Alireza Etemad

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Summary

I am a senior energy researcher with a strong focus on building energy systems, district heating, and efficient HVAC systems. I possess extensive expertise in these areas and have developed robust technical skills to handle complex engineering and research projects involving multiple stakeholders. With my excellent communication skills, I can effectively promote sustainable energy practices. My passion lies in fostering a greener future, and I am committed to achieving this goal.

Education

2023 – Now **Ph.D., Mechanical Engineering** University College Dublin, Dublin, Ireland
Thesis title: *Development of Ultra-Low Temperature District Heating Systems*
Funded by NexSys Project

2018 – 2020 **M.Sc. Energy Systems Engineering**, Islamic Azad University (SRBIAU), Tehran, Iran
Thesis title: *Design and analysis of an integrated HVAC system for implementation in high-rise buildings*.

2014 – 2018 **B.Sc. Mechanical Engineering**, Zanjan University, Zanjan, Iran
Thesis title: *Applications of Building Information Modelling (BIM) in HVAC Systems Design*.

Publications

See Google scholar profile for full publications list

Journal Articles

1. S. M. Ebrahimi-Saryazdi, A. Etemad, A. Shafaat, and A. M. Bahman, "A comprehensive review and sensitivity analysis of the factors affecting the performance of buildings equipped with variable refrigerant flow system in middle east climates," *Renewable and Sustainable Energy Reviews*, vol. 191, p. 114 131, 2024, ISSN: 1364-0321. DOI: https://doi.org/10.1016/j.rser.2023.114131.
2. A. Etemad, N. Zare, A. Shafaat, and A. M. Bahman, "Assessing strategies for retrofitting cooling systems in historical buildings," *Energy Reports*, vol. 11, pp. 1503–1516, 2024, ISSN: 2352-4847. DOI: https://doi.org/10.1016/j.egyr.2024.01.017.
3. S. M. Ebrahimi-Saryazdi, A. Etemad, A. Shafaat, and A. M. Bahman, "Data-driven performance analysis of a residential building applying artificial neural network (ANN) and multi-objective genetic algorithm (GA)," *Building and Environment*, vol. 225, p. 109 633, 2022, ISSN: 0360-1323. DOI: https://doi.org/10.1016/j.buildenv.2022.109633.

Conference Proceedings

1. S. M. Ebrahimi-Saryazdi, A. Etemad, A. Shafaat, and A. M. Bahman, "Sensitivity Analysis of VRF Systems in Hot climate Buildings: Kuwait Case," Kuwait City, Kuwait, Nov. 2023.
2. S. M. Ebrahimi Saryazdi, A. Etemad, A. B. Forough, E. Livani, and S. Bozorgmehri, "Performance analysis of integrated passive technologies for net-zero energy building: Case study of Iran," in *ASHRAE Topical Conference Proceedings*, American Society of Heating, Refrigeration and Air Conditioning Engineers, Inc., 2019, pp. 80–89.

Research Projects

2023 – 2027 **NexSys**, Next Generation Energy Systems (Link).

- PhD research on modelling and optimization of low-temperature district heating systems - Supervised by Assoc. Prof. James O'Donnell
- Contributed to collaborative research on commercial heat pumps flexibility - Supervised by Prof. Andrew Keane
- Contributed to collaborative research on co-simulation of air-source residential heat pumps - Supervised by Prof. Andrew Keane

SEAI Research Fellowship, Future Technology Integration of District Heating in Ireland's Energy Sector

- Research Collaboration within Sustainable Energy Authorithy of Ireland (SEAI)'s Decarbonized Heating and Cooling Program - Supervised by Prof. Donal Finn

2023 – 2024 **IEA DHC Annex TS5**, Integration of Renewable Energy Sources into existing District Heating and Cooling Systems (Link)

- Contributed in WI.A3 : Methodologies for RES potential assessment in district heating systems - Supervised by Prof. Urban Persson

2023 – 2026 **IEA DHC Annex XIV**, InteGradeDH – Large-scale integration of low-grade sources into district heating networks through geothermal seasonal storage and heat pumps (Link)

- Contributed to WP 2: Configuration and performance of HP-based substations (EURAC) - Supervised by Dr. Marco Cozzini

2019 – 2023 **Kuwait University Research Grant No. [EM04/21]**, Supervised by Assistant Prof. Ammar Bahman

- Contributed to research on data-driven performance analysis and optimization of buildings
- Contributed to research on performance analysis of VRF cooling systems
- Contributed to research on BIM-based MEP retrofit of heritage buildings

2021 – 2022 **SRBIAU AI and Architecture Laboratory**, Supervised by Dr. Reza Babakhani

- Contributed to developing building energy models to be integrated with AI-driven plan generation tool.

