Newsletter | December 2023

Editor's Note

Welcome to the Dec 2023 issue of the Nanotechnology Council newsletter. This issue brings you the latest updates and activities in the IEEE-NTC community. We hope you enjoy it and do let us know if there is any topic youâ€™d like to see covered in the future. All future content submissions to the newsletter should be sent to the new editors: Yijun Cui and Ke Chen.

Yijun Cui

Nanjing University of Aeronautics and Astronautics
Nanjing, China

Ke Chen

Nanjing University of Aeronautics and Astronautics
Nanjing, China

Contents:

BREAKING NEWS

OJ-NANO Call for Papers â€“ Special Section on IEEE-NANOMED 2023

CALL FOR PAPERS:
IEEE Open Journal of Nanotechnology (OJ-NANO)
Special Section on
â€œIEEE-NANOMED 2023: Nano/Molecular Medicine & Engineeringâ€

IEEE Open Journal of Nanotechnology (OJ-NANO), a gold fully open access journal launched in 2020 by IEEE Nanotechnology Council, publishes research advancing the theory, design and development of nanotechnology and its scientific, engineering and industrial applications. The journal has an independent editorial board, established peer-review process, is targeting a ten-week rapid publishing schedule and is fully compliant with funder mandates, including Plan S. Your work will be exposed to 5 million unique monthly users of the IEEE *Xplore*Â® Digital Library. *IEEE OJ-NANO* received its **first Journal Impact of 1.7** and is now indexed in the **Science Citation Index Expanded (SCIE)**™ by Clarivate Analytics as well as in ScopusÂ®! This development indicates increased visibility and profile for both the journal and its published articles, demonstrating *IEEE OJ-NANO* is a reliable and high-quality source of information in the field of

nanotechnology.

IEEE OJ-NANO will devote a special section on â€œ**IEEE-NANOMED 2023: Nano/Molecular Medicine and Engineering**â€ to a collection of papers highlighting research and technology development in the field of nanobiotechnology, molecular engineering, micro/nano-fluidics, micro/nano-system integration, nano-biology and nanomedicine. IEEE Nanotechnology Council sponsors the 16th IEEE International Conference on Nano/Molecular Medicine & Engineering (IEEE-NANOMED 2021) held on 5 â€“ 8 December 2023 to foster interaction between physicians, scientists and engineers in these emerging areas.

NOTE: *IEEE OJ-NANO* will **waive 25% of the APC** (Article Publishing Charge) for papers accepted for publication in the NANOMED 2023 special issue!

Areas of interest include but are not limited to:

- Nano and molecular technologies in medical theranostics
- Nanotechnology in drug delivery
- Biomedical imaging
- Bio/Nano sensing
- Biochips and Bio-MEMS
- Biomechatronics
- Biological interface
- Cells at the nanoscale
- Frontiers in nanobiotechnology
- Translational medicine

Submissions are solicited from the IEEE-NANOMED 2023 conference participants and other researchers in the field for a review paper or a research paper for this themed issue. Manuscripts will be subject to the OJ-NANO normal peer review procedures. **If your manuscript is based on the IEEE-NANOMED 2023 paper, the manuscript must build significantly on it, with at least 30% of the submitted results representing new research.** Additional text, figures and references are obligatory, and no passages of texts or figures should be identical to your conference paper as this could breach copyright. A nearly exact duplicate of the conference paper will be rejected.

Manuscripts for IEEE OJ-NANO must be prepared using the â€œIEEE manuscript templateâ€ and â€œInformation for Authorsâ€ at https://oj-nano.ieeenano.org/submitting-an-article/; and be submitted on-line via the IEEE Manuscript Central found at https://mc.manuscriptcentral.com/oj-nano. On submission to IEEE OJ-NANO, authors should **select** the â€œ**Special Issue: IEEE-NANOMED 2023**â€ as a manuscript type instead of â€œRegular Paper.â€ Also, indicate in the cover letter that you wish the paper to be considered for the Special Issue â€œNano/Molecular Medicine and Engineering."

