



BEST Center Annual Institute

High Performance Building Technician Education: *Technologies, Trends, and Knowledge and Skills of Technicians*

January 6 - 9, 2016 | AGENDA-AT-A-GLANCE

Wednesday, January 6 – Berkeley

Indoor Air Quality (IAQ) + Ventilation – Rengie Chan, Bill Fisk, LBNL & Bud Offermann, Indoor Environmental Engineering

Observations from the Paris Climate Treaty – Dr. Nan Zhou, LBNL

On-Demand Ventilation – Andrew Krioukov, CEO, Building Robotics

Methods for Fault Detection – Lily Hu, Mary Ann Piette, Jessica Granderson, LBNL

Tour FLEXLAB

The Future of Building Energy Efficiency – Steve Selkowitz, LBNL

Thursday, January 7 – Davis & Sacramento

Tour of the California Lighting Technology Center

Advanced Lighting and Daylighting Solutions for Existing Buildings - Kosta Papamichael, California Lighting Technology Center (CLTC)

Advanced Lighting and Daylighting Solutions for Existing Buildings

Water-Energy Nexus and Building Management Analytics – Sumiko Hong, Center for Water and Energy Efficiency (CWEE)

Building Energy Audits: ZOHO Automated Tool, and Entry-level Auditor Workforce Shift - Siva Gunda, Energy Efficiency Center (EEC)

Comparative Study of Zero Net Energy Communities between UC Davis West Village and Tokyo, Japan - Kristin Heinemeier, Energy Efficiency Center (EEC)

Overview of the Western Cooling Challenge – Jonathan Woolley & Paul Fortunato, Western Cooling Efficiency Center (WCEC)

Tour of the Western Cooling Efficiency Center Lab

Tour of West Village (Largest ZNE Community in the US)

Tour of the Honda Smart Home

Tour Sacramento City College Living Lab

Friday, January 8 – Oakland

Present and Future BAS Technologies: Skills Needed for Technicians - Jay Santos, Facility Dynamics Engineering

Maintaining Buildings for High Performance: What Building Technicians Must Know and Be Able to Do - Paul Ehrlich, President, Building Intelligence Group

Managing High Performance Buildings: A Building Managers' Perspective - Building Owners and Managers Association (BOMA) panel

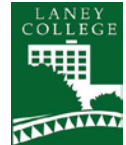
Operating and Maintaining High Performance Buildings: Preliminary Findings - Peter Crabtree

Synopsis of Findings for Certification of High Performance Building Technicians - Paul Ehrlich

Movie Night: “This Changes Everything” & “Building a Better Tomorrow”

Saturday, January 9 – Oakland

Action Plan Presentations by Faculty

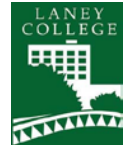


BEST Center Annual Institute
High Performance Building Technician Education:
Technologies, Trends, and Knowledge and Skills of Technicians

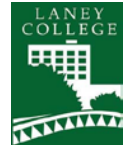
January 6 - 9, 2016 | AGENDA

Wednesday, January 6 - Berkeley

- 6:30am Hotel breakfast
- 7:30 LBNL Shuttle from Executive Inn to Waterfront Hotel
- 7:45 LBNL Shuttle from Waterfront Hotel to LBNL
Lawrence Berkeley National Lab (LBNL), Building 54, Perseverance Hall
1 Cyclotron Road MS 90R3111, Berkeley CA 94720
- 8:30 Registration & Refreshments
- 9:00 **Welcome to Lawrence Berkeley National Lab** – Mary Ann Piette, Head of LBNL Building Technology & Urban Systems Division
- 9:10 **Welcome and Introduction of Participants** – Pamela Wallace, BEST Center Director
- 9:30 **Overview of BEST Center and Institute Objectives** – Peter Crabtree, BEST Center Principal Investigator & Dean, CTE, Laney College
- 9:55 **Introduction to Presentations of the Day** - Mary Ann Piette
- 10:00 **Indoor Air Quality (IAQ) + Ventilation** – Rengie Chan, Research Scientist, Indoor Environment Group of the Energy Analysis & Environmental Impact Division & Bill Fisk, Senior Scientist (retired), LBNL; Industry Perspective by Bud Offermann, President, Indoor Environmental Engineering
- 10:00 **Commercial Building Ventilation: Effects on People and Building Energy use, standard setting**
- 10:25 Break
- 10:30 **Diagnosing ventilation and indoor air quality problems in commercial buildings**
- 11:10 **Technologies to measure and control ventilation rates in commercial buildings: Show and tell of air flow measurement devices**

