

# 2024 PV Reliability Workshop

## Welcome to the 2024 Photovoltaic Reliability Workshop!

NREL hosts this annual workshop so that solar technology experts can discuss current and future issues in PV reliability. Longer-lasting PV systems make lower-cost solar electricity and have less impact on the environment, human health, and natural resources.

PVRW offers a combination of oral presentations, panel discussions with vigorous audience participation, and poster presentations. At our workshop, every attendee is a presenter or the sole guest of a presenter.

### Chair:

Michael Owen-Bellini

### Committee:

Teresa Barnes  
Ken Boyce  
Jennifer Braid  
David Brearly  
Evelyn Butler  
Kristopher Davis  
Michael Deceglie  
Chris Deline  
Tristan Erion-Lorico  
Robert Flottemesch  
Andrew Gabor  
Peter Hacke  
Clifford Hansen  
Henry Hieslmair  
Will Hobbs  
Anubhav Jain  
Cara Libby  
Mark Mikofski  
Gernot Oreski  
Jon Previtali  
Ingrid Repins  
Laura Schelhas  
Colin Sillerud  
Nick de Vries  
Kent Whitfield

## AGENDA – Tuesday, 27 February 2024

Check-In / Breakfast: 7:00 am

### 8:30 am **Session 1: Reliability implications of U.S.-based Manufacturing**

Session Chairs: TBD1, TBD2

- Opening remarks from the Chair — Michael Owen-Bellini, [NREL](#)
- US PV manufacturing growth: Quality and reliability challenges — Terry Jester, [PI Berlin](#)
- — Harsh Galia, [Qcells](#)
- Panel Discussion

Break: 10:05 am

### 10:30 am **Session 2: Current Events**

Session Chairs: TBD1, TBD2

- Let's talk about PV module re-engineering costs — Henry Hieslmair, [DNV](#)
- Challenges and conclusions using NLP on unstructured PV project O&M text logs — Charity Faith Sotero, [kWhAnalytics](#)
- A data-based assessment of solar project availability in the United States — Dan Chawla, [Natural Power](#)
- Panel Discussion

Powermark Prize Announcement: 11:50

Lunch: 12:00 pm

Poster Session A: 1:00 pm

### 2:30 pm **Session 3: Current Events**

Session Chairs: TBD1, TBD2

- — Nick De Vries, [Silicon Ranch](#)
- — Ray Saka, [IHI Terrasun Solutions](#)
- Performance modelling and yearlong outdoor degradation analysis of a GaAs//Si tandem module — Martin Springer, [NREL](#)
- Panel Discussion

Break: 3:50 pm

### 4:20 pm **Session 4: Materials availability, Recycling, Circular economy**

Session Chairs: TBD1, TBD2

- Don't forget to make it last: circular economy for PV in the energy transition — Heather Mirlet, [NREL](#)
- Developing a PV circular economy — Evelyn Butler, [SEIA](#)
- — Pablo Diaz, [SolarCycle](#)
- Panel Discussion
- Poster Awards

Poster Awards: 5:40 pm

PVRW Mixer: 5:50 pm

## AGENDA – Wednesday, 28 February 2024

Check-In / Breakfast: 7:00 am

DOE Announcement: 8:30 am

- 8:40 am      **Session 5: Glass & Cell Fracture**  
Session Chairs: TBD1, TBD2
- Glass durability and breakage — Michael Pilliod, [Central Tension](#)
  - Large format PV modules: A survey of mechanical breakage statistical data — Colin Sillerud, [CFV](#)
  - Hail impact characterization of modules to inform damage mitigation and loss modelling — Peter Bostock, [VDE](#)
  - Panel Discussion

Break: 10:00 am

- 10:30 am      **Session 6: Big floppy modules. Special Panel**  
Session Chairs: Tim Silverman
- Risk mitigation of large form factor PV modules — Colleen O'Brien, [UL](#)
  - Quality and reliability issues in large PV modules — Christos Monokroussos, [TUV Shanghai](#)
  - TBD
  - Panel Discussion

Lunch: 11:50 am

Poster Session B: 12:50 pm

- 2:20 pm      **Session 7: Cell issues & Metallization**  
Session Chairs: TBD1, TBD2
- — Alessandro Virtuani, [EPFL](#)
  - UV degradation in PV cells — Tristan Erion-Lorico, [PVEL](#)
  - Metallization reliability — Peter Hacke, [NREL](#)
  - Panel Discussion

Break: 3:40 pm

- 4:10 pm      **Session 8: Polymer Issues**  
Session Chairs: TBD1, TBD2
- Sequential stress testing identifies processing defects in bifacial photovoltaic module packaging that limit durability — Dana Kern, [NREL](#)
  - Analysis of degradation and cracking behaviour of PVDF-based backsheets — Chiara Barretta, [PCCL](#)
  - Predictive mechanics and photochemical degradation kinetics modeling for polymeric encapsulants — Kuan Liu, [Stanford University](#)
  - Panel Discussion
  - Poster Awards

Poster Awards: 5:30 pm

Workshop Meetup at Edgewater Public Market: 6:15 pm

## AGENDA – Thursday, 29 February 2024

Check-In / Breakfast: 7:00 am

8:30 am

### Session 9: Extreme Weather

Session Chairs: TBD1, TBD2

- — John Allen, [Central Michigan University](#)
- Extreme weather and PV: performance and resilience lessons — Dirk Jordan, [NREL](#)
- Typhoon-ovoltaics: Successes, failures, and lessons learned after a typhoon in Guam and wind events elsewhere — James Elsworth, [NREL](#)
- Panel Discussion

Break: 9:50 am

10:20 am

### Session 10: Connectors

Session Chairs: TBD1, TBD2

- Photovoltaic cable connectors: A comparative assessment of the present state of the industry — David Miller, [NREL](#)
- NEMA Solar PV Council standardization activity — Johnathan Stewart, [NEMA](#)
- Using robots for inspecting connectors — Derek Chase, [OnSight](#)
- Panel Discussion

Lunch: 11:40 am

Poster Session C: 12:40 pm

2:10 pm

### Session 11: Inverters

Session Chairs: TBD1, TBD2

- — Akanksha Singh, [DNV](#)
- — Bill Brooks, [Brooks Engineering](#)
- Device-centric reliability of PV inverters — Sudip K. Mazumder, [University of Chicago](#)
- Panel Discussion

Break: 3:30 pm

4:00 pm

### Session 12: Emerging Technology Panel

Session Chairs: Nick De Vries

- — Todd Krajewski, [Swift Solar](#)
- Large-scale perovskite/silicon tandem modules: opportunities and challenges — Charlie Hasselbrink, [Caelux](#)
- — Chris Eberspacher, [TandemPV](#)
- Bridge to bankability for perovskite-based modules — Parth Bhatt, [DNV](#)
- Panel Discussion
- Poster Awards

Poster awards: 5:20 pm