NREL
NATIONAL RENEWABLE ENERGY LABORATORY

9th DOE/NREL Hands-On PV Experience (HOPE)

Taking place virtually - hosted by National Renewable Energy Laboratory in Golden, CO, USA
July 6-10 & 20-24, 2020

**NREL is a national laboratory of the U.S. Department of Energy,
Office of Energy Efficiency and Renewable Energy, operated by the Alliance for Sustainable Energy, LLC.**

SCHEDULE FOR DOE/NREL HANDS-ON PV EXPERIENCE (HOPE)

JULY 6-10 & 20-24, 2020

Monday, July 6, 2020

Time				Session
ET	CT	MT	PT	
10:45am-11am	9:45am-10am	8:45am-9am	7:45am-8am	**Introductions and expectations for the week** - Adele Tamboli
11am-12pm	10am-11am	9am-10am	8am-9am	**PV Basics Intro Lecture** - Marc Landry
12pm-1pm	11am-12pm	10am-11am	9am-10am	**Si Overview** - Paul Stradins
1pm-2pm	12pm-1pm	11am-12pm	10am-11am	**Modules Overview** - Timothy Silverman
2pm- 3pm	1pm-2pm	12pm-1pm	11am-12pm	Break (1hr)
3pm-4pm	2pm-3pm	1pm-2pm	12pm-1pm	**III-V Overview** - Myles Steiner

Tuesday, July 7, 2020

Time				Session
ET	CT	MT	PT	
11am – 12pm	10am-11am	9am-10am	8am-9am	**Perovskites Overview** - Joseph Berry
12pm-1pm	11am-12pm	10am-11am	9am-10am	**Terrawatt Challenge & PV Economics** - Samantha Reese, Randy Ellingson
1pm-2pm	12pm-1pm	11am – 12pm	10am-11am	**CdTe Overview** - Matthew Reese
2pm-3pm	1pm-2pm	12pm-1pm	11am-12pm	Break (1hr)
3pm - 4:30pm	2pm-3:30pm	1pm-2:30pm	12pm-1:30pm	**Poster Session**: Group 1: *David Jerome Rokke* *Jack Farrell* *Deepak Jain Veerendra Kumar*
				Poster Session: Group 2: *Alan Medina Gonzalez* *Shujie Li* *Abigail R Meyer*
				Poster Session: Group 3: *Pravini Fernando* *Atefe Hadi* *Margherita Taddei* *Nicole Berry*
				Poster Session: Group 4: *Melissa Davis* *James Reiford* *Aidan H. Coffey* *Aesha Patel*
				Poster Session: Group 5:

				Benjamin E. Davis *Adam Hans Danielson* *Andre Chavez* *Sahar Pishgar*

Wednesday, July 8, 2020

Time				Session
ET	CT	MT	PT	
11am – 1pm	10am-12pm	9am-11am	8am-10am	**OTF Tour** -Timothy Silverman
1pm-2:30pm	12pm-1:30pm	11am-12:30pm	10am-11:30am	**PV Trivia** - Silvana Ayala & Ann Greenaway
2:30pm-3pm	1:30pm-2pm	12:30pm-1pm	11:30am-12pm	Short Break (30 mins)
3pm-4pm	2pm-3pm	1pm-2pm	12pm-1pm	**Array Monitoring, Energy Yield Modeling** - Randy Ellingson

Thursday, July 9, 2020

Time				Session
ET	CT	MT	PT	
11am – 12pm	10am-11am	9am-10am	8am-9am	**Staff Q&A Sessions: Material Characterization by (S)TEM** - Andrew Norman
12pm-2pm	11am - 1pm	10am-12pm	9am-11am	**PV Device Fabrication Sessions** **Silicon** - San Theingi Group 1 *Ben Davis* *Andam Hanz Danielson* *Andre Chavez*
				PV Device Fabrication Sessions **III-Vs** - Myles Steiner, Michelle Young Group 2 *Alan Medina Gonzolez* *Shujie Li* *Abby Meyer* *Sahar Pishgar*
				PV Device Fabrication Sessions **Perovskites -** Axel Palmstrom, Menjin Yang Group 3 - *Pravini Fernando* *Margherita Taddei* *Nicole Berry* *Melissa Davis* *James Raiford (Jimmy)* *Aidan H. Coffey* *Aesha Patel* *Atefe Hadi*
				PV Device Fabrication Sessions **CdTe** - Eric Colegrove Group 4 - *David Rokke* *Jack Farrell* *Deepak Jain Veerendra Kumar*

