Personal information

Surname(s) / First name(s)	**Libralato Michele**
Email(s)	Michele.Libralato@uniud.it
Date of birth	31 july 1989

Current Position

January 2022 - Ongoing	**Assistant Professor (RtdA)** at University of Udine, Italy **The Building-HVAC system in a smart energy community** funded by MUR (Ministero dell'Università e della Ricerca) under PON "Ricerca e Innovazione" 2014-2020 (D.M. 1062/2021) in collaboration with Archest srl. **Course:** IN1080 - Workshop On Architectural Design And Sustainable Construction - II **Sector:** ING-IND/11 - Building Physics and Building Energy Systems **Programme:** Architecture (master). **Teaching**: IN1080 - Workshop On Architectural Design And Sustainable Construction - II **Sector:** ING-IND/11 - Building Physics and Building Energy Systems **Programme:** Architecture (master). **Laboratory activities:** Operation of Dynamic Vapour Sorption Analyser (DVS) Vsorp Basic for material hygrothermal modelling and the determination of water vapour sorption curves (sorption isotherms) and water vapour permeability at the Thermal Systems Lab. **Other activities:** Project participant in PRIN2017 FLEXHEAT (2019-2024), RELUIS WP5 (2022-2024), ESPeRT – TR 1.2 (2023-2024) Member of the public outreach and communication committee of the Polytechnic Department of Engineering and Architecture of the University of Udine.
2024 - On going	**Early Career Editorial Board:** Journal of Building Performance Simulation
2017 - Ongoing	**Thesis Co-supervisor** at University of Udine, Italy 8 dissertation theses for the civil engineering bachelor degree, 4 dissertation thesis for the civil engineering master degree and 1 dissertation thesis for the mechanical engineering master degree. **Thesis Supervisor** at University of Udine, Italy 1 dissertation thesis for the mechanical engineering master degree.

Work Experience

October 2021 - January 2022

Adjunct Professor - Docente a contratto
at University of Udine, Italy
Course: IN1080 - Workshop On Architectural Design And Sustainable Construction - II
Sector: ING-IND/11 - Building Physics and Building Energy Systems
Programme: Architecture (master).

April 2019 - January 2022

Postdoctoral Research Fellowship - Assegno di ricerca
at University of Udine, Italy
Monitoring, data analysis, and modeling of a commercial building and its refrigeration and air conditioning systems funded by MIUR of Italy, within the framework of the PRIN2017 project **The energy flexibility of enhanced heat pumps for the next generation of sustainable buildings (FLEXHEAT)** grant 2017KAAECT
Activities: Data collection and analysis of a commercial refrigeration and HVAC system, building modelling and simulation using TRNSYS (type development), EnergyPlus, DesignBuilder, WUFI Plus.
Laboratory activity: Dynamic Vapour Sorption (DVS) Analyser measures of building materials at the Thermal Systems - IOT Laboratory (Univeristy of Udine)
Supervisor: Prof. Giovanni Cortella.

November 2019 - March 2020

Post-graduate research fellowship
at University of Udine, Italy
Characterization of critical climatic parameters for assessing the risk of moisture damage in building components
Supervisor: Prof. Onorio Saro.

September 2020 - January 2021

Teaching Assistant
at University of Udine, Italy
Course: IN1080 - Workshop On Architectural Design And Sustainable Construction - II
Sector: ING-IND/11 - Building Physics and Building Energy Systems
Programme: Architecture (master).

October 2017 - September 2019

Student Tutor
at the University of Udine, Italy.

November 2016 - October 2019

Ph.D. Student (XXXII cycle)
at the University of Udine, Italy
Applications of Coupled Heat and Moisture Transfer Simulations in Buildings
Supervisors: Prof. Onorio Saro and Prof. Daniele Goi.

June 2019 - August 2019

Visiting Scientist
Danmarks Tekniske Universitet (Technical University of Denmark) , Kongens Lyngby, Denmark
Activities: Research on the simulation of sorption hysteresis of hygroscopic materials and moisture buffering in buildings
Supervisors: Prof. Carsten Rode and Prof. Menghao Qin.

November 2018 - March 2019

Visiting Student
at the Free University of Bozen-Bolzano, Italy
Activities: Experimental study of heat and mass transfer in novel mycelium-based building materials and opaque components of the building envelope
Supervisors: Ph.D. Giovanni Pernigotto.

June 2019 - August 2019

Industrial Trainee
Ove Arup and Parthers, Glasgow, United Kingdom
Activities: Contributed to design processes and research activities concerning Façade Engineering and Building Physics, attended to training courses.

