustina Asenjo (ICMM-CSIC), Oksana Fesenko (ICMM-CSIC), José Miguel García-Martín (IMN-CSIC), Julián González (Universidad del País Vasco/Euskal Herriko Unibertsitatea; UPV/EHU), Cristina Gómez Polo (Universidad Pública de Navarra; UPNA), Pilar Marín (Universidad Complutense de Madrid, Instituto de Magnetismo Aplicado; UCM, IMA), David Navas (ICMM-CSIC), Rafael Pérez del Real (ICMM-CSIC), and Victor Prida (Universidad de Oviedo).

1st row, left to right: José C. Gómez Sal, Antonio Hernando, Lola (Manuel's wife) and Manuel ▶

The tribute combined personal aspects and emotional memories with scientific content. To do this, after ICMM Director José Ángel Martín Gago's opening, it was structured into eight small sessions: Each one had chairs who made a personal introduction, a scientific talk about 15 minutes long, and a final set of videos with greetings from colleagues in many different countries.

Session 1 was dedicated to the origins of his career. The chair, José C. Gómez Sal (Univ. Cantabria), highlighted that Salvador Velayos immediately called him Don Manuel, for his knowledge and his friendliness. In his talk, Antonio Hernando (UCM, IMA), his Ph.D. supervisor, pinpointed that Manuel's youthful character, almost a hippie who liked to travel, manifested over time in his insistence on internationalizing the research that was being done in Spain. This was corroborated by José Manuel Barandiarán (UPV/EHU), who showed joint photographs in exotic destinations such as Teotihuacán or Easter Island. Moreover, he highlighted his role as co-founder of the Spanish Club of Magnetism, CEMAG (in 2002), and the Spain Chapter of IEEE Magnetics Society (in 2007). Finally, Julián González (UPV/EHU), who was his second Ph.D. student (defended in 1987), sent an emotional message.

Session 2 was dedicated to his career at the Institute of Applied Magnetism (IMA). Raúl Valenzuela (UNAM, Mexico) was the chair and highlighted that his sabbatical year at IMA was the most productive of his career, as well as the most enriching in oenology. Pilar Marín, current director of the IMA, was his student between 1989 and 1995, and she recounted their joint pioneering work on amorphous magnetic wires (together with Cristina Gómez Polo) and later on microwires with a magnetic core and a glass shell. She also fondly remembered her stay with Helmut Kronmüller at the Max Planck Institute for Metals Research. Finally, Hector García-Miquel (Univ. Politécnica de Valencia), Marcelo Knobel (UNICAMP, Brazil), Paola Tiberto (INRIM, Italy), and Elis and Joao Paulo Sinnecker (UFRJ and CBPF, Brazil) sent warm regards in their videos.

◀ *Manuel receiving his present (left to right: Manuel, José Miguel García-Martín, Agustina Asenjo, Rafael Pérez del Real),*

▲ *Manuel with his national and international guests at the on-site event*

Session 3 was devoted to nanowires. Ruy Sanz (INTA) was happy to see in the room the people responsible for 90% of the scientist he has become, and José Rivas (USC) pointed out how Manuel managed to unify many people around magnetism in Spain and represent that community at the highest international level. Then, José Miguel García-Martín (IMN-CSIC), his student between 1996 and 1999, recounted the beginnings of their research in magnetic nanowires fabricated by electrodeposition, which was later improved when Manuel's group started producing their own porous templates with tailored characteristics. He mentioned group excursions and meals at Christmas time and one of the important lessons from Manuel: "Having a plate of jamón (Spanish ham) with a foreign researcher is work too!" Short messages from Ester Palmero (IMDEA), Juan Luis Palma (Univ. Central, Chile), Victor Prida (Univ. Oviedo), and Ricardo Ibarra (Univ. Zaragoza) were also shown.

Session 4 was about internationalization. Oksana Fesenko (ICMM-CSIC) highlighted the organization of Intermag 2008 in Madrid, with the presence of two Nobel Prize awardees and the Minister of Science, and Laura Lewis (Northeastern University) referred to the importance of Manuel's stay in Boston. Ron Goldfarb (NIST, USA), president-elect of IEEE Magnetics Society, talked about the enduring influence of Manuel on that society: Manuel was a member of the AdCom in 2010–2012 and an officer from 2012 until he became president in 2017–2018. He expanded the society to Latin America, Eastern Europe, and Russia, and in fact he received the Distinguished Services Award in 2021 for strengthening the society's reach worldwide. Moreover, he was Distinguished Lecturer in 2023 and has been talking about cylindrical microwires and nanowires all over the world this last year. Videos from MagSoc President Atsufumi Hirohata (Tohoku University, Japan), Beth Stadler (University of Minnesota, USA), and Rudi Schaefer (IFW Dresden, Germany) complemented this part.

