



Welcome to the 2025 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:

Chris Deline

Committee:

Teresa Barnes
Ken Boyce
Jennifer Braid
Evelyn Butler
Kristopher Davis
Michael Deceglie
Tristan Erion-Lorico
Robert Flottemesch
Peter Hacke
Henry Hieslmair
Will Hobbs
Cara Libby
Danielle Merfeld
Christos Monokroussos
Colleen O'Brien
Gernot Oreski
Michael Owen-Bellini
Jon Previtali
Ingrid Repins
Laura Schelhas
Eric Schneller
Adam Shinn
Colin Sillerud
Nick de Vries
Allan Ward
Kent Whitfield

AGENDA – Tuesday, 4 March 2025

Check-In / Breakfast: 7:30 am

8:30 AM **Session 1: Opening session**
Session Chairs: Ingrid Repins, George Kelly

- Workshop Opening Remarks —Chris Deline, [NREL](#) (8:30-8:45)
- Terabase Mechanized PV System Installation —Matt Campbell, [Terabase](#) (8:45-9:15)
- The American Solar Manufacturing Renaissance: Maintaining the Momentum —MJ Shiao, [American Clean Power](#) (9:15-9:45)
- PowerMark Prize Announcement —John Wohlgemuth, [PowerMark](#) (9:45-9:55)

Break: 9:55 AM

10:25 AM **Session 2: Field results - Extreme Weather**
Session Chairs: Will Hobbs, Brooke Stanislawski

- Assessing the Impacts of Extreme Weather Events on Photovoltaic Installations Using Remote Sensing Imagery —Kirsten Perry, [NREL](#) (10:25-10:45)
- Duke Energy's Extreme Weather Perspectives —Matt Pickett, [Duke Energy](#) (10:45-11:05)
- Survivability of Island PV Following Hurricane Beryl —Frank Oudheusden, [Azimuth Ventures](#) (11:05-11:25)
- Panel Discussion (11:25-11:45)

Lunch: 11:45 AM

Poster Session A: 12:45 PM

2:15 PM **Session 3: Issues from the Field**
Session Chairs: Robert Flottemesch, Sanjana Kartik

- Field Testing Methods and Results —Jim Rand, [Core Energy Works](#) (2:15-2:35)
- Typical Rates of Module Anomalies Found in IR Inspections —Nathan Brunner and Charlie Davies, [DNV and Raptor Maps](#) (2:35-2:55)
- Observations and Risks Noted from the Field —Penny Ladner, [DNV](#) (2:55-3:15)
- Panel Discussion (3:15-3:35)

Break: 3:35 PM

4:00 PM **Session 4: Module Manufacturing**
Session Chairs: Teresa Barnes, Tristan Erion-Lorico

- US Manufacturing Overview —Teresa Barnes, [NREL](#) (4:00-4:05)
- Evaluating First Solar Modules for High Load and Hail Conditions —Lou Trippel and Nick Strevel, [First Solar](#) (4:05-4:20)
- An Update on Qcells' US Manufacturing and Reliability Testing —Max Kontopp, [QCells](#) (4:20-4:35)
- US Module Manufacturing and Hail Resistant Module Development —Hongbin Fang, [LONGi](#) (4:35-4:50)
- Panel Discussion (4:50-5:20)
- Awards from Poster Session A (5:20-5:30)

PVRW Mixer Sponsored by RETC, TÜV Rheinland, and VDE: 5:30 PM

Poster Session A – Tuesday, 4 March 2025

Notes: **DuraMAT** posters are indicated with **red** titles. Presenters are indicated in **bold type**.

