INTEGRATED DESIGN LAB

Annual Report 2025–2026

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Cover Image: Metropole Project. Architect: BuildingWork, Photo by Doug Walker Photography.

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LETTER FROM THE DIRECTORS

Dear Friends and Supporters of the UW IDL,

Our cover feature this year is the Metropole Project, a historic building in Seattle's Pioneer Square. Led by the Satterberg Foundation and architecture firm BuildingWork, the project exemplifies the opportunity for transformational change within our existing building stock. The neglected and fire-damaged 1892 Richardsonian brick building has been re-imagined as a community hub, offering mission-driven organizations affordable office space—all with exceptionally low energy use (18 EUI). The Metropole has been the site of several IDL tours and events this year, showcasing how design and technology can revitalize existing buildings, add value to our communities, and position our region for a more prosperous and energy-efficient future.

We have maintained our emphasis on accelerating the energy transition across the existing building stock. As Washington State enters the first wave of Building Performance Standards (BPS) compliance deadlines and Oregon develops similar requirements, the energy transition of existing buildings no longer a distant objective—it is an immediate challenge and an opportunity to rethink how we invest in, operate, and improve our building stock. The IDL is working to help building owners and industry decision-makers navigate this transition, identify opportunities, and capture the broader value of strategic, long-term investments in building performance.

Central to this effort is preparing the next generation of building industry professionals to understand building operations and conduct performance assessments. After 18 months of operation, we are thrilled to have received continued funding from the U.S. Department of Energy to sustain the Pacific Northwest Building Training and Assessment Center (PNW BTAC) through 2027. This program strengthens our partnerships with South Seattle College, Northwest Indian College, and the UW Industrial Assessment Center. PNW BTAC combines hands-on and virtual building audit training with the development of technical roadmaps for regional building owners, which to-date has included 52 students across 14+ building sites, and over 1,000 hours of onsite assessment activities.

We are also working to make strategic building-performance decisions more accessible. Through our partnership with the Northwest Energy Efficiency Alliance (NEEA), we co-authored a new web-based Building Upgrade Guide to help owners make the business case for holistic capital planning and whole-building energy efficiency.

As part of our R&D work, we have created and shared tools and methods for energy efficiency and decarbonization aimed at underserved building sectors. Notably, IDL partnered with Olson Kundig to develop and release DARA (Decarbonization Analysis for Residential Architecture), a freely available open-source tool that enables practitioners working on small-scale and single-family residential projects to analyze the lifecycle carbon impacts of design decisions. We also published the methodology and results of our work with the Seattle Housing Authority to develop an energy and indoor environmental quality investment decision-making tool for its scattered-site, small-scale residential properties.

We remain deeply grateful to our partners including NEEA, BetterBricks, our Puget Sound utilities, the U.S. Department of Energy, ARPA-E, AIA, ASHRAE, the UW Population Health Initiative, IES, and our Advisory Board for their continued guidance and support. None of this work is possible without our partners.

With Gratitude,

Christopher Meek
FAIA, IES
Professor
Director

Heather Burpee
AIA, EDAC
Research Professor
Director, Education and Outreach

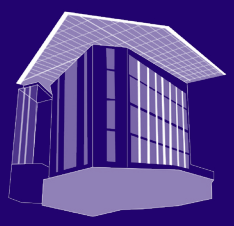
IDL at a GLANCE

WHO WE ARE

The IDL is operated by the **Department of Architecture** in the **College of Built Environments** at the **University of Washington** in the **Center for Integrated Design**. We are a self-sustaining organization of interdisciplinary faculty, staff, students, professional collaborators, and partner organizations working together to push the boundary on what's possible in sustainable building design. Our shared mission is to discover solutions that overcome the most difficult building performance barriers, and to meet the building industry's goals of moving towards radically higher performing buildings and healthy urban environments.

