

Position Available: Post-Doctoral Researcher

Department: Industrial Engineering

Institution: University of Florence

Research Topic: Numerical Simulation of CO₂ Mixtures during Boiling and Condensation

Supervisor: Dr. Lorenzo Talluri

Duration: 12 months (renewable), starting immediately after the interview process

Qualifications:

- Minimum 4-year degree or Master's degree in a relevant field
- PhD or equivalent foreign qualification
- Proficiency in OpenFOAM and Python

Selection Procedure: Candidates will be assessed based on qualifications and remote interviews.

Description of Research Activity:

Months 1-6: Development of Multiphase Multi-Species Model

- Conduct an in-depth study of phase change phenomena in CO₂-based mixtures using 3D numerical simulations.
- Develop a multiphase multi-species model to predict mixture behaviour during phase change.
- Integrate transport equations for individual species and a thermodynamic model for CO₂-based mixtures.
- Aim to obtain physically consistent results for accurate calculation of heat transfer coefficient and pressure drop in heat exchangers.

Months 6-12: Simulation Optimization for Maximized Heat Transfer Coefficient

- Optimize simulations to maximize overall heat transfer coefficient.
- Study mass transfer resistance during phase change and identify suitable correlations for heat exchanger design.
- Provide design guidelines for heat exchangers operating with CO₂ mixtures.
- Develop a model coupled with optimization algorithms to enhance heat exchanger efficiency.
- Integrate CFD and optimization algorithms into heat exchanger design process.

Application Procedure: Please send a CV, cover letter, and contact information for references to lorenzo.talluri@unifi.it