



BUILDING TECHNOLOGY & URBAN SYSTEMS ENERGY TECHNOLOGIES AREA



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Fostering Community

The COVID-19 pandemic has changed the way many of us work, sending us to video conferences rather than office buildings and labs every day. But it hasn't changed the spirit and important contributions that continue to take place across Berkeley Lab and within our division. The FLEXLAB® facility, for example, is hosting air quality research that will help inform safety measures when people do come together again within buildings. And our researchers continue to connect with each other and the wider STEM community. Learn more below about how we're setting the stage for safer, more efficient buildings now and in the future.

—Mary Ann Piette, Division Director, Building Technology and Urban Systems

Research on Airborne Virus Transmission in Buildings



Berkeley Lab's indoor air quality experts are using computer models and experiments at the FLEXLAB® testbed to study the risk of airborne transmission of viruses within buildings and how to mitigate those risks.

“As our leaders develop plans to get people back to work safely, we want to apply our expertise in air movement and contaminant removal to inform guidance,” said Brett Singer, head of the Lab's Indoor Environment research group.

[Read more](#)

Berkeley Lab Staff Join Outreach Day for Women in STEM



The students took part in a day of activities highlighting women in STEM at the Laboratory and their career pathways. A career panel featuring Tammy Campbell, Mekena Metcalf, Ashley White and Jessica Granderson covered non-linear career pathways, advice on building confidence and their reasons for pursuing a STEM career. Pictured at left: FLEXLAB® Executive Director Cindy Regnier with students.

[Read more](#)

“Sensor Suitcase” Wins Award for Excellence in Technology Transfer



The Retro-Commissioning Sensor Suitcase, an innovative technological solution developed to improve a building’s operating costs, comfort and energy performance, was recently honored with the 2020 Federal Laboratory Consortium Award for Excellence in Technology Transfer.

Division Deputy Director Jessica Granderson led the development of the analytical software for the Sensor Suitcase.

[Read more](#)

Vi Rapp Appears in 'Faces of STEM' Profile

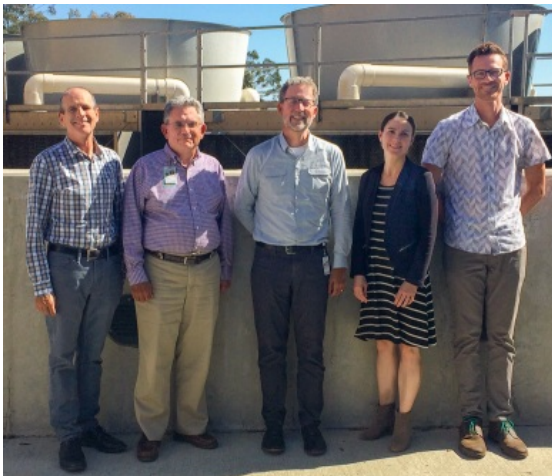


A new Department of Energy video series, the Faces of STEM, offers quick videos that spotlight all things STEM and what national laboratories and offices are doing to innovate and change the world. In this installment, research scientist Vi Rapp talks about her research on combustion and how she became interested in a science career.

[Watch here](#)

[Learn more about the series](#)

Lab Breaks New Ground in Data Center Optimization



A new efficiency metrics project from the National Energy Scientific Research Computing Center (NERSC) leverages Berkeley Lab’s decades-long expertise in energy management.

The Lab’s Energy Technologies Area has supported NERSC and other Berkeley Lab facilities on energy issues for some 30 years. Recently, researchers have been working to boost efficiency at NERSC’s Shyh Wang Hall and the computing, storage and networking systems hosted in the building’s data center.

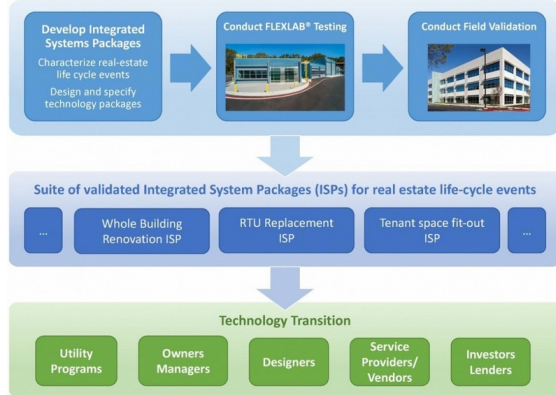
Pictured, left to right, are members of the NERSC Efficiency Optimization Project team: Norm Bourassa and Jeff Broughton of NERSC; John Elliott and Deidre

Carter of Sustainable Berkeley Lab; and Walker Johnson of kW Engineering.

