

CPAD

The Coordinating Panel for Advanced Detectors

Petra Merkel (Fermilab, CPAD chair)

Karsten Heeger (Yale, CPAD vice chair)

October 6, 2020

New CPAD website forthcoming

CPAD – Coordinating Panel for Advanced Detectors

Context

HEP benefits from the development of both evolutionary and transformative detector instrumentation that is coordinated across the national laboratories and with the university community, and with international partners and other disciplines.

Formation of CPAD

- Standing body for the development of instrumentation for the field of particle physics
- Created under the auspices of the executive committee of the DPF in the spring of 2012
- Working on updated bylaws with DPF Chair in 2020

CPAD Leadership 2020-2021

- **Co-Chairs**

- Petra Merkel / Karsten Heeger
- Started in May 2020
- Held meetings with Ian Shipsey and Marcel Demarteau to pass the torch

- **CPAD Executive Board**

- New in 2020-2021
- Helps with staffing task forces, committees, outreach into the community

New Exec Board

Rick van Berg (Penn) [Neutrinos/Energy, electronics]

Maurice Garcia-Sciveres (LBNL) [Energy, ASICs etc.]

Ulrich Heintz (Brown) [Energy, silicon]

Kim Palladino (Wisconsin/Oxford) [DM, LXe]

Marina Artuso (Syracuse) [Rare/Precision, silicon]

Jinlong Zhang (ANL) [Energy, TDAQ]

Brad Benson (FNAL) [CMB, packaging, electronics]

Lindley Winslow (MIT) [Axion DM/0v2beta]

Roxanne Guenette (Harvard) [Neutrinos]

David Asner (BNL) [instrumentation]

Steve Worm (DESY Zeuthen)[collider/ILC/Instrumentation]

Karl van Bibber (UCBerkeley)[QIS, Axions]

Looking forward to working closely with DPF, DOE and Snowmass community

GIRA Award

Graduate Instrumentation Research Award

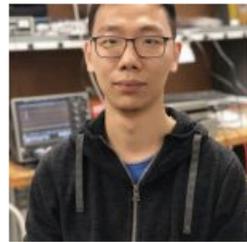
- Established in 2018, 1-2 students per year for 2-year projects

The winner of the 2018 Graduate Instrumentation Research Award was:



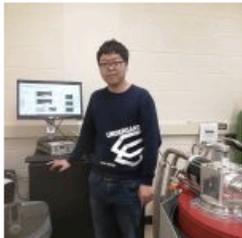
• Vetri Velan (UC Berkeley) for “Measurement of Light and Heat Signal Yields in Superfluid ^4He With Calorimetric Readout”.

The winners of the 2019 Graduate Instrumentation Research Award were:



• Xinran Li (Princeton) for “**High resolution selenium imaging detector for neutrinoless $\beta\beta$ decay**”.

• Yiou Zhang (Brown) for “**Development of magnetic tunnel junction sensor array for d physics of dark matter**”.



* Supported by the HEP Quantum Information Science research program

The winners of the 2020 Graduate Instrumentation Research Award were:

• Matthew Bressler (Drexel University) for “**Construction and Commissioning of a 10 kg Scintillating Argon Bubble Chamber for GeV Dark Matter and Reactor CEvNS**”.



Former GIRA Committee Members

2019-2020 (Current)

- Jonathan Asaadi (Chair) (UT Arlington)
- Carl Haber (LBL)
- David Moore (Yale)
- Bjoern Penning (Brandeis)
- Jen Raaf (FNAL)

2018-2019

- Marina Artuso (Syracuse)
- Jonathan Asaadi (UT Arlington)
- Roxanne Guenette (Chair) (Harvard)
- Dan McKinsey (UC Berkeley)

2017-2018

- Jodi Cooley (SMU)
- Juan Estrada (FNAL)
- Maurice. Garcia-Sciveres (Chair) (LBNL)
- Roxanne Guenette (Harvard)

→ Many good ideas and R&D efforts

DPF Instrumentation Award

2020 DPF Instrumentation Award and DPF Instrumentation Early Career Award

<https://www.aps.org/units/dpf/awards/instrumentation.cfm>

Citations for 2019

The DPF Instrumentation Award 2019 is presented by the APS Division of Particles and Fields (DPF) to:

