
Instrumentation and Measurement Science

Topical Group of the American Physical Society GIMS Newsletter 43, Fall 2015

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Newsletter Resumes

This issue marks the resumption of publication of the GIMS Newsletter in a new format after a year's hiatus. The GIMS Newsletter will be published once per year in the fall as a summary of past and upcoming activities. We will be using email for reminders to the membership regarding GIMS elections, nominations to APS fellowship, GIMS student travel grants, nominations for the Keithley Award and other matters.

Any questions, comments or corrections regarding the newsletter should be directed to the GIMS Secretary-Treasurer. Contact information for GIMS officers is at www.aps.org/units/gims/governance/officers

Diversity Statement

With respect to the nominations mentioned in this newsletter, it is important to remember the membership of APS is diverse and global, so officers, committee members, Prize and Award winners as well as Fellows of the APS should reflect that diversity. Nominations of women, members of underrepresented minority groups, and scientists from outside the United States are especially encouraged.

GIMS Service to Members

GIMS provides services to its membership that include:

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

These efforts can only be maintained through the efforts of members who volunteer to serve as officers and committee members. We thank all present and past officers and committee members.

Please consider serving as an officer or committee member.

Please bring GIMS to the attention of your colleagues and encourage them to join – particularly younger

colleagues. We need constant infusion of young physicists to maintain the organization.

GIMS Elections - 2016

Current officers are listed on page 7. Each year GIMS holds an election to fill vacant offices in accordance with the GIMS Bylaws; see www.aps.org/units/gims/governance/bylaws.cfm

Our next election will take place in January 2016; we will need to fill the Vice-Chair slot. Anyone interested in helping with GIMS governance as an officer, executive committee member or as a member of any of the appointed committees (Keithley Award, Fellowship, Nomination) should contact the GIMS Secretary-Treasurer. Nominations for the January 2016 election should be submitted by December 18.

GIMS Business Meeting

Please consider attending our annual business meeting. It will be held on Tuesday evening during the March Meeting. See the meeting schedule for location.

GIMS Statistics

For more detail see

www.aps.org/membership/units/statistics.cfm

APS Membership: 50,578

GIMS Membership: 541 (~1.06% of APS membership)

GIMS Fellows: 56 (~10% of GIMS membership)

GIMS Treasury

Contact Secretary-Treasurer for more detail

- Current Balance: \$67,907
- Past year (2014) expenses: \$5,653

APS Keithley Award

The Keithley Award is presented annually to recognize physicists who have been instrumental in the development of measurement techniques or equipment that have impact on the physics community by providing better measurements. Details of the award may be found at

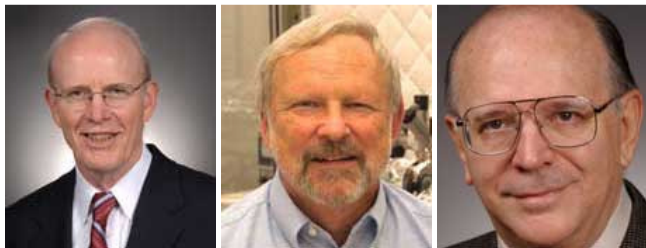
www.aps.org/programs/honors/awards/keithley.cfm .

Nominations for the award are submitted in the early spring to summer, a year in advance of the presentation of the award at a March Meeting; nominations close in July. Check the website for details.

If you are considering submitting a nomination, now is the time to begin preparation.

The recipients for 2015 and 2016 are shown below.

Recipients: 2015



Daniel T. Pierce (left)

John Unguris (middle)

Robert J. Celotta (right)

National Institute of Standards and Technology

"For the invention and development of electron spin sources and detectors, and their application to measurement science"

Recipient: 2016



Albert Migliori

Los Alamos National Laboratory

"For the development of Resonant Ultrasound Spectroscopy, used to study lattice and electronic phenomena in condensed matter physics, solving problems as diverse as the elastic properties of plutonium, to finding that the pseudogap state of cuprates is indeed a thermodynamic phase."

APS/GIMS Fellows

GIMS can nominate APS members to APS Fellowship. GIMS has a committee for fellowship nominations that selects nominees from proposals made by GIMS members. GIMS members may propose APS members for fellowship through GIMS, the nomination process is described at

www.aps.org/programs/honors/fellowships/nominations.cfm. The process is being revamped to utilize an online nomination system which should be online in 2015. Fellowship nominations close in June each year.

If you are considering submitting a nomination, now is the time to begin preparation.

Fellows elected in 2014 and 2015 are listed below.

2014

Armstrong, Michael R.

