

CURRICULUM VITAE

of

Miguel Abreu de Almeida Mendes

January 2023

PERSONAL DATA

Name: Miguel Abreu de Almeida Mendes

Date and Place of Birth: 26/03/1981 at Lisbon, Portugal

Nationality: Portuguese

Civil Status: married

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ACADEMIC DEGREES

Ph.D., Mechanical Engineering (1/2007 to 5/2011)

Instituto Superior Técnico – TU Lisbon, Portugal

- **Thesis Topic:** *Modeling and simulation of hydrocarbon oxidation processes within inert porous media*
- **Classification:** 90-95%
- **Adviser:** Prof. José Carlos F. Pereira (IST, Portugal)
- **Co-Advisers:** Dr. José M. Chaves Pereira (IST, Portugal), Prof. Dimosthenis Trimis (TU Freiberg, Germany)
- **Note:** Exchange PhD student at the Chair of Gas and Heat Technology – Institute of Thermal Engineering, TU Bergakademie Freiberg, Germany (1/2008 to 3/2009)

Graduation Degree, Mechanical Engineering (9/1999 to 9/2005)

Instituto Superior Técnico – TU Lisbon, Portugal

- **Area of Specialization:** Applied Thermodynamics
- **Classification:** 18 (out of 20)
- **Final Project:** *Dynamic modeling and simulation of a small-scale Organic Rankine Cycle for power production*
- **Final Project Adviser:** Prof. Pierro Colonna (TU Delft, The Netherlands)
- **Note:** Exchange ERASMUS student at the Faculty of Mechanical, Maritime and Materials Engineering, TU-Delft, The Netherlands (9/2004 to 8/2005)

HONORS / AWARDS

- Diploma of Excellent Teacher IST 2017/18 (course of Heat Transfer) (2018)
- Young Researchers UTL/Deloitte Award (2011)
- Merit Scholarship UTL (ranked 1st in Mech. Eng. graduation course) (2004)
- Merit Scholarship UTL (ranked 1st in Mech. Eng. graduation course) (2003)
- Merit Scholarship UTL (ranked 1st in Mech. Eng. graduation course) (2002)
- Merit Diploma UTL (ranked 3rd in Mech. Eng. graduation course) (2001)

RESEARCH INTERESTS

- multi-mode heat and mass transport in porous and heterogeneous media
- Reactive flows and phase-change in porous and heterogeneous media
- Renewable and sustainable energy sources
- Modeling and simulation of energy conversion systems
- System optimization and uncertainty quantification analysis
- Algorithms and computational frameworks for simulation of complex multi-physical systems: parallel computing, multi-scale & hybrid models, homogenization approach, etc.

RESEARCH EXPERIENCE

Assistant Professor (9/2017 to present)
Mechanical Engineering Department, Instituto Superior Técnico – TU Lisbon, Portugal

- **Topic:** *Transport phenomena in porous media*
- **Main research activities:** - optimized structures for heat transfer enhancement
- biomass thermochemical conversion processes
- combustion systems using alternative fuels (e.g. nanofuels, ammonia, hydrogen)
- small-scale and low-cost technology transfer in energy systems

Post-doctorant researcher (1/2015 to 8/2017)
Division of Combustion Technology - Engler-Bunte-Institute, Faculty of Chemical and Process Engineering, Karlsruhe Institute of Technology, Germany

- **Topic:** *Numerical methods for modeling and simulation of reactive flows in porous media*
- **Main research activities:** - Measurement/simulation of soot filtration and regeneration in diesel particulate filters
- Prediction of effective properties of porous foams based on their real structure
- Proposal writing for creation of new projects
- **Other research activities:** - Design and characterization of combustion systems
- Optimization of porous structures for high temperature heat transfer applications
- Extension of Lattice-Boltzmann Method for porous media combustion
- **Adviser:** Prof. Dimosthenis Trimis (KIT, Germany)

Post-doctorant researcher
Group leader of sub-project B02 (within SFB 920) (9/2011 to 12/2014)
Chair of Gas and Heat Technology, Institute of Thermal Engineering, TU Bergakademie Freiberg, Germany

- **Topic:** *Flow behavior, heat and mass transfer in porous and heterogeneous structures*
- **Main research activities:** - Detailed simulation of metal melt filtration in ceramic foams
- LBM for large-scale CFD simulations in complex structures

- **Other research activities:** - Porous structure optimization for catalytic reactors, radiant burners, evaporators
- Refractory composite-material optimization for improved thermal-shock resistance
- Modeling curing process of goods stacked in industrial furnaces
 - **Advisers:** Prof. Dimosthenis Trimis (TU Freiberg, Germany), Prof. Subhashis Ray (TU Freiberg, Germany)
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PhD Researcher

(1/2007 to 5/2011)

Laboratory of Simulation in Energy and Fluids, Mechanical Engineering Department, Instituto Superior Técnico – TU Lisbon, Portugal

- **Topic:** *Modeling and simulation of hydrocarbon oxidation processes within porous media reactors*
 - **Adviser:** Prof. José Carlos Fernandes Pereira (IST, Portugal)
 - **Co-Adviser:** Dr. José M. Chaves Pereira (IST, Portugal)
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PhD visiting Researcher

(1/2008 to 3/2009)

Chair of Gas and Heat Technology, Institute of Thermal Engineering, TU Bergakademie Freiberg, Germany

- **Topic:** *Experimental activities on hydrocarbon oxidation processes within porous media reactors*
 - **Adviser:** Prof. Dimosthenis Trimis (TU Freiberg, Germany)
 - **Co-Adviser:** Prof. Subhashis Ray (TU Freiberg, Germany)
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Graduate Researcher

