

CALL FOR PAPERS



THE 38th IEEE PHOTOVOLTAIC SPECIALISTS CONFERENCE

June 3-8, 2012
Austin Convention Center
Austin, Texas, USA

www.ieee-pvsc.org



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Technical Co-Sponsors



Invitation from the Chair

On behalf of the Organizing, Steering, Cherry and International Committees, it is my great honor to invite you to join the 38th IEEE Photovoltaic Specialist Conference (PVSC), June 3-8, 2011, at the Austin Convention Center in Austin, Texas. This is our first conference in Texas and will give you a chance to experience Texas hospitality and world-famous Austin music and entertainment. Our commitment is to remain the premier technical conference covering all aspects of PV technology, from fundamental physics and basic material science to installed system performance. Authors will have the opportunity to submit their papers for peer-review towards publication in the newly launched **IEEE Journal of Photovoltaics (JPV)**. We will also continue our Industrial Exhibition that brings together PV specialists with the industry developing the materials, services, and tools needed to conduct PV research, development and manufacturing. I invite you to come and be part of THE photovoltaic conference event of the year!

Highlights include:

Strong Technical Program: Building off the record number of technical presentation at the 37th PVSC, we will continue with our ten (10) technical areas. This year we are highlighting our activities in Areas 9 and 10, with a special focus on the synergies and convergence of distributed terrestrial PV and the Smart Grid. We are bringing many of the technological leaders of the Smart Grid community together with our community of leading PV specialists for an in-depth investigation of the pundits' claims. All of the other traditional areas will be represented as described in the technical area descriptions at the end of the call.

Full Day of Tutorials: We will have twelve tutorials scheduled, consisting of half-day lectures taught by experts in the field. The topics will range from basic physics of solar cell operation to details about the latest trends in the industry that will be valuable to newcomers to PV as well as seasoned veterans.

Industrial Exhibition: Within the fantastic Austin Convention Center, our exhibit space has been designed to bring together the commercial sector with photovoltaic technologists. Our focus will be on tools and services for testing, measurement, characterization, and processing for both R&D and manufacturing.

Student Participation: Our technical community's future is only as vibrant as our student body, so we have created incentives to encourage students to attend and to be active participants in the conference, including reduced registration and tutorial fees, special hotel rates, best student presentation awards in each technical area, and the opportunity to work as graduate student assistants to conference operations.

Hotel Accommodations: Special rates have been secured at the Hilton Hotel adjacent to the Convention Center, and several others within easy walking distance, including the Courtyard and Residence Inns and the Radisson. This is an extremely busy time in Austin and nearby hotels are likely to be booked very early, so don't miss the opportunity to secure your accommodations at one of these conference hotels at reduced pre-negotiated rates.

Social Program: Continuing our theme of enhancing our PV Specialists community, our goal is to create relationships on a social as well as professional level amongst our attendees, families, and companions. From the Cherry Award Reception to the Conference Banquet to the daily sightseeing tours, the social program is going to be truly memorable. Plan to bring family members and arrive early and stay late!

We urge you to register for the meeting and make your hotel reservation well ahead of the deadline. The increased interest PV and Austin venue is likely to lead to greatly increased attendance, and the hotel will maintain our group rate and room block for a limited time. Please join us in Austin and help to continue the excellence of the world's first and still premier PV technical conference.

BJ Stanbery
General Chair

Call for Papers

38th IEEE Photovoltaic Specialists Conference

On behalf of the Technical Program Committee, I invite you to submit an abstract on your latest achievements in photovoltaics research, development, and applications to the 38th IEEE PVSC. The PVSC is not just about the latest efficiency record either so whether it is a new module encapsulation, an novel characterization technique, or a new piece of science of the materials used in PV, we encourage your submissions in any topic related to PV. The chance to share and discuss these crucial PV developments in a timely and influential forum is what the PVSC is all about. Please contribute to the PVSC's tradition as the premier international conference on the science and technology of photovoltaics.

PV is a global industry, growing exponentially worldwide. Many key participants in the community have noted that, with strong cost drivers for a competitive technology, worldwide shipping of product will become increasingly difficult as it becomes a greater part of the cost of the devices. At the same time, electric power generation is intrinsically regional as long distance transmission is hard. Therefore this is a technology of worldwide interest and research and development in PV is distributed globally. I encourage participation from around the world in the 38th PVSC. This conference has traditionally had worldwide appeal and I hope that will continue in Austin. Travel to Texas is easy and Austin is a fun city, in addition to hosting the best PV conference in 2012.

We are continuing to promote two new technical areas that were initiated at the 35th PVSC. In recognition of the rapidly growing interest in organic photovoltaics and dye-sensitized solar cells, we are encouraging a special focus on *Organic Photovoltaics*, which is Area 6 at the 38th PVSC. The other special focus area is *Area 8: Advances in Characterization of Photovoltaics*. Here the desired focus will be on methods of measurement and analysis themselves, rather than on a particular photovoltaic material system. Where the characterization method is applied specifically to a given technology we plan joint sessions between that area and Area 8. By breaking out characterization methods separately, it is hoped that researchers will have more exposure to tools typically used for PV materials across areas of specialization. This will give researchers some 'new eyes' with which to look at their materials.

