

Curriculum Vita for Thomas Bednar

1.1.2023

Date of birth: 07/06/1971
Place of Birth: Vienna, Austria
Nationality: Austria
Position: Full Professor
Head of Research Unit of Building Physics
Head of Institute of Material Technology, Building Physics and Building Ecology
Faculty of Civil and Environmental Engineering
TU Wien
A-1040 Vienna; Karlsplatz 13/207-02
Languages: German, English

Academic qualifications

Since 2016	Full Professor for Building Physics at TU Wien
2006 - 2016	Associate Professor at TU Wien.
12/2005	Habilitation (Venia Docendi) at TU Wien in the field of "Building Physics"
04/2000	Ph.D. (Doctor of Technical Sciences) Graduation with distinction at the TU Wien Thesis: Assessment of Hygrothermal Behaviour of Building Elements and Buildings – Development of Measurement and Calculation Methods (Beurteilung des feuchte- und wärmetechnischen Verhaltens von Bauteilen und Gebäuden - Weiterentwicklung der Meß- und Rechenverfahren)
06/1995	M.Sc. Technical Physics Master thesis: Influence of Spin fluctuations on the temperature dependence of electronic transport coefficients (Einfluss von Spinfluktuationen auf die Temperaturabhängigkeit der elektronischen Transportkoeffizienten)

Employments and international experiences

Since 1.1.2019	Head of Institute of Material Technology, Building Physics, and Building Ecology Head of Research Unit Building Physics
Since 2008	Head of the Research Centre for Building Physics and Sound Protection Institute for Building Constructions and Technology, TU Wien
10/2014	Visiting Researcher at Chalmers University of Technology, Göteborg Probabilistic Assessment of Hygrothermal building performance (IEA Annex 55)
02/2013	Visiting Researcher; University of Technology Turin, Italy Total energy use in buildings (IEA Annex53)
02 /2008	Guest lecture, Chalmers University of Technology, Göteborg, Sweden
03/2002	Visiting Researcher at Chalmers University of Technology, Göteborg Hygrothermal building simulations.
2000-2006	Assistant Professor Institute for Building Materials, Building Physics and Fire Protection, TU Wien.
08/1999	Visiting Researcher at the University of Strathclyde (Scotland) Building simulation
1996-2000	University Assistant Institute for Building Materials, Building Physics and Fire Protection, TU Wien
1990,1991,1992,1995	Employment at Consulting and Engineering Company for Technical Physics Field of work: Nuclear Radiation, Particle Dynamics in Water flows, Air quality measurements, Sound Propagation
1993, 1994	Employment at SIEMENS Austria Computer Tomography, System for handling telephone calls

National Committees or Scientific Advisor

Since 2021	Member of Innovation Lab "renowave.at"
2009-2022	Member of the scientific advisory board for the Research Centre "Energy and Environment" at TU Wien
Austrian Standards	Head of AG 175-01: Calculation and measurement methods on thermal performance and energy use in the built environment
Austrian Standards	Member of ASI 175 "Thermal performance in buildings and building components" ASI 208 "Acoustic properties of building products and buildings" ASI 235 "Economic use of energy in buildings" ASI 006 "Fire safety "
Since 2009	Permanent member of the Federal Advisory Committee for Monuments of the Federal Ministry of Education, Arts and Culture