Deadlines:

Manuscript Submission	30 April 2024
Anticipated Publication	31 October 2024

Guest Editors:
Kin Fong Lei, Ph.D.
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DISTINGUISHED LECTURERS

Distinguished Lecturers (DL) for 2024

The IEEE NTC is pleased to announce the appointments of Distinguished Lecturers for 2024.

DL Names	Topic(s)
	• Rubbery electronics: materials, devices and integrated systems

Cunjiang Yu	• Soft deformable electronics towards a seamless integration with soft biology
Jean-Pierre Leburton	• 2D Nano-Electronic Materials for Bio-sensing and Big Data
Xinran Wang	• 2D Semiconductors for Future Computing
Pedram Khalili Amiri	• Nanoscale Magnetism: From new materials to unconventional computing systems
Mohsen Rahmani	• Can we tame the light waves via engineered nanoscale particles?
Gengchiau Liang	• Physics of Nanoelectronics and Spintronics and Device Applications • Electron and spin transport in novel materials • Device physics of Probabilistic-Bits and their applications to stochastic/Probabilistic computing
Sanjukta Bhanja	• Unconventional Computing using Spintronics • Solving Quadratic Unconstrained Binary Optimization using Nanomagnetic Grid • Nanomagnetic memory in auxiliary roles: a consideration for computing and security applications

For a detailed introduction of the DLs for 2024, please go to the NTC website.

TECHNICAL ACTIVITIES

NTC Forum on Nanomechanics and Machine Learning

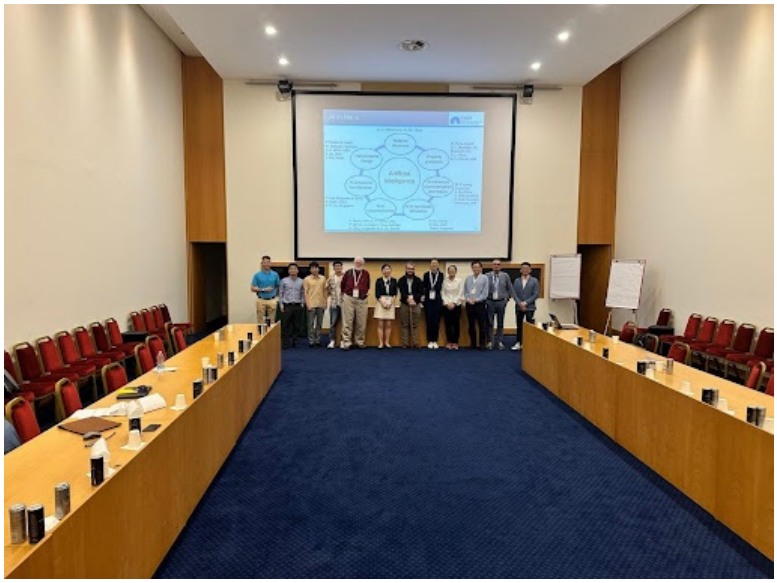
Before the IEEE NMDC 2023 Conference (23-25 Oct. 2023), the NTC focus forum on Artificial Intelligence (AI) and Nanotechnology was held in Mercurio Hall in Ariston Hotel, Paestum, on 21-22 Oct. 2023. The forum is proposed and Chaired by Prof. Dr. Xiaoying Zhuang from Leibniz University Hannover, Germany, with Prof. Xiaoning Jiang from NC State representing NTC as the VP TA. Dr. Teresa Cheng from Leibniz University Hannover and Dr. Quanzhou Yao from South China University of Science and Technology helped with the organization. There were totally 12 participants coming from Australia, Belgium, China, Germany, Norway, Switzerland and the US including Mr. Tylor Jaynes from the NTC Standards Committee who participated as an additional observer. The forum invited experts

with various background including AI algorithm, metamaterials, nanomechanics experiments, nano tribology, nanomaterials design, nanomaterials manufacturing, packaging, nano energy harvesters, photodetectors, 2D materials etc in order to bring chemistry of new ideas and explore new ideas of AI in nanotechnology. Enhancing our interactive session, one of our attendees contributed to the discussions via an online connection. A series of twelve insightful presentations showcased groundbreaking developments in AI as applied to the field of nanotechnology. Highlights of the talks included:

- AI enhanced energy harvester design and applications;
- AI assisted experiment on mechanical characterization, such as piezoelectric thin film and high entropy alloys;
- AI assisted inverse design of metamaterials
- AI assisted 2D materials characterization;
- AI assisted experimental results, such as piezoresponse force microscopy (PFM) for accelerated potential valley of stick-slip behaviour in tribology, and for high quality PFM images;
- AI based nano materials design and exploration;

The forum also discussed the issues regarding the AI applications in nanotechnology, including the demand of a large number of data and the physics issues that gives â€œsenseâ€ to the results or output from AI. Research related to â€œAI and Nanotechnologyâ€ showed interesting potential and a pre-forum study made by Prof. Zhuang showed that AI is among the most active and rising directions in nano materials and nano technology around the world where many interesting examples have revealed the perspectives. Dr. Jakob Schwiedrzik from EMPA at Switzerland presented extreme naonmechanics testing with self-developed instruments at EMPA of extremely high strain rate testing as well as cryogenic and high temperature. He also showed AI based data analysis of large datasets generated by high throughput multimodal materials characterization for various applications. Prof. Jim Morris from Portland State University gave an overview talk of NTC history and future perspective and afterwards he presented issues and uncertainties in electric conduction of discontinuous metal nanoparticle in thin film. Prof. Jianying He presented additively manufactured high entropy alloys where AI can be used to accelerate and optimize the manufacturing parameters for high strength alloy. Prof. Yabin Jin from Tongji University showed the AI enhanced inverse design of metamaterials and topological insulating structures where AI can accelerate novel functions and features. Prof. Timon Rabczuk from Bauhaus University Weimar presented AI mathematical model, theory and algorithms for scientific computing and materials design. He also showed the insight of Dr. Binh Huy Nguyen from Interuniversity Microelectronics Centre (imec), Belgium presented AI assisted MEMS design and characterization. Prof. Di Bartolomeo presented interesting findings of photoconductivity, negative photoconductivity and pressure hysteresis of several 2D materials including MoS2 and ReS2 etc. Prof. Xiaoying Zhuang presented the AI based 2D materials exploration and multiscale materials characterization and homogenization using deep learning. Dr. Quanzhou Yao from South China University of Science and Technology presented AI enhanced solution of for the statistical study of stick-slip events in nano triboelectricity. Dr. Qiong Liu demonstrated recent results on PFM and Ramen spectrum characterization of flexoelectricity of 2D materials. Dr. Teresa Cheng summarize the state of the art of nano energy harvesters and future perspective about how to use AI to develop more efficient energy harvester.

During the forum, several discussion sessions were carried out and it was agreed that it is important to disseminate and demonstrate successful showcases to NTC and IEEE community where AI can be used to enhance current research methods. It was proposed that it is necessary to organize and provide training courses or lectures that can deliver basic mathematical models and knowledge of using AI. Issues of data generation raised a lot of discussions and questions regarding the quality and quantitates of the data. A key step is of course to see the problem for each researcher that can be improved or solved by AI. Future plans under consideration are the foundation of new technical committee within NTC in the area of â€œAI and Nanotechnologyâ€, special sessions in IEEE Nano 2024 in Spain and the further communications with other IEEE societies such as Computer Science. A special issue of NTC journals or the magazine is under discussion and envisioned to be organized.