2pm-3pm	1pm–2pm	12pm–1pm	11am–12pm	Break (1hr)
3pm-4pm	2pm-3pm	1pm-2pm	12pm-1pm	**Staff Q&A Sessions** - Matt Reese

Friday, July 10, 2020

Time				Session
ET	CT	MT	PT	
12pm-1pm	11am-12pm	10am-11am	9am-10am	**Staff Q&A Sessions** - Joseph Berry
1pm-2:30pm	12pm-1:30pm	11am – 12:30pm	10am – 11:30am	M&C: **Scanning Kelvin Probe & other SPM** - Sanjini Nanayakkara, Nick Xiao, Chun Sheng Jiang *Abigail R Meyer* *Adam Hans Danielson* *Pravini Fernando* *Alan Medina Gonzalez* *Deepak Jain Veerendra Kumar* *Atede Hadi* *Aesha Patel* *Margherita Taddei*
				M&C: **PL -** Darius Kuciauskas & Pat Dippo *Aidan H. Coffey* *Andre Chavez* *David Jerome Rokke* *Jack Farrell* *James Raiford* *Melissa Davis* *Nicole Berry* *Sahar Pishgar*
				Students with free time to organize meetings with NREL Staff, or take a break *Benamin Davis* *Shujie Li*
2:30pm-3pm	1:30pm-2pm	12:30pm-1pm	11:30am-12pm	Short Break (30min)
3pm-4pm	2pm-3pm	1pm- 2pm	12pm-1pm	**Staff Q&A Sessions**: Graduate Student to Postdoc Transitions – Ann Greenaway

Monday, July 20, 2020

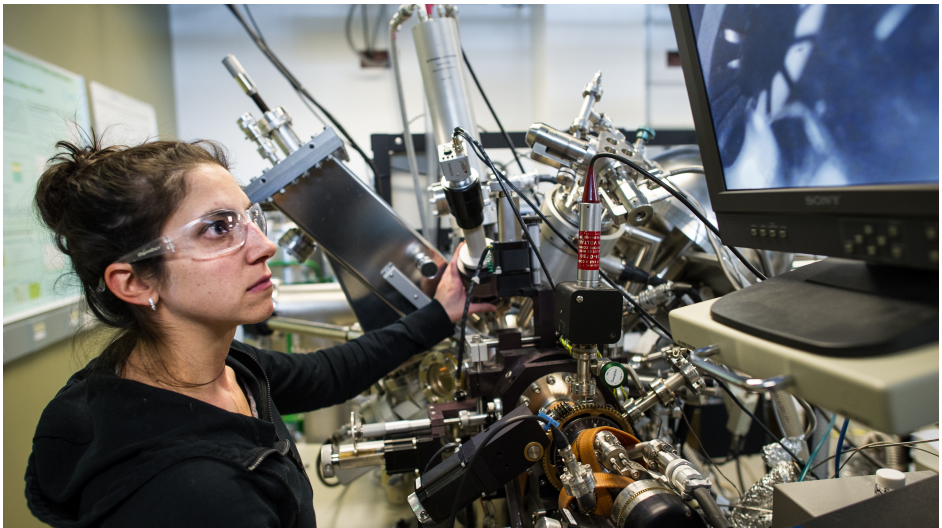
Time				Session
ET	CT	MT	PT	
11am-12pm	10am-11am	9am-10am	8am-9am	**PV Cell Measurements** - Matthew Reese, Axel Palmstrom
12pm-1pm	11am-12pm	10am-11am	9am-10am	**Skills for Writing Scientific Papers** - Robert Klie
1pm-2pm	12pm-1pm	11am-12pm	10am-11am	**Solar Cell Modeling** - Nick Strandwitz (Lehigh), Emily Warren