Education and Training

2016-2019

Ph.D. in Environmental and Energy Engineering Science
University of Udine, Italy
Applications of Coupled Heat and Moisture Transfer Simulations in Buildings
Supervisor: Prof. Onorio Saro **Co-supervisor:** Prof. Daniele Goi
Abstract: The uncontrolled presence of moisture in building envelopes and structures could be the cause of several typologies of damages (for example freeze-thaw cycles damage or corrosion of metal reinforcements) and health and safety hazard for the occupants (mould and fungi growth). In this thesis, the models implemented in the commercial software tools are presented and some of the limits met in the simulation process, mostly regarding material parameters and the weather files, have been studied and analysed.

2013-2016

Master of Civil Engineering
University of Udine, Udine, Italy
Qualification: 105/110
Thesis:"Condensation Risk Assessment of Shadow Box Systems in Curtain-Wall Façades"
Supervisor: Prof. Onorio Saro (Uniud) **Co-supervisor:** Ph.D. Giovanni Zemella (ARUP)
Abstract: This dissertation set out to propose a condensation risk assessment method for the shadow box curtain-wall system, a façade system used to achieve an iconic appearance in tall buildings. The shadow box complex thermal behaviour is described and discussed focusing on the performance requirements. A physical model is defined, based on radiation, natural ventilation and thermal transmission. The whole building simulation approach has been chosen over the computational fluid dynamics simulation in order to easily calibrate the model with tests and to obtain a more general model, that, once validated can be extended to a whole year simulation for a different climate and different shadow box geometries. The model is then implemented with the software EnergyPlus.

October 2014 - February 2015

Visiting student - ERASMUS Programme
Technische Universität Wien,Vienna, Austria
Completed courses: Thermal Aspects of Building Performance, Current Topics in Building Performance, Composites Engineering, Basics of Stochastic Mechanics, Finite Difference Modelling in Geoengineering, Stability Problems in Rock Engineering, Underground Excavation Design.

2008 - 2013

Bachelor of Civil Engineering
University of Udine, Udine, Italy
Qualification: 101/110
Thesis: "The Finite Elements Method as a Tool for The Energy-Driven Design of Window Frames"
Supervisor: Prof. Onorio Saro
Abstract: This thesis discusses the problem of the computation of the thermal transmittance of window frames with the finite elements method and shows that the obtained results can be used to design the window frames, from a thermic and hygrometric point of view. This study, based on the prescriptions of UNI EN ISO 10077-2 discusses the accuracy obtainable using different finite elements dimensions and shapes (triangular and quadrangular elements). The software used for the FEM analysis is Elmer FEM the software Gmsh is used to generate the meshes. Computational results are used to define improvements to the window frame design and to obtain better performing products. The window frame used as case study is a product of the company Serrametal S.r.l. and allows discussing the aspects of the use of the finite element method, with conclusions extendable to other building elements and other physical models.

2003 - 2008

High School graduate degree
Secondary High School Liceo Scientifico "G.Marinelli", Udine, Italy
qualification: 85/100

Books

October 2020

G.Comini, M. Libralato
Cambiamento Climatico - Il punto di vista fisico tecnico
In Italian ISBN: 888988438X (S.G.Editoriali, Padova)
Description: University book designed as support for a course on climate change in science and technology majors. All the major topics covered by the IPCC reports are summarized, providing the reader with the physics background that explains the phenomena of climate change.

January 2022

G.Comini, M. Libralato
Cambiamento Climatico - Il punto di vista fisico tecnico Nuova edizione
In Italian ISBN: 8833594394 (libreriauniversitaria.it)

June 2022

G.Comini, M. Libralato
Verso una nuova energetica. Dalle fonti esauribili alla decarbonizzazione
In Italian ISBN: 8833594750 (libreriauniversitaria.it)
Description: University book outlining the exhaustible primary sources that have marked the industrial era, with emphasis on the reasons that have accompanied the transitions between different sources. Next, traditional and modern renewable sources are described from the perspective of their possible contribution to the transition to a sustainable energy system. Finally, the strategies and technologies needed to decarbonize the current energy system are discussed, justifying the priority role that will have to be played by electricity generation in excess of today's needs and the non-secondary role that will have to be given to hydrogen.