Group photo of the forum participant (taken by Julia Zhuang)

2023 IEEE NTC TC10 Modeling and Simulation December Webinar

Webinar 3
Date: 12 December 2023
Time: 1600-1700 CET (GMT+1)
Speaker: Dr. Tue Gunst, Synopsys QuantumATK
Organizer: Josef Weinbub, TC 10 Co-Chair, weinbub@iue.tuwien.ac.at
Topic: QuantumATK: Interfacing cutting-edge practical nanoelectronic applications with advanced atomistic simulations

Abstract:
Advancing next-generation nanoelectronics requires integrating atomistic cutting-edge simulation methods into realistic nanoelectronic device models. In this webinar, I will demonstrate how machine-learned force fields and multi-model simulators can be used to model nanoelectronic research problems by combining realistic interfaces, flexible electrostatic solvers, and advanced transport analysis. I will also highlight the latest trends in QuantumATK modeling and present case studies relevant to the nanoelectronic industry.

Presenter:
Tue Gunst is a senior application engineer at Synopsys working on advanced transport and materials applications in the QuantumATK team. Tue specializes in nanoelectronics modeling, using his background as a university scientist (Post Doc & assistant professor at the Technical University of Denmark from 2013 to 2019) to bridge the gap between the newest simulation methodologies and applications relevant to key industry players. Tue collaborated closely with QuantumATK teams throughout his university research projects and joined Synopsys in 2019 to accelerate the utilization of advanced modeling techniques in nanoelectronic research applications.

For registration, please check the link.

WIN ACTIVITIES

NTC WIN Region 9 New Coordinator Announced

YOUNG PROFESSIONALS

NTC Young Professionals Reception held at NMDC 2023

During IEEE NMDC 2023 Conference, a reception was hosted for the Young Professionals (YPs) and students which a unique gateway to the world of nanotechnology and materials science. Organized by the IEEE Nanotechnology Council (NTC), a unique Social and Networking event allowed YPs to connect, in a relaxed atmosphere, with leading experts and senior scientists, while expanding their professional network, exploring career prospects, and gaining valuable insights into IEEE and NTC. NMDC 2023 was a remarkable opportunity for YPs and students to enhance their careers, broaden their horizons, and experience the vibrant IEEE community firsthand.

Third Call for Young Professionals to Join IEEE Nanotechnology Council Technical Committees

Are you interested in the field of Nanotechnology and in expanding your professional horizons? Consider joining one of the IEEE Nanotechnology Council Technical Committees. Our mentoring program (MENED) is designed for young professionals interested in gaining new skills and experiences, participating in professional activities, and further development of their professional network.

The major strength of IEEE Nanotechnology Council (NTC) resides in its large number of members and volunteers, and the unlimited spectrum of nanotechnology applications. Currently, the IEEE NTC activities (technical, educational, conferences, publications, standing committees, etc.) and initiatives are extremely rich and rise the IEEE NTC to the level of a well-recognized world leader in the field of nanotechnology. To guarantee sustainability of NTC activities and to enable successful succession planning in the NTCâ€™s leadership, a new initiative was launched at the beginning of 2022, namely the **IEEE NTC Mentoring program: from Effectiveness to Durability, or the so-called NTC MENED program**. The NTC MENED program aims to enable the NTC volunteers to grow indispensable skills to carry out the NTC activities and to gradually integrate a larger number of well-trained NTC volunteers into the different initiatives. The objectives of NTC MENED program are as follows: 1) To reach a high level of success in the NTC activities; 2) To maximize the chance of new volunteers to reach their goals; and 3) To establish a mentoring culture that concerns the durability of NTC MENED program. Through the NTC MENED program, the final goal of NTC is to connect people and create teams in which everyone brings ideas, trust and rapport.

Find your chosen technical committee and fill out our short application form so we can get to know you better. The deadline is **15 January 2024**.

NTC Young Professionals Connections

Five Regional NTC YP LinkedIn pages have been established and are timely updated. The regional coordinators established cooperation with the regional NTC conference organizers in order to support and ensure presence of young professionals.

NTC YP LinkedIn:

- Region 7 (Canada)
- Region 9 (Latin America)
- NTC YP India
- Region 8 (Africa, Europe, Middle East)
- Region 10 (Asia and Pacific)

CONFERENCES

NANO 2024 â€“ Call for Papers

The 24th IEEE International Conference on Nanotechnology (IEEE NANO 2024) will
be held from 8 - 11 July 2024, in GijÃ³n, Spain.
https://2024.ieeenano.org/
Download CFP (PDF)

Since its founding in 2001, IEEE NANO has been the flagship conference of the IEEE Nanotechnology Council (NTC). It promotes advanced research in nanoscience and nanotechnology.