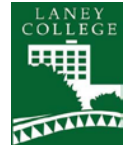


- 11:45 Lunch/Networking
- 12:30pm **Observations from the Paris Climate Treaty** – Lynn Price, Senior Staff Scientist and Leader of the China Energy Group of the Energy Analysis and Environmental Impacts Division, Energy Technologies Area, LBNL; Dr. Nan Zhou, Deputy Director, US-China Clean Energy Research Center for Buildings Energy Efficiency (CERC-BEE)/LBNL. Introduced by Mary Ann Piette
- 1:15 **On-Demand Ventilation** - Andrew Krioukov, CEO, Building Robotics. Introduced by Mary Ann Piette
- 2:00 Break
- 2:10 **Fault Detection in Building HVAC Systems with application to Central Chiller Plants: Introduction to Energy Management and Information Systems, HVAC System Fundamentals, and Fault Detection and Diagnosis** – Mary Ann Piette; Lily Hu, Graduate Student (Ph.D. candidate), University of California at Berkeley; Jessica Granderson, Research Scientist and Deputy for Research, Building Technology and Urban Systems Division, LBNL
- 2:45 Group Exercises in Fault Detection and Diagnosis
- 3:30 Discussion of Exercise Results
- 4:00 Facilitated Discussion about Presentations of the Day – Ted Wilinski & Brian Lovell, BEST Center Co-Principal Investigators
- 4:45 **Tour FLEXLAB**
Items of Note at FLEXLAB:
- Chilled Water Monitoring
 - BIPV Installation
 - Upcoming PV + Storage Installation
 - Use of Thermal Mannequins Within Test Space
- 5:45 Shuttle from Building 90 to UC Berkeley Faculty Club
1 Faculty Club, Berkeley, CA 94720
- 6:00 Networking Dinner - UC Berkeley Faculty Club
- 6:30 **The Future of Building Energy Efficiency** – Steve Selkowitz, Senior Advisor for Building Science, LBNL
- 7:15 Questions and Answers; Discussion
- 8:00 Adjourn, LBNL shuttle to hotels



Thursday, January 7 – Davis & Sacramento

- 6:30am Hotel breakfast
- 7:15 Depart hotels for Jack London Train Station. Executive Inn guests take hotel shuttle. Waterfront Hotel guests walk.
- 7:30 Meet at the Jack London Train Station
245 Second Street, Oakland, CA 94607
- 7:45 Ride Amtrak Capital Corridor Train (#524) to Davis, CA
- 9:17 Shuttle to California Lighting Technology Center
633 Pena Drive, Davis, CA 95618
- 9:30 **Tour of the California Lighting Technology Center** - Kosta Papamichael & Nicole Graeber
Group will split into 2 groups for tours
- 10:30 Shuttle to UC Davis ARC
Located at SE Corner of LaRue Road & Orchard Road
- 10:45 **Welcome and Overview of the UC Davis Energy Efficiency Center** – Benjamin Finkelor,
Executive Director, Energy Efficiency Center (EEC), UC Davis
- 10:55 **Advanced Lighting and Daylighting Solutions for Existing Buildings** – Dr. Kosta
Papamichael, Co-Director, California Lighting Technology Center (CLTC), UC Davis
- 11:45 **Water-Energy Nexus: Data Analytics and Integration** – Sumiko Hong, Executive Director,
Center for Water and Energy Efficiency (CWEE), UC Davis
- 12:15pm **Lunch & Overview of the Western Cooling Challenge** – Jonathan Woolley, Associate
Engineer and Paul Fortunato, Outreach Coordinator, (WCEC), UC Davis
- 1:00 **Building Energy Audits** – ZOHO Automated Tool, and Entry-level Auditor Workforce Shift
- Siva Gunda, Director of Research, Energy Efficiency Center (EEC), UC Davis
- 1:45 **Comparative Study of Zero Net Energy Communities between UC Davis West Village
and Tokyo, Japan** - Kristin Heinemeier, Principal Engineer, Energy Efficiency Center (EEC),
UC Davis
- 2:15 Walk from the ARC to West Village, Split into 3 groups for tours – Katherine Bannor &
Taimour Khalid, Energy Efficiency Center (EEC), UC Davis & Ryan Taylor, UC Davis student