International Committees and Scientific Advisor

Since 2016	Coordinator of CIB W040 "Heat and moisture Transfer in Buildings" https://www.buildingphysics4all.org/
Since 2007	Nordic Building Physics Symposium Member of the Scientific Committee
2015-2019	Member of Scientific Reviewing Board Panel "Built Environment" for the Swedish Research Council for Sustainable Development
2010-2015	Austrian delegate to IEA Annex 55 „Reliability of Energy Efficient Building Retrofitting – Probability Assessment of Performance & Cost“
2012	Member of the international Advisory Board for the Research Assessment Exercise 2012 of KTH/Stockholm / Schweden „research-evaluation/rae-2012-1.582169 “
2008-2013	Austrian delegate to IEA Annex 53 „Total Energy Use in Buildings: Analysis & Evaluation Methods “
2010	Member of the International Scientific Advisory Boards for the development of the Swedish University of Building Engineering Sciences CHALMERS, KTH, LTH, LTU in collaboration
2003-2007	Austrian delegate to IEA Annex 41 „Whole Building Heat, Air and Moisture Response“
CEN	Austrian representative to CEN TC 371 "Project Committee - Energy Performance of Building project group" CEN TC 89 "Thermal performance of buildings and building components"
ISO	Austrian representative to ISO TC 163 "Thermal performance and energy use in the built environment" ISO TC 205 "Building environment design"

Scientific rewards

Sustainability Award 2014 – Field of action: Research

First Place for Doctoral School URBEM

Austrian State Prize 2015 „Clean Technology Austria“

Winner Main category "Research and Innovation"

Plus-Energy Office Tower of TU Wien at Getreidemarkt

Research Supervision

Doctoral Schools

2013-2016 URBEM Head of Doctoral School, Supervisor
<http://urbem.tuwien.ac.at>

2011-2013 ENSYS2030 Supervisor
Ensys2030 an der TUWien

Ph.D.-Projects

David, Alexander:2022

Developing the basic method for quality assurance and accelerated commissioning of energy monitoring systems
Entwicklung der grundlegenden Methode zur Qualitätssicherung und beschleunigten Inbetriebnahme von Energiemonitoringsystemen

Markus Leeb:2020

Entwicklung einer Methodik zur Zielerreichung bei der Planung von energieeffizienten Bürogebäuden
Development of a methodology for achievement of objectives in planning energy efficient office buildings

Ehrlich Florian:2018

Entwicklung eines stockwerkübergreifenden Querlüftungsmodells unter Berücksichtigung von Insekten- und Pollenschutzgittern für Einfamilienhäuser zur Prognose der sommerlichen Überwärmung
Development of a cross ventilation model between floors taking account of Insect- and Pollen screens for single family houses to predict the summer overheating

Neusser, Maximilian: 2017

Analyse des Einflusses von Verbindungsmitteln auf das Schalldämmmaß von leichten Trennwandkonstruktionen durch realitätsnahe Modellierung von Schraub- und Klebeverbindungen
Sound transmission loss analysis of fastening methods of lightweight partition walls by realistic modeling of screw and glue connections

Eder, Katharina; 2017

Interaction of building envelope and cooling ceilings - system analysis and system modeling

Ziegler, Manuel; 2016

Method for establishing scalable load profiles for residential and office buildings to run an urban simulation environment considering construction and mechanical engineering technologies as well as the impact of social differentiation :
Methode zur Erstellung skalierbarer Lastprofile für Wohn- und Bürogebäude in Abhängigkeit der Bau- und Haustechnik sowie der Einfluss sozialer Differenzierung für eine urbane Simulationsumgebung

Gladt, Matthias; 2014

An algorithm for the automatic reduction of multi-zone models for thermal building simulation

Handler, Simon 2014

Steigerung der Energieeffizienz von kleinvolumigen Wohnbauten durch solarthermische Aktivierung von Betondecken :
simulationsbasierte Entwicklung eines Gebäudekonzepts und einer neuen Methode zur Vordimensionierung

Nusser, Bernd; 2012

Flachgeneigte hölzerne Dachkonstruktionen : Systemanalysen und neue Ansätze zur Planung hygrisch robuster flachgeneigter hölzerner Dachkonstruktionen unter Beachtung konvektiver Feuchteinträge und temporärer Beschattungssituationen

Holzer, Tamara; 2011;

Entwicklung eines Anlagensystems zur optimierten Wärme- und Feuchterückgewinnung in Wohnraumlüftungsgeräten

Sofic, Mario; 2009

Erhöhung der Anwendbarkeit vereinfachter Berechnungsverfahren zur Bestimmung des Heizwärme- und Kühlbedarfs von Gebäuden : als Basis für ein Sicherheitskonzept

