

**FIRST CALL FOR PAPERS**  
**The 2020 U.S. WORKSHOP on the PHYSICS**  
**and CHEMISTRY of II-VI MATERIALS**

October 19 – 22, 2020

Hilton Tampa Airport Westshore, Tampa, FL

<http://www.ii-viworkshop.org>

**II-VI Detector Materials**

- IR
- UV
- Gamma-Ray
- X-Ray
- Photovoltaic
- CdZnTe
- HgCdTe
- ZnO
- ZnS
- History of IR Detectors

**Special Sessions**

- Superlattices: II-VI and III-As/Sb
- II-VI Based Solar Cells
- Alternatives to CdZnTe Substrates
- HgCdTe Avalanche Photodiodes
- X-Ray and Gamma-Ray Detectors
- Surfaces and Interfaces
- ZnO Materials and Devices
- Defects and Doping
- Surface Passivation

**Participating Agencies**

U.S. Army CCDC C5ISR NVESD  
U.S. Army Research Laboratory  
U.S. Army SMDC  
U.S. Navy Electro-Optics Center  
Penn State University  
Office of Naval Research  
Air Force Research Laboratory  
Army Research Office  
The Minerals, Metals & Materials Society  
Endorsed by The American Physical Society

**2020 II-VI WORKSHOP**

***Purpose***

The purpose of this Workshop is to bring together the industrial, governmental, and academic communities that work with II-VI materials. These II-VI materials are critical in a wide range of detector technologies operating in the infrared, ultraviolet, x-ray, and gamma-ray regions of the spectrum, as well as broad-band devices such as solar cells. They include HgCdTe, ZnSe, ZnO, ZnS, and CdTe, as well as other II-VI semiconductors and alloys. Spectrometers, imagers, and other sophisticated systems exploiting various properties of these materials are finding applications in many fields, including national security, homeland security, medicine, industrial process monitoring, basic science, astronomy, energy production, and more. The Workshop aims at advancing the understanding of the basic physics and chemistry of these materials, and thereby contributes to the continual improvement of these system capabilities.

The 2020 Workshop is the number 39<sup>th</sup> in a series that began in 1981.

### ***Areas of Interest***

Areas covered include a broad range of disciplines and materials properties. Included are materials growth and characterization, materials engineering, intrinsic and extrinsic defects and dopants, surface chemistry, fabrication processes, electrical properties and modeling, charge transport, noise sources, optical properties, photorefraction, electro-optical and magneto-optical properties, as well as the interaction among all these.

### ***Workshop Format***

The Workshop program will consist of about 60 oral presentations and possibly a poster session. Invited and contributed papers with a common theme will be grouped for presentation.

To provide ample time for discussion, there are scheduled morning and afternoon breaks. Lunch will be provided, affording additional discussion time. To further promote informal discussion and interaction, the first day will conclude with a wine and cheese reception accompanied by tabletop displays from commercial vendors displaying products and services of interest to the Workshop community.

Authors of accepted papers are encouraged to submit full-length manuscripts, which will be peer reviewed and published as part of the Workshop proceedings in a Special Issue of the Journal of Electronic Materials.

Student participation is strongly encouraged. An award recognizing the best student paper will be presented at the conclusion of the Workshop. Funding exists to support student travel to the Workshop. Some student financial assistance is available for conference attendees.

### ***Tutorial***

This year the II-VI Workshop will feature a tutorial section on Monday, October 19. The tutorial will be given by Dr. Philip Klipstein of SemiConductor Devices on "III-V Barrier Detectors". The tutorial welcomes all interested and registered II-VI workshop participants. The workshop committee particularly encourages graduate students, post-docs and junior researchers to attend the tutorial and explore the topics in detail and tap into the experience of and network with the well-established researchers. More information about the tutorials such as topic, registration, time and location will be posted on the II-VI Workshop website and also distributed via email in following weeks.

### **Selected Focus Topics**

- II-VI and III-V Emerging Infrared Detector Technologies
- Novel Gain-Enhanced Devices
- Multi-Band Detectors
- Near-Room-Temperature IR Devices
- Material Growth and Modeling
- Substrates for HgCdTe: CdZnTe and Alternatives
- Structural Characterization
- Doping Issues in HgCdTe
- Radiation Detectors
- Solar Cells
- Integration of 6.1-Å II-VI and III-V Materials
- IR Applications of Plasmonics and Metamaterials

Multiple Invited speakers will present review talks on these topics. Check the Workshop Web site for updates.

