

**Preliminary Agenda  
DOE Solar Program Review Meeting  
October 25-28, 2004**

Author	Affiliation	Paper Title	When
--------	-------------	-------------	------

**OPENING SESSION I (Mon., 8:30 AM, Oct. 25)**

**Chair: R. Matson**

R. Matson	NREL	Conference Welcome	8:30
R. Truly	NREL	NREL Welcome	8:40
R. Sutula	DOE	DOE Welcome	8:50
M. Tatro	SNL	SNL Welcome	9:10
TBD	SEIA	SEIA Roadmap and Agenda	9:20

**OPENING SESSION II (Mon., 10:30 AM, Oct. 25)**

**Chair: S. Bull**

R. King	DOE	Photovoltaics Program Overview	10:30
F. Wilkins	DOE	Solar Thermal Program Overview	10:50
P. Johnston	APS	¢/kWh OR kWh/¢?	11:10

**LUNCH (Mon. Oct. 25)**

Nathan Lewis	Cal Tech	Scientific Challenges in the Development of Sustainable Energy
--------------	----------	--

**HIGH PERFORMANCE PV I: THIN FILMS (Mon., 1:40 PM, Oct. 25)**

**Chair: T. Gessert**

Martha Symko-Davies	NREL	High Performance Photovoltaic Project Overview	13:40
T. Coutts	NREL	Advances in Polycrystalline Thin-Film Tandem Solar Cells	14:00
William N. Shafarman	University of Delaware (IEC)	Growth and Characterization of CdZnTe and Cu(InGa)(SeS) <sub>2</sub> for Wide Bandgap Solar Cells	15:20
Jehad Abushama	NREL	Properties of Surface-modified CuGaSe <sub>2</sub> (CGS) Solar Cells with Improved Performance;	14:40
Roger Aparicio	Georgia Institute of Technology	Progress in Thin film Si Bottom Cell for High Performance Thin Film Tandem Solar Cells	15:00
Alvin Compaan	University of Toledo	Toward a tandem cell with all II-VI semiconductors by magnetron sputtering	15:20

**EXPLORATORY PV I: NEXT-GENERATION THIN FILMS (Mon., 1:40 PM, Oct. 25)**

**Chair: B. Gregg**

R. McConnell	NREL	Exploratory Research for New Solar Electric Technologies	13:40
A. Frank	NREL	Dye- and Semiconductor-Sensitized Nanoparticle Solar Cell Research at NREL	14:00
Benjamin T. King	Univ. of Nevada	Ultra-High Efficiency Excitonic Solar Cell	14:20
Sean Shaheen	NREL	Polymer Based Nanocomposites for Solar Energy Conversion	14:40
Thomas Mason	Northwestern	Interface and Electrode Engineering for Next-Generation Organic Photovoltaic Cells	15:00
S. Wei	NREL	Band Structures and Optical Properties of Transparent Conducting Oxides: Cd <sub>2</sub> SnO <sub>4</sub> , Zn <sub>2</sub> SnO <sub>4</sub> , and CdIn <sub>2</sub> O <sub>4</sub>	15:20

**SOLAR HEATING & LIGHTING (Mon., 1:40 PM, Oct. 25)****Chair: T. Merrigan**

Jay Burch	NREL	Low-cost Solar Water Heating Systems	13:40
Gary Jorgensen	NREL	Durability of Polymeric Glazing and Absorber Materials	14:00
Sue Mantell	Univ. of Minnesota	Next Generation Polymer Solar Heating Systems	14:20
Greg Kolb	SNL	Overview of Solar Heating Industry Assistance Program	14:40
Jeff Muhs	Oak Ridge	Recent Advances in Hybrid Solar Lighting R&D	15:00
Jay Burch	NREL	Solar Domestic Hot Water Systems Analysis	15:20