To have your paper considered for presentation at the 38th PVSC, please submit a 3-page evaluation abstract, and a short abstract no more than 300 words in length for display on the PVSC website, by the deadline below. Manuscripts are expected to be detailed enough to allow a competent technical review, a suggested format has been provided at the conference website. The preferred way to submit your abstract is via the 38th PVSC website at www.ieee-pvsc.org. Log in with your user name and password and carefully follow the instructions provided to upload your abstract successfully. Please be aware that the abstract and 3-page extended summary may constitute disclosure of what you include. Therefore be careful how you present proprietary or patentable information.

The deadline for electronic submission of the abstracts is February 6, 2012 at midnight Pacific Standard Time (UTC - 8 hours). Contributing authors will be notified of the acceptance status of their papers after March 10, 2012. For visa application purposes, an invitation letter will be issued at that time. Authors will be asked to confirm that they will be able to present their work at the conference and upload their manuscript by the due date of May 21, 2012 (2 weeks before the conference).

Submission to the IEEE *Journal of Photovoltaics (J-PV)*: Authors submitting particularly high quality review abstracts, as evaluated by the program committee, will be offered the opportunity to directly submit a manuscript to *J-PV*. Authors who accept that opportunity will provide a full *J-PV* manuscript through the *J-PV* website (<http://mc.manuscriptcentral.com/jpv>) by May 21, 2012 as well as provide a 3-page abstract to the PVSC website (link) for conference attendees to electronically view. Papers submitted to *J-PV* will undergo a full peer review. Manuscripts accepted to *J-PV* will be published in *J-PV* as well as included in the conference proceedings DVD. For manuscripts rejected or withdrawn, the authors will provide a regular PVSC manuscript that will be archived in the conference proceedings and available on the IEEE Xplore website. This PVSC proceedings paper can be a modified version of the submitted manuscript or review abstract, having benefited from the *J-PV* review process. When the *J-PV* articles are finalized, a DVD copy of the full conference proceedings will be assembled and mailed to registered attendees.

Angus A Rockett
Program Chair, 38th PVSC

Technical Areas

Area 1: Fundamentals and New Concepts for Future Technologies

Chair: Ryne Raffaele, Rochester Inst. Of Tech., USA

Co-Chair: Ned Elkins-Daukes, Imperial College, UK

Co-Chair: Yoshitaka Okada, Univ. Tokyo, Japan

Subarea 1.1: Fundamental Conversion Mechanisms – Martha Symko-Davies (NREL)

Subarea 1.2: Quantum Dots, Nanowires, and Quantum Wells – Seth Hubbard (Rochester Inst. Of Technology)

Subarea 1.3: Novel Materials Systems – Pete Sheldon (NREL)

Dear Colleagues,

On behalf of the technical program committee it is my pleasure to invite you to submit papers for Area 1: **“Fundamentals and Concepts for New Technologies”** of the **38th IEEE Photovoltaic Specialists Conference**, which will be held in **Austin, Texas**, from **June 3-8th in 2012**. The IEEE PVSC meeting is the established international platform for presenting PV related research of high scientific level.

The development of the photovoltaic industry over the past decade has been truly remarkable. However, much work remains if we are to be able to sustain this type of growth over the decades to come. Papers are sought for Area 1 that describe basic research in physical, chemical and optical phenomena, new materials and novel device concepts, which are essential to feed the innovation pipeline leading to future-generation PV technologies.

We would like to devote Area 1 to recent work on photovoltaic fundamentals and new concepts, which have been categorized in four subareas as presented below. We encourage people to submit papers on **detailed scientific research studies** and **visionary papers** addressing the full range of fundamental materials and technological challenges for the future of our field, including:

Subarea 1.1: Fundamental Conversion Mechanisms

Recently, a variety of new paradigms for photovoltaic conversion have been proposed. Subarea 1.1 attempts to capture the best experimental and theoretical work exploring these new approaches.

Examples of new mechanisms of interest are non-conventional PV conversion processes based on quantum confinement and nanostructured concepts, intermediate-band solar cells, multiple charge generation, up/down converters, thermophotonics, hot-carrier cells, and other concepts. Also, new device structures that incorporate such things as quantum dots, wires, and wells, highly metamorphic materials, and new materials systems are also of interest.

Finally, cross-cutting science approaches which may involve heretofore unexplored materials, such as new hybrid organic/inorganic molecules, or innovative device structures, such as luminescent concentrator designs, are solicited.

Subarea 1.2: Quantum Dots, Nanowires, and Quantum Wells

The use of quantum confined materials has great potential for exploitation in future photovoltaic conversion systems. Subarea 1.2 will cover the synthesis, characterization, and modeling of these low-dimensional materials and devices. This will include developmental studies on both colloidal and epitaxial new quantum dot systems and their use in devices. Papers on the theoretical and experimental progress on the development of intermediate band solar cells are anticipated. New results are solicited on the growth and use of nanowires and nanotubes for a variety of photovoltaic applications, such as light-trapping antireflection coatings and as absorber materials. Finally, the use of multiple quantum wells and other means of bandgap engineering for new multi-layer and concentrator solar cells are included in this subarea.

