

Instrument and Measurement Science

Topical Group of the American Physical Society GIMS Newsletter 49, August 2022

In this newsletter: *GIMS at the APS March Meeting, GIMS Student Presentation Award Winners, Student Travel Grant Awarded, GIMS Election Results, Highlights from the Annual Business Meeting, GIMS Supports Safe Passage Fund, GIMS Seeking Historical Documents for Curation, Call for Nominations, About GIMS*

GIMS at the APS March Meeting

The 2022 APS March Meeting was held in Chicago, Illinois from March 14th to 18th. Due to the ongoing COVID-19 pandemic this year's March Meeting offered a very different conference experience. The meeting occurred at a time when many COVID precautions were still in place, but with restrictions on in-person gatherings beginning to ease. Attendees were required to wear masks during the conference, and present proof of vaccination as well as a recent negative test result. Attendance from the National Laboratories was quite limited, as the Department of Energy was just beginning to allow limited conference travel at the time.

GIMS sessions at the March Meeting featured a mix of in-person presentations (39 in total) and pre-recorded video contributions (36 in total). In spite of the unusual circumstances these sessions were quite well attended, with 158 in-person attendees over 9 different sessions. Unfortunately, there were also 7 no-shows for scheduled presentations. A full list of GIMS sessions from the 2022 APS March Meeting is provided below.

List of Sessions:

F31: Detector and Detection Science

G31: Instrumentation 1: Gas, NMR, Materials

K31: Instrumentation 2: Optical, Thermal, and More

M15: Keithley Award Symposium

Invited Speakers: D. Rugar (IBM Research),
 H. J. Mamin (IBM Research), P. H. Grutter
 (McGill), C. L. Degen (ETH Zurich), R.
 Budakian (U. Illinois Urbana-Champaign)

N31: Advances in Scanned Probe Microscopy

Q31: Microscopy 1: Electrons, THz, Optical
Invited Speaker: R. F. Klie (U. Illinois
 Urbana-Champaign)

S31: Microscopy 2: X-rays, Neutrons, Scanned

T31: Scattering Science and Methods

W31: Learning and Analytics for Measurements

We would like to extend our thanks to the members of the 2022 Program Committee for putting together an interesting and topical scientific program: **Chris Jacobsen** (Chair), **Antonella Badia**, **Sarah Burke**, **Angela Di Fulvio**, **Alex Frano**, **Angelika Kühnle**, **Emily Mace**, **Melissa Santala**, **Laurel Winter**, and **Shan Wu**. Planning for the 2023 APS March Meeting in Las Vegas is already under way, with help from the new 2023 Program Committee: **Catherine Pappas** (Chair), **Antonella**

Badia, Lawrence Carr, Angela Di Fulvio, Jisun Kim, Youli Li, Jianwei (John) Miao, Brian Regan Laurel Winter, Shan Wu, and Piotr Zolnierczuk.

The 2022 Keithley Award

The APS March Meeting also marked the official presentation of the **Joseph F. Keithley Award for Advances in Measurement Science**. This award is presented annually to a physicist who has been instrumental in the development of measurement techniques or equipment that have impact on the physics community by providing better measurements. The award is endowed by Keithley Instruments, Inc. and the Topical Group on Instrument and Measurement Science. The 2022 Keithley Award was presented to **Dr. Daniel Rugar** and **Dr. H. Jonathon Mamin** from IBM Research *"for seminal developments in magnetic force microscopy leading to significant measurement advancements, including the detection of a single electron spin and nuclear magnetic resonance imaging at the nanometer scale."* The conference also featured a Keithley Award Symposium (Session **M15**) with invited talks by Daniel Rugar, Harry Mamin, Peter Grutter, Christian Degen, and Raffi Budakian.



John Mamin (Left) and Daniel Rugar (Right) receiving the Keithley Award at the APS March Meeting

GIMS would like to extend our thanks to the 2022 Keithley Award selection committee: **Angela Di Fulvio** (Chair), **Irfan Siddiqi** (2021 Keithley Award Recipient), **Vesna Mitrovic**, **Christie Nelson**, and **Amanda Petford-Long**. We are also pleased to welcome the new 2023 Keithley Award selection committee: **Irfan Siddiqi** (Chair), **Daniel Rugar** (2022 Keithley Award Recipient), **John Mamin** (2022 Keithley Award Recipient), **Ian Fisher**, **Johanna Wecker**, **Angela di Fulvio**, and **Ercan Alp**.

