EDOARDO DE CRISTO

Academic and Professional Curriculum Vitae

PERSONAL INFORMATION

***Name**:* *Edoardo De Cristo*
Nationality: Italian

EDUCATION AND TRAINING

***June 2024**:* Ph.D. in Industrial and Civil Engineering

***February 2024**:* Research Fellow at the Department of Industrial, Electronic, and Mechanical Engineering (DIIEM), Roma Tre University . Research Topic: "Development of an advanced non-contact thermometric method for measuring the thermal resistance of building walls" (ING-IND/11 Environmental Applied Physics).

***December 2023**:* Conclusion of the PhD scholarship in Industrial and Civil Engineering (XXXVI cycle) at the Niccolò Cusano University, Rome.

***November 2020**:* Professional Engineer License, Civil and Environmental Engineering sector, section A.

November 2020: Ph.D. scholarship recipient in Industrial and Civil Engineering (XXXVI cycle) at Niccolò Cusano University, Rome

February 2020: Master's Degree in Civil Engineering from Niccolò Cusano University.
Final Grade: 110/110 cum laude.

July 2017: Bachelor's Degree in Civil Engineering from Roma Tre University.

INTERNATIONAL ACTIVITIES

June 2023: Guest Editor for the Special Issue "*Research Trends of Thermal Comfort and Energy Efficiency in Buildings*", MDPI energies.
Link: https://www.mdpi.com/journal/energies/special_issues/0K79KP424W

June 2023: Participation in the 40th International Heat Transfer Conference (UIT), Assisi, Italy.

June 2023: Participation in the 8th AIGE/IIETA International Conference and 18th AIGE Conference, Turin, Italy.

September 2022: Participation in the International Conference on Noise and Vibration Engineering (ISMA) organized by KU Leuven Department of Mechanical Engineering, Leuven, Belgium.

July 2019: Scholarship recipient for the Summer Program No. 2 "Structural Strengthening and Rehabilitation of Historical Buildings" organized by H2CU, University of Bologna, IUAV Venice, held at Cornell Tech, New York.

WORK EXPERIENCE

February 2023 - Present: Research activities at the Applied Physics Laboratory of Roma Tre University focused on the study of building energy sustainability.
Key activities:

- Heat flux measurements on a low-cost experimental apparatus through a novel non-destructive technique based on the THM method; comparison of the results with those obtained by employing conventional heat flux sensors. The measured parameters are:
    - surface temperatures, logged by employing temperature probes
    - air temperatures, acquired by employing a dedicated probe
    - air velocity, measured through an anemometer
    - heat flux, recorded by employing a conventional heat flux plate

  The acquired data are initially memorized in a data logger. Subsequently, a post-processing approach is employed to assess the radiative and convective heat transfer coefficients.
- Heat flow measurements conducted through a direct and indirect approach (and relative comparison) on an optimized experimental apparatus characterized by significantly improved thermal behavior compared to the first apparatus. The measured parameters are:
    - surface temperatures, logged by employing temperature probes
    - air temperatures, acquired by employing a dedicated probe
    - air velocity, measured through an anemometer
    - heat flux, recorded by employing a conventional heat flux plate

  The acquired data are initially memorized in a data logger. Subsequently, a post-processing approach is employed to assess the radiative and convective heat transfer coefficients;
- Identification of the thermal properties of bodies by thermography: measurement of emissivity through the contact thermometer technique and the emissivity marker approach; evaluation of the apparent reflected temperature by the direct technique and the diffuse reflector method. Analysis and comparison of the obtained results;
- Design and implementation of three-dimensional numerical models of calibrated fine elements using COMSOL software, for identify the optimal position for installing the heat flux and surface temperature sensors;
- Comprehensive study of the Urban Heat Island (UHI) phenomenon in the city of Rome, with particular attention to the assessment of its impacts on the energy performance of buildings. This study involves the strategic identification of meteorological stations located in rural, sub-rural and urban areas and the subsequent characterization of the Roman territory through GIS (Geographic Information System) analysis, carried out using the QGIS software. The acquisition of meteorological data relating to the years 2020 and 2022 allows to calculate the heat island intensities in the different areas

of interest, as well as to estimate the energy needs of buildings through the dynamic software TRNSYS. Particular attention was paid to the issue relating to the selection of the reference meteorological station, in accordance with the best practices reported in the literature;

- Critical analysis of the reliability of existing models in literature for estimating the sky temperature. Identification of new formulas based on the analysis of climate data from the ARPALAZIO micrometeorological network and comparison of the results with those obtained through widely used sky temperature models.