Session 5 was focused on magnetic sensors. In his introduction, another former student, Jacob Torrejón (Institute Curie, France), mentioned the good atmosphere that Manuel created in the group, sometimes admonishing the students, both men and women: "If you don't play soccer with us on Friday afternoons, I will not sign your thesis!" Victor Prida (Univ. Oviedo) said that Manuel asked questions to take you out of your comfort zone. Ratislav Varga (PJSU, Slovakia), who was a postdoc in 2002, explained how he has used the magnetic bistability of microwires to develop sensors that measure stress, vibration, humidity, temperature, magnetic field, or position. In fact, Varga founded RVmagnetics in 2015, which currently has 22 employees. Masahiro Yamaguchi (Tohoku Univ., Japan), Mattia Butta (CVUT, Czech Republic), and Javier Maira (CSIC) sent videos of gratitude to the honoree.

Manuel´s group with some of his former students and postdocs ▶

Session 6 was dedicated to functionalized nanowires. Ignacio Mínguez (Marvel Fusion, Germany), a former student, thanked Manuel for pushing him to his best, while Manuel Hernández-Vélez (UNAM), long-time collaborator, summarized Manuel's activity with these words: work, entrepreneurship, energy, professionalism, solidarity, and faithful friendship. In her talk, Carmen Mijangos (ICTP-CSIC) explained several successful combinations between polymers and magnetic materials, such as polymer gels with magnetic nanoparticles and polymer fibers with magnetic nanowires. She also summarized their joint work in scientific management activities in the Ministry of Science for some years. Finally, videos from Israel Betancourt (UNAM, México), Paula Bercoff (UNC, Argentina), Dora Altbir (USACH, Chile), and Germán Infante (IMDEA Materials) were shown.

Session 7 was about other magnetic nanostructures. Kleber Pirota (UNICAMP, Brazil), postdoc for 7 years, remembered the soccer games on Friday afternoons and Manuel's nickname on the pitch: "cabecita de oro" (little golden head), due to his ability to score with a header. David Navas (ICMM-CSIC) thanked Manuel for pushing him to travel and stay in other centers, something that in the end allowed him to meet his wife, the Portuguese researcher Celia Tavares. Karla Merazzo (SINTEF, Norway), a former student that came from Costa Rica, talked about magnetic antidot arrays, especially those prepared using alumina templates, and she told us three important lessons that she learned from Manuel: (1) the importance of networking, which is professionally flirting; (2) her evolution from drinking coke to drinking good wine; and (3) her discovery of snow (she came from Costa Rica, right?). Carlos Luna (UANL, Mexico), Diana Leitao (TUE, Netherlands), and Laura Heyderman together with Ales Hrabec (ETH Zurich, Switzerland) sent nice videos.

Session 8 was centered on applied magnetism. Wagner Rosa (Revvity Signals, Spain) thanked Manuel for introducing him to many personal connections, and as a Brazilian, he wanted to certify that, besides wine, Manuel can also appreciate a good caipirinha in Copacabana. Rafael Pérez del Real (ICMM-CSIC) recounted different experiences working with Manuel on projects with different companies, from those who wanted to obtain information without paying anything to those that were successful, as happened with Airbus. In fact, David García (Airbus DS, Spain), a former Ph.D. student between 1995 and 2000, explained the importance of magnetic materials for electromagnetic interference shielding for avionics and embedded electronics, for instance, when a lightning discharge hits an aircraft: Magnetic microwires turned out to be particularly suitable for this. The session ended with kind videos from Javier Moya (Univ. Católica de Salta, Argentina) and Arantxa Fraile (Univ. de Barcelona).