- 001. *Dynamic mechanical compatibility of trackers and PV modules (DuraMAT)*, **C. O'Brien**
- 004. *Steady-state and Sequenced Accelerated Aging to Reveal Degradation Pathways and Inform IEC Testing Standards*, **K. Liu**, D.C. Miller, N. Bosco, J.M. Newkirk, R.H. Dauskardt
- 007. *Why backsheets degrade? Merging Experimental Backside Testing with Spectral Irradiance Modeling*, **S. Ovaitt**
- 010. *Progress Towards a Universal PV Plug and Socket*, **M. Kempe**
- 013. *Recommendations and Limitations for Winter PV Capacity Tests*, **A. Dionigi**
- 016. *DuraMAT Data Hub Chat*, **R. White**, S. Zisman, A. Nag, D. Rager
- 019. *Forecasting glass resilience of large format modules*, **M. Springer**, T. Silverman, J. Newkirk, N. Bosco
- 022. *Critical Role of Incoming Quality in Domestic Module Manufacturing*, **P. Bhatt**
- 025. *Simulating Wind-Driven Physics and Instabilities in Single-Axis Trackers*, **E. Young**
- 028. *Field connectors – observations from current construction projects*, **R. Chatelain**, T. Deer
- 031. *Root cause investigation of glass cracking in field-mounted solar modules*, **J. Karas**, R. Flottemesch, V. Parikh
- 034. *IEC 61724 Standard Overview*, **M. Gostein**
- 037. *Mapping PV degradation mechanisms and field performance by leveraging large language models*, **B. Li**, M. Springer, D. Jordan, A. Jain
- 040. *De-Risking EPE Encapsulants: Modeling Polymer-Polymer Interfaces*, **H. Dedmon**, M. Wilson, E. Palmiotti
- 043. *New Cells, New Issues: Stress Tests for N-Type PV Module Designs*, **A. Sinha**, J.N. Jaubert, D.B. Kern, T. Karin
- 046. *Predicting Degradation Kinetics Occurring During Encapsulant Lifetime*, H. Dedmon, S. Kruse, J. Kustas, J. Braid, M. Chandross, **M. Wilson**
- 049. *Reliability Evaluation of High-Efficiency Double-Glass PV Modules*, **J.M. Kuitche**
- 052. *Applying Geospatial Workflows with “PVDeg”*, **T. Ford**, S. Ovaitt, M. Springer, M. Kempe
- 055. *Measuring the stress factors for PV back sheet degradation*, **A. Wesley**, S. Oviatt, M. Prilliman, J. Newkirk, R. Arnold, M. Springer, M. Kempe
- 058. *Failure modes in modern cell interconnects for PV modules*, **P. Hacke**, N. Bosco, J. Hartley, S. Uličná
- 061. *Effect of Cell Cracks on Module Power Loss and Degradation: Modern Module Architectures*, **V. Parikh**
- 064. *Accelerated stress testing to deconvolute simultaneous-but-distinct degradation pathways under UV illumination*, **R. Wai**, X. Hanna, J. Newkirk, K. Terwilliger, S. Johnston, D. Miller, P. Hacke, D. Kern
- 067. *Gridline wear-out depends on the regime of crack opening*, **S. Rabade**, N. Bosco
- 070. *Investigation of inner layer cracking in PPE backsheets*, **S. Mitterhofer**, Z. Li, A. Aiello, K. Jensen, X. Gu, M.D. Kempe, W. Hobbs
- 073. *Assessing risk of glass failure during due diligence*, **B. Weinshenker**
- 076. *Let's Not R-EPE-at Our Mistakes*, **M. Mirzokarimov**, D. Roberts, L. Schelhas, H. Dedmon, M. Wilson, J. Munro, L. Madenjian, M. Issa, **E. Palmiotti**
- 079. *Emerging Technique for Detecting Damage On Various Module Layouts*, **R.M. Smith**, D.J. Colvin, B.A. Thompson, C.J. West, E.M. Langlois
- 082. *Module breakage impacts on system availability*, **C. Helms**, N. de Vries
- 085. *Strengthening PV Thin Glasses Using Salt Pastes*, **J. Rimsza**, J. Nance, K. Strong
- 088. *Encapsulants for screen-printed copper contacts*, T. Druffel, **D. Williams**, K. Elmer, E. Yenney, A. Nambo, R. Dharmadasa, P. Stradins, P. Hacke, W. Nemeth, S. Theingi, K. Kenney, J. Munro