Lawrence Livermore National Laboratory

Citation: For outstanding contributions to time-domain experimental methods applied to materials under extreme conditions.

Izumi, Nobuhiko

Lawrence Livermore National Laboratory

Citation: For outstanding contributions to the development of novel neutron and x-ray diagnostic capabilities for inertial confinement fusion experiments.

Rodriguez, George

Los Alamos National Laboratory

Citation: For his outstanding leadership in the development of ultrafast laser-based and high-speed optical instrumentation and his creative application of these diagnostics to the impactful measurement of materials, systems, and devices.

2015

Cho, Hsiao-Mei

SLAC - National Accelerator Laboratory

Citation: For outstanding contributions to the development of sensitive bolometers and superconducting amplifiers, and leadership in their application to the measurement of the polarization of the cosmic microwave background.

Tyliszczak, Tolek

Lawrence Berkeley National Laboratory

Citation: For the groundbreaking development and technical implementations of the highest performance soft x-ray scanning transmission microscope (STXM) and its applications, and investigation of extraterrestrial particles.

March Meeting GIMS Focus Sessions

The GIMS focus sessions for the March 2016 meeting are listed at:

www.aps.org/meetings/march/scientific/focus3.cfm#1912; that page is reproduced below. We thank the organizers of these sessions for their efforts.

If any GIMS member would like to propose a focus session for the March 2017 meeting, they should contact the Secretary-Treasurer and/or attend the GIMS Business Meeting. The business meeting is normally held on the Tuesday of the March Meeting. Check the March meeting schedule for details.

19: INSTRUMENTATION AND MEASUREMENTS (GIMS)

19.1.1: Advances in Scanned Probe Microscopy 1: Novel Approaches and Ultrasensitive Detection

The APS Topical Group on Instrumentation and Measurement (GIMS) invites papers on advances in Scanning Probe Microscopy and related instrumentation, with a focus on novel approaches and ultrasensitive detection. Advances in scanned probe force measurement and mapping exploiting novel tip-sample interactions, improved detection sensitivity and widening of circumstances under which they are applied continue to push the frontier in the measurement of a broad range of physical, chemical and biological systems. This session will focus on the continued innovative development of scanned probe microscopy and related instrumentation. Particular advances and applications are seen in new approaches to force detection and novel techniques for probing a variety of surfaces and interactions. This session seeks to bring together expertise from a variety of fields in scanned probe microscopy that will further the development of advanced instrumentation and measurement science focused on the atomic and nanometer scale.

Organizer: **Joseph Stroschio** (joseph.stroschio@nist.gov)

19.1.2: Advances in Scanned Probe Microscopy 2: High Frequencies and Optical Techniques

The APS Topical Group on Instrumentation and Measurement (GIMS) invites papers on advances in Scanning Probe Microscopy and related instrumentation with a focus on optical techniques and radio-frequency measurements. A severe limitation in traditional scanning probe microscopy is low temporal resolution, originating from the diminished high-frequency response of readout circuitry. It was recently shown that some of these obstacles can be overcome. Recent advances in the combination of scanning probe and optical techniques have resulted for example in ultra-fast (sub-picosecond) temporal resolution and tip-enhanced Raman scattering. This session seeks to bring together expertise from a variety of fields in scanned probe microscopy and optical techniques that will further the development of advanced instrumentation and measurement science focused on the atomic and nanometer scale.

Organizer: **Joseph Stroschio** (joseph.stroschio@nist.gov)

19.1.3: Advances in Scanned Probe Microscopy 3: Scanning Probes Spectroscopic Techniques

The APS Topical Group on Instrumentation and Measurement (GIMS) invites papers on advances in Scanning Probe Microscopy and related instrumentation with a focus on spectroscopic measurements on novel materials. The scanning tunneling microscope has matured over the last few years into a tool that is now routinely applied in energy-resolved measurement modes at cryogenic temperatures. The atomic-force microscope has been used to measure force-distance curves which give detailed information about atomic species on the surface and at the tip apex as a form of force spectroscopy. This session seeks to bring together expertise from a variety of aspects of scanned probe microscopy that will further the development of advanced instrumentation and measurement science focused on the atomic and nanometer scale spectroscopic measurement of new and novel materials.

Organizer: **Joseph Stroschio** (joseph.stroschio@nist.gov)

19.1.4: Optical Spectroscopic Measurements of 2D Materials (GIMS/DMP)

The APS Topical Group on Instrumentation and Measurement (GIMS) invites papers on advances in optical spectroscopic measurements and related instrumentation for two-dimensional (2D) materials and heterostructures composed of these materials. Optical spectroscopy is used to study the interaction of light with physical materials and includes but is not limited to absorption, scattering, and emission. Of particular interest in this session are novel measurements that provide fresh insight and/or have been combined with other techniques to interrogate concealed phenomenon. We seek to bring together expertise from a variety of spectroscopic fields with a focus on 2D materials that will further optical measurement science as foundational to identifying the underlying physics of these materials and devices.