Tuesday, July 21, 2020

Time				Session
ET	CT	MT	PT	
11am-12:30pm	10am-11:30am	9am-10:30am	8am-9:30am	**PV Cell Characterization:** **III-V** - Myles Steiner Group 1
				PV Cell Characterization: **Perovskites** - Matthew Reese, Axel Palmstrom Group 2
				PV Cell Characterization: **CdTe** - Eric Colegrove Group 3
				PV Cell Characterization: **Si** - San Theingi Group 4
12:30pm-2pm	11:30am-1pm	10:30am-12pm	9:30am-11am	**Career Panel -** Joseph Berry, Samamatha Reese, Sage Bauers, Matthew Reese, Malika Jeffries-EL, Stacey Bent
2pm- 3pm	1pm-2pm	12pm-1pm	11am-12pm	Break (1hr)
3pm-4pm	2pm-3pm	1pm-2pm	12pm-1pm	**Staff Q&A Sessions:** Tandems - Emily Warren

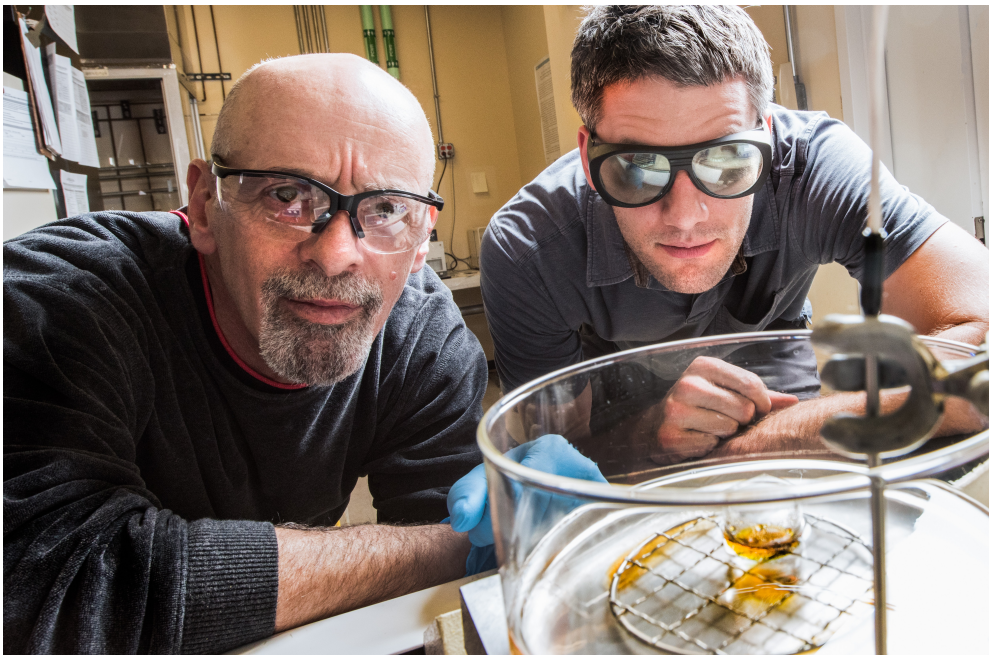
Wednesday, July 22, 2020

Time				Session
ET	CT	MT	PT	
11am-12pm	10am-11am	9am-10am	8am- 9am	**Module Certification** - Paul Ndione
12pm-1pm	11pm – 12pm	10am-11am	9am-10am	**Cell Certification** - Tao Song
1pm-2:30pm	12pm-1:30pm	11-12:30pm	10am-11:30am	Break (1hr)
2:30pm-4pm	1:30pm-3pm	12:30pm-2pm	11:30pm-1pm	**Entrepreneurship & Research proposal pitches** - Rachelle Ihly, Nick Strandwitz, Chih-hung Chang



