Kathryn G. Hinkelman (formerly Van Lieshout)

PhD Student, Architectural Engineering
University of Colorado Boulder
1111 Engineering Dr, ECCE 240
Boulder, CO 80309

kathryn(dot)hinkelman(at)colorado(dot)edu
khinkelman.github.io
colorado.edu/lab/sbs

Research Interests

Smart & sustainable communities, modeling & simulation, district energy systems, biomimicry, ecology, human centered design, indoor environmental quality, life cycle assessment

Education

University of Colorado Boulder *expected May 2022*
PhD Student, Architectural Engineering
Building Systems Engineering, Energy | GPA: 4.0

University of California, Berkeley *May 2015*
MS in Mechanical Engineering
Concentration in Design | GPA: 4.0

University of Denver *Jun 2013*
BS in Mechanical Engineering
Summa Cum Laude, Phi Beta Kappa, Departmental Distinction | GPA: 3.97

Sponsored Research Projects

Major contributor to proposal development:

EAGER: Collaborative Research: Modernizing Cities via Smart Garden Alleys with Application in Makassar City (Award No. CNS-2025459, 07/20-06/22).
- Sponsor: National Science Foundation. PI: Dr. Wangda Zuo. Amount: **$175,000**.

Optimal Co-Design of Integrated Thermal-Electrical Networks and Control Systems for Grid-interactive Efficient District (GED) Energy Systems (06/20- 12/23)
- Sponsor: Department of Energy. PI: Dr. Wangda Zuo. Amount: **$4,159,922**.

Journal Publications

(Under Review) Ye, Yunyang, **Kathryn Hinkelman**, Yingli Lou, Wangda Zuo, Gang Wang, Jian Zhang. "Evaluating the Energy Impact Potential of Energy Efficiency Measures for Retrofit Applications: A Case Study with U.S. Medium Office Buildings." *Building Simulation*.

Ye, Yunyang, **Kathryn Hinkelman**, Jian Zhang, Wangda Zuo, and Gang Wang. 2019. “A Methodology to Create Prototypical Building Energy Models for Existing Buildings: A Case Study on U.S. Religious Worship Buildings.” *Energy and Buildings* 194: 351–65. https://doi.org/10.1016/j.enbuild.2019.04.037.

Lu, Xing, **Kathryn Hinkelman**, Yangyang Fu, Jing Wang, Wangda Zuo, Qianqian Zhang, and Walid Saad. 2019. “An Open Source Modeling Framework for Interdependent Energy-Transportation-Communication Infrastructure in Smart and Connected Communities.” *IEEE Access* 7: 55458–76. https://doi.org/10.1109/ACCESS.2019.2913630.

Van Lieshout, Kathryn G, Joy G Anderson, Kevin B Shelburne, and Bradley S Davidson. 2014. “Intensity Rankings of Plyometric Exercises Using Joint Power Absorption.” *Clinical Biomechanics* 29: 918–22. https://doi.org/https://doi.org/10.1016/j.clinbiomech.2014.06.015.

Peer-Reviewed Conference Publications

Hinkelman, Kathryn, Sen Huang, Jing Wang, Wangda Zuo. 2019. "Enhancing the Implementation of a First-order Equivalent Thermal Parameter Model to Enable Accurate and Robust Building Thermal Response Prediction." *Building Simulation Conference*. Rome, Italy.

Ye, Yunyang, **Kathryn Hinkelman**, Jian Zhang, Yulong Xie, Wangda Zuo. 2019. "A Methodology to Determine Energy Savings Impact of Building Energy Code Upgrades: A Case Study on Small Offices." *Building Simulation Conference*. Rome, Italy.

Van Lieshout, Kathryn G, Cindy Bayley, Sarah O Akinlabi, Lisa von Rabenau, and David Dornfeld. 2015. "Leveraging Life Cycle Assessment to Evaluate Environmental Impacts of Green Cleaning Products." In *Procedia CIRP*, 29:372–77. Sydney, Australia. https://doi.org/10.1016/j.procir.2015.02.063.

Peer-Reviewed Poster Sessions

Hinkelman, Kathryn. Xing Lu, Wangda Zuo, Yangyang Fu, Jing Wang, Yingchen Zhang. "Multi-domain Modeling Framework for Future Smart and Connected Communities." *21st Century Energy Transition Symposium*, Denver, CO, April 1-2, 2019.

Van Lieshout, Kathryn G, Owen RW Dennis, Joy G Anderson, Kevin B Shelburne, Bradley S Davidson. "Intensity rankings of plyometric exercises using joint power absorption." *American College of Sports Medicine Annual Meeting*, Indianapolis, IN, May 28-June 1, 2013.