Dolezal, Franz; 2009

Trittschall-Flankenübertragung bei Massivholzkonstruktionen

Jachan, Christian; 2003

Hygienischer Tauglichkeitsnachweis und Optimierung der bauphysikalischen Performance von Gebäuden in Passivbauweise

Ph.D.-projects advisory committee

Kukk, Vilu; 2022 (Opponent)

Hygrothermal Criteria for Design of Cross-Laminated Timber External Walls with Ventilated Facades
Tallinn University of Technology

Charlotte Svensson Tengberg; 2022 (Opponent)

A design-build contractor risk assessment framework for new technical solutions in the construction industry
Chalmers University of Technology

Kaufmann, Thomas; 2016

Modellierung und Simulation von urbanen Stromversorgungsnetzen in einem multiskalaren Gesamtmodell

Bothe, Dominik; 2016

Modellierung und Simulation von weit verzweigten, vermaschten Netzen für thermische Energie und Gas

Forster, Julia; 2016

Strategische raumbezogene Visualisierung im Kontext der Innenentwicklung urbaner Siedlungs-, Energie- und Mobilitätssysteme am Beispiel der Stadt Wien

Danilo Schulter; 2013

Nachhaltige Gebäudesanierung durch lebenszyklusorientierte Bauproduktauswahl
TU Graz

Max Funk; 2011

Hysteresis der Feuchtespeicherung in porösen Materialien
TU Dresden

M.Sc-Projects

72 since 2000

https://catalogplus.tuwien.at/primis-explore/search?query=lsr13.contains:bednar%20diplomarbeit&tab=default_tab&search_scope=UTW&sortby=date&vid=UTW&facet=local13.include:HS-DIPLOMASTER,II&langcode_DE&mode=advanced&offset=0&came_from=sort

Important contributions to Demonstration buildings for new methods for design, construction and commissioning of buildings

1140 Wien, Multifamily building Utendorfgasse

<http://www.hausderzukunft.at/results.html/id2822>



Rewards:

First passive-house in social housing

Sustainability rating
klima:aktiv 1000 von 1000 Punkten

3400 Kierling, Multifamily building

Renovation and new building without a conventional heating system

<http://www.hausderzukunft.at/results.html/id6231>



Rewards:

First renovation with sustainability rating
klimaaktiv Gold Standard

ETHOUSE Award 2013

1040 Wien, Plus-Energy-High-rise Office building of TU Wien

<http://www.hausderzukunft.at/results.html/id6475>



Rewards:

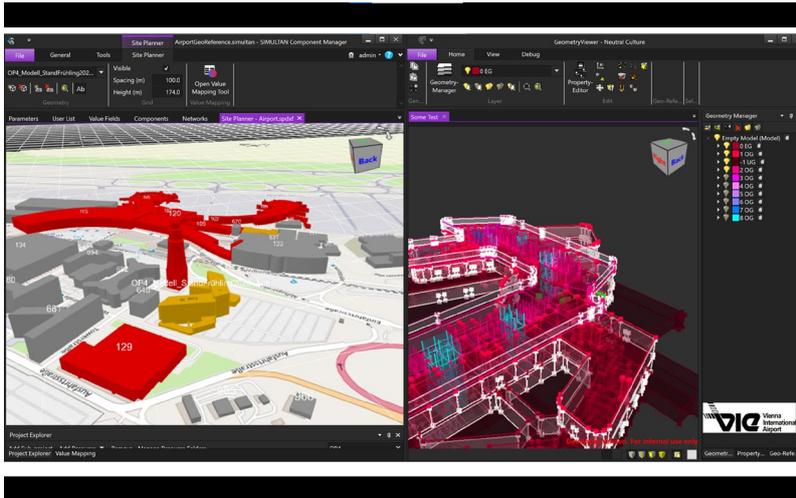
Sustainability rating:
klima:aktiv 1000 von 1000 Punkten
ÖGNB TQB 986 von 1000 Punkten