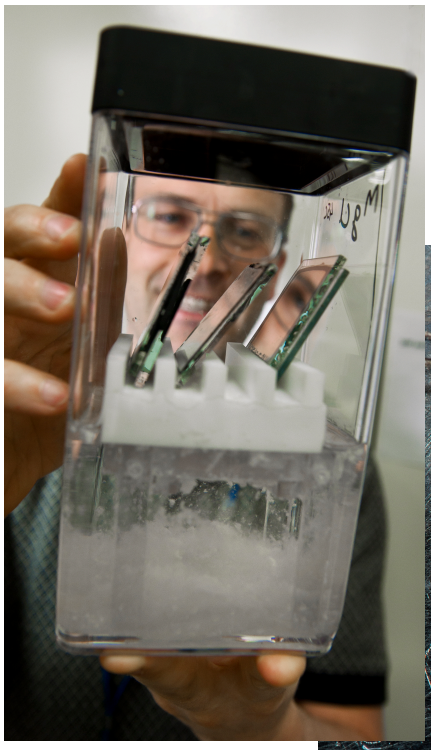
Thursday, July 23, 2020

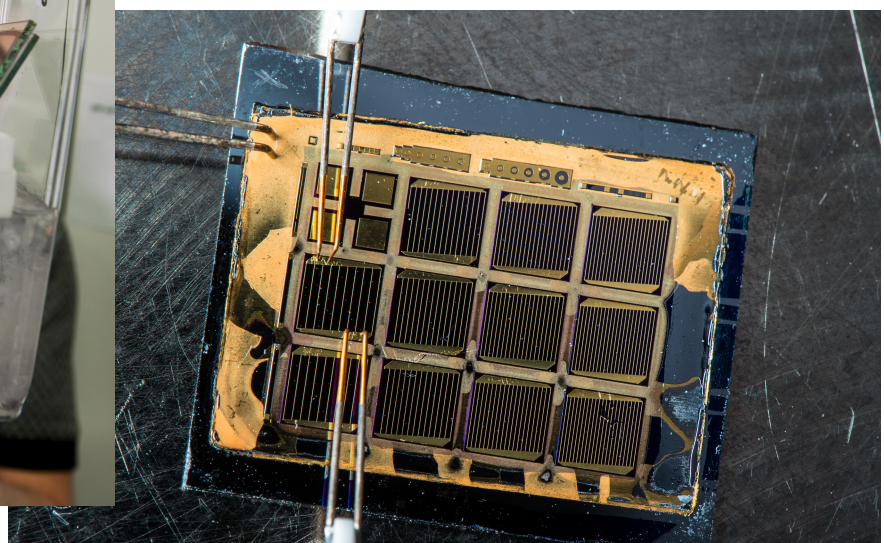
Time				Session
ET	CT	MT	PT	
11am-12:30pm	10am-11:30am	9am – 10:30am	8am-9:30am	M&C: **SEM/CL/EBIC** - Harvey Guthrey *Aesha Patel* *Aidan H. Coffey* *Alan Medina Gonzalez* *Nicole Berry* *David Jerome Rokke*
				M&C: **X-ray Techniques** - Ann Greenaway & Dennice Roberts *Abigail R Meyer* *Adam Hans Danielson* *Andre Chavez* *Benjamin E. Davis* *Deepak Jain Veerendra Kumar* *Jack Farrell* *Melissa Davis*
				M&C: **(S)TEM** - Andrew Norman *Atede Hadi* *Melissa Davis* *Shujie Li* *James Raiford* *Sahar Pishgar* *Margherita Taddei* *Pravini Fernando*
12:30pm-1:30pm	11:30am-12:30pm	10:30am-11:30am	9:30am-10:30am	**Starting your own Research Lab** - Letian Dou
1:30pm-2:30pm	12:30pm-1:30pm	11:30am-12:30pm	10:30am-11:30am	Break (30min)
2:30pm-4pm	1:30pm-3pm	12:30pm-2pm	11:30am-1pm	**Afternoon Tea** – Materials and Chemical Science Directorate