091. *Silicon Module Recycling by High-Power Lasers*, P.K. Kanaujia, M. Owen-Bellini, H. Mirletz, D.L. Young, **M.C. Gupta**

094. *A computationally derived framework for predicting probability of PV module glass breakage by hail impact*, J. Hartley, **S.J. DiGregorio**

AGENDA – Wednesday, 5 March 2025

Check-In / Breakfast: 7:30 am

8:30 AM

Session 5: Module Reliability Science

Session Chairs: Kaushik Roy Choudhury, Colin Sillerud

- Sensitivity of Material Selection for Glass-Backsheet Modules —Suchi Mitra, [Heliene](#) (8:30-8:50)
- Breaking the Trend: Are Retro PV Module Designs a Cost-Effective Solution to Glass Reliability? —Jennifer Braid, [SNL](#) (8:50-9:10)
- Performance and Degradation of PV Encapsulants for UV Induced Degradation Study —Dennice Roberts, [NREL](#) (9:10-9:30)
- Panel Discussion (9:30-9:50)

Break: 9:50 AM

10:20 AM

Session 6: Module reliability - UVID

Session Chairs: David Young, Archana Sinha

- UVID Observations on TOPCON Technologies —Cherif Kedir, [RETC](#) (10:20-10:40)
- UV + Damp Heat Induced Power Losses in Fielded Utility N-Type Si PV Modules — Ashley Gaulding, [NREL](#) (10:40-11:00)
- UVID Initiates Metastability in the Dark: How to Properly Measure n-Type Modules —Todd Karin, [PVEL](#) (11:00-11:20)
- Panel Discussion (11:20-11:40)

Lunch: 11:40 AM

Poster Session B: 12:40 PM

2:10 PM

Session 7: PV System Insurance

Session Chairs: Nick de Vries

- PV Risks and the Insurance Landscape —Mike Perron and Sandy Calvert, [FM Global and Moore-McNeil](#) (2:10-2:30)
- NatCat Modeling and Resiliency Considerations for Solar Property Insurance —Nicole Thompson, [kWhAnalytics](#) (2:30-2:50)
- Models, PMLs, and Insurance Sublimits —Lauren Carroll-Allan, [CAC Specialty](#) (2:50-3:10)
- Panel Discussion (3:10-3:30)

Break: 3:30 PM

4:00 PM

Session 8: Inverters and BOS

Session Chairs: Colleen Obrien

- Connector Reliability Testing and Standards —Laurie Burnham, [SNL](#) (4:00-4:20)
- Uncapped Photovoltaic Connectors - A Combined Field and Chamber Study Verifies and Elucidates the Degradation —Dave Miller, [NREL](#) (4:20-4:40)
- Nominal Operating IGBT Temperature (NOIT), A Metric for Establishing Reliable Inverter Operations —Nick deVries, [Silicon Ranch](#) (4:40-5:00)
- Panel discussion (5:00-5:20)
- Awards from Poster Session B (5:20-5:30)

End of Wednesday Sessions

Poster Session B – Wednesday, 5 March 2025

Notes: Presenter names are in **bold type**.