Hanguo Wang

For his seminal contributions to and sustained development of the use of liquid xenon and argon detectors for direct detection searches for dark matter, including the two-phase technique. Today, liquid xenon (LXe) and liquid argon (LAr) 2-phase time-projection chambers (TPCs) are the leading technologies for direct detection searches for weakly interacting dark matter above

The DPF Early Career Instrumentation Award 2019 is presented by the APS Division of Particles and Fields (DPF) to:

Ana Amelia Machado and Ettore Segreto

For the invention and development of the ARAPUCA photon detector, a novel and effective tool for measuring scintillation light in liquid argon detectors. The greatest challenge for the detection of the VUV (127 nm) scintillation photons in a large liquid-argon volume is attenuation. An ARAPUCA consists of a small volume with highly reflective internal surfaces and acceptance

Citations for 2018

The DPF Instrumentation Award 2018 is awarded to **Professor Rinaldo Santonico from the University of Rome, Tor Vergata**, for the development of large gap Resistive Plate Chambers (RPCs) and their successful application in a wide variety of experiments.

The DPF Instrumentation Early Career Award 2018 is awarded to **Dr. Javier Tiffenberg from Fermilab and the University of Chicago** for the development of the Skipper CCD and its application in light dark matter and coherent neutrino-nucleus interaction searches.

Established in 2015

Added early career award in 2018

2020 Award Committee:

Roger Rusack (chair),
Gabriella Carini (vice chair),
Sunil Golwala,
Ulrich Heintz,
Ana Amelia Machado,
Ettore Segreto,
Hanguo Wang

SBIR Program Advisory Committee

Advises DOE Program Manager for Detectors, Helmut Marsiske, on SBIR topics, assignment of reviewers; helps review process along

Michael Begel (BNL)	Ron Lipton (FNAL)
Gabriella Carini (BNL)	Petra Merkel (FNAL)
Gary Drake (FNAL)	Adam Para (FNAL)
Jim Fast (PNNL)	Julie Segal (SLAC)
Maurice Garcia-Sciveres (LBNL)	Rick van Berg (UPenn)
Carl Haber (LBNL)	Bob Wagner (ANL)
Chris Kenney (SLAC)	

→ Please let CPAD chairs know if you are interested in getting involved in CPAD work

Annual CPAD Workshops

Annual workshops organized at volunteer university with local org committee and scientific org committee assigned and run by CPAD

2019 CPAD workshop provided input to the DOE BRN

Next workshop planned in support of Snowmass

- Most likely online: Stony Brook and Zoom
- March 2021
- Coordination with Snowmass Instrumentation Frontier topical groups
- Opportunity for interdisciplinary workshop with NP and QIS

→ How can CPAD be most helpful in advancing the case for instrumentation during the Snowmass process?



CPAD INSTRUMENTATION FRONTIER 2016 AT CALTECH, 8-10 OCT. : NEW TECHNOLOGIES FOR DISCOVERY II

HOME WORKING GROUPS COMMITTEES SCIENTIFIC PROGRAM TRAVEL/DIRECTIONS/MAPS ACCOMMODATIONS



UNM | CPAD 2017
October 12-14 Albuquerque, New Mexico



Delegate's Meeting Info
Parking at UNM
National Advisory Committee

New Technologies for Discovery III: The 2017 CPAD Instrumentation Frontier Workshop



CPAD Instrumentation Frontier Workshop 2018
December 9-11, 2018
Brown University and Rhode Island Convention Center, Providence, Rhode Island



Home

New Technologies for Discovery IV: The CPAD Instrumentation Frontier Workshop 2018



CPAD INSTRUMENTATION FRONTIER WORKSHOP 2019
University of Wisconsin-Madison

HOME REGISTRATION PROGRAM WORKING GROUPS VENUE HOTELS MAP TRAVEL INFORMATION COMMITTEES PAST CPAD CONFERENCES



Basic Research Needs

DOE Basic Research Needs Study on High Energy Physics Detector Research and Development