Subarea 1.3: Novel Materials Systems

Subarea 1.3 covers progress on the development of new materials for photovoltaic applications. This would include the theoretical and experimental development of new compound semiconductors based on more abundant or less toxic that may be used as replacements for current state-of-the-art materials. Materials with improved physical properties, such as absorption coefficients, carrier mobilities, or bandgaps are also included. Also, advances in coatings such as oxygen and moisture barriers or transparent conductors are of interest. New and better antireflection coatings and materials used selective filters are solicited.

Please check the 38th IEEE PVSC website at www.ieee-pvsc.org for the latest information and to submit your extended abstract of three pages in length before the deadline. We are looking forward to seeing you all in Austin.

Sincerely,

Ryne Raffaele, Rochester Institute of Technology, USA - Area 1 Chair

N. (Ned) Ekins-Daukes, Imperial College, London, United Kingdom – Area 1 Co-Chair

Yoshitaka Okada, The University of Tokyo, Japan – Area 1 Co-Chair

Area 2: Thin Film Polycrystalline Photovoltaics

Chair: Markus Beck, First Solar, USA

Subarea 2.1: Absorber formation and characterization – Chris Ferekides (Univ. S. Florida), Tokio Nakada (Tokyo Univ.), and Daniel Abou-Ras (HZB).

Subarea 2.2: Alternate substrates, back contact materials, buffer compounds, and TCO's – Ingrid Repins (NREL) and Clemens Heske (Univ. Nevada Las Vegas).

Subarea 2.3: Device properties, modeling, stability, and defect characterization -- Susanne Siebentritt (Univ. Luxembourg) and Ralph Gottschlag (Loughboro Univ.).

Subarea 2.4: High volume manufacturing, performance, metrology, process control, and reliability – Ayodhya Tiwari (ETH) and John Kessler (Univ. de Nantes)

Dear Colleagues,

On behalf of the technical program committee, it is our pleasure to invite you to submit your **Thin Film Polycrystalline Photovoltaics (Area 2)** related papers to the **38th IEEE Photovoltaic Specialists Conference**, to be held in Austin, Texas, the week of June 3, 2012.

Over the past decade thin-film compound semiconductor based photovoltaic devices, in particular CdTe and Cu(In,Ga)(S,Se)₂, managed to transition from the laboratory into high volume manufacturing capturing close to 20% of the terrestrial PV market while new material systems, such as Cu₂ZnSn(S,Se)₄, are demonstrating potential to follow suite. Despite the significant progress for the various material systems a multitude of challenges remain and there continues to be a need for fundamental as well as applied research. Area 2 of the 38th IEEE PVSC invites contributions addressing recent progress in this field spanning the range of material formation and characterization, device measurements and modeling as well as module manufacturing and process metrology. Additional aspects encompass device stability and module reliability, alternate substrates, back contact and buffer materials as well as transparent conductive oxides. Contributions should address the fundamental science and engineering issues of thin-film deposition, characterization of structural, optical, electrical and interface properties, modeling, the role of defects and impurities, the effect of interfaces and buffer layers as well as device stability and module reliability.

Please check the 38th IEEE PVSC website at www.ieee-pvsc.org for the latest information and to submit your extended abstract of three pages in length before the deadline. We are looking forward to seeing you all in Austin.

Sincerely,

Markus Beck, First Solar, USA - Area 2 Chair

Area 3: III-V and Concentrator Technologies

Chair: Mark Stan, Emcore, USA

Co-chair: Carlos Algora, UPM

Co-chair: Kenji Araki, Daido Steel Corp., Japan

Co-chair: Frank Dimroth, Fraunhofer, Germany

Co-chair: Scott Burroughs, Semprius, Inc., USA

Sub-Area 3.1: Materials and Devices

Sub-Area 3.2: Concentrator Receiver and Modules

Sub-Area 3.3: High and Low Concentrator Systems

Dear Colleagues,

On behalf of the technical program committee, it is our pleasure to invite you to submit papers in the area of **III-V and Concentrator Technologies (Area 3)** to the **38th IEEE Photovoltaic Specialists Conference**, to be held in Austin, Texas, the week of June 3, 2012.

This focus area of the IEEE Photovoltaic Specialists Conference covers the latest technical progress in concentrating photovoltaic technology. The area welcomes papers describing advances enabling higher efficiency, lower cost, or more reliable concentrator cells, modules and systems.

Sub Area 3.1: Materials and Devices – Frank Dimroth, Chair

Solar cell devices are discussed for concentrator systems, including studies on high-efficiency cell materials and designs, their theoretical modeling, materials development, cell characterization, performance, long-term behavior, reliability, industrial manufacturing, and cost. The concentrator cells may include monolithic multijunction III-V solar cells, low-cost silicon concentrator cells, stacked cells, new component cells, etc.