- 002.** *Lessons learned from solar PV energy yield assessment validation*, **E. Giacchino**, E. Soderlund, E. DeCristofaro, J. Silhavy, M. Sleiman
- 005.** *Comparison of degradation due to outdoor exposure and accelerated stress testing in perovskite solar cells*, **T. Tayagaki**, S. Hirooka, H. Kobayashi, K. Yamamoto, T.N. Murakami, M. Yoshita
- 008.** *IEC TC 82 Status*, **G. Kelly**
- 011.** *A New Framework for Standardized Assessments of Risk Severity for Issues in Operating Assets*, **D. Penalva**
- 014.** *2000V PV System LCOE Benefit Analysis*, **B. Frazier**
- 017.** *Selecting bankable resource data for solar energy assessments*, **C. Bordonaro**, P. Metaut, A. Berlinsky, T. Romshek
- 020.** *IEC Standard Aging Sequences for Adhesion in PV Modules*, **R. Arnold**, D. Miller, A. Jackson
- 023.** *Going beyond stuck trackers: how well do your trackers work?*, **W. Hobbs**, K. Anderson
- 026.** *Evaluation of front eave loads caused by snow accumulation on PV modules*, **T. Tanahashi**, T. Chiba, S. Adachi, H. Arakawa, Y. Tsuno, K. Ikeda, T. Oozeki
- 029.** *Hail Damage - A Direct Comparison of Glass-Polymer and Glass-Glass Modules*, **A. Hendricks**
- 032.** *Analyzing the Mechanical Resilience of PV Modules with Different Frame Designs*, **T. Billie**
- 035.** *Field Testing of PID-p Susceptible Bifacial PERC Modules: Impact of Light, Voltage and Module History*, **C. Molto**, D.J. Colvin, R. Smith, P. Hacke, F. Li, G. TamizhMani, J. Oh, H. Seigneur
- 038.** *Effect of Salt Mist and DH Preconditioning on PID for Mono and Bi-facial half cell PERC modules*, **C. Bainier**, J. Cano-Garcia, G. Kaur, E. Kam-Lum
- 041.** *Encapsulation selection for TOPCon cells with LECO*, **J. Munro**, Y. Li, L. Madenjian, M. Issa, P. Brigandi
- 044.** *Investigating Temperature Uniformity and Accuracy in PV Module Lamination: A Verification Study*, **A. Jackson**, R.L. Arnold
- 047.** *Wind-Induced Dynamic Loading and PV Module Frame Fatigue Crack Initiation and Propagation*, **F. Oudheusden**, C. Needham, J. Ness
- 050.** *Increasing glass reliability through highly temperable glass*, **A. Mitchell**, Z. Zhang, C. Kelly, D. Bressler, B. Fulmer, J. Harris
- 053.** *Comparing Outdoor and Indoor I-V Curves on Bifacial PERC PV Modules Experiencing Polarization-Type Potential-Induced Degradation (PID-p)*, **D. Colvin**, C. Molto, R. Smith, M. Matam, P. Hacke, F. Li, G. TamizhMani, H. Seigneur
- 056.** *Spectroscopic analysis of water in PV modules: from water detection to water mapping in polymers*, **C. Buerhop-Lutz**, O. Stroyuk, O. Mashkov, S. Vorstoffel, O. Ghaffari, I. Peters
- 059.** *Hail Kinetic Energy damage thresholds on large scale PV panels*, **J. Carl**
- 062.** *Anomaly detection in PV fleet data via interpretable machine learning*, **B. Meyers**, A. Dufour, G. Ogut
- 065.** *Wind-Induced Dynamic Loading and PV Module Frame Fatigue Crack Initiation and Propagation*, F. Oudheusden, **C. Needham**, J. Ness
- 068.** *Module Mounting Design Qualification Challenges*, **J. Sorensen**, S. Lokanath
- 071.** *Incentivizing reliable PV through Revenue Put insurance premium reduction*, **H. Rasmussen**, A. Shinn
- 074.** *Main factors contributing to the underperformance of solar modules in Colombia: high power tolerances and degradation due to inadequate cleaning procedures and improper handling of solar modules*, **R. Naranjo**, L.F.R. Chavez, J. Barrera, K. Visbal, J.S. Conejo
- 077.** *Filtering of Operational Data for Performance Issue Breakdowns*, **B. Pereyra**