Manuel and Agustina Asenjo

After these eight sessions, Manuel himself gave a short speech. He was introduced by two long-time members of his group. First, Cristina Bran, who thanked him for his support for 11 years, told us that Manuel doesn't believe in vacations, because he thinks that every day in the lab should be as fun as vacations. Then, Agustina Asenjo highlighted the decisive role played by Manuel's wife and life companion, Lola, bringing up their two sons while she also worked (the whole family was in the room, and they all agreed!). Manuel started by thanking the Organizing Committee and said he felt quite lucky for having met fine people to work with along his career. As mentors, he mentioned Salvador Velayos and his Ph.D. supervisor, Antonio Hernando, from his beginnings at Complutense Univ. Madrid, and his stays with Helmut Kronmüller at the Max Planck Institute in Germany and with Otto V. Nielsen at the Techniske Danmark Univ. in Denmark. He thanked Carmen Mijangos and José Luis Martínez for involving him in scientific management in the Ministry of Science, and Ron Goldfarb, the guilty person for his engagement with IEEE. Then, Manuel described the key points to establish a successful group: attracting Ph.D. students, postdocs, and visiting scholars, promoting personal interactions, and deepening one's initial research line but also widening scientific interests.

At the end, Manuel and Lola received a present: two tickets for the National Auditorium to watch the Munich Philharmonic Orchestra conducted by Zubin Mehta at the end of January. But that night, they had something even better: Their first grandchild, Lucía, was born. So, we are quite sure that, all things considered, they will remember this day forever. Congratulations!

A happy couple: Manuel and Lola

Manuel Vazquez's Tribute event is online now. Catch it through YouTube ▲

Joint Annual Meeting of IEEE Magnetics Society Spain Chapter & Spanish Magnetism Club (CEMAG)

in San Lorenzo de El Escorial, Madrid, Spain

Submitted by Victor Manuel de la Prida Pidal (Spain Chapter Chair) &
Patricia de la Presa (Spain Chapter Secretary & Treasurer)

On November, 22 and 23, 2023, more than 100 attendees participated in the Joint Annual Meeting of the IEEE Magnetics Society Spain Chapter and the Spanish Magnetism Club (CEMAG) in San Lorenzo de El Escorial, Madrid, Spain.

On the inaugural day of the event, the 7th Young Researchers in Magnetism (YRinM2023) session unfolded, orchestrated by Ph.D. students from across Spain. Within this session, the second edition of the Best Ph.D. Thesis and the II Video and Infographic Design Contest "Magnetism Has an Impact" were conducted, with the added distinction of the top two talks and two poster presentations receiving accolades from the IEEE Magnetic Society. The second day featured compelling presentations, including talks by Dr. Susana Isabel Cardoso de Freitas, the Distinguished Lecturer 2023 of the IEEE Magnetic Society, Prof. Jorge Méndez Ramos, who delved into the contributions to magnetism by Professor Blas Cabrera, and Prof. Ricardo Ibarra García, recipient of the eighth edition of the Salvador Velayos Award. Additionally, the general assemblies of CEMAG and the Magnetics Society convened. It is noteworthy that the IEEE Spain Section cosponsored this highly successful gathering.

7th Young Researchers in Magnetism (YRinM2023)

The 7th Young Researchers in Magnetism (YRinM) session was celebrated at San Lorenzo de El Escorial during the Annual Meeting of the IEEE Magnetics Society Spain Chapter and the Spanish Magnetism Club (CEMAG). The YRinM is an inclusive and informal conference, organized by and for Ph.D. students, providing a platform to share ongoing research advancements with colleagues, and it is expected to endure for many years. Thanks to the financial support of the Spain Section, the IEEE Magnetics Society, 38 students were able to present their early contributions to magnetism and magnetic materials. The YRinM session was held on-site in the historical Real Centro Universitario María Cristina (UCM), which contributed to the goal of fostering social interactions between and among young researchers, the cornerstone of this event. The organizing committee board presented awards for the top two oral presentations and the top two posters at the closing ceremony.

Organizers of YRinM2023: (from 1st row, left to right) María González, Yolanda Álvarez, Beatriz Sisniega. 2nd row, from left to right: Jose Luis Marqués, andJuan Diego Aguilera,

At the end of the conference, the winner of the 2022 Best Doctoral Thesis Award in Magnetism, young doctor Álvaro Martín Gallo Córdova from ICMM-CSIC, presented his work titled “Magnetic Nanoreactors: Environmental Catalysis Applications.”