Journal Articles

July 2023

V. Gentile, M. Libralato, S. Fantucci, L. Shtrepi,G. Autretto
Enhancement of the hygroscopic and acoustic properties of indoor plasters with a Super Adsorbent Calcium Alginate BioPolymer
Journal of Building Engineering 76, 107147 (Elsevier, 2023)

July 2023

F. Ciuffarin, M. Négrier, S. Plazzotta, M. Libralato, S. Calligaris, T. Budtova, L. Manzocco
Interactions of cellulose cryogels and aerogels with water and oil: Structure-function relationships
Food Hydrocolloids Vol.140 (Elsevier, 2023)

October 2021

M. Libralato, A. De Angelis, G. Tornello, O. Saro, P. D'Agaro, G. Cortella
Evaluation of multiyear weather data effects on hygrothermal building energy simulations using WUFI Plus
Energies Vol. 14, Issue 21 (MDPI, 2021)

March 2021

M. Libralato, A. De Angelis, O. Saro, M. Qin, C. Rode
Effects of considering moisture hysteresis on wood decay risk simulations of building envelopes
Journal of Building Engineering 42, 102444, October 2021 (Elsevier, 2021)

June 2020

M. Libralato, A. De Angelis, G. Corazza. O. Saro
Optimization of the configuration of photovoltaic and solar thermal collectors in a nearly zero energy building
Italian Journal of Engineering Science, Vol. 64, No. 2-4, pp. 179-185., June 2020 (IIETA, 2020)

April 2020

M. Libralato, G. Murano, A. De Angelis, O. Saro, V. Corrado
Influence of the meteorological record length on the generation ofrepresentative weather files
Energies, Volume 13, Issue 8, April 2020, 2103 (MDPI, 2020)

February 2020

K. Zu, M. Qin, C. Rode, M. Libralato
Development of a moisture buffer value model (MBM) for indoor moisture prediction
Applied Thermal Engineering, Volume 171, 5 May 2020, 115096 (Elsevier, 2020)

June 2019

M. Libralato, A. De Angelis, O. Saro
Evaluation of the ground-coupled quasi-stationary heat transfer in buildings by means of an accurate and computationally efficient numerical approach and comparison with the ISO 13370 procedure
Journal of Building Performance Simulation, 12(5):1-9, (Taylor & Francis, 2019)

June 2018

A. De Angelis, M. Libralato, O. Saro
Numerical simulations of coupled conduction – free convection in low conductive vertical finned surfaces
Modelling, Measurement and Control, 79 (3) 98-102 (IIETA, 2018)

Conference Papers

July 2024

M. Libralato, P. D'Agaro, G. Cortella
Energy flexibility study of a hotel using TRNSYS
Building Simulation Applications BSA 2024, 6th IBPSA-Italy Conference Bolzano

December 2023

V. Gentile, M. Libralato, S. Fantucci, L. Shtrepi, G. Autretto
Super adsorbent bio-polymer additive to improve hygroscopic and acoustic properties of a conventional lime plaster
Journal of Physics: Conference Series 2654 (1), 012074

November 2023	M. Libralato, P. D'Agaro, G. Cortella **Development of an energy digital twin from a hotel supervision system using building energy modelling** Journal of Physics: Conference Series 2600 (3), 032014
January 2022	P. D'Agaro, M. Libralato, G. Toffoletti, G. Cortella **Influence of cooling load profile on the prediction of energy use in commercial refrigeration plants** SCIENCE ET TECHNIQUE DU FROID, 139
June 2022	F. Frasca, E. Verticchio, M. Libralato, P. D'Agaro, G. Cortella, A.M. Siani **A comparison among three whole-building dynamic simulation software and their applicability to the indoor climate modelling of historical buildings** Building Simulation Applications BSA 2022, 5th IBPSA-Italy Conference Bolzano
June 2022	M. Libralato, M. Danovska, G. Pernigotto, A. Gasparella, P. Baggio **Effects of Different Moisture Sorption Curves on Hygrothermal Simulations of Timber Buildings** Building Simulation Applications BSA 2022, 5th IBPSA-Italy Conference Bolzano
June 2022	G. Cortella, G. Toffoletti, M. Libralato, P. D'Agaro **Demand side management through latent thermal storage in HVAC systems coupled with commercial refrigeration units** SCIENCE ET TECHNIQUE DU FROID, 136
January 2022	P. D'Agaro, M. Libralato, G. Toffoletti, G. Cortella **Demand Coverage and Energy Savings by Combined CO2 Refrigeration System and HVAC in Supermarkets** SCIENCE ET TECHNIQUE DU FROID, 1146
November 2021	M. Libralato, A. De Angelis, P. D'Agaro, G. Cortella, M. Qin, C. Rode **Damage risk assessment of building materials with moisture hysteresis** Journal of Physics: Conference Series 2069 (1), 012043
October 2021	M. Libralato, A. De Angelis, P. D'Agaro, G. Cortella, O. Saro **Multiyear hygrothermal performance simulation of historic building envelopes** IOP Conference Series: Earth and Environmental Science 863 (1), 012045