Das innovative Gebäude 2015

Eurosolarpreis 2015

Austrian State Prize 2015 „Clean Technology Austria“
Category Research and Innovation

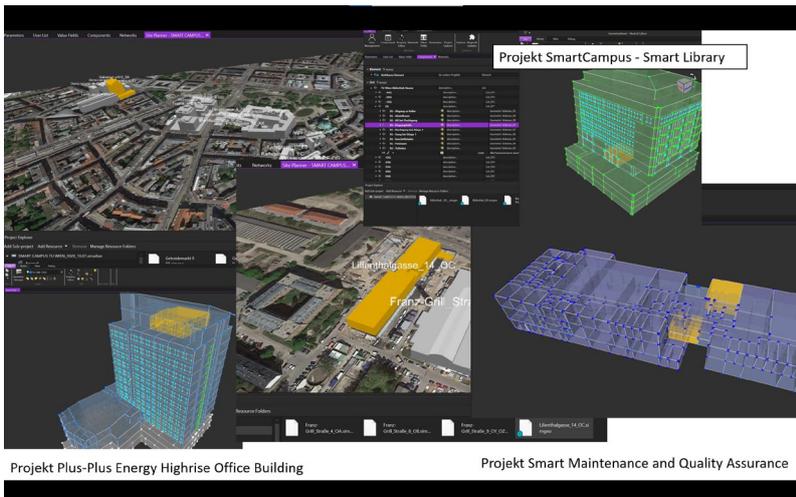
Virtuelle Flughafenstadt Wien – Virtual Airport City Vienna



Siehe auch:

David, A., Sint, S., & Bednar, T. (2022). DATA-DRIVEN MODELLING OF THE ENERGY CONSUMPTION OF AIRPORT CITIES. In *Proceedings of BauSim Conference 2022*. BauSIM 2022 - 9th Conference of IBPSA-Germany and Austria, Weimar, Germany. <https://doi.org/10.34726/3621>

SmartCampus TU Wien



Open Source Projects:

<https://github.com/bph-tuwien/SIMULTAN>

First release 27.10.2022

The SIMULTAN data model for BIM and GIS data offers an Open-Source way to store information about buildings and infrastructure. The main goal is to offer a holistic, open and flexible way to store information for building and infrastructure analyses.

Siehe auch: Bühler, M., Steiner, B., & Bednar, T. (2022). Digital Twin applications using the SIMULTAN data model and Python. In *2022 IOP Conference Series: Earth and Environmental Science*. World Building Congress 2022, Melbourne, Australia. <https://doi.org/10.1088/1755-1315/1101/8/082015>

2000-2019

317 Publications

81 Peer Reviewed

28 SCI Publications

2020-2022

20 Peer Reviewed

7 SCI Publications

Selected Publications:

Development of virtual environments (physical modeling, numerical solution methods and prototype implementations in IT solutions) for the planning of renovations and new building

P. Wegerer, C. Deseyve, T. Bednar: "In-situ-Bestimmung thermischer Eigenschaften von Baukonstruktionen"; in: "Bauphysikkalender 2012", herausgegeben von: Ernst & Sohn; Bauphysik Kalender, Ernst & Sohn, Deutschland, 2012, ISBN: 978-3-433-60123-5, S. 273 - 296.

P. Wegerer, T. Bednar: "Risikoabschätzung von Innendämmsystemen und Beurteilung der Zuverlässigkeit hygrothermischer Simulationen am Beispiel einer Innendämmung aus Schilfdämmplatten"; "ökosan´11 Internationale Konferenz für hochwertige energetische Sanierung von großvolumigen Gebäuden", 2011, 10 S.

C. Harreither, B. Nusser, T. Bednar: "Decision Support Method for Flat Roofs using Probabilistic Tools to calculate Life Cycle Costs and Energy Efficiency"; 5th International Building Physics Conference (IBPC), Kyoto, Japan; 2012, P 481-488, 8 S.