Presentation Sessions

"Enhancing the Implementation of a First-order Equivalent Thermal Parameter Model to Enable Accurate and Robust Building Thermal Response Prediction." *Building Simulation Conference*. Rome, Italy, September 2-4, 2019.

"A Modeling Framework to Evaluate Energy, Transportation, and Communication Interdependence in Smart and Connected Communities." *Intelligent Building Operations Workshop*, Boulder, CO, August 7-9, 2019.

"Leveraging life cycle assessment to evaluate environmental impacts of green cleaning products." *22nd CIRP Conference on Life Cycle Engineering*, Sydney, Australia, April 7-9, 2015.

Technical Reports (Not Peer-Reviewed)

Van Lieshout, Kathryn G. 2015. "Environmental impact and indoor environmental quality assessment of Pinoleville Pomo Nation demonstration home: An implementation of life cycle assessment and culturally-inspired design." Master's Thesis. *University of California, Berkeley*.

Final Report (co-authored with Alice Agogino (PI) and student team). 2015. "Advanced UX Development Based on Innovative Technology: Integrating UX Design with the Internet of Things." Samsung Electronics Co., Ltd. DMC R&D Center.

Agogino, Alice (PI). **Kathryn Van Lieshout**, Chandrayee Basu, Kyunam Kim, Julien Caubel, Elizabeth Cheng, Aparna Dhinakaran. 2014. "Model Predictive Smart Lighting Commissioning System for Emerging Demand Management." Energy Innovations Small Grant Program: Final Report. California Energy Commission.

Professional Experience

Research Assistant *May 2019 – Present*

Sustainable Buildings and Societies Laboratory with Dr. Wangda Zuo, University of Colorado Boulder

- Developer for the Modelica Buildings Library, a popular open-source library with dynamic simulation models for building and district energy and control systems
- International collaborator with IBPSA Project 1 Task 3 (Application & Dissemination), standardizing testing frameworks & advancing computational modeling & simulation capabilities for urban-scale energy systems

MEP Engineer *Jul 2015 – Jul 2018*
The Boulder Engineering Company, Boulder, CO
- Designed HVAC, power, and lighting systems for multi-family residential and commercial building projects, including restaurants, breweries, manufacturing, and medical office buildings
- Developed complete construction documents for rooftop PV systems totaling over 500 KW
- Created, evaluated, and refined new office standards through transition to 100% Revit usage
- Independently designed and coordinated entire MEP systems for office projects from schematic design through construction administration

Graduate Student Researcher *Jan 2014 – May 2015*
Berkeley Energy and Sustainable Technologies Lab with Professor Agogino, University of California, Berkeley
- Quantified potential energy savings from closed-loop daylighting systems for demand response
- Managed 7 design teams (38 students) on developing innovative design concepts for the Internet of Things

Undergraduate Research Assistant *Jun 2012 – Jul 2013*
Biomechanics Lab with Professor Davidson, University of Denver
- Spearheaded first-time research collaboration between the Engineering and Athletics Departments
- Detailed experiment, collected data, analyzed results, and presented research in quantifying plyometric intensity for sports rehabilitation

TEACHING EXPERIENCE

Teaching Assistant *Spring 2019*
AREN 4317: Architectural Engineering Design, University of Colorado Boulder
- Provided technical support for designing mechanical HVAC and hydronic systems
- Independently taught course lectures on Building Information Modeling (BIM) and interdisciplinary collaboration
- Coordinated meetings/assignments/presentations/grades for 37 students, 15 industry mentors, & 5 faculty
- *"I wish Katy had more opportunities to give a lecture."*

Teaching Assistant *Fall 2018*
AREN 3540: Illumination I, University of Colorado Boulder
- Supported 41 upper-level undergraduate students through technical foundations of light
- Held office hours, graded assignments, and developed supplemental course material for instructor
- *"Katy was available & knowledgeable about this topic and was good at providing clear feedback & help."*

Graduate Student Instructor *Spring 2014*
ME 110: Intro to New Product Development, University of California, Berkeley
- Guided 14 interdisciplinary teams through design process from ideation to functional prototype
- Coordinated semester finale showcase presentation with academic and industry professionals

Graduate Student Instructor *Fall 2013*
ME 107: Mechanical Engineering Laboratory, University of California, Berkeley
- Independently supervised 20 students on a dynamics laboratory experiment
- Held weekly lab sections and assisted students on homework assignments

Academic Tutor *Jan 2011 – Jun 2012*
Athletics and Recreation, University of Denver
- Tutored university athletes in subjects of Differential Equations, Calculus, and Engineering Concepts
- Reviewed class material & explained concepts that were missed due to athletic travel

