

Instrument and Measurement Science

25TH ANNIVERSARY NEWSLETTER

FEBRUARY 2009

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<http://units.aps.org/units/gims>

The Topical Group on Instrument and Measurement Science (IMSTG/GIMS) of the American Physical Society 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.

I. Early GIMS History: Dating to the Beginning

YEAR	VICE-CHAIR	CHAIR	PAST CHAIR & NOM. COMMITT. CHAIR	FELLOWSHIP COMMITTEE	SECRETARY-TREASURER	EXECUTIVE COMMITTEE MEMBER	EXECUTIVE COMMITTEE MEMBER	SELECTED FELLOWS
MAR 1984 MAR 1985		Lawrence Rubin						None
MAR 1985 MAR 1986	James Schooley	Lawrence Rubin			Richard Higgins	Ansel Anderson, Richard Anderson, James Matey	Howard Sample, Clayton Swenson, William Wing	None
MAR 1986 MAR 1987	James Schooley	Lawrence Rubin			Richard Higgins	Ansel Anderson, Richard Anderson, James Matey	Howard Sample, Clayton Swenson, William Wing	None
MAR 1987 MAR 1988	James Schooley	Lawrence Rubin			Richard Higgins	Ansel Anderson, Richard Anderson, James Matey	Howard Sample, Clayton Swenson, William Wing	None
MAR 1988 MAR 1989	James Matey	James Schooley	Lawrence Rubin	Clayton Swenson	Eric Jones	Richard Anderson, Bruce Brandt, Alan Clark, Lorimer Miller	Howard Sample, Clayton Swenson, Thomas Braid (ex-officio)	Alan Clark, Richard Higgins, Lorimer Miller, James Schooley
MAR 1989 MAR 1990	James Matey	James Schooley	Lawrence Rubin	Clayton Swenson, Karl Kessler, Ansel Anderson	Eric Jones	Bruce Brandt, Alan Clark, James Gaines, Klaus Jaeger	Lorimer Miller, John Kraus, Thomas Braid (ex-officio)	Robert Cutkosky, Fred Fickett, Howard Layer, Jacques Vanier
MAR 1990 MAR 1991	Richard Anderson	James Matey	James Schooley	Lawrence Rubin, Ansel Anderson, Karl Kessler	Eric Jones	Bruce Brandt, Alan Clark, Robert Erdman, James Gaines	Klaus Jaeger, John Kraus, Thomas Braid (ex-officio)	James Gaines, Robert Soulen
MAR 1991 MAR 1992	Richard Anderson	James Matey	James Schooley	Lawrence Rubin, Ansel Anderson, Karl Kessler	Bruce Brandt	Alan Clark, Robert Erdman, James Gaines, Klaus Jaeger	John Kraus, Andreas Mandelis, Thomas Braid (ex-officio)	Richard Anderson, Ernst Bauer, Kumar Nickramsinghe

II. Special Award to Lawrence Rubin

An award will be presented to Larry Rubin to celebrate the 25th anniversary of the formation of GIMS. The award will be presented at the GIMS dinner following the GIMS business meeting in Pittsburgh on Tuesday evening. The traditional dinner is free to all attendees at the business meeting who will be led to the restaurant at the conclusion of the business meeting. The GIMS business meeting is session M27 on Tuesday at 5:45 PM in room 329.

III. Keithley Award 2009

Robert Schoelkopf (Yale)

Citation: *For development for high frequency measurements of mesoscopic physics and quantum noise, including the radio-frequency single-electron transistor and absolute thermometry based on electron shot-noise.*

Keithley Award Selection Committee:

J. Matey (US Naval Academy)
C. MacDonald (Univ. at Albany)
A. Macrander (Argonne)
K. Waldrip (Sandia)

IV. New APS/GIMS Fellows

Samuel Benz (NIST)

Citation: *For inventing and developing the first Josephson junction array arbitrary waveform synthesizer and using it as a practical quantum-based voltage divider.*

Larry A. Nagaharra (National Cancer Institute)

Citation: *For his pioneering work in developing scanning probe microscopy and other nanotechnology platforms for the analysis, manipulation and measurements at the nanoscale and of molecular components and for the elucidation of the fundamental physical principles underlying these systems.*

David Siddons (Brookhaven National Laboratory)

Citation: *For his contribution to x-ray optics, x-ray physics, x-ray detectors, and the development of synchrotron radiation instrumentation and experimental techniques.*