Bednar, Hanisch, Holzer, Grüner: Strategische Optimierung der Luftfeuchtereulation bei Lüftungsanlagen zur Reduktion des Energieeinsatzes für Be- und Entfeuchtungsanlagen
Berichte aus der Energie- und Umweltforschung 1/2013 Herausgeber: bmvit

M. Gladt, T. Bednar: "Fully Automated Calculation Of Shadow Casting With Matrix-Based Coordinate Transformations And Polygon Clipping"; 13th International Conference of the International Building Performance Simulation Association, Chambéry, France (2013), 8 S.

F. Friembichler, T. Bednar, S. Handler, et al.: Thermische Bauteilaktivierung. Entwicklung eines Rechenkerns; Schriftenreihe 11/2014 Herausgeber: bmvit; Deutsch, 249 Seiten

K.Eder, Th.Bednar: Effect of façade systems on the performance of cooling ceilings: In situ measurements; Frontiers of Architectural Research; Volume 4, Issue 1, March 2015, Pages 68–78

Development of sustainable and energy-efficient building concepts

U. Schneider, T. Bednar, J. Sima, H. Liebich: "Baudenkmale im Spannungsfeld von Energieeffizienz und Risikovermeidung" ;in: "Bauphysik Kalender 2010", herausgegeben von: Ernst & Sohn; Bauphysik Kalender, Ernst & Sohn, Ernst & Sohn, 2010, (eingeladen), ISBN: 978-3-433-02938-1, S. 341 - 368.

M. Sofic, A. Korjenic, T. Bednar: "Quantification of safety factors for simplified heating and cooling demand calculation methods for Vienna"; Building Simulation, Volume 4 (2011), Number 3; S. 189 - 204.

M. Dörn, N. Morishita, A. Korjenic, T. Bednar: "The combined impact of thermal renovations and user behaviour on predicting residential heating energy use"; 5th International Building Physics Conference (IBPC), Kyoto, Japan; 28.05.2012 - 31.05.2012; (2012), 8 S.

H. Schöberl, R. Hofer, M. Leeb, T. Bednar, G. Kratochwil; Österreichs größtes Plus- Energie-Bürogebäude am Standort Getreidemarkt der TU Wien; Schriftenreihe 47/2014, Herausgeber: bmvit Deutsch, 160 Seiten

M. Neusser, A. Lederer, C. Harreither, T. Bednar: "Identification of the user Behavior Related Influence on the Estimated Energy Performance"; Energy procedia, 78 (2015), S. 597 - 602.

P. Wegerer, T. Bednar: "Hygrothermal performance of wooden beam heads in inside insulated walls considering air flows"; Energy procedia, 132 (2017), S. 652 - 657.

A. David, M. Leeb, T. Bednar: "Comparison of the planned and the real energy consumption of the world's first (Plus-)Plus-Energy Office High-Rise Building"; Energy procedia, 132 (2017), S. 543 - 548.

A. David, Th. Bednar, M. Leeb, H. Schöberl Planung: „Ausführung und Betriebserfahrung eines Plus-Energie-Bürohochhauses“; Bauphysik Kalender 2023; Ernst&Sohn; 2023

Optimization of engineering structures regarding building acoustics and noise emissions

Wolfgang Winter, Helmut Schöberl, Thomas Bednar; Holzbauweisen im verdichteten Wohnungsbau Konstruktion - Bauphysik – Kosten; 2005, 195 S., zahlr. Abb. u. Tab., Gebunden; Fraunhofer IRB Verlag

F. Dolezal, T. Bednar, M. Teibinger: "Flankenübertragung bei Massivholzkonstruktionen; Teil 1: Verbesserung der Flankendämmung durch Einbau elastischer Zwischenschichten und Verifizierung der Anwendbarkeit von EN 12354"; Bauphysik, Bauphysik 30, Heft 3 (2008), S. 143 - 151.