**POSTERS, MONDAY (Mon. 4:00 PM, Oct. 25)**

Dick Bourne	Davis Energy Group	SunCache Residential Solar Water Heating System - Phase V
Dick Rhodes	FAFCO	Polymer ICS System Development
Byard Wood	Utah State Univ.	Quality Assurance via Certification; Development and Maintenance of testing Standards for Solar Energy Systems
Oscar Crisalle	University of Florida	Identification of Critical Paths in the Manufacturing of Low-Cost High-Efficiency CGS/CIS Two-Junction Tandem Cells
J. David Cohen	University of Oregon	Determining Hole Carrier Mobilities Directly in Working CIGS Photovoltaic Devices
Eric Harmon	Light Spin Technologies	Novel Polycrystalline Thin-Film Solar Cells
Mark Stan	Emcore	InGaP/InGaAs/Ge TRIPLE JUNCTION HIGH CONCENTRATION SOLAR CELL DEVELOPMENT AT EMCORE PHOTOVOLATAICS
Christiana Honsberg	University of Delaware	InGaN Solar Cells
Lewis M. Fraas	JX Crystals	TOWARD 40% EFFICIENT MECHANICALLY STACKED III-V TERRESTRIAL CONCENTRATOR CELLS
Steven A. Ringel	Ohio State U	Advances in III-V Heterostructures and Solar Cells on SiGe/Si Substrates
Stephen Kusek	Concentrating Technologies	A Scaleable High Concentration PV System
Jim Rand	Astropower	Recrystallization of germanium on a Ceramic Substrate
A. Ptak	NREL	Enhanced-depletion-width GaInNAs solar cells grown by molecular-beam epitaxy
W.E. McMahon	NREL	An on-sun comparison of GaInP <sub>2</sub> /GaAs tandem cells with top cell thickness varied
Brent Nelson	NREL	Integrating Deposition, Processing, and Characterization Equipment within the National Center for Photovoltaics
Andrew Norman	NREL	Electron microscopy studies of GaP(NAs) grown on Si
Steve Johnston	NREL	Electron Traps Detected in p-type GaAsN Using Deep Level Transient Spectroscopy
S. R. Kurtz	NREL	Correlation of DLTS and Performance of GaInNAs Cells
Nathan R. Neale	NREL	Coadsorbent-Induced Band Edge Shift in Dye-Sensitized TiO <sub>2</sub> Solar Cells
Jao van de Lagemaat	NREL	Effect of Nonideal Statistics on Electron Diffusion in Dye-Sensitized TiO <sub>2</sub> Solar Cells

Nikos Kopidakis	NREL	Influence of the electrolyte on the performance of dye-sensitized TiO <sub>2</sub> solar cells: band edge movement and surface shielding
Brian A. Gregg	NREL	TOWARD A UNIFIED TREATMENT OF ELECTRONIC PROCESSES IN ORGANIC SEMICONDUCTORS
Luke Robertson	Georgia Tech	Correlation of Morphology and Device Performance in Inorganic-Organic TiO <sub>2</sub> -Polythiophene Hybrid Solid-State Solar Cells
Doug Ruby	SNL	PV-Powered Hydrogen Production from the Electrolysis of Water
Greg Lush	University of Texas, El Paso	Fabrication, Characterization, and Simulation of Solar Cells
Robert McConnell	NREL	Generating Hydrogen through Water Electrolysis using Concentrator Photovoltaics
Fannie Posey Eddy	NREL	DOE-NREL Minority University Research Associates Program
Robert Sowah	Howard University	Modeling and Control of High-Concentrator Photovoltaics for Hydrogen Production for Fuels Cells
Kara Broussard	Southern University	Energy Conversion and Storage Devices: Solar Energy Research And Education
Dawit Jowhar	Fisk University	Development of Quantum Dot-Sensitized ZnO and TiO <sub>2</sub> Nanorod Array Solar Cells
A. D. Compaan	UT	CdTe: How thin can it be and how does chloride activation change grain boundaries?
H. Sankaranarayanan	U. South Florida	Impurity Effects in Two-Step Processing of CIGS Solar Cells
C. Ferekides	U. South Florida	Contact and Stability Studies of CdTe Solar Cells
James Sites	Colorado St. University	CdTe and CIGS Numerical Simulations: When Are They Helpful?
Tim Nagle	Colorado St. University	Local J-V Curves from LBIC Measurements
Alan Fahrenbruch	Colorado St. University	Effect of CdTe and CIGS thickness on cell efficiency: experiment versus simulation
N. G. Dhere	Florida Solar Energy Center, UCF	Development Of Large Area CIGSS Thin Film Solar Cells
Tim R. Ohno	Colorado School of Mines	Defect physics and chemistry in thin film CdTe Solar Cells
F. Seymour	Colorado School of Mines	Study of Deep Electronic States in CdTe solar cells with Capacitance Transient Measurements
S. Feldman	Colorado School of Mines	Defect studies of CdTe cells using spatially and spectrally resolved electro-optical methods
J. Beach	Colorado School of Mines	Non-uniformities in CdS/CdTe cells deposited on buffer layers.
John Yarbrough	Colorado School of Mines	Multiple wavelength near field scanning optical microscopy study of thin film polycrystalline solar cells
W.S. Sampath	Colorado State University	Advances in Continuous In-Line Processing of CdS/CdTe Devices: Stability and Scale-Up
Alan E. Delahoy	Energy Photovoltaics, Inc.	Large Area CIGS Films and Modules Produced by a Hybrid Process, and High Performance TCOs
W. Dan Turner	Texas A&M University	Outdoor Monitoring of Thin Film PV Modules in Hot and Humid Climate
Vijay Kapur	ISET	Fabrication of CIGS Solar Cells via Printing of Nanoparticle Precursor Inks
Jonathan Cowen	Case Western	Liquid-Phase Deposition of CuInSe <sub>2</sub> Thin Films