Fellowship Selection Committee:

J. Strosio (NIST)
T. Graber (Argonne and U. Chicago)
E. Hudson (MIT)

V. March 2009 Meeting Sessions (114 GIMS Papers = 1.7% of total)

A. GIMS business meeting in Pittsburgh, Session M27

Tuesday, March 17
5:45PM
Room 329

B. Invited Symposia

Session T3: Keithley Award Session (GIMS)

Chair: James Matey, US Naval Academy
Wednesday, March 18
Rooms 301/302

2:30 PM–3:06 PM

T3.00001: Microwave Measurements of Mesoscopic Devices

KEITHLEY AWARD SPEAKER:

Robert Schoelkopf

(Departments of Applied Physics and Physics, Yale University)

3:06 PM–3:42 PM

T3.00002: Near-Quantum-Limited SQUID amplifier

Invited Speaker: John Clarke

(University of California, Berkeley and Lawrence Berkeley National Laboratory)

3:42 PM–4:18 PM

T3.00003: Optomechanics with microwave light

Invited Speaker: Konrad Lehner

(JILA: University of Colorado and NIST)

4:18 PM–4:54 PM

T3.00004: Noise in Mesoscopic, Quantum, and Nano-Systems

Invited Speaker: Daniel Prober

(Yale University)

4:54 PM–5:30 PM

T3.00005: Nonlinear Dispersive Measurement with Superconducting Circuits

Invited Speaker: Irfan Siddiq

(University of California, Berkeley)

Session W8: Forefront Detectors for Synchrotron Radiation

Chair: Timothy Graber, University of Chicago

Thursday, March 19

Rooms 414/415

11:15 AM–11:51 AM

W8.00001: Advanced X-ray Detector Development at NSLS

Invited Speaker: David Siddons

(National Synchrotron Light Source, Brookhaven National Laboratory)

11:51 AM–12:27 PM

W8.00002: Novel Detector developments for the European XFEL
Invited Speaker: Heinz Graafsma
 (DESY-Hamburg)

12:27 PM– 1:03 PM

W8.00003: Integrating Pixel Array Detector Development
Invited Speaker: Sol Gruner
 (Cornell University)

1:03 PM– 1:39 PM

W8.00004: CMOS Hybrid Pixel Detectors for Scientific, Industrial and Medical Applications
Invited Speaker: Christian Broennimann
 (DECTRIS Ltd)

Session Y8: Pushing the Limits of Mechanical Detection

Chair: Dan Rugar, IBM Almaden
Friday, March 20
 Rooms 414/415

8:00 AM– 8:36 AM

Y8.00001: Quantum Optical Control of Micromechanics
Invited Speaker: Markus Aspelmeyer
 (Institute for Quantum Optics and Quantum Information (IQOQI), Austrian Academy of Sciences, Vienna, Austria)

8:36 AM– 9:12 AM

Y8.00002: Measurement of Dispersive Coupling Between a Nanoresonator and a Superconducting Qubit
Invited Speaker: Matthew LaHaye
 (California Institute of Technology)

9:12 AM– 9:48 AM

Y8.00003: Nanoscale Magnetic Resonance Imaging Based on Ultrasensitive Force Detection
Invited Speaker: H.J. Mamin
 (IBM Research Division, Almaden Research Center)

9:48 AM– 10:24 AM

Y8.00004: A Cantilever-based apparatus for detecting micron-scale deviations from Newtonian gravity
Invited Speaker: Aharon Kapitulnik
 (Stanford University)

10:24 AM– 11:00 AM

Y8.00005: The quantum limit and beyond in gravitational wave detection
Invited Speaker: Nergis Mavalvala
 (Massachusetts Institute of Technology)

C. Focus sessions and regular sessions.

All sessions are in room 329

Monday, March 16**8:00 AM– 11:00 AM**

13 papers.
 Chair: Andreas Heinrich, IBM A27. Focus session: Advances in Scanned Probe Microscopy I: Low Temperatures
Invited Speaker: Eric Hudson (MIT)

Monday, March 16**2:30 PM– 5:30 PM**

15 papers.
 Chair: Larry Rubin, MIT D27. Advances in Instrumentation and Measurement I

Tuesday, March 17**8:00 AM– 10:48 AM**

12 papers.
 Chair: Young Kuk, Seoul National University H27. Focus session: Advances in Scanned Probe Microscopy II: Force Methods
Invited Speaker: Oscar Custance (National Institute for Materials Science)