### **Keynote Address**

This year's Keynote Speaker will be from the Office of Naval Research (ONR).

### **Invited Speakers will include:**

Whitney Mason, DARPA, *"Latest Efforts in EO/IR Imaging at DARPA"*

David Benson, NVESD, *"Analysis of HgCdTe/CdZnTe Defects"*

Sumith Bandera, NVESD, *"Progress and Challenges in SLS FPA Technology"*

David Rhiger, RVS, *"Current-Voltage Analysis of Dual-Band n-p-n HgCdTe Detectors"*

David Ting, JPL, *"Type-II Strained Layer Superlattice Barrier Infrared Detectors"*

Lorenzo Faraone, U. Western Australia, *"Status and Future Direction of IR Technology Research at UWA"*

Antoni Rogalski, Military University of Technology, *"Trends in Performance Limits of HOT Infrared Photodetectors"*

Uptal Roy, Savannah River National Laboratory, *"CdZnTeSe: An Emerging Material Toward Advancement of Radiation Detector and Substrate Applications"*

Phillipe Ballet, CEA-LETI, *"Advanced X-Ray Characterization and Imaging of IR Materials"*

## GENERAL TOPICS

The scope of the Workshop includes the basic physics and chemistry of all II-VI materials and their applications. Materials of interest include HgCdTe, HgCdSe, ZnSe, ZnO, ZnS, CdTe, and CdZnTe. Issues in the following critical areas are of interest:

- X-Ray & Gamma-Ray Radiation Detectors
- Radiation Effects in HgCdTe
- II-VI-Based Solar Cells
- Materials Growth and Characterization
  - Control of composition, carrier concentration, and lifetime
  - Modeling of growth and processing
  - Equilibrium and non-equilibrium growth
  - Defects and Doping
- Physics of Failure
  - Characterization, particularly non-destructive
  - Effect on electrical and optical properties
- P-doping issues in HgCdTe
  - Impurities
  - Diffusion
  - Activation and segregation
- Dislocations: generation mechanisms, properties, kinetics, characterization, mitigation
- Surfaces and Interfaces
- Etching, passivation, and metallization
- Modeling and Simulation
- Material properties
  - Growth and processing
  - Device physics
  - Characterization of Materials
  - Electrical, optical, and microstructural characterization
- ZnO and ZnS Materials and Devices
- Magnetic semiconductors
- 2D Materials
- Quantum Dots

## CALL FOR PAPERS

Papers describing significant advances in the state of the art of scientific results and understanding in the Workshop issues are solicited. Experimental results or theoretical results addressing experiments are encouraged. Emphasis should be on new fundamental physics and chemistry of materials for detector applications. Abstracts must contain results to be considered.

Papers will be selected on the basis of (1) originality, (2) significance of results, (3) quality and completeness of the research, and (4) breadth of interest. Extended abstracts of all accepted papers will be published in the Book of Extended Abstracts, which will be distributed at the Workshop. Submitted full-length manuscripts, after peer review, will be published in the Journal of Electronic Materials.

## WORKSHOP WEB SITE

<http://www.ii-viworkshop.org>

The Workshop Web page has the latest information on the Workshop and is updated as information becomes available.

## ABSTRACTS

1. Abstracts, suitable for publication, should clearly indicate the following:
  - a. original aspects of research
  - b. objective and approach of work
  - c. previous publications or presentations
  - d. experimental data
  - e. scientific implications of results
2. One-page abstracts should be double spaced on a single 8 1/2 × 11-in. sheet of paper. One (1) additional page of supporting figures will be accepted and is encouraged. The title, author(s), and affiliation(s) must be included.
3. A complete mailing address (phone, fax, and e-mail) of the presenter must be included.
4. Abstracts to be considered as student papers must be identified as such, and the name of the advisor must also be included.
5. Abstracts are to be submitted on or before **June 5, 2020**.