OUR WORK

The Integrated Design Lab's mission is underpinned by three service streams that work in tandem to promote an energy efficient, healthy built environment:



Knowledge Transfer through Education and Outreach – We share technical knowledge and lessons learned with our commercial clients and industry partners through professional education programs and public tours of the Bullitt Center.

Discovery through Research – We perform targeted research projects on high performance buildings in order to discover new technologies and strategies for healthy, energy efficient buildings.

Guidance through Technical Assistance – We apply our research findings by providing technical design assistance that translates new strategies and technologies to building project teams and industry partners.

The outcomes of our work intersect with people, policies, cities and buildings, and markets. Work examples are highlighted throughout this report. **In the past decade the Integrated Design Lab has produced:**

192 PAPERS PUBLISHED & JOURNAL ARTICLES, AND **529 CONFERENCE PRESENTATIONS**

DIRECT PROJECT INFLUENCE ON OVER **72,500,000 SQUARE FEET** OF COMMERCIAL BUILDINGS

OVER **99,500 HOURS** OF PAID GRADUATE STUDENT RESEARCH ENGAGEMENT AND **MENTORSHIP**

OVER **2,225 TOURS** SERVING OVER **42,000 PEOPLE VISITING** THE BULLITT CENTER

CONTACT

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SPONSORSHIP

Interested in collaborating with the IDL? Contact us to learn more, make a tax-deductible contribution to support the lab's mission, or to create student research internships.

Image Credit: University of Washington Image Collection

OUTCOME I: THEORETICAL & APPLIED RESEARCH

Decreasing carbon emissions requires the building sector to reduce energy waste and embodied carbon. The UW IDL's work supports ambitious programs, evaluates new technologies, develops tools, roadmaps, and helps implement innovative projects deploying sustainable design strategies.

UW Population Health Initiative [1]

Chris Meek and Teresa Moroseos are part of a team led by UW Assistant Professor Narjes Abbasabadi and Assistant Professor Mehdi Ashayeri (Southern Illinois University) that was awarded UW's Population Health Initiative (PHI). This grant will expand the team's work to advance urban modeling and machine learning techniques for improved indoor air quality, health, and energy efficiency for existing residential buildings in Seattle's Duwamish Valley and beyond. Recent activities include the publication of a paper and sharing research with community members at the Duwamish River Festival via the Duwamish River Community Coalition (DRCC).

NEEA Whole Building Implementation

The UW IDL with Molly McCabe of HaydenTanner have partnered with the Northwest Energy Efficiency Alliance (NEEA) to develop a new holistic "Whole Building" efficiency program that leverages building performance standards to accelerate and deepen energy efficiency in the existing building stock in Washington and Oregon – a generational opportunity that will pay dividends over the next several decades. Key goals include: (1) developing clear and compelling arguments for holistic and strategic energy improvements in the region's most common building typologies as part of routine capital planning (2) providing innovative tools to identify and leverage financing/ funding mechanisms, and (3) articulate the business case for whole-building efficiency approaches to their internal and external stakeholders. This work is part of a multi-year NEEA-led special project.

BetterBricks Building Upgrade Guide [2]

The UW IDL is collaborating with the BetterBricks team at the Northwest Energy Efficiency Alliance to help understand the best tools for building upgrades and resources for meeting Building Performance Standards. The outcome of this work is the BetterBricks Building Upgrade Guide to be used as a resource for those looking to meet Building Performance Standards throughout the Pacific Northwest region. Informing this guide are interviews with over 50 stakeholders, synthesizing key ideas for regional resources, new opportunities, and persistent barriers. It also included identifying case studies of buildings, people, or processes that have been engaged with energy efficiency upgrades and Building Performance Standards.

ARPA-E POD LCA

UW IDL is collaborating with UW's Life Cycle Lab on a four-year, ARPA-E-funded project supporting whole-building life cycle assessment (WBLCA). Recent milestones include quality control and documentation for calculating the environmental impacts of building electricity use for a novel WBLCA tool, along with development of energy modeling parameters for template buildings that integrate embodied and operational environmental impacts.