Organizer: **Angela R. Hight Walker**
(angela.hightwalker@nist.gov)

Student Travel Grants

GIMS is able to provide a limited number of travel grants for students who are attending the March Meeting to present a paper in one of the GIMS sponsored sessions.

The process for awarding a grant is currently as follows:

1. The applicant must be an active student at an accredited degree granting institution.
2. The applicant must be the first author of a paper in a GIMS sponsored session at the March meeting – focus or regular session.
3. Applicants must be GIMS members.
4. Awards are capped at \$500; this covers travel, accommodation and food. Awards do not cover registration fees.
5. The applicant may apply for the grant by sending a package consisting of the following items to the GIMS Secretary-Treasurer via email:
 - a. An application letter that provides the (a) paper name, (b) abstract, (c) log number for the online submission, (d) sorting category, (e) a description of the applicant's role(s) in the paper, (f) full contact information for the student (Name, Institution, Address, phone, email) and (g) an itemized estimate of the expenses the applicant plans to submit if awarded a grant.
 - b. A copy of the applicant's CV; this should include other publications.
 - c. A letter of recommendation from the applicant's faculty advisor -- this may be sent separately.
 - d. A copy of the paper being presented. This may be only the abstract if that is all that is ready. However, a full paper provides better information upon which to base an award decision than an abstract alone.
6. Deadline for application two weeks after the sorting session for the March Meeting which is normally held in early December..
7. Evaluation of the applications will take place by email, by the GIMS executive committee.
8. The selection of awardees will be based on the quality of the paper and the applicant's CV and recommendation. Incomplete applications will not be considered.
9. The selection(s) will be announced six weeks after the paper assignments to sessions have been made available to the GIMS Secretary-Treasurer.
10. Awardee sends receipts and a completed APS travel and expense report form to GIMS Secretary-Treasurer after the meeting – form is available at www.aps.org/about/governance/committees/travel.cfm
11. Secretary-Treasurer submits expenses to APS and requests that the expense check be sent directly to the awardee. The awardee should allow at least 6 weeks after the receipt of the expense form by the Secretary-Treasurer for receipt of the check.

GIMS Governance

Contact information for GIMS officers is at
www.aps.org/units/gims/governance/officers

Executive Committee

Chair: Dennis Mills (03/15 - 02/16)

Argonne National Lab

Chair-Elect: Charles Mielke (03/15 - 02/16)

Los Alamos National Lab

Vice Chair: Angela Hight Walker (03/15 - 02/16)

NIST - National Institute of Standards and Technology

Past Chair: Fedor Balakirev (03/15 - 02/16)

Los Alamos National Lab

Secretary/Treasurer: James Matey (03/14 - 02/17)

NIST - National Institute of Standards and Technology

Member-at-Large: Joseph Gladden (03/14 - 02/17)

University of Mississippi

Member-at-Large: Terrence Jach (03/14 - 02/17)

NIST - National Institute of Standards and Technology

Member-at-Large: Janos Kirz (03/14 - 02/17)

Lawrence Berkeley National Lab

Member-at-Large: Richard Steiner (03/14 - 02/17)

NIST - National Institute of Standards and Technology

Member-at-Large: Rachael Floyd (03/15 - 02/18)

Janis Research Company, LLC

Member-at-Large: George Rodriguez (03/15 - 02/18)

Los Alamos National Lab

Assigned Council Representative

Forum on Industrial and Applied Physics

Gregory Meisner

Fellowship Committee

For fellows elected in 2015, work completed

Chair: Angela Hight-Walker, NIST

Nominating Committee

For election to be held in January 2016

Chair: Dennis Mills, Argonne National Lab

Vice-Chair: Barry Zink, University of Denver

Keithley Award Committee

For award to be presented at APS March Meeting 2016, work completed.

Chair: Chuck Agosta, Clark University

Vice-Chair: Fedor Balakirev, Los Alamos

Past Awardee: Daniel Pierce, NIST

At Large: Veerle Keppens, University of Tennessee

At Large: Barry Zink, University of Denver

Notes & Disclaimer

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.

The articles in this issue represent the views of the GIMS publication committee and are not necessarily those of individual GIMS members or the APS.

This newsletter was edited by James R. Matey, Secretary-Treasurer, with input from the Executive Committee.