Colin Wolden	Colorado School of Mines	Formation of Chalcogen Containing Plasmas and Their Use in Synthesis of Photovoltaic Absorber Layers
Changhui Lei	U. Illinois	Nanostructure and Nanochemistry of Cu(In,Ga)Se <sub>2</sub> Materials
John Perkins	NREL	Application of Combinatorial Tools for Solar Cell Improvement - New High Performance Transparent Conducting Oxides
Larry Olsen Craig Perkins	PNNL NREL	Barrier Coatings for Thin Film Solar Cells XPS and UPS Studies of Thin Film PV Materials Modified By Reactions in Liquids
W. K. Kim	U. Florida	In-situ Investigation on Reaction Mechanism and Kinetics of CuInSe <sub>2</sub> Formation from Cu-In/Mo/glass Precursor during Selenization
Xuege Wang	U. Florida	Pulsed Laser Annealing and Rapid Thermal Annealing on CIGS Solar Cells
Jiyon Song	U. Florida	Growth and Characterization of Zn <sub>x</sub> Cd <sub>1-x</sub> S Buffer Layers by Chemical Bath Deposition for CuGaSe <sub>2</sub> and Cu(In,Ga)Se <sub>2</sub> Solar Cells
S. Smith	NREL	Spatially-resolved studies of grain-boundary effects in polycrystalline solar cells using micro-photoluminescence and near-field microscopy
Chris Eberspacher Helio Moutinho	Unisun NREL	Non-vacuum Processing of CIGS Solar Cells Conductive Atomic Force Microscopy of CdTe/CdS Solar Cells
Yong Zhang Steve Wilcox	NREL NREL	Raman studies of nanocrystalline CdS:O film Progress Toward an Updated National Solar Radiation Data Base
Dave Renné	NREL	Workplan and Annex: "Solar Resource Knowledge Management"
Susannah Pedigo	NREL	Planning Strategic Communications and Outreach for the Solar Program
Brian Keyes Mike Seman	NREL Colorado School of Mines	The FTIR Laboratory in Support of the PV Program The ion transport and storage characteristics of tungsten and vanadium oxide films deposited by PECVD for electrochromic applications

**RECOMBINATION/LIFETIME FOCUS SESSION (Mon., 7:00 PM, Oct. 25)**

***Chairs: B. Keyes, D. Levi***

Juris P. Kalejs	RWE SCHOTT Solar Inc	Ribbon Lifetime Issues - Application of Photoluminescence Diagnostics	19:00
Ron Sinton	Sinton Consulting	ON THE USE OF MINORITY-CARRIER LIFETIME MEASUREMENTS: APPLYING R&D DEVICE-PHYSICS RESULTS INTO CRYSTALLINE SI MANUFACTURING LINES	19:20
George Rozgonyi	NC State	Lifetime scanning using Microwave Reflection Spectroscopy	19:40
Wyatt Metzger	NREL	Time-resolved Photoluminescence and Photovoltaics	20:00
Richard Ahrenkiel	NREL	Recombination Lifetimes Using the RCPCD Technique: Comparison with Other Methods	20:20
Randy Ellingson	NREL	Photoexcited charge carrier lifetime measurements by time-resolved photoluminescence upconversion	20:40