[Click Here to Submit Your Abstract!](#)

**Electronic abstract submission is required and should be submitted as a Microsoft Word file or as PDF file.**

6. Foreign authors requiring a visa are encouraged to submit their abstracts as early as possible. Special consideration will be made to ensure that an early application for a visa can be made.
7. Authors of accepted papers will be notified by June 26, 2020. Authors of accepted papers are requested to submit a revised abstract, not to exceed four pages, for inclusion in the Book of Extended Abstracts by August 21, 2020.
8. Full-length papers for publication in the Workshops Proceedings in a Special issue of the Journal of Electronics Materials must be submitted electronically by using the link on the Workshop's Web page <http://www.ii-viworkshop.org>

The authors can submit manuscripts from October 19 – December 18, 2020.

## 2020 WORKSHOP CALENDAR

Deadline for Submission of Abstracts	June 5, 2020
Notification of Accepts/Rejects	June 26, 2020
Deadline for Late-News Abstracts	July 10, 2020
Deadline for Extended Abstracts	August 21, 2020
Hotel Reservation Deadline	September 26, 2020
Workshop Registration Deadline	October 2, 2020
JEM Paper Submission Deadline	October 19 – December 18, 2020
2020 II-VI Workshop	October 19 – 22, 2020

## **WORKSHOP ORGANIZATION**

### **CO-CHAIRS**

Scott Johnson, Raytheon Vision Systems  
Ishwara Bhat, Rensselaer Polytechnic Institute  
Daniel Lofgreen, Raytheon Vision Systems

### **PROGRAM COMMITTEE**

Tony Almeida, U.S. Army CCDC C5ISR NVESD  
Jose M. Arias, CACI / U.S. Army CCDC C5ISR NVESD  
Enrico Bellotti, Boston University  
Gregory Brill, Army Research Laboratory  
Arnold Burger, Fisk University  
Joseph Burns, Air Force Research Laboratory  
Roger DeWames, MTEQ / U.S. Army CCDC C5ISR NVESD  
Nibir Dhar, U.S. Army CCDC C5ISR NVESD (Proceedings Co-Editor and Web Site Manager)  
Tim Gessert, National Renewable Energy Laboratory  
Ralph James, Savannah River National Lab  
Pradip Mitra, Leonardo DRS, Electro-Optical and Infrared Systems (EOIS)  
Thomas Myers, Texas State University – San Marcos  
Jill Nolde, Naval Research Laboratory  
Joe Pellegrino, U.S. Army CCDC C5ISR NVESD  
Eric Piquette, Teledyne Imaging Sensors  
Marion Reine, Consultant, Infrared Detectors  
Jonathan Schuster, Army Research Laboratory  
Sivalingam Sivananthan, University of Illinois at Chicago  
Priyalal Wijewarnasuriya, Teledyne Imaging Sensors

### **WORKSHOP COORDINATORS**

Samantha Tola  
Palisades Convention Management  
411 Lafayette Street, Suite 201  
New York, NY 10003  
212/460-8090, ext. 203  
fax: 212/460-5460  
e-mail: stola@pcm411.com

Paola Caicedo  
Sivananthan Laboratories, Inc.  
590 Territorial Drive  
Bolingbrook, IL 60440  
E-mail: pcaicedo@sivananthanlabs.us

### **SPECIAL ISSUE EDITORIAL COORDINATOR**

Paola Caicedo  
Sivananthan Laboratories, Inc.  
590 Territorial Drive  
Bolingbrook, IL 60440  
E-mail: pcaicedo@sivananthanlabs.us

## **WORKSHOP PARTICULARS**

### ***Location and Date***

The 2020 II-VI Workshop will be held on October 19 – 22, 2020 at the Hilton Tampa Airport Westshore, 2225 N Lois Ave, Tampa, FL 33607.

### ***Registration***

The Workshop Registration Form will be available in June 2020. Registration fees are not yet set so please check the Workshop web site periodically for updates.

The deadline for Workshop early bird discount registration is October 2, 2020.

### ***Hotel Accommodations***

A block of rooms has been reserved at the Embassy Suites Lakefront Hotel at special Workshop rates. A limited number of rooms will be available to Government employees and university staff/students with proper identification. More information on making hotel reservations will be available on the Workshop Web site in the coming months. Please check the website frequently for updates. Reservations received after the cut-off date of September 16 will be subject to availability.

### ***Student Financial Assistance***

To help defray the cost of attending the Workshop, full-time students presenting papers will receive partial support of their travel expenses. This support must be requested in advance of the Workshop.