The GIMS APS Fellowship

The incoming class of APS fellows were also honored at the March Meeting. The APS Fellowship Program was created to recognize members who have: (a) made advances in physics through original research and publication, (b) made significant innovative contributions in the application of physics to science and technology, or (c) made significant contributions to the teaching of physics or service and participation in the activities of the APS. Each year, no more than 0.5% of the APS membership (excluding student members) can receive this honor.



Andrew Lupini (ORNL), recipient of the 2021 APS GIMS Fellowship

155 members were inducted in the 2021 class of APS Fellows. The APS Fellowship from the Topical Group on Instrument and Measurement Science was awarded to **Dr. Andrew R. Lupini** from Oak Ridge

National Laboratory “for groundbreaking contributions to the fields of electron microscopy and aberration-correction in scanning transmission electron microscopy and for the development of new image and spectroscopy capabilities, higher-resolution, and better sensitivity to atomic-resolution imaging and spectroscopy.”

GIMS would like to thank the members of the 2021 APS Fellowship committee for their service: **Catherine Pappas** (Chair), **Art J. Nelson** (2020 GIMS APS Fellow), **Chris Jacobsen**, **Elias Garratt**, **Peter Grütter**, and **Angela Hight Walker**. We are also pleased to welcome the members of the 2023 Fellowship committee: **Vesna Mitrovic** (Chair), **Andrew Lupini** (2021 GIMS APS Fellow), **Michael Martin**, **Emily Mace**, and **Peter Grütter**.

GIMS Student Presentation Award Winners

The GIMS Student Presentation Award competition was launched in 2021 in conjunction with the virtual APS March Meeting. The second edition of the competition was held this year at the 2022 APS March Meeting in Chicago. In total, ~50 student participants in the GIMS sessions competed for these awards. A panel of judges evaluated all contributed oral presentations and selected six award winners for their outstanding presentation of high-impact work representing significant advances in the field of instrumentation or measurement sciences. The 2022 GIMS Student Presentation Award winners were:

• **Daehun Lee** – University of Texas at Austin (Graduate)

“Visualization of acoustic mode conversion and power flow in suspended thin-film phononic device”

• **Karma Morey** – Massachusetts Institute of Technology (Graduate)

“Automated polarization control for application in time-resolved second harmonic generation experiments”

• **Louis Beaudoin** – Université de Sherbrooke (Graduate)

“Probing quasi two-dimensional materials using Nuclear Magnetic Resonance”

• **William Huxter** – ETH Zurich (Graduate)

“Scanning Gradiometry of Magnetic and Electric Fields with a Single Nitrogen-Vacancy Sensor”

• **Stephanie Ribet** – Northwestern University (Graduate)

“Enhancing Symmetry Breaking Defects in Materials with a STEM Phase Plate”

• **Isak McGieson** – Oregon State University (Graduate)

“Kinetic and thermodynamic measurements of the crystallization of phase change materials using transmission electron microscopy and nanocalorimetry”

All winners will receive an APS certificate recognizing their achievement along with a monetary prize (\$100 each). We hope these awards will help to encourage more students to join and work with the Topical Group on Instrument and Measurement Science. Congratulations to all of our award winners!

GIMS would like to thank our 2022 Student Awards Committee: **Shan Wu** (Chair), **Matthew Smylie**, and **Lahsen Assoufid**. We are also grateful to our panel of judges: **Alexander Gray**, **Chris Jacobsen**, **Melissa Santala**, **Matt Smylie**, and **Shan Wu**.

The next GIMS Student Presentation Award competition will be held at the 2023 APS March Meeting in Las Vegas (Mar. 6th to 10th). The competition is open to any undergraduate or graduate student who: (a)

has not yet received a PhD degree, and (b) is giving a contributed oral presentation in a GIMS-sponsored session. We look forward to seeing you there!

Student Travel Grant Awarded

GIMS is able to provide a limited number of travel grants for students or postdocs who are attending the March Meeting to present a paper in one of the GIMS sponsored sessions. These travel grants are valued at \$500, and are intended to cover costs associated with travel, accommodations, and food. This year the GIMS Student Travel Grant was awarded to **Junghyun Bae** from Purdue University. Junghyun's contributed talk, "A High-Resolution Muon Spectrometer Using Multi-Layer Gas Cherenkov Radiators" was presented in Session F31: Detector and Detection Science. Congratulations to Junghyun, and thanks to all who applied.