Teaching Experience

Teaching and Lecturing

2023 – 2026 **Teaching Assistant**, University College Dublin.
Energy Systems in Buildings II

Feb 2024 **Guest Lecturer**, University of Ljubljana, Slovenia.
MEP systems in refurbishment projects
Within and MSc module BIM A+6: BIM-based rehabilitation and sustainability analysis

Dec 2023 **Guest Lecturer**, Amirkabir University of Technology, Tehran, Iran.
Fundamentals of Building Energy Systems
Within a BSc module: Energy Conversion

2018 – 2022 **Lecturer**, Novin Parsian Institute, Tehran, Iran.
Building Energy Simulation For Engineers

Teaching Experience (continued)

2019 – 2021 **Lecturer**, Tehran Institute of technology, Tehran, Iran.
3D MEP modeling with AutoDesk Revit

Presentations

Feb 2024 **Presentation at IBSO Panel**, Low-temperature district heating potential in Ireland's Building Stock - Dublin, Ireland

Aug 2023 **Presentation at EirGrid Research Forum**, The Role of Data Centres as Prosumers in Future Energy Systems - Dublin, Ireland

Awards and Certificates

Awards and Achievements

2023-2027 **Fully-funded PhD Scholarship**, Science Foundation Ireland / NexSys Project (€22,000/year)

SEAI Decarbonized Heat Fellowship , Sustainable Energy Authority of Ireland (€25,000/year)

Certification

2023 **Modelica-based Simulation of Building and District Energy Systems**. By Aalborg University.

2022 **Technology of Intelligent and Integrated Energy Systems**. By TU Delft.

2021 **Buildings as Sustainable Energy Systems Professional Certificate**. By TU Delft

Data Science for Construction, Architecture and Engineering. By National University of Singapore (NUS).

Python for Data Science and AI. By IBM.

2017 **Advanced Energy Audit and Simulation in Buildings**. By Neon, Energy Optimization Center.

2016 **Advanced HVAC Design**. By Novin Parsian Institute.

Memberships

ASHRAE Student Member Since 2017

CIBSE Student Member Since 2019

Engineers Ireland Student Member Since 2023

Skills

Languages English (Full Professional Proficiency)

Coding Python, MATLAB

Energy Modelling Tools EnergyPlus (DesignBuilder), Modelica (Dymola), Simulink (Simscape)

Special Python Libraries Pyomo, BuildingsPy, Sci-kit Learn, Pandas, Numpy, Matplotlib

Misc. Tableau, Advanced Excel, LATEX

Soft Skills Independent Working, Critical Thinking, Problem-Solving, Attention to Detail, Collaboration, Leadership, Time Management

Research Interests

Building Energy Modelling White-box Simulation Methods, Data-driven Models (Black-Box), Grey-box Reduced Order Models, Building Energy Retrofit

District Heating (DH) Low-temperature DH, Waste Heat Utilization in DH, Thermal Source Networks, DH Policy, DH System Modelling and Optimization

Heating and Cooling Technologies Heat Pumps, Thermal Energy Storage, Hydronic Systems Design and Balancing

Professional Work Experience

2024 **Guest Researcher**, Indoor Environmental Quality and Building Systems Research Group, Department of the Built Environment, Aalborg University, Copenhagen
Collaborative Research on Modeling and Optimization of Thermal Source District Heating Networks

2023 – Now **Senior Energy Policy Researcher**, Sustainable Energy Authority of Ireland (SEAI), (Part-time), Dublin
My primary focus in this position as a SEAI decarbonised heat group member was developing a national guideline for district heating development in Ireland. I was also assigned to represent Ireland in the IEA Technology Collaboration Program in District Heating and Cooling (Annex TS5 and XIV).

2020 – 2023 **Co-founder / Senior Energy Engineer**, Ario Tahvie Farda, Tehran, Iran.
My key responsibilities in this position included designing and optimising energy systems for buildings, designing and renovating industrial district heating systems, and leading design teams in projects.

2019 – 2021 **Building Energy Systems Engineer**, Aranik Engineering Co. , Tehran, Iran.
My key responsibilities in this position included energy modelling for high-rise buildings, modelling of HVAC systems, and supervision of construction projects. In this role, I designed over 15 high-rise projects in Tehran.

2018 – 2019 **Energy Systems Researcher**, Niroo Energy Research Institute | Tehran, Iran.
My key responsibilities in this position included conducting professional research in the energy sector, including renewable energy sources, thermal energy storage, geothermal heat pumps and participating in international research projects

2016 – 2018 **Mechanical Engineer**, Kargosha Engineering Co. | Online Engineering Services, Tehran, Iran.

References

- **Associate Professor James O'Donnell**. School of Mechanical and Materials Engineering | University College Dublin | Dublin, Ireland.
  E-mail: james.odonnell@ucd.ie | Tel: +353866027707
- **Professor Donal Finn**. School of Mechanical and Materials Engineering | University College Dublin | Dublin, Ireland.
  E-mail: donal.finn@ucd.ie | Tel: +35317161947