Tuesday, March 17**11:15 AM– 1:51 PM**

11 papers.
 Chair: Albert Macrander, Argonne National Laboratory J27. Focus Session: X-ray and Neutron Instruments and Sciences I
Invited Speaker: Yujie Wang (Argonne)

Wednesday, March 18**8:00 AM– 11:00 AM**

13 papers.
 Chair: Jay Gupta, Ohio State University P27. Focus Session: Advances in Scanned Probe Microscopy III: High Frequency and Optical Techniques
Invited Speaker: Lukas Novotny (Univ. Rochester)

Wednesday, March 18**11:15 AM– 2:15 PM**

15 papers.
 Chair: Dennis Mills, Argonne National Laboratory Q27. Focus Session: X-ray and Neutron Instruments and Sciences II

Thursday, March 19**8:00 AM– 10:48 AM**

10 papers.
 Chair: Igor Sokolov, Clarkson University V27. Focus Session: Emerging Scanning Probe Microscopy Methods for Biological Applications
Invited Speakers: Boris Akhremitchev (Duke) and Bryan Huey (Univ. Connecticut)

Friday, March 20,**11:15 AM– 1:27 PM**

11 papers.
 Chair: Charles Agosta, Clark University Z27. Advances in Instrumentation and Measurement II

VI. Synopsis of GIMS Officer Duties

A. Chair

Mainly responsible for an orderly succession in the vice-chair/chair-elect/chair sequence

1. Forms and chairs a nominating committee—January at the latest.
2. Informs the GIMS Sec.-Treas. of names to appear on a ballot for election in time to have an orderly election before the next March meeting—January at the latest.
3. Attends the APS convocation meeting—February.
4. Conducts the GIMS business meeting at the March meeting.
5. A typical Agenda:
 - Hand out of fellowship diplomas and pins—by the outgoing vice-chair
 - Announcement of student travel grants awards—by the sec.-treas.
 - Solicitation of focus session abstracts for the next March meeting—by the vice-chair (i.e., the new program chair)
 - Report on the Keithley Award and announcement of next Keithley Committee Chair—by the outgoing Keithley Committee Chair
 - Conduct vote on new “regular member” to serve on the Keithley Committee—by the chair
 - Presentation GIMS member enrollment statistics—by the sec.-treas.
 - Summary of GIMS disbursements and GIMS budget balances—by the sec.-treas.

- Presentation and possible vote on edits/amendments to the GIMS bylaws (if any)—by the sec.-treas
- Solicitation and discussion of new business items raised by any attendee—by the chair
- Lead the attendees of the business meeting to the GIMS dinner—by the sec.-treas.

B. Chair-Elect & Program Chair

Mainly responsible for organizing the March meeting program. This is the most labor intensive position. Best APS contact: Ken Cole

1. Chairs the program committee. This committee standardly consists of the organizers of the focus sessions and the Keithley Award Chair.
2. Obtains and follows the current version of the “Handbook for March Meeting Program Chairs” available from Donna Baudrau at the APS.
3. Conceives of and organizes two all-invited-speaker symposia of four speakers each. Along with the Keithley Award sessions this leads to three invited symposia for GIMS. Three is the “canonical” number of the GIMS invited symposia. All three symposia need to be organized in time for the Invited Speaker Meeting of the APS in November.
4. Invites speakers for all GIMS sessions, and works with the Sec.-Treas. to approve honoraria or travel grants.
5. Attends the APS meeting on invited speakers—October/November.
6. Sets up all GIMS sessions at the Sorter’s Meeting held meeting in December. The Keithley session is included. This includes placing

sessions in available conference timeslots and meeting rooms. A meeting room also needs to be reserved for the GIMS business meeting.

7. Attends the APS Sorter’s Meeting—December.
8. Attendance at the APS Convocation Meeting is optional.

C. Vice-Chair

Mainly responsible for forming and chairing the Fellowship Committee. The basic duty is to conduct a vote on fellowship nominations received by the APS that are directed at GIMS. If there are too few in any year, this may mean recruiting nominations. The APS informed sec.-treas. in 2008 that of all the APS Units, GIMS stands out as the only one that has never had a woman nominated for fellowship. Fellowship nominations should be made in winter or early spring, and the results of fellowship selections are due to APS in July. The number of fellowships that can be awarded is typically 2 or 3. The total is not fixed but can be increased due to special APS policies, e.g., an additional fellowship for foreign members may be available. The best APS contact on issues associated with fellowship selection is Alan Chodos.