Sub Area 3.2: Concentrator Receivers and Modules – Kenji Araki, Chair

This sub-topic area presents the latest advances in receiver and module design, testing, manufacturability, and reliability. Testing and characterization relating to optical and electrical design, thermal management, and environmental factors are emphasized. Reliability of receivers and panels relating to cell protection, mounting and interconnecting, heat sinking, optics, mechanical design, qualification testing, and other factors are covered. Performance modeling and characterization based upon environmental conditions are sought. Module cost analysis is also welcome.

Sub Area 3.3: High and Low Concentrator systems – Damien Buie, Chair

System integration of receivers and modules into tracking and non-tracking systems are important factors to overall system performance, cost, and reliability. This sub-topic area is intended to cover both high and low concentrator system designs utilizing III-V cells, Si cells, and other novel concentrator materials. Discussion topics include system cost, performance and operation, characterization, environmental factors, and reliability. Field performance measurements and evaluation of concentrator projects to permit realistic evaluation of overall system performance, reliability, and design requirements that lead to revised and better designs for improved cost and manufacturability are encouraged.

Please check the 38th IEEE PVSC website at www.ieee-pvsc.org for the latest information and to submit your extended abstract of three pages in length before the deadline. We are looking forward to seeing you all in Austin.

Sincerely,

Mark Stan, Emcore, USA - Area 3 Chair

Carlos Algora, UPM - Area 3 Co-Chair

Kenji Araki, Daido Steel Corp., Japan

Frank Dimroth, Fraunhofer Institute, Germany

Scott Burroughs, Sempruis, Inc., USA

Area 4: Crystalline Silicon Photovoltaics

Chair: Nathan Stoddard, Solarworld, USA

Co-Chair: Paul von Dollen, University of California Santa Barbara, USA

Co-Chair: Gianluca Coletti, ECN

Subarea 4.1: Feedstock – Roland Einhaus (Apollon Solar)

Subarea 4.2: Crystallization and Wafering - Jingtang Lu (Suntech)

Subarea 4.3: Passivation and Advanced Devices – Giso Hahn (Univ. of Konstanz)

Subarea 4.4: Advances in Industrial Cell Processing – Rick Li (Dupont)

Subarea 4.5: Fundamentals (Modeling, Characterization, Gettering, Defects) – Mariana Bertoni (1366 Technologies)

Dear Colleagues,

On behalf of the technical program committee, it is our pleasure to invite you to submit your **Crystalline Silicon Photovoltaics (Area 2)** related papers to the **38th IEEE Photovoltaic Specialists Conference**, to be held in Austin, Texas, the week of June 3, 2012.

The downward trend in module prices worldwide continues to drive the need for improved technology in crystalline silicon to maintain competitiveness and meet the demands of a widening market. Refinements in fundamental understanding on topics such as crystallization techniques, defect control and surface passivation drive further improvement in performance. Advances in cell performance demand a difficult balance of performance and manufacturability. We invite papers reporting on all aspects of crystalline silicon technology, encompassing the value chain from feedstock through crystallization, wafer cutting, wafer handling and cell design, as well as the fundamental aspects of defect characterization, gettering, modeling and optics.

Please check the 38th IEEE PVSC website at www.ieee-pvsc.org for the latest information and to submit your extended abstract of three pages in length before the deadline. We are looking forward to seeing you all in Austin.

Sincerely,

Nathan Stoddard, Solarworld, USA - Area 4 Chair

Paul von Dollen, UCSB, USA - Area 4 Co-Chair

Gianluca Coletti, ECN- Area 4 Co-Chair

Area 5: Thin Film Silicon based PV technologies

Chair: Arno Smets, Delft University of Technology, the Netherlands

Co-chair: David Young, NREL, USA

Co-chair: Aad Gordijn, Forschungszentrum Jülich, Germany

Co-chair: Hitoshi Sai, AIST, Japan

- Sub-Area 5.1 Fundamental properties of thin film silicon
Nikolas Podraza (University of Toledo, USA)
- Sub-Area 5.2 Processing issues for thin silicon films and devices
Yasushi Sobajima (Osaka University, Japan)
- Sub-Area 5.3 Light management concepts in thin film silicon solar cell devices
Franz-Jozef Haug (EPFL Neuchatel, Switzerland)
- Sub-Area 5.4 Novel concepts for thin film silicon solar cell devices
Vikram Dalal, (Iowa State University, USA)
- Sub-Area 5.5 Polycrystalline and epitaxial silicon technology
Ivan Gordon (IMEC, Belgium)
- Sub-Area 5.6 Thin film silicon based solar cells, multijunctions and PV modules.
Bernd Stannowski (Helmholtz Zentrum Berlin, Germany)

Dear Colleagues,

On behalf of the technical program committee, it is our pleasure to invite you to submit papers in the area of **Thin Film Silicon based PV technologies (Area 5)** to the **38th IEEE Photovoltaic Specialists Conference**, to be held in Austin, Texas, the week of June 3, 2012.

