# Rolf Jacobson - Research Fellow, LEED AP, CPHC

### **EDUCATION:**

- 2011 Masters of Science, Sustainable Design, CDES, University of Minnesota
- 2007 Masters of Architecture, CDES, University of Minnesota
- 2001 Bachelor of Arts, St. Olaf College, Northfield, MN Major: Physics, Math

### **EXPERIENCE:**

2015-23 **Research Fellow,** Center for Sustainable Building Research Research Projects include:

- The Market for Passive House Multifamily Projects in Minnesota, MN Commerce Department CARD grant research, PI
- WRAP Project, MN Commerce Department field testing innovative home weatherization methods using exterior wall insulation and air barrier
- Increasing the Energy Efficiency of Buildings Through On-Body Supplemental Heating: A Feasibility Analysis, CDES Collaborative Grant, PI
- Sharing Our Roots Net Zero Energy Office & Education building energy modeling and mechanical and enclosure systems guidance and review, including thermal bridge modeling
- Northfield Net Zero Energy Affordable Housing project energy modeling and mechanical and enclosure systems guidance and review, including thermal bridge modeling
- PNNL High R Windows Validation "Thin Triple" glazed windows field research and testing
- PNNL Wall Upgrades for Residential Energy Renovation field installation of wall assemblies, renovation packages, and moisture monitoring equipment
- Building America Solution Center Winter Weather Guides development of design and construction guides to limit condensation for walls and roofs in cold climates
- NorthernSTAR Affordable Solid Panel Perfect Wall System energy and moisture modeling and analysis, energy and moisture sensor installation and monitoring, construction process supervision
- University of Washington LCA Practice Guide development with Kate Simonen.
- Aeon Wall Evaluation Study using WUFI, Glaser, and THERM moisture analysis tools.
- Minnesota Sustainable Housing Initiative (www.mnshi.umn.edu) High performance multifamily housing prototype development, Passive House, and software comparison.
- Minnesota Sustainable Housing Initiative (www.mnshi.umn.edu) High performance housing case study analysis and documentation for the mnshi website database.
- SB2030 and B3 Program B3 Guidelines updates, development of the B3 Small Buildings Method, tool development (renewable energy levelized cost calculator and Glaser moisture analysis tool), and trainings. Also, program administration and support for residential projects.

## 2007-15 **Owner and principal,** Skandia Design & Consulting, LLC

Provided design, energy, and envelope consulting services for new private residences and home renovation projects. Worked with homeowners, architects, and developers to design and build high-performance homes. Additional services included energy modeling (REM Rate, PHPP, Energy-10), window and envelope selection, HVAC and renewable energy systems planning, hygrothermal modeling (WUFI) and thermal bridge analysis (THERM).

- 2013-15 **Research Consultant,** University of Minnesota Cold Climate Housing Program and DOE Building America NorthernSTAR team member Research projects included:
  - Best of NorthernSTAR energy modeling and analysis of energy saving measures (mechanical systems, air sealing, and exterior insulation) employed in an affordable housing deep energy retrofit.
  - Ground Source Heat Pump Field Study Data analysis and energy modeling for in-situ residential ground source heat pump installations.
  - Innovative Insulation Retrofit for Concrete Block Foundations Data analysis and drafting research report on impacts of various insulation strategies for existing concrete block foundations including core fills and shallow exterior insulation.
  - Excavationless Insulation Retrofit for Foundations Presentation development on the combined hydrovac/pourable foam technology for insulating existing foundations.
  - Building Science Education Development for trades and students.

2008–12 Research Fellow, Center for Sustainable Building Research

- Research projects included:
- Development of Upstream Energy Design Guidelines for single family and multi-family affordable housing projects.
- High Performance Commercial Windows Design Guide, with NREL Data analysis, graph production, and website development (http://www.commercialwindows.org)
- Minnesota Sustainable Housing Initiative (www.mnshi.umn.edu) Research, analysis, and costing of sustainable design strategies and technologies, energy modeling, website design and production, and community design charrettes, focused on affordable housing
- Design Guidelines for Sustainable Housing Research paper comparing sustainable building guidelines and rating systems such as LEED NC, submitted to Yonsei University, S. Korea
- Minnesota Site and Building Carbon Calculator, submitted to MPCA
- Post Occupancy Evaluations utility bill analysis for normalized water and energy use, submitted to Washington County
- 2010–11 **Fulbright Student Researcher,** Centre for Zero Emissions Buildings (ZEB) Self-directed Master's of Science thesis research in Norway on the comparative performance of 8 types of passive house envelopes commonly used in cold climates. Building science topics included life cycle environmental impacts, hygrothermal performance, thermal bridging, and 2-D U-value analysis. Worked with NTNU professors and SINTEF researchers to learn software programs and analysis techniques for WUFI, THERM, PHPP, and 2-D U-values.
- 2006-08 **Research Assistant**, Center for Sustainable Building Research Research projects included:
  - Viking Terrace Green Building Health Outcome Evaluation helped conduct multi-unit blower door and pressure testing, indoor air quality monitoring, and utility bill analysis for 60-unit affordable housing complex.
- 2006-10 Architect Intern, Abraham + Associates Architects Primarily responsible for the successful completion of LEED EB certification for 65,000sf office building in Edina, MN. Work included documenting and managing credit submittals,