Image Credit: University of Washington Image Collection

OUTCOME II: EDUCATION & OUTREACH

The IDL forges partnerships to advance knowledge of high-performance buildings and overcome barriers for implementation. We develop and deliver educational programs for the professional design community, the University, and the public. These programs accelerate the realization of buildings that deliver exceptional environmental performance and improved return on investment.

Washington State Energy Code Interviews and Webinars [3]

Heather Burpee and Teresa Moroseos partnered with the Northwest Energy Efficiency Alliance (NEEA) on a two-part project focused on the Washington State Energy Code (WSEC). The first phase gathered practitioner feedback on common challenges and sticking points in applying the energy code. The second phase is delivering three educational webinars in 2026 on the 2021 WSEC-C, including sessions on existing buildings and UA tradeoff analysis.

Metropole Project Tours

Heather Burpee collaborated with NEEA's Advanced Performance HVAC team to deliver a paired webinar and in-person building tour of the Metropole Building. The historic building is a leading example of energy-efficient adaptive reuse, transforming a National Register property into a high-performance community hub. Led by the Satterberg Foundation, the renovation combines deep energy savings with a low projected EUI, AP DOAS technology, and other design strategies to achieve ambitious sustainability goals. Driven by ambitious environmental goals and achieving LEED Platinum Certification, the project showcases deep integration across design disciplines. The team employed a whole-building approach, aligning architectural vision with advanced performance HVAC strategies to achieve exceptional overall building performance.

Pacific Northwest Building Training and Assessment Center (PNW BTAC)[4]

The UW and its institutional partners at South Seattle College and Northwest Indian College have developed a Certificate Program and multi-institution curriculum under the UW IDL-led Pacific Northwest Building Training Assessment Center (PNW BTAC). This curriculum is integrated into programs and coursework at the participating institutions and will build regional capacity for building performance improvements: a trained workforce, and access to benchmarking and strategic roadmaps for energy efficient operations. The BTAC team offered a building energy efficiency workshop to pre-engineering students at Northwest Indian College as part of their summer STEM program. To-date nine buildings in the Pacific Northwest region have received detailed building performance assessments as part of the programs hands-on training program and over 30 students have received Building Assessment Training Certificates.

Bullitt Center Award [5]

The Bullitt Center has been recognized as a "Global Model of Smart Green Building," receiving the prestigious award through the Sustainable Cities and Human Settlements Awards Program at the 16th Global Forum on Human Settlements. Presented by the Global Forum on Human Settlements and supported by United Nations agencies, the award recognizes exemplary leadership in sustainable building and urban development. The formal awards ceremony will take place later this year at the 21st Global Forum on Human Settlements in southeastern Turkey during COP31. The UW IDL continues a robust tour program. Join us for a tour!

Image Credit: University of Washington Image Collection

OUTCOME III: TECHNICAL INFLUENCE ON DESIGN & CONSTRUCTION

The IDL's interdisciplinary faculty and students have influenced over 70 million square feet of new construction and major building renovation in the past decade. We provide technical assistance to architects, engineers, and building owners during early design phases through construction and operations with evidence-based strategies developed from research and targeted to deliver energy savings and reduced carbon emissions.

DARA: Decarbonization Analysis for Residential Architecture [6]

In partnership with Olson Kundig Architects (OK), the UW has developed a residential whole building lifecycle carbon emissions calculator for early-stage small-scale residential design decisions: Decarbonization Analysis for Residential Architecture (DARA). This freely available open-source tool enables designers to select key project attributes, such as location, envelope, structural design, window to-wall ratio, and HVAC system, and interactively calculate both embodied and operational carbon emissions. It allows users with little to no life cycle analysis technical knowledge to evaluate how design decisions affect carbon emissions over the project's lifetime. DARA was funded by a competitive Upjohn Research Initiative Award from the American Institute of Architects (AIA).