IEEE NANO 2024 invites contributions from both academic and industry-based researchers in the field of nanotechnology. Authors should prepare a paper (4-6 pages) using the template in the IEEE style and submit it for review by **1 March 2024**.

Technical Categories

- Nanorobotics & Nanomanufacturing
- Nanofabrication
- Spintronics
- Nanosensors & Nanoactuators
- Nano-Metrology & Characterization
- Nanopackaging
- Nano-Energy, Environment, & Safety
- Nano-Acoustic Devices, Processes, & Materials
- Emerging Plasma Nanotechnologies
- AI in Nanotechnology
- Nanobiomedicine
- Nano-Optics, Nanophotonics, and Nano-Optoelectronics
- Nanoelectronics
- Nanomaterials
- Modeling & Simulation
- Nanomagnetics
- Nanoscale Communications
- Quantum, Neuromorphic, & Unconventional Computing
- Nanotechnology in Soft Electronics

Important Dates

- **Special Session & Forum Proposal Deadline** 1 February 2024, Decision 15 February 2024
- **Workshop Proposal Deadline** 15 February 2024, Decision 1 March 2024
- **Four-page Papers Submission Deadline** 1 March 2024, Decision 30 April 2024

Organizing Committee
General Chair
Montserrat Rivas (University of Oviedo, Spain)
General Co-Chairs
Kremena Makasheva (French National Center for Scientific Research (CNRS), France)
Valentine Novosad (Argonne National Laboratory, USA)
Program Committee
Giovanni Finocchio (University of Messina, Italy)
Jia Yan Law (University of Sevilla, Spain)
Vito Puliafito (Politecnico di Bari, Italy)

NEMS 2024 â€“ Call for Papers

The 19th IEEE International Conference on Nano/Micro Engineered and Molecular Systems (IEEE-NEMS2024) will be held in Kyoto University of Advanced Science (KUAS), between 2 - 5 May 2024.
https://www.ieee-nems2024.org
Download CFP (PDF)

IEEE-NEMS: IEEE-NEMS is a premier conference series sponsored by the IEEE Nanotechnology Council focusing on the promotion of advanced research areas related to MEMS, nanotechnology, and molecular technology. Prior conferences were held in Jeju (Korea, 2023), Bangkok (Thailand, 2019), Singapore (2018), Los Angeles (USA, 2017), Matsushima and Sendai (Japan, 2016), Xiâ€™an

(China, 2015), Hawaii (USA, 2014), Suzhou (China, 2013), Kyoto (Japan, 2012), Kaohsiung (Taiwan, 2011), Xiamen (China, 2010), Shenzhen (China, 2009), Hainan Island (China, 2008), Bangkok (Thailand, 2007), Zhuhai (China, 2006).

Kyoto: IEEE-NEMS 2024 will be held in Kyoto. Kyoto served as Japanâ€™s capital and the emperorâ€™s residence from 794 until 1868. It is one of the countryâ€™s ten largest cities with a population of 1.5 million people and a modern face. The conference venue, the Kyoto University of Advanced Science (KUAS), with newly established Faculty of Engineering, accelerates the evolution of robots and automated machines, as well as drones and electric vehicles.
IEEE NEMS 2024 invites all interested MEMS, nanotechnology, and molecular technology fields professionals and academics to submit oral and poster. We welcome you to contribute to the most up-to-date research and latest developments from around the world. Abstracts will be reviewed by the Technical Committee and, if accepted, the author will be asked to submit the full paper (optional) which will be assigned to the appropriate session based on the authorâ€™s application and program requirements.