SELECT RESEARCH PROJECTS

Modernizing Cities via Smart Garden Alleys with Application in Makassar City *Jul 2020 – Present*
Sponsored by NSF (Award CNS-2025459) and DOS, PI: Dr. Wangda Zuo, University of Colorado Boulder
Collaboration with Virginia Tech, Universitas Gadjah Mada (Indonesia), and Institut Teknologi Bandung (Indonesia)
- The goal of this research is to catalyze the transformation of Makassar City's garden alleys into smart environments by deploying a sensor network at representative green allies and conventional allies to collect data related to air quality, microclimates, and other factors; to analyze the heterogeneous data using

machine learning techniques; and to then share the data and its insights with city representatives and specific communities within the city.

Support for District Energy Simulation with Modelica *Jan 2019 – Present*
Collaboration with the NREL and LBNL, University of Colorado Boulder
- The goal of this project is to create a new software analysis platform that leverages the Modelica language in order to enable developers of community-scale construction projects to effectively evaluate and optimize district heating and cooling systems

BIGDATA: Collaborative Research: IA: Big Data Analytics for Optimized Planning of Smart, Sustainable, and Connected Communities *Oct 2018 – Present*
Sponsored by the NSF (Awards IIS-1802017 & IIS-1633363), PI: Dr. Wangda Zuo, University of Colorado Boulder
- The goal of this project is to develop a new planning framework for smart, connected and sustainable communities that allows meeting such zero energy, zero outage, and zero congestions goals by optimally deciding on how, when, and where to deploy or upgrade a community's infrastructure.

Assessing Sustainability of Homes with the Pinoleville Pomo Nation *Oct 2013 – May 2015*
Master's Project with Dr. Alice Agogino and Dr. Daniel Kammen, University of California, Berkeley
- Designed a culturally-inspired indoor environmental quality monitoring tool for tribal residents
- Developed and tested the mechanical, electrical, and software systems for the PV-powered sensors
- Evaluated the life cycle impacts of the home with geothermal heat pumps and grid-tied PV system

Retrofitting Commercial Buildings with Smart Lighting Systems *Jan 2014 – Oct 2014*
Sponsored by the California Energy Commission, while at University of California, Berkeley
- Computed potential energy savings from using a smart lighting system for demand response
- Performed an LCA of the smart lighting sensors and assessed the effective environmental payback

LEADERSHIP

Conference Chair
Intelligent Building Operations (IBO) Workshop, University of Colorado Boulder *Aug 7, 2019*
- Session chair for *Modeling and Assessment Tools*

Collegiate Athlete *Aug 2009 – Nov 2012*
Division I Women's Soccer Team, University of Denver
- Balanced intensive athletic duties of regular practice, games, and travel with a difficult course load
- Gained leadership qualities through coaching clinics and motivating teammates on and off the field
- Regular starter and leader to the team, finishing 22nd in the nation in senior season

AWARDS & SCHOLARSHIPS

International Building Performance Simulation Association (IBPSA) Project 1 Scholarship Recipient *2019*

The Link Foundation Energy Fellowship Program Honorable Mention *2019*

Colorado Engineering Council Silver Medal & Certificate of Merit *2013*

Pioneer Award ("the **highest honor** given to undergraduate students" at the University of Denver) *2013*

Mechanical Engineering Departmental Distinction *2013*

Taylor Achievement Award *2013*
Presented by Ortho Transmission, LLC in recognition of passionate contribution to the Hugate Transcutaneous Amputation Prosthesis Project

Hornbeck Scholar (7 quarters), University of Denver *2010-2013*

Dean's List (8 quarters), University of Denver *2010-2013*

A University of Denver Scholar-Athlete of the Year (4 years) *2009 – 2013*

NSCAA Scholar All-West Region Team *2012*

Second Team All-WAC Selection *2012*

Academic All-American First Team, Division I Women's Soccer *2011*

Preseason All-Sun Belt Conference Team	*2011*
Sun Belt Conference Commissioner's List (all 3 seasons)	*2009 – 2011*
SBC All-Conference First Team	*2010*
DU Invitational All-Tournament Team	*2009*
CS360's Primetime Performers of the Week (9/15)	*2009*

PROFESSIONAL ASSOCIATIONS

ASHRAE: American Society of Heating, Refrigerating and Air-Conditioning Engineers	*2017 – Present*
ICC: International Code Council	*2018 – Present*
IBPSA: International Building Performance Simulation Association	*2019 – Present*
IEEE: Institute of Electrical and Electronics Engineers	*2019 – Present*
ASME: American Society of Mechanical Engineers	*2019 – Present*