- 2:30 **Tour of the Western Cooling Efficiency Center Lab** - Paul Fortunato
Tour of West Village (Largest ZNE Community in the US) - Ben Finkelor
Tour of the Honda Smart Home - Ryan Harty, Founder, Honda Home Energy Management System

- 3:30 Shuttle to Sacramento City College & **Facilitated Discussion** – Ted Wilinski & Brian Lovell
3835 Freeport Blvd, Sacramento, CA

- 4:00 **Tour Sacramento City College Living Lab**

- 5:00 Shuttle to Sacramento Train Station
401 I Street, Sacramento Valley Station, Sacramento, CA 95814

- 5:40 Ride Amtrak Capital Corridor Train (#547) Train from Sacramento to Oakland, Light boxed dinners will be served

- 7:30 Arrive at Jack London Train Station

- 7:30 Adjourn, Walk to Waterfront or Take Hotel shuttle to Executive Inn. Free night (Restaurant/bar options at Jack London Square)

Friday, January 8 – Oakland

Laney College, Laney Bistro, 900 Fallon Street, Oakland, CA 94607

- 6:30am Hotel Breakfast

- 8:00 Shuttle from hotels to Laney College

- 8:30 Gather & Networking

- 8:50 Recap of Day 1 & 2, Preview of Day 3 Agenda – Larry Chang, BEST Center Manager

- 9:00 **Present and Future BAS Technologies: Skills Needed for Technicians** - Jay Santos, Co-Founder, Facility Dynamics Engineering. Introduction by Chuck Frost, BEST Center Co-Principal Investigator

- 10:00 **Maintaining Buildings for High Performance: What Building Technicians Must Know and Be Able to Do** - Paul Ehrlich, President and Founder, Building Intelligence Group

- 11:00 Break



- 11:15 **Managing High Performance Buildings: A Building Manager's Perspective** - Building Owners and Managers Association (BOMA) panel – Moderated with commentary by Carlos Santamaria, Principal, CEES-Advisors & California Energy Chair, BOMA California. Panelist: Danny Murtagh, Director of Engineering, Embarcadero Center, and David Petroff, Senior Property Manager, Columbia Property Trust
- 12:30pm Lunch/Networking
- 1:30 **Operating and Maintaining High Performance Buildings: Preliminary Findings** - Peter Crabtree
- 2:00 **Synopsis of Findings for Certification of High Performance Building Technicians** - Paul Ehrlich
- 2:30 Break
- 2:45 **Introduction to Small Group Discussions** - Brian Lovell & Ted Wilinski
- 3:00 **Small Group Discussions – Key Learnings and Lesson Planning for Technician Education**
Groups: Building Diagnostics; IEQ; Lighting; Zero Net Energy; Codes and Standards; BAS Systems; High Performance Building Operations; or Other
- 4:00 **Reporting Out and Discussion** – Ted Wilinski & Brian Lovell
- 5:00 Networking Dinner
- 6:00 Movie Night: ***This Changes Everything*** screening preceded by premiere of the BEST Center's ***Building a Better Tomorrow*** video
- 8:00 Adjourn, Shuttle to hotel & Prepare Report Back presentation

Saturday, January 9 – Oakland

Laney College, Laney Bistro, 900 Fallon Street, Oakland, CA 94607

- 6:30am Hotel breakfast
- 8:15 Shuttle from hotels to Laney College
- 8:30 Preview of Day 4 - Larry Chang
- 9:00 **Action Plan Presentations by Faculty**
- 12:00pm Lunch & Action Plan Presentations continue
- 1:00 Wrap-up discussion
- 1:15 Evaluations
- 2:00 Adjourn and Depart