We appreciate also the collaboration of the researchers who served as members of the evaluation committee: Professors Cristina Gómez-Polo, Patricia de la Presa, Josep Fontcuberta, and Manuel Vázquez, all of whom are members of the IEEE Magnetics Society. The diploma and prize were given to the winner by the Distinguished Lecturer 2023 Professor Susana Cardoso, after the oral talk presented by Álvaro.

Rubén Corcuera Paños (Univ. Zaragoza) won the first oral presentation award.

Poster Presentation Award: Alfredo Escribano Huesca (Univ. Granada)

Ana Isabel Jiménez Ramírez (Univ. Oviedo) won the second oral presentation award.

Poster Presentation Award: Uxua Jiménez Blasco (Univ. Navarra)

◀ *Susana Cardoso presenting the Best PhD Thesis of 2022 on Magnetism, Magnetic Materials and their Applications to Álvaro Martín Gallo Córdova (ICMM-CSIC)*

The collaboration between CEMAG and the IEEE Magnetics Society Spain Chapter makes it possible for the strong organization of YRinM by young researchers.

II Video and Infographic Design Contest "MAGNETISM HAS AN IMPACT"

This event aims to promote among the young students the interest in showcasing their research through three-minute videos and infographics. We had eight presentations this year, and the two best videos and infographics received awards. All prizes were given to the winners by Distinguished Lecturer 2023 Professor Susana Cardoso.

The organizers also thank Dr. Ron Goldfarb for his kind support in capturing all the good memories (photographs) of the event.

Best Video Award, 1st place: Eduardo Ordoqui Huesa, Public University of Navarra ▶

Best Video Award, 2nd place: Ana Isabel Jiménez Ramírez (Univ. Oviedo) ▼

Best Infographic Award, 1st place: Daniel Arranz, Institute of Applied Magnetism, UCM ▶

▲ *Best Infographic Award, 2nd place: Yolanda Álvarez (Univ. Oviedo)*

Conference & School Calendar

To list your conference/events in the Newsletter in a future edition, please contact the Editor.

Symposium @ TMS20204 - Advanced Soft Magnets and Magnetocaloric Materials: An FMD Symposium in Honor of Victorino Franco
Mar 3-7, 2024
Orlando, FL, USA

International Symposium on Integrated Magnetics (iSIM) 2024
May 4-5, 2024
Rio de Janerio, Brazil

Intermag 2024
May 5-10, 2024
Rio de Janerio, Brazil

IOP Magnetism 2024 - UK and RoI conference welcoming international and industry
Mar 25-26, 2024
Loughborough, UK

ICSM2024 - International Conference on Superconductivity and Magnetism; together with Quantum Materials and Technologies
Apr 27 - May 4, 2024
Fethiye, Turkey

Spin Caloritronics XIII 2024
May 20-24, 2024
Beijing, China

EMSA2024 - European Magnetic Sensors and Actuators
Jun 24-27, 2024
Košice, Slovakia

ICM 2024 - 22nd International Conference on Magnetism
Jun 30 - Jul 5, 2024
Bologna, Italy

ICMFS2024 - 25th International Colloquium on Magnetic Films and Surfaces
Jul 7-12, 2024
Perugia, Italy

CEMAG Summer School - "Current Research in Magnetism and Magnetic Materials: from fundamentals to applications"
Jun 24-28, 2024
Seville, Spain

NANO 2024 - 2024 IEEE International Conference on Nanotechnology
Jul 8-11, 2024
Gijón, Spain

TMRC 2024
Aug 5 - 7, 2024
University of California, Berkeley, USA

IEEE MagSoc Summer School 2024
Jun 9-14, 2024
Taipei, Taiwan

THERMAG 2024
Aug 21 - 24, 2024
Baotou, China

ESM2024 - The European School on Magnetism 2024: Magnetism for energy-efficient devices
Aug 27 - Sep 6, 2024
York, UK

CEFC 2024 - 21st Biennial Conference on Electromagnetic Field Computation
Jun 2-5, 2024
Jeju, Korea

Magnetic Frontiers Conference 2024: Magnetic Materials and Motors for Green Energy Applications
Sep 15 - 19, 2024
TU Darmstadt, Germany

Joint MMM-Intermag 2025
Jan 13-17, 2025
New Orleans, USA

MMM 2025
Oct 27-31, 2024
Palm Beach, FL, USA

INTERMAG 2025

January 13-17, 2025 • New Orleans, Louisiana

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

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