drafting organizational sustainability policies, conducting client meetings, and participating in HVAC recommissioning efforts.

- 2003-05 **Framer**, Olympic Construction Worked as a framer for local home construction company, learning the process and technique of wood frame construction.
- 2000-02 **Project Coordinator**, enXco Wind Energy Development Worked as a project manager in the Midwest office of a nation-wide, utility-scale wind energy developer. Identified and scouted potential sites, organized and led landowner meetings/acquisition efforts, and managed landowner and meteorological tower databases.

#### **COMPUTER SKILLS:**

WUFI Pro hygrothermal modeling software, THERM and Flixo heat flow modeling software, Athena Eco-calculator life cycle environmental analysis, PHPP Passive House Planning Package, WUFI Passive, REMRate, BEopt, CostWorks construction cost database, Adobe Photoshop, Adobe Illustrator, Google Sketchup and Layout, Microsoft Office Suite

#### **ORGANIZATIONS & PROFESSIONAL ACTIVITIES:**

Carbon Leadership Forum Passive House MN, Leadership Circle Building Enclosure Council of MN LEED accredited professional (LEED AP) Certified Passive House Consultant (CPHC)

#### **AWARDS & HONORS:**

 Fulbright Scholarship, 2010/2011
Thesis Prize nomination, University of Minnesota, 2007
ARCC King Student Medal for Excellence in Architectural + Environmental Design Research, University of Minnesota, 2007

Graduated Magna Cum Laude, Phi Beta Kappa, with Departmental Distinction in Physics, St. Olaf College, 2001

#### **PUBLISHED PAPERS & ARTICLES**

U.S. Department of Energy, 2021. "Condensation Control in Attics and Roofs in Cold Weather" U.S. Department of Energy, 2021. "Condensation Control for Walls in Cold Weather"

Pacific Northwest National Laboratory, 2021. "Wall Upgrades for Energy Retrofits: A Techno-Economic Study"

U.S. Department of Energy, 2020. "Affordable Solid Panel 'Perfect Wall' System" Passive House Building – North American Highlights, 2017. "Re-examining Thermal Bridges" Minnesota Department of Commerce, 2016. "Residential Ground Source Heat Pump Study"

U.S. Department of Energy, 2015. "NorthernSTAR 1 ½ Story Demonstration House of Cold Climate Solutions for Affordable Housing"

Home Energy Magazine, November 2014. "Comparing Eight Cold Climate Envelopes"

U.S. Department of Energy, 2014. "Innovative Retrofit Strategies for Concrete Masonry Foundations"

GRIN Verlag, 2011. "Performance of 8 Cold Climate Envelopes for Passive Houses"

#### PRESENTATIONS

North American Passive House Network national conference – 2017 and ½-day workshop 2018 Midwest Renewable Energy Association Energy Fair – September 2017 Halfmoon Continuing Education 1-day seminar, Passive House Planning and Design – Sept. 2016 Duluth Energy Design Conference – February 2021, '19, '18, '15, '13, '12 MN Sustainable Building 2030, 10-wk Course – March 2015, '14, '13, '12 Northeast Sustainable Energy Association, Building Energy Conference – March 2014 Passive House Northwest – ½-day workshop and conference presentation – April 2017 Passive House Institute US National Conference – February 2021, '20, '19, '17, '16, '15, '14, '13, '12 AIA MN Convention and Exposition – September 2021, '15, '13 Passive House Alliance Minnesota Chapter (presentation and webinar) – February '22, May '13 Passivhus Norden (Scandinavian Passive House Conference in Trondheim, Norway) – October 2012 AIA MN Building Enclosure Council (BEC) – February 2012