September 2021	P. D'Agaro, M. Libralato, G. Toffoletti, G. Cortella **Ice thermal energy storage for electricity peak shaving in a commercial refrigeration/HVAC unit** TPTPR2021 6th Thermophysical properties and Transfer Processes of Refrigerants Conference, Italy, 1- 3 September, 2021
August 2021	M. Libralato, A. De Angelis, P. D'Agaro, G. Cortella, M. Qin, C. Rode **Damage risk assessment of building materials with moisture hysteresis** IBPC2021 International Building Physics Conference, Kongens Lyngby, 25-27 August 2021
September 2019	M. Libralato, A. De Angelis, P. D'Agaro, G. Cortella, O. Saro **Multiyear hygrothermal performance simulations of historic building envelopes** SBE21 Sustainable Built Heritage, Bolzano, Italy, 14-16 April 2021
September 2019	M. Libralato, G. Murano, A. De Angelis, O. Saro, V. Corrado **Generation of moisture reference years for interstitial condensation risk assessment: influence of the meteorological record length** 16th IBPSA International Conference & Exhibition Building Simulation 2019, BS2019, Rome, Italy, 2-4 September 2019
June 2019	M. Danovska, M. Libralato, G. Pernigotto, A. De Angelis, O. Saro, P. Baggio, A. Gasparella **Numerical and experimental study on the impact of humidity on the thermal behavior of insulated timber walls** Building Simulation Applications BSA 2019 - 4th IBPSA-Italy conference June, 19-21 2019, Bolzano
June 2019	M. Libralato, G. Pernigotto, A. Prada, A. De Angelis, O. Saro, A. Gasparella **Design and evaluation of extreme moisture reference years for moisture-related risk assessments** Building Simulation Applications BSA 2019 - 4th IBPSA-Italy conference June, 19-21 2019, Bolzano

January 2019

M. Libralato, O. Saro, A. De Angelis, S. Spinazzè
Comparison between Glaser method and Heat, Air and Moisture transient model for moisture migration in building envelopes
Applied Mechanics and Materials 887, 385–392 (Trans Tech Publications, Ltd. 2019). Presented at Envibuild conference 2017 in Wien.

September 2018

M. Libralato, G. Murano, A. De Angelis, O. Saro, V. Corrado
Hygrothermal modelling of building enclosures: reference year design for moisture accumulation and condensation risk assessment
7th International Building Physics Conference, IBPC2018, Syracuse, NY, USA, 23-26 September 2018

June 2018

A. De Angelis, M. Libralato, O. Saro
Numerical Simulations of Coupled Conduction – Free Convection in Low Conductive Vertical Finned Surfaces
The 3rd AIGE/IIETA International Conference and 12th AIGE 2018 Conference, Reggio Calabria – Messina, Italy, 14 – 16 June 2018

Conference Papers as Speaker

July 2024

M. Libralato, P. D'Agaro, G. Cortella
Energy flexibility study of a hotel using TRNSYS
Building Simulation Applications BSA 2024, 6th IBPSA-Italy Conference Bolzano

November 2023

M. Libralato, P. D'Agaro, G. Cortella
Development of an energy digital twin from a hotel supervision system using building energy modelling
Journal of Physics: Conference Series 2600 (3), 032014

June 2022

F. Frasca, E. Verticchio, M. Libralato, P. D'Agaro, G. Cortella, A.M. Siani
A comparison among three whole-building dynamic simulation software and their applicability to the indoor climate modelling of historical buildings
Building Simulation Applications BSA 2022, 5th IBPSA-Italy Conference Bolzano

June 2022

M. Libralato, M. Danovska, G. Pernigotto, A. Gasparella, P. Baggio
Effects of Different Moisture Sorption Curves on Hygrothermal Simulations of Timber Buildings
Building Simulation Applications BSA 2022, 5th IBPSA-Italy Conference Bolzano

August 2021

M. Libralato, A. De Angelis, P. D'Agaro, G. Cortella, M. Qin, C. Rode
Damage risk assessment of building materials with moisture hysteresis
IBPC2021 International Building Physics Conference, Kongens Lyngby, 25-27 August 2021

September 2019

M. Libralato, A. De Angelis, P. D'Agaro, G. Cortella, O. Saro
Multiyear hygrothermal performance simulations of historic building envelopes
SBE21 Sustainable Built Heritage, Bolzano, Italy, 14-16 April 2021