1. Forms and Chairs the GIMS Fellowship Committee. This committee is traditionally formed from the pool of GIMS officers and executive committee members.
2. Informs the Fellowship recipients of the time and place of the GIMS Business Meeting at the March Meeting. They will receive their fellowship diplomas and pins at the business meeting.

3. Attends the Sorter's Meeting, and "learns the ropes" associated with becoming the Program Chair the following year.
4. Attendance at the APS Convocation Meeting is optional.

D. Secretary-Treasurer

Mainly responsible for the GIMS Newsletters and general correspondence with the APS on APS-wide issues that are sent to all secretaries of APS Units.

1. Chairs the publication committee. This committee loosely consists of the GIMS officers and the Keithley Committee Chair.
2. Drafts two GIMS Newsletters annually (one in early winter to precede the March meeting and one in early fall), circulates the draft(s) to the GIMS publication committee for edits/additions, and hands-off the finished Newsletter to the APS for publication. The APS requirements for Newsletters are available in a guideline document entitled: "APS Unit Newsletter Procedures". The main APS contact for Newsletters is Kerry Johnson.
3. Interacts with the APS to keep the GIMS website up-to-date.
4. Set up elections for new officers and executive committee members upon receiving a slate of candidates from the chair of the nominating committee. The Sec.-Treas. formally interacts with the APS to conduct the elections.
5. Organizes the traditional GIMS dinner at the March Meeting following the GIMS business meeting.

6. Processes student travel grant requests for ravel to the March meeting.
7. Attends the APS Convocation Meeting—February.
8. Serves as a principal contact between the APS and the GIMS Topical Subgroup.
9. Brings fellowship diplomas and pins to the business meeting.
10. Takes notes at the business meeting to be included in the fall issue of the GIMS Newsletter.

E. Keithley Award Committee Chair

Mainly responsible for making an orderly and timely selection of the Keithley Award winner to be announced at the March meeting. The APS contact is Alan Chodos. The committee is formally set up by Chodos and traditionally consists of at least these members: the Chair, a nominal vice chair, the winner of the last Keithley Award, and a "regular member" that is voted on at the GIMS business meeting. The "regular member" has, in recent years, been the most recent outgoing GIMS Chair. The composition of the committee is entirely at the discretion of the APS, and inactive GIMS members have in recent years been asked to Chair the Keithley Award committee, e.g., Art Hebard.

1. Organizes the timely sending of electronic nomination packages to the committee members. The APS will send out the packages, but the APS is a bureaucracy and needs to be prompted—August.
2. Organizes and conducts a conference telephone call with all

committee members and selects a winner. Promotion of a committee member to chair the subsequent Keithley Committee is discussed and decided. This person is then formally suggested to Alan Chodos.

3. Organizes a slate of invited speakers for the GIMS Award symposium session. The speakers are the Keithley Awardee plus as many as four other well known workers in the field of the Award. These may include authors of the nomination package. The list of invited speakers needs to be communicated to the Program Chair in time for the Invited Speakers Meeting in October/November.

F. GIMS Executive Committee Members

Main duties are the organization of focus sessions and service on GIMS committees upon request.

1. Organize focus sessions. These involve writing an abstract so that a special category is created that appears in the pull down menu seen by a submitter of abstracts for the March meeting. This abstract needs to be submitted to the GIMS program chair by May/June.
2. Recruit abstract submissions to their focus session.
3. Select up to two invited speakers for the focus session. Communicates the names and emails of invited speakers to the GIMS Program Chair in time for Invited Speaker session in Oct/Nov.
4. Serve on the nominating committee and/or fellowship committee upon request by the chairs of these committees.

VII. Secretary Treasurer Report

Available funds as of Nov. 30, 2008

Keithley Award \$80,107.62

GIMS \$78,000.31

VIII. Nomination Committee Formed

A slate of candidates for the next GIMS Vice-Chair and for an executive committee member is being prepared.

Nominating committee membership:

Chuck Agosta (Clark Univ.)

Joe Stroschio (NIST)

Eric Hudson (MIT)

Rachel Floyd (Janis Corp.)

Al Macrander (Argonne).

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GIMS
NEWSLETTER

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