

11th DOE/NREL Hands-On PV Experience (HOPE)

National Renewable Energy Laboratory | Golden, CO, USA

July 18-22, 2022



**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)

Sunday, July 17, 2022

1pm – 10pm: Room check-in Colorado School of Mines (CSM), Maple Hall, 1733 Maple St., Golden, CO 80401.
Dinner on your own. There are many restaurants within a 10- to 20-minute walk. There is a Safeway within a 10-minute walk.

7:00 Introductions and expectations for the week (Maple Hall, Garden Level lounge)

Monday, July 18, 2022

7:00 Breakfast
7:35 Board shuttle bus CSM, from next to cafeteria
7:40 Shuttle bus will be departing
7:55 Check-in – NREL (RSF)

SERF Auditorium (C108)

8:00 Welcome & Safety Orientation
8:30 Perovskites Overview
9:30 “There’s More Than One Way to Make a Tandem Solar Cell”
10:30 Break
10:45 PV Cell and Module Certification
12:15 Lunch (SERF Patio)
1:15 “Deployment of CdTe & Si”
2:30 Professional Development
3:45 Break
4:00 Poster Session (Main Entrance of RSF)
5:00 Shuttle bus (meet at SERF) returns to CSM

Dinner on your own

Tuesday, July 19, 2022

7:00 Breakfast
7:40 Shuttle bus will be departing CSM, from next to cafeteria
7:55 Arrive at NREL – SERF C108

Break into groups:

Group 1 (Si)
Group 2 (Perovskites A)
Group 3 (CdTe)
Group 4 (Perovskites B)

8:00 Groups 1 & 4: Modules, Reliability and Field Hands-On Experience
Group 2: Perovskites Fabrication A
Group 3: CdTe Fabrication Session I
9:30 Break – to be taken whenever convenient for each group
12:00 Lunch (SERF Patio)
1:00 Break into groups:
Group 1: Si Fabrication Session I
Group 2: Perovskites Fabrication A
Group 3: CdTe Fabrication Session I
Group 4: Perovskites Fabrication B I
2:30 Break – to be taken whenever convenient for each group
5:00 Shuttle bus (meet at SERF) returns to CSM.
Pizza will be provided at the panel for dinner

6:30 Pizza and Panel Discussion on “Professional Career and Postdoc Opportunities” at CSM, Maple Hall Community Room

8:00 Panel Ends

Wednesday, July 20, 2022

7:00 Breakfast
7:40 Shuttle bus will be departing CSM, from next to cafeteria
7:55 Arrive at NREL – S&TF 127)
8:00 Break into groups:
Group 1: Si Fabrication Session II
Groups 2&3: Modules, Reliability and Field Hands-On Experience
Group 4: Perovskites Fabrication B
12:00 Lunch (S&TF Patio)
1:00 IV Characterization & Data Discussion
2:15 Break
2:30 PV Sustainability Solutions Guest Lectures:
“Water-soluble lift-off technology for CdTe/MgCdTe double heterostructure solar cells”
“Understanding the atmospheric screen-printable Cu paste for silicon solar cells”
3:15 Break
3:30 Measurement & Characterization Lab Sessions:
1. (S)TEM
2. Photoluminescence
3. XPS/UPS
5:00 Shuttle bus (meet at S&TF) will return to CSM

Dinner on your own

Thursday, July 21, 2022

7:00 Breakfast
7:40 Shuttle bus will be departing CSM, from next to cafeteria
7:55 Arrive at NREL – S&TF 127

8:00 Systems Integrations
9:00 Perovskite Faculty Panel
10:15 Break
10:30 Measurement & Characterization Lab Sessions:
1. CV & DLTS
2. Scanning Probe Microscopies
3. SEM/CL/EBIC
12:00 Lunch (S&TF Patio)
1:00 “Defining the Terawatt Challenge”
2:15 “Technoeconomic Analysis and Life Cycle Assessment”
3:15 Break

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3:30 Measurement & Characterization Lab Sessions:

1. MJ Characterization
2. Photoluminescence II
3. X-rays

5:00 Shuttle bus (meet at S&TF) returns to CSM

Dinner on your own

Friday, July 22, 2022

7:00 Breakfast

7:40 Shuttle bus will be departing CSM, from next to cafeteria

7:55 Arrive at NREL – S&TF 127

8:00 PV Device Characterization:

1. Perovskites A/B & CdTe
2. Silicon

10:15 Break

10:30 Solar Industry Panel

Energy and Environmental Economics, Inc.)

DNV

EnergySage

First Solar

Moderator: NREL Staff

12:00 Lunch (S&TF Patio)

1:00 “Solar in SPACE”

1:30 Student closing presentations: takeaways to share with home institution (5 min. each)

2:45 Afternoon Tea (SERF Patio)

3:15 Meet with NREL scientists (arranged in advance)

4:15 Review of HOPE and student survey - S&TF 127

5:00 Shuttle bus (meet at S&TF) returns to CSM

Dinner on your own

Saturday, July 23, 2022

Check out (by 10:00 AM)

Students are welcome to coordinate hikes or other activities before returning home.

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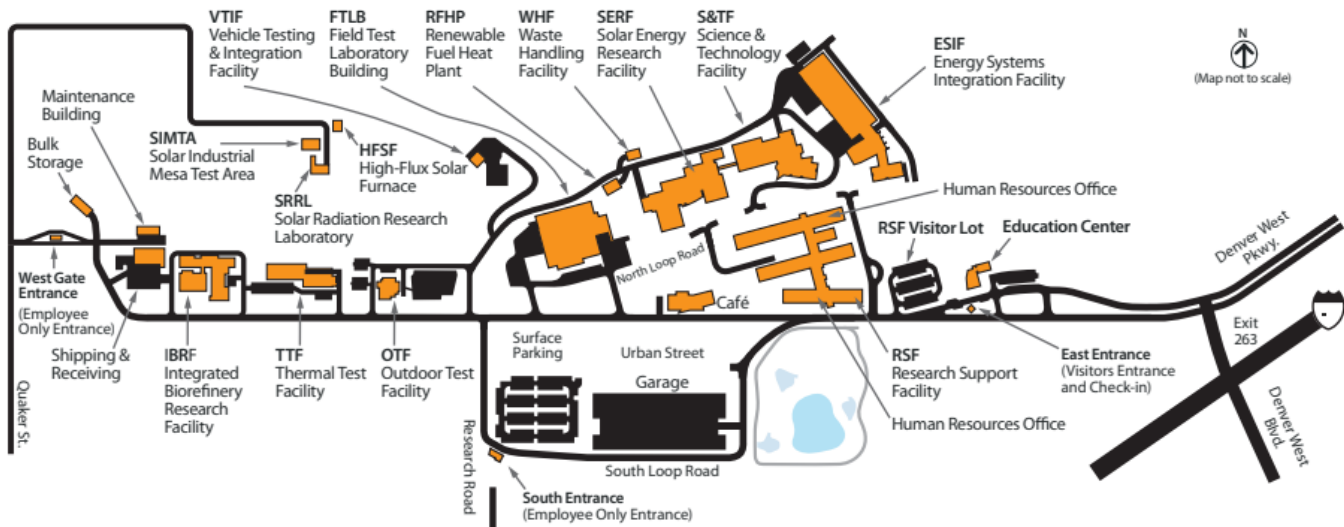
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