080. *A New Vulnerability in Bypass Diodes Under High Temperature, Long Term Operation in Reverse Bias (HTRB)*, K. Rane, **N. Shiradkar**
083. *Pre-failure signatures of solar pv inverters: a pathway for improving inverter reliability*, **K. Buch**, R. Dhakal, W. Li
086. *Unraveling the Degradation of SHJ Solar Cells with 82% Less Silver*, **M.W. Martinez-Szewczyk**, O.J. Hildreth, M.I. Bertoni
089. *Classification of Defects in Thin film Silicon Modules for Hotspot Formation Using EL Imaging*, **S.K. Pullayikody**, P. Sluijs, N. Zeiher, V. Venkatesh, G. Mathiazhagan, R. Vasudevan, A. Smets
092. *Rapid Screening of SHJ and TOPCon Solar Cells for UV Degradation*, **J.D. Zubieta Sempertegui**, N. Moser-Mancewicz, J.G. Gezelter, S.R. Buffone, S. Cheng, M. Kamperai, N.G. Tshuma, G. Thomas, C. Biao, J.L. Bryan, K.O. Davis, M.I. Bertoni, L.S. Bruckman, I.T. Martin
095. *PV Equipment Failures: Patterns and Predictions from O&M log data*, **C. Sotero**
098. *Best practices for pv project hail recovery*, **S. Ressler**
101. *An evaluation of operational PV project availability performance*, **K. Mullaney**, A. Chang, B. Grenko
104. *Evaluating the Degradation of Silicon Heterojunction Devices Through Chemical Analysis and Computational Simulation*, **N. Moser-Mancewicz**, J. Ochoa, M. Martinez-Szewczyk, T. Bantle, D. Kern, D. Jordan, S. Johnston, J. Medvedeva, M. Bertoni
107. *Reliable design: establishing a feedback loop between real world and design conditions*, **D. Herron**, A. Lindsay, M. Toro
110. *Module Due Diligence for Procurement by a Developer*, **S.K.L. Xu**
113. *Field Demo Sneak Peak: Side-by-Side Comparison of Hail Damage Mitigation*, **K. Reiter**, M. Bolen, D. Doerner
116. *Fluctuating PV module wind loads*, **Y. Fewless**
119. *Steel module frames plus trackers equals cost savings*, **L.B. Ahsler**

AGENDA – Thursday, 6 March 2025

Check-In / Breakfast: 7:30 am

8:30 AM Session 9: Next-Gen PV Reliability

Session Chairs: Frédéric Dross

- An Update on Perovskites Performance and Reliability Based on PACT's Testing — Michael Deceglie and Tim Silverman, [NREL](#) (8:30-8:50)
- Qualification Test Standards for Floating PV — Mauro Pravettoni, [TII - Abu Dhabi](#) (8:50-9:10)
- Reliability of TOPCon Solar Cells: Understanding Degradation and Recovery of Poly-Si/SiOx Passivating Contacts — Aditya Ratnapagol, [NREL](#) (9:10-9:30)

Break: 9:30 AM

10:00 AM Session 10: Trackers + glass + hail

Session Chairs: Michael Deceglie, Sumanth Lokanath

- Effectiveness of Hail Stow in Photovoltaic Systems — Jon Previtali, [VDE](#) (10:00-10:20)
- Full-scale High Speed Wind Testing of Trackers — David Kresse, [NexTracker](#) (10:20-10:40)
- Fatigue Loading of Purlins for Single Axis Solar Trackers — Nat Healy and Scott Van Pelt, [GameChange Solar](#) (10:40-11:00)
- Spontaneous Glass Breakage in Glass-Glass Modules — Ellie Palmiotti, [NREL](#) (11:00-11:20)
- Panel Discussion (11:20-11:40)

Lunch: 11:40 AM

Poster Session C: 12:40 PM

2:10 PM Session 11: System Analysis & Modeling

Session Chairs: Elsa Kam-Lum

- Repowering and Decommissioning Cost Model — Cara Libby, [EPRI](#) (2:10-2:30)
- Is Your Project Underperformance Caused by Unreliable Trackers? — Dan Chawla, [Natural power](#) (2:30-2:50)
- Energy at the End of the World: Renewable System Design for the South Pole — Amy Bender, [ANL](#) (2:50-3:10)