**PLENARY SESSION: MANAGING THE SOLAR R&D PORTFOLIO:  
DOE'S SYSTEMS-DRIVEN APPROACH (Tues., 8:30 AM, Oct. 26)**

**Chair: C. Cameron**

C. Cameron	SNL	Systems-Driven Approach: What Is It and Why Do It?	8:30
R. Margolis	NREL	SDA Analysis Team Activities	8:40
D. Mooney	NREL	Performance and Cost Model for Solar Energy Technologies in Support of the Systems-Driven Approach	9:00
C. Hanley	SNL	Benchmarking of Solar Technologies for the Systems-Driven Approach	9:20
W. Bower	SNL	The Systems Driven Approach to Inverter R&D	9:40
K. Zweibel	NREL	Analyzing Thin Film Technologies: A Concrete Example Using the Systems-Driven Approach	9:55

**HIGH PERFORMANCE PV II: III-V's AND CONCENTRATORS (Tues., 10:30 AM, Oct. 26)**

**Chair: M. Symko-Davies & Bob McConnell**

Raed Sherif	Spectrolab, Inc.	DEVELOPMENT OF HIGH EFFICIENCY GaInP/GaInAs/Ge CONCENTRATOR CELLS & ROBUST RECEIVER PACKAGES FOR HIGH CONCENTRATION PHOTOVOLTAIC TERRESTRIAL MODULES	10:30
Harry A. Atwater	California Institute of Technology	Wafer-Scale Fabrication of Ge/Si and InP/Si for Multijunction Solar Cell Applications	10:50
J. F. Geisz	NREL	III-V/Si lattice-matched tandem solar cells	11:10
V. Garboushian	Amonix	Report on Year 1: "DESIGN AND DEMONSTRATION OF A GREATER THAN 33% EFFICIENCY HIGH-CONCENTRATION MODULE USING >40% III-V MULTIJUNCTION DEVICES"	11:30
Keith Emery	NREL	"Characterization of PV Concentrators at NREL"	11:50

**POLY THIN FILMS I: CdTe (Tues., 10:30 AM, Oct. 26)**

**Chair: K. Zweibel**

Glenn Teeter	NREL	XPS and AES Studies of Cu/CdTe(111)-B	10:30
Tim Gessert	NREL	Advances in the In-House CdTe Research Activities at NREL	10:50
V. G. Karpov	UT	PHYSICS OF LARGE AREA THIN-FILM DEVICES: NONUNIFORMITIES, INTERFACIAL LAYERS, AND REACH-THROUGH EFFECTS	11:10
B. McCandless	IEC	High Throughput Processing of Stable CdTe/CdS Solar Cells	11:30
D. Albin	NREL	The Intrinsic Stability of CdTe and Cu(In,Ga)Se <sub>2</sub> Polycrystalline Thin Film Devices	11:50

**TECHNOLOGY ADOPTION I (Tues., 10:30 AM, Oct. 26)**

**Chairs: J. Thornton & C. Hanley**

John Thornton	NREL/SNL	The Role of Technology Adoption Within the Department of Energy's Solar Energy Technologies Program	10:30
Heather Mulligan	DOE Seattle	The Million Solar Roofs Initiative: A Solar Deployment Strategy	10:50
Jane Weissman	IREC	Moving Markets with Education & Outreach Strategies: IREC's Results with Getting the Right Information to the Right People	11:10
Sandra Begay-Campbell	SNL	Native American EmPowerment: Solar Electric Initiatives	11:30
V. M. Fthenakis	Brookhaven	Optimization of cadmium telluride photovoltaic module recycling	11:50

**LUNCH (Tues. ,Oct. 26)**

Stephen Forrest	Princeton	Tandem, planar, bulk and mixed heterojunction solar cells: Achieving high efficiencies using small molecular weight organic photovoltaics
-----------------	-----------	---

**PV Manufacturing R&D I (Tues., 1:40 PM, Oct. 26)****Chairs: K. Brown & R. Mitchell**

R. Mitchell	NREL	PV Manufacturing R&D Project -- Trends in the U.S. PV Industry	13:40
Ray Hudson	Xantrex Technology, Inc	PV Inverter Products Manufacturing and Design Improvements for Cost Reduction and Performance Enhancements	14:10
Miles Russell	RWE Schott Solar	The Development and Testing of an AC Module	14:40
Jonathan Botkin	PowerLight Corporation	PowerLight Lean Manufacturing - Project Accomplishments	15:10