F. Dolezal, T. Bednar, M. Teibinger: "Flankenübertragung bei Massivholzkonstruktionen; Teil 2: Einfluss von Befestigungsmitteln auf die Verbesserung durch den Einbau elastischer Zwischenschichten"; Bauphysik, Bauphysik 30, Heft 5 (2008), S. 314 - 319.

M. Neusser, H. Konder, Th. Bednar; Sound pressure fields in two coupled rooms - Comparison of a finite element approach and an analytic solution; Euronoise 2015

M. Neusser, T. Bednar: "Sound radiation efficiency of lightweight building constructions-Study on the influence of panel fastening by numerical calculations and laser scanning vibrometry measurements"; Journal of the Acoustical Society of America, 141 (2017).

Urban energy systems and optimal building concepts regarding cross building exchange

A. Korjenic, T. Bednar: "Validation and Evaluation of Energy Use in Office Buildings - A Case Study"; Automation in Construction, 23 (2012), S. 64 - 70.

T. Bednar, J. Eberhardsteiner, R. Fritzenwallner, M. Neusser, H. Weinhardt (Hrg.): "Zur Energieträgerverbrauchsprognose großer, heterogener Gebäudebestände. Grundlagen - Potentiale - Vorgehensweisen"; Verlag der Österreichischen Akademie der Wissenschaften, Wien, 2015, ISBN: 978-3-7001-7838-5; 124 S.

Pollak et.al. Finale Präsentation Aspern+ Subprojekt 2 Gebäudeübergreifenden Modellierung

N. Haufe, M. Ziegler, T. Bednar: "Modelling Load Profiles For The Residential Consumption Of Electricity Based On A Milieu-Oriented Approach"; Vortrag: Sustainable Built Environment (SBE) Regional Conference Zurich 2016, Zürich, Schweiz; 13.06.2016 - 17.06.2016; in: "Expanding Boundaries Systems Thinking in the Built Environment", vdf Hochschulverlag, (2016), ISBN: 978-3-7281-3774-6; S. 184 - 188.

David, A., Sint, S., & Bednar, T. (2022). DATA-DRIVEN MODELLING OF THE ENERGY CONSUMPTION OF AIRPORT CITIES. In Proceedings of BauSim Conference 2022. BauSIM 2022 - 9th Conference of IBPSA-Germany and Austria, Weimar, Germany. <https://doi.org/10.34726/3621>

Building and City Information Modelling and Analyses

G. Paskaleva, T. Lewis, S. Wolny, T. Bednar:

"SIMULTAN as a Big-Open-Real-BIM Data Model - Evolution of Virtual Building from Design through Construction into Operation Phase"; Poster: CIB WBC 2019 - CIB World Building Congress 2019 'Constructing Smart Cities', Hongkong; 17.06.2019 - 21.06.2019; in: "CIB World Building Congress 2019 Constructing Smart Cities", (2019), ISBN: 978-962-367-821-6; 10 S.

G. Paskaleva, T. Lewis, S. Wolny, B. Steiner, T. Bednar: "SIMULTAN as a Big-Open-Real-BIM Data Model - Proof of Concept for the Design Phase"; Vortrag: CIB WBC 2019 - CIB World Building Congress 2019 'Constructing Smart Cities', Hongkong; 17.06.2019 - 21.06.2019; in: "CIB World Building Congress 2019 Constructing Smart Cities", (2019), ISBN: 978-962-367-821-6; 10 S.

G. Paskaleva, S. Wolny, T. Bednar: "Big-open-real-BIM Data Model - Proof of Concept"; Vortrag: 7th International Building Physics Conference, IBPC2018, Syracuse, NY, USA; 23.09.2018 - 26.09.2018; in: "IBPC2018 - Healthy, Intelligent and Resilient Buildings and Urban Environments", (2018), S. 1083 - 1088.

Bühler, M., Steiner, B., & Bednar, T. (2022). Digital Twin applications using the SIMULTAN data model and Python. In 2022 IOP Conference Series: Earth and Environmental Science. World Building Congress 2022, Melbourne, Australia. <https://doi.org/10.1088/1755-1315/1101/8/082015>