PUBLICATIONS IN INTERNATIONAL JOURNALS

- E. De Cristo, L. Evangelisti, G. Battista, C. Guattari, R. De Lieto Vollaro, F. Asdrubali, Annual Comparison of the Atmospheric Urban Heat Island in Rome (Italy): An Assessment in Space and Time, Buildings 13 (2023). https://doi.org/10.3390/buildings13112792.
- G. Battista, L. Evangelisti, C. Guattari, E. De Cristo, R. De Lieto Vollaro, F. Asdrubali, An Extensive Study of the Urban Heat Island Phenomenon in Rome, Italy: Implications for Building Energy Performance Through Data from Multiple Meteorological Stations, International Journal of Sustainable Development and Planning 18 (2023). https://doi.org/10.18280/ijsdp.181101.
- L. Evangelisti, L. Barbaro, E. De Cristo, C. Guattari, T. D'Orazio, F. Asdrubali, R. De Lieto Vollaro, Heat flux measurement approach for an enhanced thermometric method: preliminary tests, in: J Phys Conf Ser, 2024. https://doi.org/10.1088/1742-6596/2685/1/012051.
- L. Evangelisti, L. Barbaro, E. De Cristo, C. Guattari, T. D'Orazio, Towards an improved thermometric method: Convective and radiative heat transfer for heat flux measurement through an indirect approach, Thermal Science and Engineering Progress 49 (2024). https://doi.org/10.1016/j.tsep.2024.102479.
- E. De Cristo, L. Evangelisti, C. Guattari, R. De Lieto Vollaro, An Experimental Direct Model for the Sky Temperature Evaluation in the Mediterranean Area: A Preliminary Investigation, Energies (Basel) 17 (2024) 2228. https://doi.org/10.3390/en17092228.
- L. Evangelisti, L. Barbaro, C. Guattari, E. De Cristo, R. De Lieto Vollaro, F. Asdrubali, Comparison between Direct and Indirect Heat Flux Measurement Techniques: Preliminary Laboratory Tests, 17 (2024) 2961. https://doi.org/10.3390/en17122961.

CONFERENCE PAPERS

- G. Battista, L. Evangelisti, C. Guattari, E. De Cristo, R. De Lieto Vollaro, F. Asdrubali, *Urban heat island in Rome (Italy): a comprehensive analysis and implications for building energy efficiency*, 8th AIGE/IIETA International Conference and 18th AIGE Conference, June 14-15, 2023.
- L. Evangelisti, L. Barbaro, E. De Cristo, C. Guattari, T. D'Orazio, F. Asdrubali and R. De Lieto Vollaro, *Heat flux measurement approach for an enhanced thermometric method: preliminary tests*, 40th International Heat Transfer Conference (UIT), Assisi, June 26-28, 2023.

Edoardo De Cristo

SKILLS

Languages: Italian (native)
English (B2)

Experimental skills:

Thermal transmittance measurements using the HFM technique;
Thermal transmittance measurements using the THM technique;
Infrared thermography for non-contact surface temperature measurements;
Infrared thermography for emissivity measurements;
Indoor and outdoor climate measurements (air temperature, relative humidity, air velocity, mean radiant temperature);

Data acquisition systems:

- *LSI Lastem systems (E-log, M-log, EST033, EST124, ESV107, ESR240);*
- *TESTO systems (testo 635-2, testo 400, testo 835-H1);*
- *LUTRON systems (TM-947SD)*
- *FLUKE Ti480Pro and related image analysis software*

IT skills:

Operative Systems: Microsoft & Macintosh
Programming Languages: Python, MATLAB
Software: Microsoft 365; AutoCAD; FLUKE thermography software; 3DOM data management program by LSI Lastem, TRNSYS Transient System Simulation Tool (for dynamic building models), COMSOL (heat transfer in solids interface module for 2D and 3D models) software di termografia;

Rome, 02/09/2024

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