Conference Scope:
We invite contributions describing the latest scientific and technological research results in subjects including, but not limited to:
â€˜ Micro/Nano Electro-Mechanical Systems (M/NEMS)
â€˜ Micro/Nano/Molecular Fabrication
â€˜ Functional Nanomaterials and Devices
â€˜ Nanophotonics and Nanoscale Imaging
â€˜ Nanoscale Robotics, Assembly, and Automation
â€˜ Micro/Nano/Molecular Sensors, Actuators, and Systems
â€˜ Micro/Nano Fluidics and Devices
â€˜ Micro/Nano Mechanics
â€˜ Nanobiology/Nanomedicine/Microphysiological Systems (MPS)

Submission Deadlines
Two-Page Abstract Deadline: 18 December 2023
Notification of Acceptance: 29 January 2024
Full-Paper (IEEE Xplore) Submission Deadline: 26 February 2024
Early Bird Registration: 29 January 2024
Contact: nems_2024@ksys.me.kyoto-u.ac.jp

NMDC 2024 â€˜ Call for Papers

18th IEEE Nanotechnology Materials and Devices Conference (IEEE NMDC 2024)
22-25 October 2024, Salt Lake City, Utah, United States
Conference venue: Radisson Salt Lake City Downtown
https://ieeenmdc.org/nmdc-2024

IEEE NMDC is a flagship conference series of the IEEE Nanotechnology Council (NTC), focusing on research advances in the fields of nanoscience and nanotechnology.

Conference Scope:
The conference focuses on the latest scientific and technological advances related to

- Nanorobotics and nanomanufacturing
- Nano-biomedicine
- Nanofabrication
- Nano-Optics, Nanophotonics, and Nano-Optoelectronics
- Spintronics
- Nanoelectronics
- Modeling and Simulation
- Nanopackaging
- Nanomagnetics
- Nanoenergy, Environment and Safety
- Nano-acoustic Devices, Processes & Materials
- Quantum, Neuromorphic & Unconventional Computing
- Emerging Plasma Nanotechnologies

- Nanoscale communications and Nanonetworks
- Nanosensors and Nanoactuators
- MEMS/NEMS
- Nanoelectronics
- Nano-fluidics and integrated bio-chips
- Nanomaterials
- DNA Nanotechnology
- Nanodiamond and nanocarbon structures: materials and devices
- Nanometrology and Characterization
- Emerging material and device challenges in futuristic systems
- Education in nanotechnology
- Ethics in Nanotechnology
- Commercializing nanotechnology
- Fundamentals and applications of nanotubes, nanowires, quantum dots and other low dimensional materials

Key Dates:
Abstract Submission Date: **15 May 2024**
Full Paper Submission: 15 July 2024
Notification of Acceptance: 1 September 2024
Final Paper Submission: 1 October 2024
Accepted and presented full papers (4 to 6 pages) for IEEE NMDC 2024 will be included in IEEE *Xplore* as well as other Abstracting & Indexing (A&I) databases.

We are proud to announce that the 18th IEEE Nanotechnology Materials and Devices Conference (NMDC) will be held in lovely Salt Lake City, Utah, USA 22 - 25 October of 2024. You may recall the beautiful scenery broadcast during the 2002 Winter Olympics which were held in the Wasatch Mountains (Rocky Mountains). Utah still boasts being a wild western state; it is almost the size of Romania with roughly only 15% the population. Most of Utahâ€™s population lives along a corridor between the Great Salt Lake and the Wasatch Mountains. As the Utah population is condensed, our light rail system permits easy inexpensive travel from the Salt Lake International Airport to out conference hotel, the Radisson Downtown. In addition, there are many alternative hotels and many restaurants in walking distance or along the light rail lines.

IEEE NMDC 2024 will be the perfect stage to promote research from all across the world.

General Chair:
Daniel N Donahoe, 1000 kilometers LLC, USA
Co-Chairs:
Vice Chair: Randy J Jost, Utah State University, USA
Program Chair: Randy K Rannow, Silverdraft Supercomputing, USA
Treasurer: Lee Oien, MSEI, USA

PUBLICATIONS

IEEE Transactions on Nanotechnology

View the full current issue of IEEE T-NANO

For additional information, visit the IEEE *Xplore* website.