**POLY THIN FILMS II: CIS (Tues., 1:40 PM, Oct. 26)****Chair: R. Noufi**

Kannan Ramanathan	NREL	Properties of High Efficiency CIGS Thin Film Solar Cells	13:40
D. Tarrant	Shell Solar Industries	CIS Product Line Expansion and Production Scaleup at SSI	14:00
R. Birkmire	IEC	PROCESSING IMPROVEMENTS FOR ROLL-TO-ROLL DEPOSITION OF Cu(InGa)Se <sub>2</sub>	14:20
Alex Zunger	NREL	TBD	14:40
Chun-Sheng Jiang	NREL	Local Built-in Potential on Grain Boundary of Cu(In,Ga)Se <sub>2</sub> Thin Films	15:00
Manuel Romero	NREL	SCANNING TUNNELING LUMINESCENCE AND CATHODOLUMINESCENCE OF GRAIN BOUNDARIES IN Cu(In,Ga)Se <sub>2</sub>	15:20

**TECHNOLOGY ADOPTION II (Tues., 1:40 PM, Oct. 26)****Chairs: C. Hanley & J.****Thornton**

Vipin Gupta	NREL/SNL	Overview of the Sandia/NREL PV International Activities for the DOE Solar Energy Technologies Program	13:40
Robert Foster	SNL/SWTDI	Five-Year Reliability Assessment of SunWize PV Systems in Mexico	14:00
Larry Moore	SNL	Development of a Federal Agency List of Accepted PV Systems for Rural Coops	14:20
Chuck Whitaker	Endecon	Technical Support for Standards and Certification	14:40
Thomas Kenney	NREL	The National Impact of Zero Energy Homes	15:00
Peter Sheehan	NABCEP	NABCEP Solar PV Installer Certification Program	15:20

**PV Manufacturing R&D II: Si (Tues., 4:00 PM, Oct. 26)****Chair: R. Mitchell**

John Wohlgemuth	BP Solar	Large-Scale PV Module Manufacturing Using Ultra-thin Polycrystalline Silicon Solar Cells	16:00
Juris Kalejs	RWE Schott Solar	EFG Technology and Diagnostic R&D for Large-Scale PV Manufacturing	16:20
Jack Hanoka	Evergreen Solar	Advances in String Ribbon Silicon Technology	16:40
Ronald Sinton	Sinton Consulting	Development of an In-line Minority-carrier Lifetime Monitoring Tool for Process Control during Fabrication of Crystalline Silicon Solar Cells	17:00

**PV Manufacturing R&D II: Thin Films (Tues., 4:00 PM, Oct. 26)****Chair: K. Brown**

Tim Ellison	Energy Conversion Devices	ECD's PV Manufacturing R&D Program: The implementation of a comprehensive online diagnostic system for roll-to-roll a-Si solar cell production	16:00
Hermann Volltrauer	Energy Photovoltaics, Inc.	Recent a-Si Manufacturing Developments at Energy Photovoltaics Inc.	16:20
Jeff Britt	Global Solar Energy	SENSITIVITIES IN ROLL-TO-ROLL PROCESSING OF CIGS-BASED PHOTOVOLTAICS ON FLEXIBLE METAL FOILS	16:40
Hardial Dewan	U.Connecticut	Interfacial Characterization of Glass Surfaces and Encapsulant Bonding in Thin-film Photovoltaic Modules	17:00

**BALANCE OF SYSTEMS (Tues., 4:00 PM, Oct. 26)****Chair: W. Bower**

Ward Bower	SNL	Progress of Photovoltaic BOS R&D and Related Electronic Hardware Analysis	16:00
Ray Hudson	Xantrex	High Reliability Inverter Project	16:20
Joseph Smolenski	General Electric	General Electric's High Reliability Photovoltaic Inverter Program	16:40
Leo Casey	Satcon	SatCon's High-Reliability Inverter Initiative	17:00
Jerry Ginn	SNL	Coordination of Long-Term Inverter Testing	17:20
Sigifredo Gonzalez	SNL	Inverter Testing and Analysis at Sandia National Laboratories	17:40

**PV SYSTEMS ENGINEERING & RELIABILITY (Tues., 4:00 PM, Oct. 26)****Chair: M. Quintana**

Michael Quintana	SNL	Photovoltaic Systems Engineering and Reliability; Overview [brief intro]	16:00
Carl Osterwald	NREL	NREL PV System Performance & Standards Technical Progress	16:05
Bill Marion	NREL	Recent and Planned Enhancements for PVWATTS	16:25
Larry Moore	SNL	Photovoltaic Power Plant Experience at Arizona Public Service – A 5-Year Assessment	16:45
John Wiles	SWTDI	Changes in the 2005 National Electrical Code and Their Impact on the PV Industry	17:05
Andy Rosenthal	SWTDI	Benchmarking Results for Utility-Scale PV Systems	17:25
Jim Dunlop	FSEC	Benchmarking Results for Residential PV systems	17:45