Thin-film photovoltaics based on amorphous, nano/microcrystalline, polycrystalline and epitaxial silicon on non Si-substrates have matured through three decades of advances in the design and processing of high-quality materials, solar cells and modules. Despite these great advances, many fundamental and technological issues of great importance still remain in order to achieve further progress, like the further increase of the conversion efficiencies and the reduction of cost price of thin silicon film based solar cells. Detailed research studies and visionary papers addressing the entire spectrum of the subject are welcomed. These topics include, but are not limited, to: material characterization concerning microstructure, light induced degradation, various silicon based alloy types such as SiGe:H, SiC:H, SiO:H, film oxidation, passivation at heterojunction interfaces; processing issues concerning large throughput, large area, high deposition rates, contamination issues, processing routes for polycrystalline and epitaxial silicon; light trapping using textured interfaces, multi-layers, intermediate reflective layers and new TCO materials or concepts; novel concepts for thin silicon solar cells concerning films with new functionalities, plasmonic approaches, spectral conversion; and all topics related to amorphous/microcrystalline/polycrystalline/epitaxial silicon film solar cells and modules such as multi-junction structures, high performance and long-term reliability.

Please check the 38th IEEE PVSC website at www.ieee-pvsc.org for the latest information and to submit your extended abstract of three pages in length before the deadline. We are looking forward to seeing you all in Austin.

Sincerely,

Arno Smets, Delft University of Technology, The Netherlands - Area 5 Chair

David Young, NREL, USA - Area 5 Co-Chair

Aad Gordijn, Forschungszentrum Jülich, Germany – Area 5 Co-Chair

Hitoshi Sai, AIST, Japan – Area 5 Co-Chair

Area 6: Organic Photovoltaics

Chair: David Ginley, NREL, USA

Co-chair: Eugene Katz, Ben-Gurion University of the Negev, Israel

Co-chair: Yang Yang, University of California Los Angeles, USA

Co-chair: Barry Rand, IMEC, Belgium

Sub-Area 6.1 New Organic Materials -- Gui Bazan (UCSB) and Seth Marder (Georgia Tech).

Sub-Area 6.2 Device Concepts/Interfacial Science & Engineering -- Dana Olson (NREL) and Neal Armstrong (U. Arizona)

Sub-Area 6.3 Lifetime and Scale up of OPV and Related Devices -- Darin Laird (Plextronics) and Matt Lloyd (NREL)

Dear Colleagues,

On behalf of the technical program committee, it is our pleasure to invite you to submit papers in the area of **Organic Photovoltaics (Area 6)** to the **38th IEEE Photovoltaic Specialists Conference**, to be held in Austin, Texas, the week of June 3, 2012.

Organic, hybrid inorganic/organic, and dye sensitized solar cells are rapidly advancing technologies that are beginning to demonstrate initial commercial viability. With efficiencies in OPV and DSSC approaching or exceeding 10% and new tandem devices approaching 9% these technologies may represent scalable PV technologies capable of achieving DOE cost goals. The flexibility to model and produce different donor/acceptor combinations including both organic small molecule and polymer as well as nanostructured inorganic materials stimulate a large diversity of possible approaches to realize the promise of efficient and highly stable devices. Many of the devices are excitonic in nature necessitating new models and understanding of the critical interfaces in the bulk heterojunction and the contacts.

The symposium will focus on the examination of many of the key areas evolving in this diverse approach to solar energy.

The primary focus will be in three primary areas that crosscut many of the themes in the broad set of devices combining inorganic and organic materials to develop high performance solar energy converters with stability and low cost.

1. New materials synthesis – this includes the topic of first principles design of new donor/acceptor materials, active absorbers and the enhancement of PV properties with QD and related inorganic materials. Themes are design and synthesis for increased red response, for tandem devices, and for stability
2. Device Design and Interfacial Science and Engineering - as materials evolve so must the overall device structure as well as the interface to the outside world. This combination of device structure and interface design and characterization, crossing the boundaries of organic and inorganic materials is unique to this area.
3. Lifetime and Scale-up – while OPV devices have shown very encouraging lifetimes, it is clear that to large scale production new processes, module designs and packaging will be needed to be developed. As market penetration is aimed at building integrated PV and power generation this may require specific evolution for these applications. Key is establishing and predicting lifetime with a constantly changing materials set.

Please check the 38th IEEE PVSC website at www.ieee-pvsc.org for the latest information and to submit your extended abstract of three pages in length before the deadline. We are looking forward to seeing you all in Austin.