To learn how to submit to T-NANO, click here.

T-NANO, VOLUME 22

IEEE Open Journal of Nanotechnology

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For additional information, visit the IEEE *Xplore* website.

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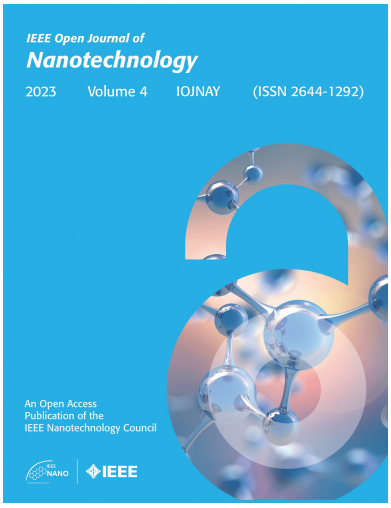
The *IEEE Open Journal of Nanotechnology* (OJ-NANO) is dedicated to publishing articles on timely topics in the field of nanotechnology by making them available immediately, freely, and permanently available to all. All articles published in OJ-NANO are exposed to 5 million unique monthly users of the IEEE *XploreÂ®* Digital Library. Among numerous articles published so far, we've selected a few review articles to highlight here.

OJNANO, VOLUME 4



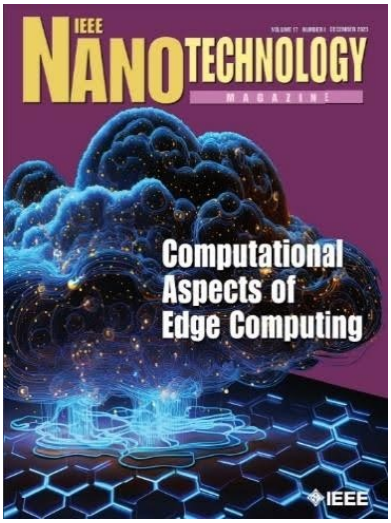
IEEE Nanotechnology Magazine

View the full current issue of IEEE INM

For additional information, visit the IEEE *Xplore* website.

To find how to submit to INM, click here.

INM, Volume 17, Number 6



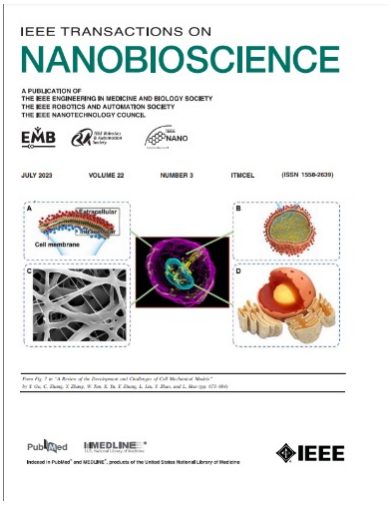
IEEE Transactions on NanoBioscience

View the full current issue of IEEE T-NB

For additional information, visit the IEEE *Xplore* website.

To find how to submit to T-NB, click here.

T-NB, Volume 22, Number 4



LIST OF NANOTECHNOLOGY COUNCIL OFFICERS (2023)

Position	Name	Position	Name
President	 **Fabrizio Lombardi**	**Past-President**	 **James Morris**

President-Elect	 **Jin-Woo Kim**	**Vice President for Conferences**	 **Kremena Makasheva**
Vice President for Educational Activities	 **Lixin Dong**	**Vice President-Elect for Educational Activities**	 **Luca Pierantoni**
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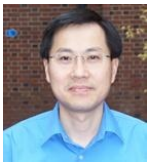
Vice President-Elect for Publications	 **Georgios Sirakoulis**	**Vice President for Technical Activities**	 **Xiaoning Jiang**
Vice President-Elect for Technical Activities	 **Weiqiang Liu**	**Secretary**	 **Edward G. Perkins**

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