Break: 3:10 PM

3:40 PM Session 12: Manufacturing and circularity

Session Chairs: Michael Kempe, Gernot Oreski

- Glass and Silicon Recovery from Solar Modules Using Laser Processing — Mool Gupta, [UVA](#) (3:40-4:00)
- Uncovering Reliability Risks in Advanced PV Modules: A Data-Driven Approach for Industry Guidelines — Mahyar Nezhad, [Kiwa](#) (4:00-4:20)
- Module Warranty Backstop by Munich Re — Ron Sastrawan, [Munich RE](#) (4:20-4:40)
- Panel Discussion (4:40-5:00)
- Awards from Poster Session C (5:00-5:10)
- Workshop Closing Remarks — Chris Deline, [NREL](#) (5:10-5:20)

Workshop Closes

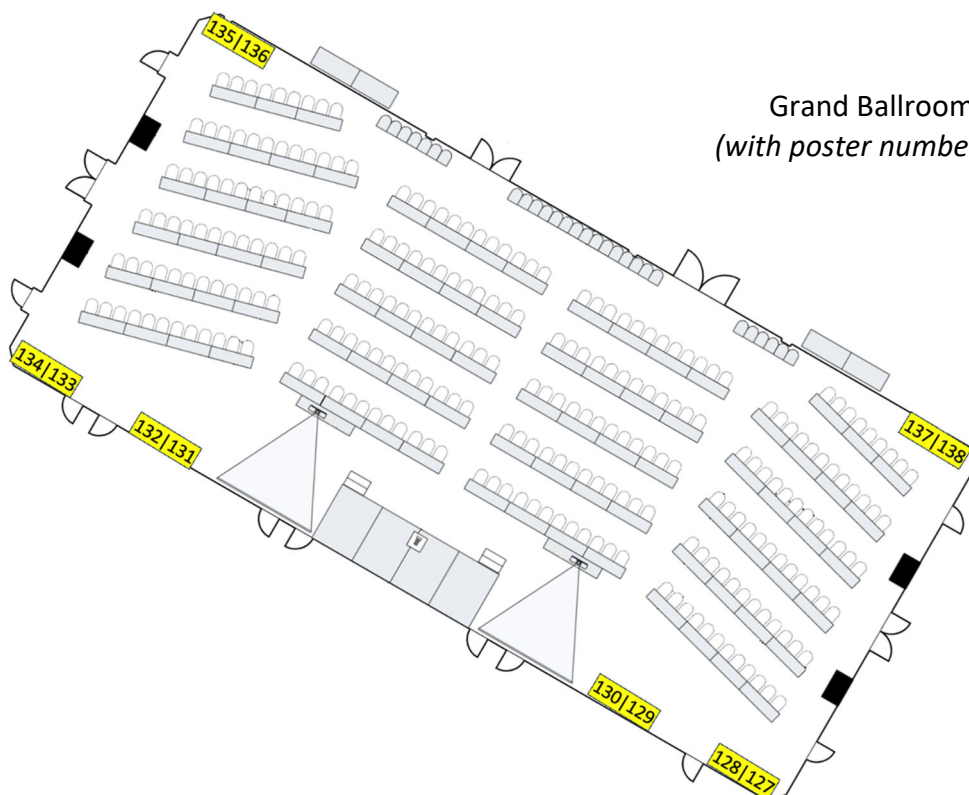
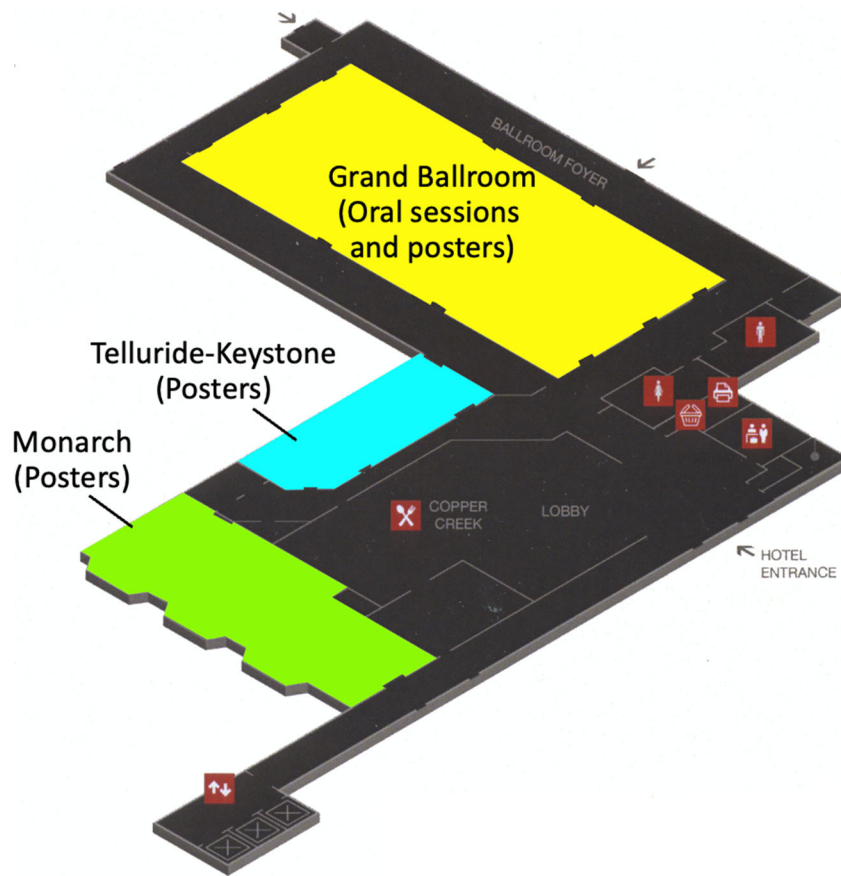
Poster Session C – Thursday, 6 March 2025