Sincerely,

David Ginley, NREL, USA - Area 6 Chair

Ivgenny Katz, Ben-Gurion University of the Negev, Israel, Area 6 Co-Chair

Yang Yang, University of California Los Angeles, USA, Area 6 Co-Chair

Barry Rand, IMEC, Belgium, Area 6 Co-Chair

Area 7: Space Technologies

Chair: David Wilt, AFRL, USA

Co-Chair: Mitsuru Imaizumi, JAXA, Japan

Co-Chair: Stephen Taylor, ESA, Netherlands

Subarea 7.1: Space Devices and Materials – Daniel Law (Spectrolab) and Pravin Patel (Emcore)

Subarea 7.2: Space Systems – Claus Zimmerman (EADS Astrium) and Scott Billets (Lockheed Martin)

Subarea 7.3: Flight Performance and Environmental Effects – Scott Messenger (NRL) and Bao Hoang (Loral)

Dear Colleagues,

On behalf of the technical program committee, it is our pleasure to invite you to submit your **Space Technologies (Area 7)** related papers to the **38th IEEE Photovoltaic Specialists Conference**, to be held in Austin, Texas, the week of June 3, 2012.

Advances in photovoltaic device performance for spacecraft applications over the past decade have been continuous and remarkable. However, spacecraft requirements of the power system continue to grow and power subsystems are still the most failure prone, thus there is much work to be done. Papers are sought that describe advancements in photovoltaic devices capable of high performance (efficiency, mass specific power, volumetric specific power, radiation stability, high temperature capability, LILT, low-cost, etc) as well as solar array designs suitable for these advanced devices. Also of interest are papers concerning cell, array and power system reliability, space environmental effects, and advanced protective materials for the space environment. To span the spectrum from fundamental research to applied engineering, we welcome papers ranging from theoretical studies to applied experimental efforts, including characterization and qualification as well as flight experiments and missions.

Area 7 has been divided into three subareas, as presented below. Submission of papers **on detailed scientific research studies** and **visionary papers** addressing the full range of these fundamental issues and technological challenges in the field are invited, including:

7.1: Space Devices and Materials

This subarea focuses on novel photovoltaic device approaches and recent developments for achieving high performance photovoltaic devices for spacecraft applications. Submissions may include (but are not be limited to) next generation multijunction solar cells, quantum enhanced devices, advanced cell materials and the spin-on of terrestrial photovoltaics for spacecraft applications (ie. thin film PV, etc). In addition, novel environmental protection technologies that enable longer on-orbit capability, high voltage operation, etc., are sought. Papers on characterization, modeling, and qualification of high efficiency solar cells are also welcome.

7.2: Space Systems

This subarea focuses on technology developments associated with integrating space photovoltaic devices into high performance spacecraft power systems, including blanket/module technologies (cell interconnects, advanced harnessing, modularity schemes, etc) and advanced solar array technologies.

7.3: Flight Performance and Environmental Effects

Analysis and results from on-orbit experimentation will be presented in this subarea. This includes behavioral data and analysis of high performance photovoltaic devices and systems exposed to the space environment as well as results from on-ground testing activities under realistic conditions. Papers examining solar cell degradation due to particle irradiation along with its modeling and flight prediction are encouraged. Also of interest are papers in which performance data is presented relevant to specific missions, such as near sun or deep space where solar cell performance has to be determined under extreme conditions (high intensity, high temperature and low intensity, low temperature, respectively). Finally, an emphasis will be placed on papers addressing photovoltaic device/array reliability.

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Sincerely,

David Wilt, AFRL, USA - Area 7 Chair

Mitsuru Imaizumi, JAXA, Japan - Area 7 Co-Chair

Stephen Taylor, ESA, Netherlands - Area 7 Co-Chair

Area 8: Characterization Methods

Chair: Gerald Siefer, Fraunhofer ISE, Germany
Co-chair: Yoshihiro Hishikawa, AIST, JapanUSA
Co-chair: Daniel Macdonald, ANU, Australia
Co-chair: Manuel Romero, NREL, USA

Sub-Area 8.1: Defects in Photovoltaic Materials and Solar Cells
Sub-Area 8.2: Advanced Methods and Instruments for the Characterization of Solar Cells and Modules
Sub-Area 8.3: Characterization Methods for the Photovoltaic Industry: In-Situ Measurements, Process Control, Defect Monitoring.
Sub-Area 8.4: Challenges in the Characterization of Multi-Junction PV Devices
Sub-Area 8.5: Performance, Reliability Testing, and Standards

Dear Colleagues,

On behalf of the technical program committee, it is our pleasure to invite you to submit papers in the area of **Characterization Methods (Area 8)** to the **38th IEEE Photovoltaic Specialists Conference**, to be held in Austin, Texas, the week of June 3, 2012.

It is difficult to understand innovation in photovoltaics without the support of measurements and characterization. Measurements are needed at all different levels of R&D: from the investigation of the operating principles of solar cells to standards for the performance of installed PV systems. Understanding the relations between structure, physical properties, and the resulting PV performance is an exemplary problem in materials science and engineering and, in our opinion, one of the most critical to the development of the next generation of PV. Area 8 is intended for the presentation of the latest developments in the characterization of photovoltaics. We encourage members of the PV community to submit their contributions addressing the full range of scientific and technological challenges in the field, including the following topics:

8.1: Defects in Photovoltaic Materials and Solar Cells.