Friday, July 24, 2020

Time				Session
ET	CT	MT	PT	
1pm-2:30pm	12pm-1:30pm	11am-12:30pm	10am-11:30am	M&C: **CV, DLCP, DLTS, Admittance** - Steve Johnston *Abigail R Meyer* *Aesha Pael* *Atede Hadi* *Benjamin E. Davis* *David Jerome Rokke* *Nicole Berry* *Pravini Fernando* *Sahar Pishgar*
				M&C: **XPS/UPS** - Elisa Miller *Adam Hand Danielson* *Aidan H. Coffey* *Alan Medina Gonzalez* *Deepak Jain Veerendra Kumar* *James Raiford* *Shujie Li* *Jack Farrell* *Melissa Davis*
				Students with free time to organize meetings with NREL Staff, or take a break *Andre Chavez* *Margherita Taddei*
2:30pm-3pm	1:30pm-2pm	12:30pm-1pm	11:30am-12pm	Short Break (30min)
3pm-4pm	2pm-3pm	1pm- 2pm	12pm-1pm	**Careers Paths/Postdoc Options** - Rachelle Ihly, Ann Greenaway, James Vickers (DOE)





Participants

Student's Name	University	Professor	Technology Group
Abigail R Meyer	Colorado School of Mines	Sumit Agarwal	III-V
Adam Hans Danielson	Colorado State University	Walajabad Sampath	Silicon
Aesha Patel	University of Toledo	Randy J. Ellingson	Perovskites
Aidan H. Coffey	Purdue University	Letian Dou	Perovskites
Alan Medina Gonzalez	Iowa State University	Javier Vela	III-V
Andre Chavez	University of New Mexico	Sangm M Han	Silicon
Atefe Hadi	Iowa State University	Matthew G. Panthani	Perovskites
Benjamin E. Davis (Ben)	Lehigh University	Nicholas C. Strandwitz	Silicon
David Jerome Rokke	Purdue University	Rakesh Agrawal	CdTe
Deepak Jain Veerendra Kumar	University of Louisiana at Lafayette	Terrence Chambers	CdTe
Jack Farrell	University of Illinois at Chicago	Robert Klie	CdTe
James Raiford	Stanford University	Stacey Bent	Perovskites
Margherita Taddei	University of Washington	David Ginger	Perovskites
Melissa Davis	Florida State University	Zhibin Yu	Perovskites
Nicole Berry	Boston University	Malika Jeffries-EL	Perovskites
Pravini Fernando	Binghamton University	Jeffery Mativetsky	Perovsites
Sahar Pishgar	University of Louisville	Joshua Spurgeon	III-V
Shujie Li	Oregon State University	Chih-hung Chang	III-V

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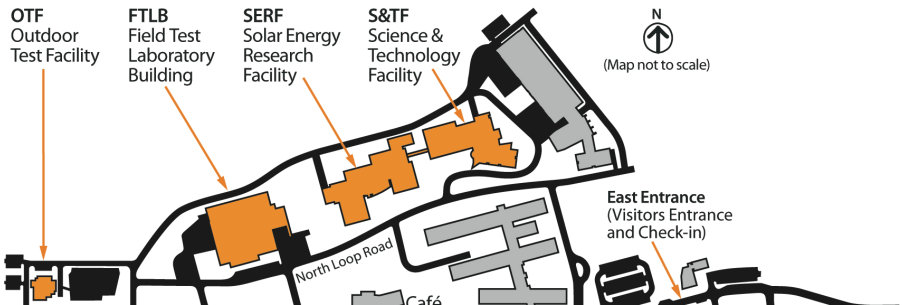
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