[Read more](#)

Berkeley Labs' Toolkits Aim to Save Energy for Commercial Buildings

Integrated systems packages (ISPs) can help achieve deep energy savings in retrofits without sacrificing occupant comfort. Berkeley Lab has developed a new set of draft ISP toolkits for commercial buildings. These provide step-by-step information on the technology packages from project applicability checklists to



operations and maintenance manuals.

The intent of the research is to significantly reduce transaction costs for owners and service providers through technology and business process integration, standardization and streamlining throughout the real estate delivery chain. The final ISPs will streamline planning and installation and provide whole-building energy savings of up to 20 percent.

[Read more](#)

Berkeley Lab's EMIS Team Develops and Publishes Open Source Automated Building Footprint Extractor (AutoBFE) Toolbox on GitHub

AutoBFE provides a replicable workflow to extract building footprints from satellite/aerial images using state of the art deep learning image segmentation algorithms.

This release is part of a project, [Machine Learning for Improved Efficiency Analysis and Asset Information](#), funded by the U.S. Department of Energy's Building Technologies Office. This project is developing automated approaches to determine building characteristics and efficiency opportunities using unstructured data from sources such as drone-based RGB and thermal images, satellite or aerial images, and LIDAR.

AutoBFE is a toolbox that allows others to easily reproduce our approach, offers transparency in modeling solutions, and facilitates continuous improvement via incorporation of alternative deep learning algorithms and/or expansion of the training data (e.g., cities into the training dataset).

The AutoBFE toolbox is available at GitHub and comprises the following three modules:

- Module for data preparation, which aims to generate training data with very limited manual effort using openly available data sources
- Module for deep learning modeling, which aims to establish an easy modeling pipeline to reproduce the analysis and test new deep learning architectures
- Module for post-processing of model results into polygons that are easily transformable into GIS-Format (i.e., GeoJson)

For more details, join us for a webinar about the recent research outcomes from the [Machine Learning for Improved Efficiency Analysis and Asset Information](#) project, at **10:30-11:30 PST on Tuesday, June 2nd 2020**.

[Register in advance for the webinar here](#)

Recent Publications

- [Building fault detection and diagnostics: Achieved savings, and methods to evaluate algorithm performance](#) by Guanqing Lin, Hannah Kramer and Jessica Granderson
- [Building thermal load prediction through shallow machine learning and deep learning](#) by Zhe Wang, Tianzhen Hong and Mary Ann Piette
- [A Conceptual Framework to Describe Energy Efficiency and Demand Response Interactions](#) by Andrew Satchwell, Peter Cappers, et al.
- [Accuracy of HVAC Load Predictions: Validation of EnergyPlus and DOE-2 using FLEXLAB Measurements](#) by Philip Haves, et al.
- [Dimension analysis of subjective thermal comfort metrics based on ASHRAE Global Thermal Comfort Database using machine learning](#) by Wang Zhe, et al.
- [Energy and Behaviour Developing quantitative insights on building occupant behaviour: Supporting modelling tools and datasets](#) by Tianzhen Hong, Jared Langevin, Na Luo, and Kaiyu Sun
- [eProject Builder: Promoting wider adoption of energy savings performance contracts through standardization and transparency](#) by Shankar Earni, Philip Coleman, Elizabeth Stuart, Peter H Larsen

See more:

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See also: Department of Energy [Building Technologies Office](#)

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Lawrence Berkeley National Lab (Berkeley Lab) is located in the Berkeley Hills near UC Berkeley and conducts scientific research on behalf of the United States Department of Energy (DOE). It is managed and operated by the University of California (UC). The Laboratory overlooks the University of California, Berkeley.

Berkeley Lab addresses the world's most urgent scientific challenges by advancing sustainable energy, protecting human health, creating new materials, and revealing the origin and fate of the universe. Founded in 1931, Berkeley Lab's scientific expertise has been recognized with 13 Nobel prizes. The University of California manages Berkeley Lab for the U.S. Department of Energy's Office of Science. For more information, visit www.lbl.gov.

DOE's Office of Science is the single largest supporter of basic research in the physical sciences in the United States, and is working to address some of the most pressing challenges of our time. For more information, see science.energy.gov.