The presence of defects often limits the performance of solar cells and process yield. Relevant to this subarea are all methods for the characterization of defects and their influence on the PV performance, including (opto)electronic measurements, structure, composition, stress fields, and mechanical properties. This subarea includes both intrinsic defects of the PV materials and manufacturing defects associated with yield.

8.2: Advanced Methods and Instruments for the Characterization of Solar Cells and Modules.

In the last decade, improvements in methods and instrumentation in the field of the characterization of PV have been extraordinary. This subarea is targeted to an audience that is interested in getting a better understanding of the most recent developments in characterization methods and the capabilities offered by the latest generation of instruments available to the PV community and how their research can be assisted by these new capabilities.

8.3: Characterization Methods for the Photovoltaic Industry: In-Situ Measurements, Process Control, Defect Monitoring.

Process control typically requires continuous measurements integrated (and compatible) with the manufacturing equipment. These measurements, often required to be on contact and non-destructive, are essential to control manufacturing parameters and to yield and process performance optimization. In addition to this, it is important to develop feedback methods by which a process is controlled. This subarea includes both, novel methods and the application of existing methods in selected environments.

8.4: Challenges in the Characterization of Multi-Junction PV Devices

The concept of using more than one pn junction is one possible pathway to increase photovoltaic conversion efficiencies. It is successfully used in thin film photovoltaics as well as in III-V based solar cells. The internal series connection of several subcells, that cannot be accessed individually, adds complexity to the characterization. In addition spectral variations show a higher impact on the performance of these devices. Issues related to the characterization of multi-junction based photovoltaic devices are the topic of this subarea.

8.5: Performance, Reliability Testing, and Standards.

Standardization of measurements for the determination of the performance, reliability, and lifetime of PV modules and systems is increasingly important as the global installed PV power continues to expand exponentially. Of particular importance is the standardization of accelerated lifetime tests to estimate the PV performance over time. This subarea encompasses all such testing methods and standards as well as topics related to system components such as inverters, mounting hardware, resistance to harsh environmental conditions, and other issues.

Please check the 38th IEEE PVSC website at www.ieee-pvsc.org for the latest information and to submit your extended abstract of three pages in length before the deadline. We are looking forward to seeing you all in Austin.

Sincerely,

Gerald Siefer, *Fraunhofer ISE., Germany, Chair, Area 8*

Yoshihiro Hishikawa, *AIST, Japan, Area 8 co-chair*

Daniel Macdonald, *ANU, Australia, Area 8 co-chair*

Manuel Romero, *NREL, USA, Area 8 co-chair*

Area 9: PV Modules and Terrestrial Systems

Chair: Jennifer Granata, Sandia Nat. Lab., USA

Co-Chair: Wilfried van Sark, Utrecht Univ., The Netherlands

Co-Chair: Yuzuru Ueda, Tokyo Inst. Of Tech, Japan

Subarea 9.1: Irradiance Resources – Steve Ransome (SRCL)

Subarea 9.2: PV Module Materials, Durability, and Performance – Peter Hacke (NREL)

Subarea 9.3: Inverters, Batteries, and other BOS Components – Mike Fife (Adv. Energy Ind.)

Subarea 9.4: Grid Connected Systems and Smart Grids – Greg Ball (BEW)

Subarea 9.5: Stand Alone Applications and PV Products – Robert Foster (New Mexico State Univ.)

Subarea 9.6: PV Modeling - Joshua Stein (Sandia National Laboratories)

Dear Colleagues,

On behalf of the technical program committee it is my pleasure to invite you to submit papers for Area 9: “**PV Modules and Terrestrial Systems**” of the **38th IEEE Photovoltaic Specialists Conference**, which will be held in **Austin, Texas**, from **June 3-8th in 2012**. The IEEE PVSC meeting is the established international platform for presenting PV related research of high scientific level.

In recent years, we have seen expansive growth in the number, size and locations of PV installations worldwide. This growth challenges the existing capabilities in resource, performance and reliability modeling; our understanding of module, inverter and BOS component lifetime and failure mechanisms; and the interactions of PV with the grid at high penetration levels. In 2012, we invite you to share your expertise, your research, your accomplishments and the advancements in your technology with the PV community in these research areas. In addition, we will be adding a special session on how PV could be an essential part of the future, particularly with interactions with the smart grid concepts.

Please check the 38th IEEE PVSC website at www.ieee-pvsc.org for the latest information and to submit your extended abstract of three pages in length before the deadline. We are looking forward to seeing you all in Austin.