Bellevue 600 Tenant Improvement

Chris Meek and Teresa Moroseos provided daylighting design support for the Bellevue 600 TI project, a 43-story office tower in downtown Bellevue, for Boulder Associates Architects and Seneca Group.

> "Technical design assistance provided by the IDL helps shape the focus of our research and connects us with the design community in the collaborative effort to pursue a better built environment."

The analysis evaluated how ceiling design affected daylight distribution and glare, and assessed amenity spaces to identify areas of potential glare and inform space planning and shading system design.

PNW BTAC Building Assessments

The PNW BTAC combines hands-on and virtual building audit training while creating technical roadmaps for regional building owners. To-date, 52 students have participated in building assessment training across more than five building sites with over 1000 hours of on-site student assessment activities. Over thirty students have qualified for the PNW Building Assessment Certificate. Our building assessment training site outreach has resulted in the successful recruitment of fourteen PNW BTAC training sites. Completed assessments include University Presbyterian Church, AfricaTown Community Land Trust Benu Shelter, the ACT Theater, Partner Therapeutics, and the historic building at El Centro de la Raza. Additionally, the PNW BTAC cumulatively engaged 3 trade unions and 1 labor institute/apprentice center representing more than 5 trades/locals, 6 non-profit and community-based organizations, 5 government departments, and several regional utilities.

Glare Analysis Tool

UW IDL graduate student Siqing Han and Teresa Moroseos developed a Glare Analysis Webtool designed to make early-stage glare assessment more accessible. The tool allows users to evaluate the depth and area of direct sunlight on a horizontal surface at a user-defined height, across various times of day and year, based on window and exterior shading configurations. Beta testing is underway, with public release on the UW IDL website anticipated soon.

Image Credit: University of Washington Image Collection

SELECTED PRESENTATIONS & PUBLICATIONS

The IDL transfers its research findings through presentations and publications in diverse venues regionally, nationally, and internationally. These forums help to disseminate knowledge directly to design teams, professional partners, and others, bolstering the industry's technical capabilities and knowledge of high performance design.

ACEEE Paper and Presentation on Existing Building Efficiency [7]

IDL Professor Heather Burpee presented a paper at the American Council for an Energy Efficiency Economy entitled "Data-Informed Retrofit Pathways for Small-Scale Low-Rise Residential: Balancing Cost, Comfort, and Energy Efficiency in Affordable Housing." Authored by Meek, Moroseos, and Burpee, the paper introduces a decision-making and modeling tool developed to support energy efficiency retrofits and indoor environmental quality (IEQ) improvements in small-scale residential buildings operated by the Pacific Northwest public affordable housing provider.

ACEEE Paper on IDL Lab Network [8]

IDL Professor Heather Burpee presented a paper at the American Council for an Energy Efficiency Economy entitled, "Mapping the Influence of a Network: long-term market transformation through mentorship in Integrated Design." Authored by the directors at each of the five Integrated Design Labs in the Pacific Northwest Lab Network, the paper documents the labs' mentorship mission where interns learn and apply strategies for energy-efficient building design and operation. These students enter the workforce better prepared to influence the design profession, changing the workflow and design methods of the firms where they practice, providing technological skill and intellectual depth to their work.

WSSHE Healthcare Webinar

Heather Burpee participated as a panelist in a Washington State Society for Healthcare Engineering (WSSHE) event, "Critical Care Meets Critical Compliance" with moderator Adam Thordarson and co-panelists Nicole DeNamur, Faith DeBolt, Neil Burgheimer, and Sierra Spitulski. They discussed building performance standards in relationship to healthcare buildings and how participants can get started or move further with their energy efficiency, decarbonization, and compliance goals.