**SYSTEMS DRIVEN APPROACH: FOCUS SESSION (Tues., 7:00 PM, Oct. 26)****PLENARY: PROGRAM HIGHLIGHTS (Wed., 8:30 AM, Oct. 27)****Chair: T. Surek**

Larry Kazmerski	NREL	NREL PV Highlights	8:30
Jeff Nelson	SNL	From Microscale to Macroscale: PV Systems of the Future	8:50
RC Powell	First Solar, LLC	Progress in Thin Film CdTe Module Manufacturing	9:10
Dick Swanson	SunPower	A Vision for Crystalline Silicon Solar Cells	9:50
Christiana Honsberg	IEC	Next-Generation Phovoltaics	10:10

**CRYSTALLINE SILICON (Wed., 10:30 AM, Oct. 27)****Chair: H. Branz**

Tihu Wang	NREL	a-Si:H Emitter and Back-Surface-Field Contact for Crystalline Silicon Solar Cells	10:30
-----------	------	---	-------

A. Rohatgi	Georgia Tech	Development of High-Efficiency Solar Cells on Low Cost Silicon Materials	10:50
Tonio Buonassisi	UC Berkeley	The impact of metal impurity clusters on solar cell performance in multicrystalline silicon	11:10
A. Karoui	NCSU	Effect of Grown-in Light Element Impurities on PV Silicon Mechanical Properties	11:30
Steven Danyluk	Georgia Tech	Residual Stress Measurements as Related to Solar Cell Processing	11:50

### **EXPLORATORY PV II: ADVANCED SOLAR CONVERSION PROCESSES (Wed., 10:30 AM, Oct. 27)**

#### **Chair: R. McConnell**

S. K. Deb	NREL	DOE Office of Science Funded Basic Research at NREL that Impacts Photovoltaic Technologies	10:30
Mark Hanna	NREL	Quantum Dot Solar Cells: High Efficiency through Impact Ionization	10:50
Angelo Mascarenhas	NREL	High Efficiency Solar Cell Concepts: Physics, Materials, and Devices	11:10
Christiana Honsberg	Univ of Delaware	Theory and Experimental Investigation of Approaches to >50% Solar Cells	11:30
A. Zunger	NREL	New Insights on Photovoltaic Materials from Solid State Theory	11:50

### **CONCENTRATING SOLAR POWER I (Wed., 10:30 AM, Oct. 27)**

#### **Chair: T. Mancini**

Cheryl Kennedy	NREL	Development and Testing of High-Temperature Solar Selective Coatings	10:30
Cheryl Kennedy	NREL	Development and Testing of Solar Reflectors	10:50
Dan Blake, Luc Moens	NREL	Advanced Heat Transfer and Thermal Storage Fluids	11:10
Timothy Wendelin	NREL	Concentrator Optical Characterization	11:30
Henry Price	NREL	Economics of CSP Deployment	11:50

### **LUNCH (Wed., Oct. 27)**

Charles Korman	GE Energy	Vision of GE Energy
----------------	-----------	---------------------

### **THIN FILM SILICON (Wed., 1:40 PM, Oct. 27)**

#### **Chair: J. David Cohen**

Jeffrey Yang	United Solar Ovonic Corporation	Amorphous and Nanocrystalline Silicon PV Technology	13:40
Xunming Deng	University of Toledo	Fabrication, Analysis and Modeling of High-Efficiency a-Si Based Solar Cells	14:00
Steluta Dinca	Syracuse University	Insights from Modeling and Mobility Measurements in Amorphous and Microcrystalline Silicon Solar Cells	14:20
Harv Mahan	NREL	Lowgap Hot-Wire a-SiGe:H Materials and Devices	14:40
C. Wronski	Penn State	Phase Engineering of High Efficiency a-Si:H Solar Cells	15:00
Paul Stradins	NREL	Tritiated Amorphous Silicon: Insights Into the Staebler-Wronski Mechanism	15:20

### **PV MODULE RELIABILITY (Wed., 1:40 PM, Oct. 27)**

#### **Chair: R. Hulstrom**

Roland Hulstrom	NREL	PV Module Reliability R&D Project Overview	13:40
David King	SNL	Performance Degradation Rates in Commercial Modules	14:00
N. Dhere	FSEC	Outdoor Monitoring and High Voltage Bias Testing of Thin Film PV Modules	14:20