Notes: Presenter names are in **bold type**.

- 003.** *Developing a UV Spot Test for Years of Equivalent Exposure*, **I. Repins**, T. Silverman, E. Palmiotti, M. Deceglie, A. Gaulding
- 006.** *Characterization of field methods to detect wet leakage failure on PV arrays*, **R. Stromberg**
- 009.** *GroundWork® Eyewitness™ Hail Monitoring and Event Reporting Service: A summary of hail data collected from a dense network of hail monitoring devices*, **T. Morrison**, J. Chard, A. Bryan, A. Will
- 012.** *What is a polyolefin? A critical overview of ethylene copolymers as PV module encapsulants*, **G. Oreski**, C. Barretta, P. Christöfl, P. Gebhardt, K.A. Weiss, D. Miller, M. Kempe, S. Ulicna, A. Virtuani, H. Li, B. Habersberger, J. Munro, K. Proost, M. Kühne
- 015.** *Analysis the Performance of PV Modules with Different Failures under Longtime Outdoor Condition*, **B. Wang**
- 018.** *Low-cost daytime electroluminescence imaging*, **A.M. Gabor**, R. Landy, J.D. Friedl
- 021.** *Screening early field failure in metal halide perovskite modules through stress testing*, **N.P. Irvin**, S. Uličná, J. Schall, D.B. Kern, T.J. Silverman, M. Deceglie, C. Fei, X. Shi, R.L. Arnold, B. McDanold, J. Parker, J. Huang, J.J. Berry, J.S. Stein, L.T. Schelhas
- 024.** *Overview of a new solar canals project*, **L. McClintock**, M. Kempe, H. Mirletz
- 027.** *A Tool to Create High-Fidelity and Adaptive Finite Element Model for PV Systems*, **X. He**, W. Arsalane, M.P. Shah
- 030.** *From Hail to Hardware: A Comprehensive Risk Assessment for Solar Asset Resilience*, **R. Fagan**
- 033.** *PV Standards Activities of IEC*, **J. Wohlgemuth**
- 036.** *17 Years of Investigating Fires in PV Systems: A Synopsis of Experience*, **B. Brooks**
- 039.** *Soiling loss modeling in regions across the US*, **A. Berlinsky**, P. Metaut, C. Bordonaro, T. Romshek
- 042.** *Adaptable Silicon Solar Cell Metrology in the Age of the Inflation Reduction Act*, **H. Wilterdink**, A.B. Karpen, N. Degenhart, L. Bruno, W. Dobson, R. Sinton
- 045.** *X-Ray Imaging as a Tool for Understanding Photovoltaic Connector Failures*, **S. DiGregorio**, L. Burnham, B. King
- 048.** *Observation of High PV Durability Under Harsh Sequential Stress*, **D. Kern**
- 051.** *Module and tracker deformation*, **G. Jago**
- 054.** *Performance evaluation of a Brazil research floating PV power plant*, D.A. Cassini, A.S.A. Diniz, V.C. Santana, D.S. Braga, **L.L. Kazmerski**
- 057.** *Characterizing PV Modules using Paralleled MOSFET Loads with Active Feedback*, A. Mapes, **W. Sekulic**
- 060.** *Module Mounting Design Qualification Challenges*, **S. Lokanath**, J. Sorensen
- 063.** *Low-Cost Vibrational Sensors for in-situ High-wind Detection and Analysis*, **D.C. Jordan**, R. Smith, B. Sekulic, H. Seigneur
- 066.** *Updates on PV Bio-Soiling in the Southeast U.S.*, **M. Muller**, A. Rivera, M. Valerino
- 069.** *The road to perovskite bankability*, **F. Dross**, T. Krajewski, L. Crowe
- 072.** *A Comprehensive Test-to-Failure Protocol for PV Module Hail Damage: Integrating Weibull Analysis and Impact Mechanics*, **T. DeWolf-Moura**, S.A. Far, P. Bostock, R. Fritz, A. Hernandez, M. Kaur, C. Kadir, M. Pilliod, J. Previtali, J.R. Reynolds
- 075.** *Recommendations for research-scale min-module vacuum laminations*, **M. Owen-Bellini**
- 078.** *Evaluation of Durability and Cracking Propensity of Emerging PV Backsheets after Accelerated Laboratory Weathering*, **X. Gu**, S. Mitterhofer, Z. Li, A. Aiello, A. Aiello, K. Jensen, H.H. Hsien, A. Kadri, L. Ji
- 081.** *Reliable Module Design Cost Reductions for Vertical Bifacial PV*, **J.M. PE**
- 084.** *Climate Resilience for Inverter of Utility Scale PV Plant: Strategies and Risk Assessment*, **R. Dhakal**