Details of the 2023 GIMS Student Travel Grant competition will be announced later this fall. Applications are typically due in mid-February, with results announced shortly before the March Meeting. You can read more about the Student Travel Grant program at: <https://engage.aps.org/gims/meetings/upcoming/travel-grants>.

GIMS Election Results

Each year GIMS holds an election to fill vacant offices on the Executive Committee. In 2022, four new members and one returning member were elected to the GIMS Executive Committee:

Vice Chair: Prof. Vesna F. Mitrovic, Brown University

Member-at-Large: Dr. Johanna Nelson Weker, SLAC National Accelerator Laboratory

Member-at-Large: Prof. Matthew P. Smylie, Hofstra University

GIMS Early Career Member: Dr. Okan Koksai, National Institute of Standards and Technology

Secretary-Treasurer: Dr. Zahir Islam, Argonne National Laboratory



Vesna Mitrovic



Johanna Nelson
Weker



Matthew Smylie



Okan Koksai



Zahir Islam

A warm welcome to Vesna, Johanna, Matthew and Okan, and a special thanks to Zahir for his continued service to GIMS. A full list of the current GIMS executive can be found at: <https://engage.aps.org/gims/governance/executive-committee>. For more details, please refer to the GIMS Bylaws webpage at: <https://engage.aps.org/gims/governance/bylaws>.

We note that this year's election had fairly typical voter turnout (12.4%), in spite of a condensed two-week election schedule.

YEAR	Eligible voters	Total Voters	Voting Percentage
2022	597	74	12.4%
2021	555	93	16.8%
2020	515	102	19.8%
2019	472	76	16.1%
2018	NO ELECTION HELD		
2017	560	82	14.6%
2016	563	75	13.3%

In the upcoming 2023 GIMS election, we will be looking to fill **three** new positions on the Executive Committee: **one Vice Chair** and **two Members-at-Large**. Note that Vice Chair is the entry position for a four stage Vice Chair, Chair Elect, Chair, Past Chair progression. If you are interested in standing for election to a position on the GIMS Executive Committee, please contact Joseph Hagmann, Chair of the Nominating Committee (joseph.hagmann@gmail.com) by **November 30th, 2022**. The 2023 election is scheduled to take place in January, with more details to follow.

Highlights from the Annual Business Meeting

The Annual GIMS Business Meeting was held during the APS March Meeting, on Wednesday March 16th. The meeting had approximately 15 in-person attendees, and several more online. The meeting slides can be viewed at <https://tinyurl.com/37fe5r5x>.

Highlights from the meeting discussion included:

- **GIMS membership reaches an all-time high** – Membership in the topical group has been steadily increasing over the past 3 years, with GIMS officially crossing 600 members earlier this year. This marks an increase of ~20% since 2018.
- **GIMS Executive Committee reaches full strength** – Following a postponed election in 2018, the GIMS Executive Committee had been operating at less than full capacity for several years. With the successful election of 5 new members, the Executive Committee has now been restored to full strength and a regular election cycle.
- **GIMS financial update** – The financial status of GIMS is stable and generally healthy. Net revenue for 2021 (\$7,230.31)

is up from 2020 (\$4,908.63), largely due to the unit-share of revenue from the APS March Meeting (zero in 2020 due to cancellation as a result COVID-19). The only expense incurred by GIMS in 2021 was associated with the Student Presentation Awards.

YTD 12/31/21

Dues-APS Divisions/Top Group: \$2,765.00
Allocated Investment Income: \$2,527.09
Unit-share of APS meeting: \$2,527.09
Total Revenue: \$7,830.31
Student Presentation Awards: \$600
Committee Meetings-Meals: \$0
Hospitality: \$0
Total Expenses: \$600
Net Revenue: \$7,230.31

- **40th Anniversary of GIMS approaching at the 2024 APS March Meeting** – Planning is under way for special events and symposia to commemorate this milestone anniversary. Stay tuned for more details!