T. McMahon	NREL	Module Design, Materials, and Packaging Research Team: Activities and Capabilities	14:40
G. Jorgensen	NREL	Packaging Materials and Design for Improved Module Reliability	15:00
M. Kempe	NREL	Module Encapsulant Diagnostics and Modeling	15:20

### **CONCENTRATING SOLAR POWER II (Wed., 1:40 PM, Oct. 27)**

**Chair: M. Mehos**

Randy Gee	NREL, Solargenix	Advanced Trough Concentrator Design	13:40
Scott Canada	APS, Solargenix, NREL	Parabolic Trough Organic Rankine Cycle Solar Power Plant	14:00
Timothy Moss	SNL	Rotating Platform Testing Development	14:20
Douglas Brosseau	SNL	Trough Thermal Storage Developments	14:40
Bob Liden	SES, SNL	Dish Stirling Development	15:00
Mark Mehos	Platts, NREL	Siting Utility-Scale CSP Projects	15:20

### **POSTERS, WEDNESDAY (Wed., 4:00 PM, Oct. 27)**

Tanya Kaydanova	NREL	Inkjet Based Metallizations for Solar Cells
H. Atwater	CalTech	Growth of High Minority Lifetime Epitaxial and Polycrystalline Silicon by Hot Wire Chemical Vapor Deposition
Harry Atwater	CalTech	Hot-Wire Chemical Vapor Deposition of Silicon Nitride for Photovoltaic Applications
A. Belyaev	U. South Florida	ACOUSTICAL DIAGNOSTICS OF RESIDUAL STRESS IN EFG SILICON WAFERS
S.K. Estreicher	Texas Tech	Hydrogenation Methods & Passivation Mechanisms for c-Si Photovoltaics
S. Ashok	Penn State	Hydrogen-Defect Interaction Phenomena in Si
P. Craig Taylor	University of Utah	The role of hydrogen in metastable defect formation in a-Si:H and a-Ge:H
Dave Cohen	Univ. of Oregon	Electronic Properties of RF Glow Discharge Microcrystalline Silicon near the Amorphous Silicon Phase Boundary
Alan Gallagher	NIST, Univ. of Colorado	Species responsible for amorphous silicon growth and properties in photovoltaics
Keda Wang	UNC-CH	Correlation of material properties and nc-Si:H solar cell performance studied by Raman and photoluminescence spectroscopies
Vikram Dalal	Iowa State	Physics of Nanocrystalline Si Solar cells
Jian Hu	MVsystems Inc.	Four terminal solar cells using ultra thin Amorphous Silicon and nano-crystalline Si
D.L. Williamson	Colorado School of Mines	Structure of HWCVD Amorphous-SiGe:H Thin Films
Yuan-Min Li	Energy Photovoltaics, Inc. (EPV)	Thin-Film Si Solar Cells and Materials by Single-Chamber PECVD and HWCVD
Scott J. Jones	Energy Conversion Devices	Transparent conductive oxide materials for improved back reflector performance for amorphous silicon based solar cells
Dean Levi	NREL	Real-Time Spectroscopic Ellipsometry as an in-situ diagnostic for HWCVD growth of amorphous and epitaxial Si
Bhushan Sopori	NREL	Reflectance Spectroscopy: Rapid Quantitative Measurements in Commercial Production of Si Solar Cells