Sincerely,

Jennifer Granata, Sandia National Laboratory, USA

Area 9 Chair

Wilfried van Sark, Utrecht University – Area 9 Co-Chair

Yuzuru Ueda, Tokyo Institute of Technology, Japan – Area 9 Co-Chair

Area 10: PV Velocity Forum

Chair: Elaine Ulrich, U.S. Department of Energy, USA

Co-chair: John Benner, Stanford Univ., USA

Co-chair: Ardeth Barnhardt, Univ. of Arizona, USA

Co-chair: Robert Margolis, NREL, USA

Sub-Area 10.1 Manufacturing and Scaling Challenges -- John Benner, Stanford Univ

Sub-Area 10.2 Deployment Challenges -- Robert Margolis, NREL

Sub-Area 10.3 The PV Workforce Challenge -- Ardeth Barnhardt, Univ. of Arizona, USA

Dear Colleagues,

On behalf of the technical program committee, it is our pleasure to invite you to submit papers in the area of **The PV Velocity Forum (Area 10)** to the **38th IEEE Photovoltaic Specialists Conference**, to be held in Austin, Texas, the week of June 3, 2012.

The PV Velocity Forum will address strategies to sustain or accelerate high growth rates and rapid cost reductions for PV technologies.

Manufacturing and Scaling Challenges, will explore the outlook for materials & equipment supply chains (from cradle to grave), manufacturing costs, environmental & safety impacts, and Intellectual Property (IP) considerations that must be addressed in order to drive emerging technologies into production. In addition, insights, opportunities for collaboration, and lessons learned from related industries like LED lighting, flexible display and from successful market players will be highlighted. Deployment Challenges will focus on the growing solar market, including finance, bankability, validation, siting and environmental issues, regulatory & policy engagement and governmental programs & projects. Finally, the PV workforce Challenge will offer a forum for discussing the skills and expertise required to transform and grow the PV workforce as the industry and technologies mature; with an emphasis on finding ways to effectively increase the breadth of expertise engaged in PV R&D, manufacturing, and technology support.

Please check the 38th IEEE PVSC website at www.ieee-pvsc.org for the latest information and to submit your extended abstract of three pages in length before the deadline. We are looking forward to seeing you all in Austin.

Sincerely,

Elaine Ulrich, US Dept. of Energy, Chair, Area 10

John Benner, Stanford University, USA, Area 10 co-chair

Ardeth Barnhardt, University of Arizona, USA, Area 10 co-chair

Robert Margolis, NREL, USA, Area 10 co-chair

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arockett@illinois.edu

WILLIAM R. CHERRY AWARD

This award is named in honor of William R. Cherry, a founder of the photovoltaic community. In the 1950's, he was instrumental in establishing solar cells as the ideal power source for space satellites and for recognizing, advocating, and nurturing the use of photovoltaic systems for terrestrial applications. The William R. Cherry award was instituted in 1980, shortly after his death. The purpose of the award is to recognize an individual engineer or scientist who devoted a part of their professional life to the advancement of the science and technology of photovoltaic energy conversion. The nominee must have made significant contributions to the science and/or technology of PV energy conversion, with dissemination by substantial publications and presentations. Professional society activities, promotional and/or organizational efforts and achievements are not considerations in the election for the award.

This award is presented at each IEEE Photovoltaic Specialists Conference. The recipient is selected by the William R. Cherry Committee, which is composed of past PVSC conference chairpersons and past recipients of the award.

To be eligible for the award, the nominee must currently be active in the science and technology of PV conversion. He/she must have been active in the field for an extended period with the expectation of continued activity. Short-term activities in the field, and/or single outstanding contributions are not sufficient to make a person eligible for the award.

Nominations are due to the Cherry Award Chair by January 10 of each year. A nomination will remain active for 3 award cycles, after which a new nomination may be submitted.

To make a nomination, please submit a completed electronic nomination form and accompanying materials at: (<http://www.ieee-pvsc.org/ePVSC/cherry/form.php>). The information required on the electronic form is listed below:

1. The name of your nominee, and his/her current affiliation and contact information.
2. A rationale (less than 150 words) of the nominee's contributions to the advancement of the PV field.
3. A citation (less than 40 words) listing the nominee's specific contributions to make them deserving of the award.
4. A list of the nominee's activities in the field.
5. A current CV for the nominee.
6. Nominator's name, address, phone number and e-mail address.

**The deadline for Cherry Award nominations to be considered for the 38th IEEE PVSC is
January 10, 2012.**

Previous recipients of the William R. Cherry Award:

Dr. Paul Rappaport	1980	Dr. Adolf Goetzberger	1997
Dr. Joseph L. Loferski	1981	Dr. Richard J. Schwartz	1998
Prof. Martin Wolf	1982	Dr. Christopher R. Wronski	2000
Dr. Henry W. Brandhorst	1984	Dr. Richard M. Swanson	2002
Mr. Eugene L. Ralph	1985	Dr. Ajeet Rohatgi	2003
Dr. Charles E. Backus	1987	Dr. Timothy J. Coutts	2005
Dr. David E. Carlson	1988	Dr. Antonio Luque	2006
Dr. Martin A. Green	1990	Dr. Masafumi Yamaguchi	2008
Mr. Peter A. Iles	1991	Dr. Stuart Wenham	2009
Dr. Lawrence L. Kazmerski	1993	Dr. Richard King	2010
Prof. Yoshihiro Hamakawa	1994	Dr. Jerry M. Olson	2011
Dr. Allen M. Barnett	1996		