GIMS Supports Safe Passage Fund

In response to the Russian invasion of Ukraine, GIMS has made a \$500 donation to the Safe Passage Fund. The Safe Passage Fund was established by the U.S. National Academy of Sciences (NAS) in order to support Ukrainian scholars and their families who have been forced to flee the country because of the invasion. This fund will be used to support grants that will allow Ukrainian scholars to continue their important contributions to international science and research. The Safe Passage Fund is part of the Scientists and Engineers in Exile or Displaced (SEED) program, an initiative which was launched in 2021 to support displaced Afghan scholars after the

fall of Kabul. In the future, this fund will continue to provide aid to displaced or exiled scientists from around the world.

If you would like to make an individual donation to the Safe Passage Fund, you can do so by visiting the NAS website at: <https://tinyurl.com/2hr9f4vf>. You can also read more about the APS response to the invasion of Ukraine at: <https://aps.org/programs/international/ukraine.cfm>.

GIMS Seeking Historical Documents for Curation

As we approach the 40th anniversary of GIMS in 2024, the Executive Committee is attempting to collect and curate as much of the history of GIMS as possible. We have compiled a partial listing of past leadership and award winners, which can be viewed at <https://tinyurl.com/2rbzczb9>.

We also have an archive of past newsletters and other historical documents located on the APS GIMS engage webpage: <https://engage.aps.org/gims/resources/known-edge-library>.

If you can help us fill in any of the gaps in our topical group history (such as by providing a copy of an old newsletter), please contact Chris Jacobsen, Chair of GIMS (cjacobsen@anl.gov).

Call for Nominations

The GIMS executive committee is currently seeking volunteers and nominations for a variety of positions and awards:

GIMS Executive Committee – The 2023 GIMS Election will include votes for **one** position as Vice Chair, and **two** positions as Member-at-Large. Nominations for these positions will be accepted until **November 30th, 2022**.

GIMS Appointed Committee Members –

There will also be openings on several GIMS committees in the new year, including the Keithley Award, Student Award, GIMS Fellowship, Nomination, Program, and Publication committees. Volunteers for committee service are welcome at any time.

Joseph F. Keithley Award for Advances in Measurement Science – The Keithley Award is presented annually to one person, or a small group of individuals working in the same area, for outstanding advances in measurement science or instrumentation that impact the physics community by providing better measurements. Details of the award and the nomination process are available at <https://www.aps.org/programs/honors/prizes/keithley.cfm>. Nominations for the 2023 Keithley Award are currently closed, but nominations for the 2024 Award will be accepted until **June 1st, 2023**.

APS Fellowship – Each year the GIMS Fellowship committee selects nominees for APS Fellowships based on proposals submitted by the GIMS membership. The nomination process is described at: <https://www.aps.org/programs/honors/fellowships/nominations.cfm>. Nominations for the 2022 GIMS Fellowship are currently closed, but nominations for the 2023 Fellowship will be accepted until **June 1st, 2023**.

The membership of the APS is diverse and global, so officers, committee members, Prize and Award winners, and Fellows of the APS should reflect that diversity. Nominations of members belonging to traditionally under-represented groups in physics, such as women, LGBT+ scientists, scientists who are Black, Indigenous, and people of color (BIPOC), and disabled scientists are especially encouraged. We also welcome nominations for scientists from outside the United States.

About GIMS



The APS Topical Group for Instrument and Measurement Science (GIMS) was formed in 1984 to encourage precision in measurements, to encourage development of instrument and measurement science, to provide a forum for discussions of these topics, and to provide professional recognition of the importance of instrument and measurement science.

GIMS provides services to its membership that include:

- A path to APS fellowship based on work in instrument and measurement science
- The Keithley Award for instrumentation
- Focus sessions at the March Meeting
- Organization of March Meeting sessions
- Student Travel Grants
- A voice in governance of the APS

Please bring GIMS to the attention of your colleagues and encourage them to join as members. GIMS seeks to reflect the society around us, so we would particularly encourage you to reach out to your younger colleagues, and members of traditionally under-represented groups. The success of GIMS depends on your continued enthusiasm and support!

The articles in this newsletter represent the views of the GIMS Publication Committee and are not necessarily those of individual GIMS members or the APS. Suggestions for future news items or highlights from the membership are strongly encouraged. Any questions, comments or corrections regarding the newsletter should be directed to the Chair of the Publication Committee (Patrick Clancy, clancyp@mcmaster.ca) or the GIMS Secretary-Treasurer (Zahir Islam, zahir@anl.gov).