087. *Enhancing performance of solar trackers through wind nowcasting and aerodynamic mitigations*, P. Fatehi, M. Elnahla, Y. Guo, T. Wu, **J. Elsworth**, S. Dana
090. *Watts the Hype? AI's Role in Powering Solar Reliability*, **M. Mousou**
093. *Investigating oxygen barrier properties of desiccated edge sealants for protection of perovskite solar modules*, **L. Postak**
096. *Updates to the Variable Auto-encoder for crack parametrization*, **N. Jost**, O. Sanghi, B. Byford, E. Cooper, B. Pierce, I. Deane, J. Braid
099. *Edge sealed modules for improved perovskite stability in 1000 hours of damp heat testing*, **R. Ruhle**, D. Durney, D. McDougall, L. Laxmi, V. Chityala, D. Kabra, W. Sampath
102. *Edge sealed photovoltaic modules: matching thermal and optical properties of traditional encapsulation*, **D. Durney**, R. Ruhle, L. Maple, S. Johnston, D. Kern, W. Sampath
105. *Data-driven insights into solar production performance*, **P. Hwang**
108. *A review of modeled performance of PAN files in PVsyst®*, **E. Westphal**
111. *Diffuse Stow: Maximizing Potential in Photovoltaic Tracking*, **R.A. Borea**, S. Ovatt, V. Cirimele, F. Melino, G. Maugeri, T. Ford
114. *Sustainable Solar Photovoltaics: Utilising operational characteristics for end-of-life management*, **A.P. Joshi**
117. *Heat and light: reliability testing of perovskite modules*, P. Pasmans, S. Roest, **J. Veloza**
120. *Notes from the trenches*, **P. Ladner**, A. Jefferies, H. Hieslmair

Map of Presentation Rooms



Grand Ballroom Layout
(with poster numbers in yellow)

Poster Room Layouts