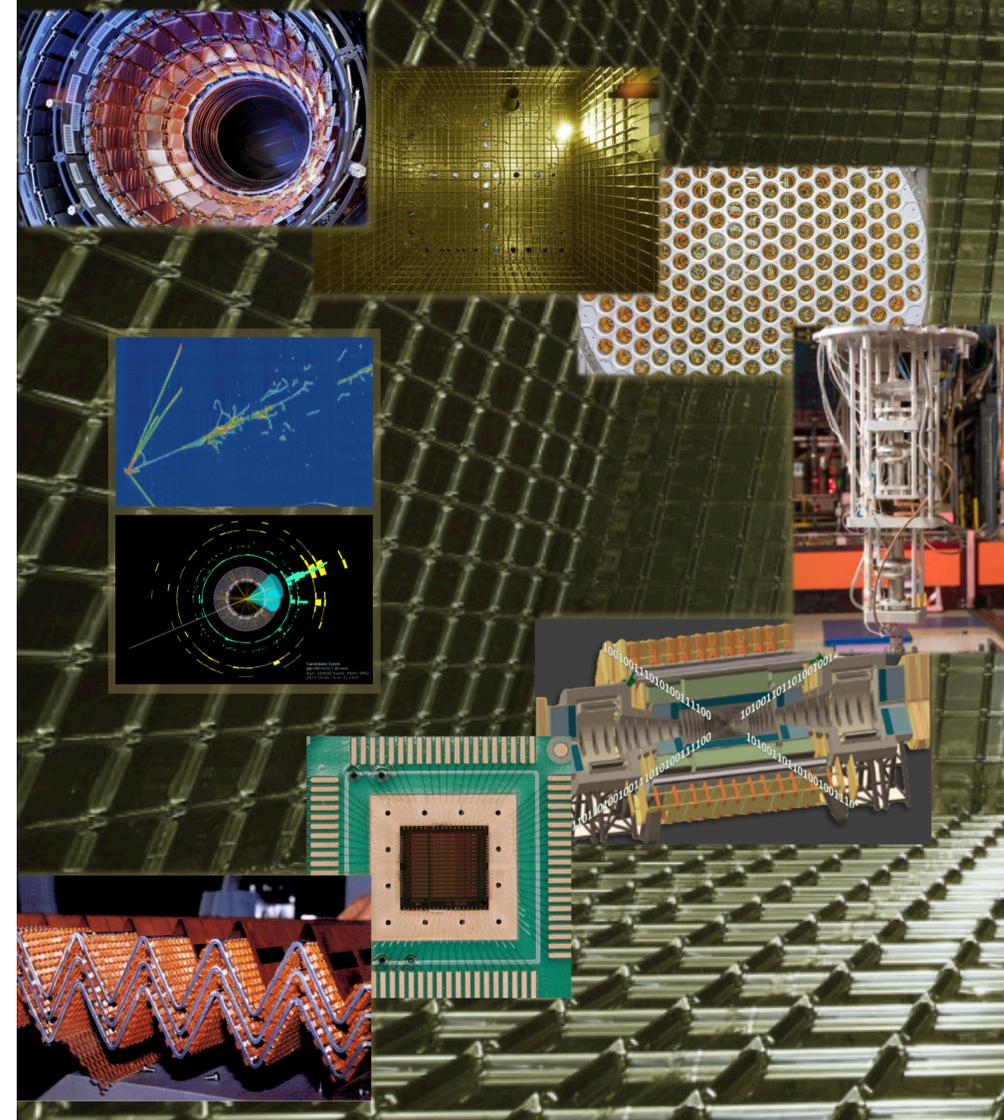
https://science.osti.gov/-/media/hep/pdf/Reports/2020/DOE_Basic_Research_Needs_Study_on_High_Energy_Physics.pdf?la=en&hash=A5C00A96314706A0379368466710593A1A5C4482

Co-chairs: Bonnie Fleming, Ian Shipsey

Grand Challenges

1. Advancing HEP detectors to new regimes of sensitivity
2. Using integration to enable scalability of HEP sensors
3. Building next-generation HEP detectors with novel materials and advanced techniques
4. Mastering extreme environments and data rates in HEP experiments

→ CPAD looks forward to working with HEP community and supporting the BRN goals



CPAD Goals in 2020-2021

Goals

- Encourage instrumentation efforts in the community
- Continue advocacy for instrumentation related efforts with DOE (and NSF)

CPAD Role in Snowmass and Beyond

- Support the Snowmass planning effort
- Assist in communicating and implementing priorities established by Snowmass process
- Identify and highlight potential cross-disciplinary efforts

→ How can CPAD and the annual CPAD workshop be most helpful in Snowmass process and beyond?

Please email us:

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