September 2019

M. Libralato, G. Murano, A. De Angelis, O. Saro, V. Corrado
Generation of moisture reference years for interstitial condensation risk assessment: influence of the meteorological record length
16th IBPSA International Conference & Exhibition Building Simulation 2019, BS2019, Rome, Italy, 2-4 September 2019

June 2019

M. Libralato, G. Pernigotto, A. Prada, A. De Angelis, O. Saro, A. Gasparella
Design and evaluation of extreme moisture reference years for moisture-related risk assessments
Building Simulation Applications BSA 2019 - 4th IBPSA-Italy conference June, 19-21 2019, Bolzano

January 2019

M. Libralato, O. Saro, A. De Angelis, S. Spinazzè
Comparison between Glaser method and Heat, Air and Moisture transient model for moisture migration in building envelopes
Applied Mechanics and Materials 887, 385–392 (Trans Tech Publications, Ltd. 2019). Presented at Envibuild conference 2017 in Wien.

September 2018

M. Libralato, G. Murano, A. De Angelis, O. Saro, V. Corrado
Hygrothermal modelling of building enclosures: reference year design for moisture accumulation and condensation risk assessment
7th International Building Physics Conference, IBPC2018, Syracuse, NY, USA, 23-26 September 2018

June 2018

A. De Angelis, M. Libralato, O. Saro
Numerical Simulations of Coupled Conduction – Free Convection in Low Conductive Vertical Finned Surfaces
The 3rd AIGE/IIETA International Conference and 12th AIGE 2018 Conference, Reggio Calabria – Messina, Italy, 14 – 16 June 2018

Awards

June 2019

Student paper award
Design and evaluation of extreme moisture reference years for moisture-related risk assessments
Building Simulation Applications BSA 2019 - 4th IBPSA-Italy conference June, 19-21 2019, Bolzano

Public Engagement

Marzo - Settembre 2024

Laboratorio Delta T
Laboratorio di divulgazione scientifica per studenti delle scuole superiori sulla trasmissione del calore e la termodinamica osservata con la termografia realizzato in collaborazione con il Dott.Francesco Scarel e l'associazione Liminal Research.
Il laboratorio è stato presentato nel 2024 all'istituto superiore BEM di Staranzano, al festival Aeson di Villa Vicentina, al Festival della Biodiversità di Milano, al Festival "Un Altro Parco in Città" di Pistoia. I video prodotti durante il laboratorio sono stati proiettati nella mostra "Risorgiva – Ecosistemi in estinzione Laboratori artscience al biotopo Schiavetti" presso il municipio di Staranzano.

Maggio 2024

Terzo classificato alla selezione di Famelab di Trieste
Talent della scienza, competizione di comunicazione scientifica per giovani ricercatori. Dopo la selezione ho potuto partecipare ad altri eventi di divulgazione scientifica come relatore organizzati dall'Immaginario Scientifico di Trieste.

Membership

September 2018 — **International Association of Building Physics**

January 2023 — **International Building Performance Simulation Association**

March 2018 — Ordine degli Ingegneri, Settore: Civile
Posizione: A-3611
sez. Udine
Ruolo: Coordinatore della Commissione Giovani

Personal Skills

Mother tongue(s) — **Italian**

Self-assessment
European level(*)

	Understanding		Speaking		Writing
	Listening	Reading	Spoken interaction	Spoken production	
Italian	C2 Proficient user	C2 Proficient user	C2 Proficient user	C2 Proficient user	C2 Proficient user
English	B2 Independent user	B2 Independent user	B2 Independent user	B2 Independent user	B2 Independent user

(*) *Common European Framework of Reference (CEF) level*

Interests

Building physics, Heat, air and moisture transfer in building materials, Material characterisation, Building restoration and retrofitting, Building HVAC/Refrigeration optimization, Thermal storage systems, Passive and low-tech control of indoor conditions, Communication.

Software

Multiphysics Comsol (UNI EN ISO 10211, UNI EN ISO 10077-2)
Hygrothermal analysis: Therm, WUFI Pro, WUFI 2D, Delphin (UNI EN ISO 13788, UNI EN 15026)
Building simulation: DesignBuilder, WUFI Plus, EnergyPlus, TRNSYS
Data analysis: Pandas (Python)
Data Visualization: Paraview, Inkscape, Matplotlib
CAD: Gmsh, AutoCAD, Rhinoceros
Programming: Octave (Matlab), Processing (Java), C, Python, Php
Web: Wordpress, Bootstrap

Autorizzo il trattamento dei miei dati personali presenti nel cv ai sensi del Decreto Legislativo 30 giugno 2003, n. 196 “Codice in materia di protezione dei dati personali” e del GDPR (Regolamento UE 2016/679).

Data: 09/10/2023

Firma