Bhushan Sopori	NREL	SiN:H Processing for Fire-Through Metal Contacts and Hydrogen Passivation: Investigations Toward a Coherent Understanding
Xuejun Niu	Iowa State	Photovoltaic Properties Of Nanocrystalline Germanium-Carbon:H alloys
Baojie Yan	United Solar Ovonic Corporation	High Rate Deposition of Hydrogenated Nanocrystalline Silicon Solar Cells
Rana Biswas	Iowa State	Nanocrystalline and microcrystalline silicon-simulations of improved material properties
David T. Danielson	MIT	Three-Dimensional Void Array Photonic Crystal Backside Reflector for Efficient Light Trapping in Thin-Film Crystalline Silicon Solar Cells
Irina Puscasu	Iowa State	Metallo-dielectric photonic crystal tunable narrowband infrared sources
A. Karoui	NCSU	Stress Induced Lifetime Variations In Rapid Thermal Processed Silicon Wafers.
Peter McNutt	NREL	21-kW Thin Film PV Technology Validation - An NREL-Solar Energy Center Cooperative Project
M. Wassmer	NREL	Net Metering Demonstration for the 2005 Solar Decathlon Competition
Alia Ghandour	NREL	Cooperation with Brazil for Sustainable Rural Development
Ian Baring Gould	NREL	Cooperation with China for Sustainable Rural Energy Development
V. M. Fthenakis	Brookhaven	Environmental Impact Assessment for Materials in the Production of Cu(InGa)Se <sub>2</sub> Photovoltaics
R. Aldrich	Steven Winter Associates	Development of a Home Energy Monitor
Gaby Cisneros	SWTDI	Complementing Energy Efficiency with PV
Paul Gilman	NREL	Rural Energy Options Analysis Training Development and Implementation at NREL
C. Warner	NREL	Solar Decathlon 2005
W. Larsen	NREL	OUTREACH IS SERIOUS FUN!
Peter Lilienthal	NREL	Using NREL's HOMER Micropower Optimization Model to Compare Solar, Diesel, and Hybrid Off-grid Power Systems
Christy Herig	Seque Energy Consulting	IEA-PV Power Systems Task 10 - Urban Scale PV Applications, Urban Energy Solutions for the Emerging Global Market
Lorenzo Roybal	NREL	Small Hybrid Systems and Applications Testing at NREL's Outdoor Test Facility
Robert Foster	SWTDI	Ten-Year Reliability Assessment of Photovoltaic Water Pumping Systems in Mexico
Jennifer S. Szaro	FSEC	IDENTIFYING KEY ISSUES IN IMPLEMENTING A QUALITY SOLAR FOR SCHOOLS PROGRAM
Joel Pankow	NREL	Alternative Approaches to Buss Bars for PV Modules
Carl Osterwald	NREL	NREL PV Module Reliability and Performance R&D Status and Accomplishments
J. DelCueto	NREL	Advanced Indoor Module Light-Soaking Facility
Yingtang Tang	ASU	Outdoor Energy Rating Measurements of PV Modules
N. Dhere	FSEC	PV Module Durability Research and Module Long-Term Exposure
Daryl Myers	NREL	Advances in Solar Radiometry and Metrology
Steve Chalmers	PowerMark	PV Certification & Accreditation Management
Howard Barikmo	Sunset Technologies, Inc.	Management and Administration of IEC TC-82 Secretariat

Kevin Lynn	FSEC	Outdoor Performance Characterization of Residential Grid-Connected Inverters
Corey Asbill	SWTDI	Inverter Long-Term Test Facility - Early Results
Lin Simpson	ITN Energy Systems	Manufacturing Process Advancements for Flexible CIGS PV on Stainless Foil
Dale Tarrant	Shell Solar Industries LP	Enhanced CIS Production Using XRF for PVD Process Control
Michael Nowlan	Spire Corporation	Development of Automated Production Line Processes for Solar Brightfield Modules
Jim Rand	GE Energy	Silicon-Film Sheet Material
R. Mitchell	NREL	PVMR&D Overview

**PEER REVIEW FOCUS SESSION, WEDNESDAY (Wed., 4:00 PM, Oct. 27)**

**PLENARY: SOLAR FUTURES I (Thurs., 8:30 AM, Oct. 28)**

**Chair: R. Margolis**

Robert Margolis	NREL	The Outlook for Solar in the U.S. to 2050	8:30
Allen Barnett	U. Delaware	The New U.S. PV Industry Roadmap	9:00
Claudine Schneider	Econergy International, Inc	Concentrating Solar Power: Where We Are and Where We Are Going	9:20
Bill Guiney	Solargenix Energy, LLC	Growing Prospect for Solar Hot Water	9:40

**PLENARY: SOLAR FUTURES II (Thurs., 10:20 AM, Oct. 28)**

**Chair: R. Margolis**

Tom Starrs	Bonneville Environmental Foundation	The Regulatory and Policy Context for Moving Solar into the Mainstream	10:20
Julie Blunden	Kema-Xenergy	Engaging the Financial Community	10:40
Daniel Kammen	RAEL, University of California	The Potential Impact of Solar on Job Creation and the Environment	11:00
Moderator: Robert Margolis	NREL	PANEL Q&A	11:20
Tom Surek	NREL	Meeting Wrap-Up	11:50