Greenbuild Presentation: Decarbonize Healthcare Buildings [9]

Heather Burpee presented in a session "Mission Possible: Decarbonizing Healthcare with LEED v.5 and ASHRAE" with Mara Baum (DIALOG), and Walt Vernon (Mazzetti) at the 2025 Greenbuild International Conference in Los Angeles. Her presentation shared pathways and strategies for decarbonizing hospitals as outlined in the 2024 ASHRAE/ASHE Decarbonize Hospital Buildings Guidebook.

SIM Build and DARA Presentations [6]

In partnership with Olson Kundig Architects, UW IDL developed the Decarbonization Analysis for Residential Architecture (DARA) tool. Thiswork was be presented at the ILFI Living Futures conference and via a peer-reviewed publication at the SIM-BUILD Building Simulation Conference in Minneapolis, MN in May of 2026 and at the AIA National Conference in San Diego, CA in June of 2026.

Greenbuild Presentation: Excessive Heat Mitigation [10]

Teresa Moroseos presented in a session "Don't Sweat It: Designing for Extreme Heat and Resilience" with Mike Fowler (Mithun), Claire McConnell (Mithun), and Kerri Mueller (Missoula Public Health) at the 2025 Greenbuild International Conference in Los Angeles. Her presentation shared research findings on effectiveness of various passive design mitigation strategies during extreme heat events in multifamily apartment buildings.

UW IDL STAFF

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PUBLICATION CITATIONS

1- Abbasabadi, N., Moroseos, T. F., Ashayeri, M., & Meek, C. (2026). AI-enhanced urban building energy modeling for health-driven decarbonization in vulnerable communities. Architecture, 6(2), 84. **Web Link.**

2- BetterBricks Building Upgrade Guide. **Web Link.**

3 - Washington State Energy Code On-Demand Training." **Web Link.**

4- U.S. Dept. of Energy, Pacific Northwest Building Training Assessment Center (PNW BTAC). **Web Link.**

5- University of Washington's Integrated Design Lab, "Bullitt Center Tour Program. **Web Link.**

6- Olson Kundig and University of Washington's, "Decarbonization Analysis for Residential Architecture (DARA) Tool." Download tool here. **Web Link**.

7- Meek, C., Burpee, H., Moroseos, T. American Council for an Energy Efficient Economy (ACEEE) Summer Study on Energy Efficiency in Buildings. "Data-Informed Retrofit Pathways for Low-Rise Residential: Balancing Cost, Comfort, and Energy Efficiency in Affordable Housing." Proceedings of the American Council for an Energy Efficient Economy (ACEEE) Summer Study on Energy Efficiency in Buildings. Asilomar CA. August 2026. **Web Link**.

8- Woods, D. (Univ. of Idaho), Burpee, H., Bauer, S. (Washington State Univ.), Mukhopadhyay, J. (Montana State Univ.), Meek, C. (UW Architecture), Day, J. (Washington State Univ.), Skuntz, M. (Montana State Univ.), Rockcastle, S. (Univ. of Oregon), Fretz, M. (Univ. of Oregon). American Council for an Energy Efficient Economy (ACEEE) Summer Study on Energy Efficiency in Buildings. "Mapping the Influence of a Network: long-term market transformation through mentorship in Integrated Design." Proceedings of the American Council for an Energy Efficient Economy (ACEEE) Summer Study on Energy Efficiency in Buildings. Asilomar CA. August 2026. **Web Link**.

9- Greenbuild International Conference + Expo, "Mission Possible: Decarbonizing Healthcare with LEED v.5 and ASHRAE." Presentation with Mara Baum (DIALOG), Jim Crabb (Mazzetti), and Walt Vernon (Mazzetti). Los Angeles, CA. 7 November 2025.

10- GreenBuild International Conference + Expo, "Don't Sweat It: Designing for Extreme Heat and Resilience." Presentation with Mike Fowler (Mithun), Claire McConnell (Mithun), and Kerri Mueller (Missoula Public Health). Los Angeles, CA. 6 October 2025.

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