(9/2005 to 12/2006)

Laboratory of Simulation in Energy and Fluids, Mechanical Engineering Department, Instituto Superior Técnico – TU Lisbon, Portugal

- **Topic:** *Modeling and simulation of hydrocarbon oxidation processes within porous media reactors*
 - **Adviser:** Prof. José Carlos Fernandes Pereira (IST, Portugal)
 - **Co-Adviser:** Dr. José M. Chaves Pereira (IST, Portugal)
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Undergraduate Researcher

(3/2005 to 8/2005)

Energy Technology Section, Department of Process and Energy, Faculty of Mechanical, Maritime and Materials Engineering, TU Delft, The Netherlands

- **Topic:** *Dynamic model and simulation of an Organic Rankine Cycle turbine plant for small power production*
 - **Adviser:** Prof. Pierro Colonna (TU Delft, The Netherlands)
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Undergraduate Researcher

(9/2003 to 7/2004)

Mechanical Engineering Department, Instituto Superior Técnico – TU Lisbon, Portugal

- **Topic:** *Modeling of the acoustic effect of a Bunsen-burner flame impinging on a flat surface*
- **Adviser:** Prof. Edgar Caetano Fernandes (IST, Portugal)

TEACHING EXPERIENCE

Teaching Courses

- **Fluid Mechanics I**, Bachelor, IST (assistant) (2022-2023)
- **Combustion**, Master, IST (coordinator) (2018-present)
- **Thermodynamics and Transport Phenomena**, Bachelor, IST (coordinator) (2017-present)
- **Heat Transfer**, Master, IST (assistant) (2017-present)
- **Air-Conditioning in Buildings**, Master, IST (assistant) (2018-2019)
- **Advanced Heat Transfer**, Master, IST (assistant) (2017-2018)
- **Fluid Dynamics**, Master, KIT (assistant) (2016-2017)
- **CFD workshop for visiting researchers**, TU Freiberg (coordinator) (2013-2014)
- **Process Modeling**, Master / PhD, TU Freiberg (assistant) (2013-2014)
- **Transport Phenomena Using CFD**, Master / PhD, TU Freiberg (assistant) (2013-2014)
- **Technical Combustion**, Bachelor / Master, TU Freiberg (assistant) (2012-2014)

Student Supervision

PhD

- Ivo Paulo, IST (co-supervisor) (2021-present)
Topic: *Hydrogen enriched gas streams via steam reforming of bio-oil from biomass liquefaction*
- Gonalo Pacheco, IST (co-supervisor) (2020-present)
Topic: *Decarbonization of the power sector using ammonia as fuel*
- Inês Ferrao, IST-UBI (co-supervisor) (2020-present)
Topic: *High Energy Density Fuels in Aviation Gas Turbines: Experiments and Modelling*
- Christoph Wieland, KIT (co-adviser) (2017)
Topic: *Development of fuel-flexible burner with integrated heat recuperation system*
- Eric Werzner, TU Freiberg (co-adviser) (2013-2017)
Topic: *Detailed modeling and simulation of metal melt filtration in ceramic foams*
- Ye Li, TU Freiberg (co-adviser) (2012-2017)
Topic: *Modeling and simulation of the curing process of ceramic goods stacked in industrial furnaces*
- Omar Alomar, TU Freiberg (co-adviser) (2012-2016)
Topic: *Modeling and simulation of complete liquid-vapor phase change process inside porous media*

Master

- Alice Martins, IST (supervisor) (2023)
Topic: *Characterization of alternative nanofuels for aviation*
- Tiago Guerreiro, IST (supervisor) (2022)
Topic: *Exploratory study of an internal combustion engine powered by ammonia*

- Beatriz Brosque, IST (supervisor) (2022)
Topic: *Design of a small-scale low-cost solar dryer for safe storage of high moisture products*
- Filipe Jorge, IST (supervisor) (2022)
Topic: *Valuing resources from a circular economy perspective for the agricultural and forestry sector*
- Miguel Fernandes, IST (supervisor) (2022)
Topic: *Body cooling system in the use of protective suits NBQR*
- Ricardo Falcão Santos, IST (supervisor) (2022)
Topic: *Development of a combustion chamber for nanofuels*
- Rocio Lechuga, IST (supervisor) (2022)
Topic: *Effect of inorganics on pyrolysis behavior of agriculture residues*
- Tomás Mendes, IST (supervisor) (2022)
Topic: *Single droplet combustion of liquid biofuels with addition of nanoparticles*
- Pedro Gonçalves, IST (supervisor) (2022)
Topic: *Multiobjective Optimization of a Poligeneration Hybrid Plant in Porto Santo*
- Francisco Guimarães, IST (supervisor) (2021)
Topic: *Numerical modeling and validation of a Chemical Reactor Network for $\text{NH}_3/\text{H}_2/\text{air}$ flames and theoretical evaluation of the Rich-Quench-Lean implementation*
- Bruno Campos, IST (supervisor) (2021)
Topic: *Kinetic modelling of biomass torrefaction as a pre-treatment for gasification*
- José Penedos, IST (supervisor) (2021)
Topic: *Effect of inorganics on the thermal decomposition behaviour of wheat straw*
- António Martins, IST (supervisor) (2021)
Topic: *Detailed modeling of the thermal cracking of tars in biomass gasification*
- Milton Mateush, IST (supervisor) (2021)
Topic: *Numerical characterization and optimization of flow and heat transmission inside corrugated tubes*
- Piotr Mazur, IST (supervisor) (2021)
Topic: *Thermodynamic analysis of a concentrated solar energy desalination plant*
- Miguel Franco, IST (supervisor) (2021)
Topic: *Ammonia combustion on a swirl and bluff body stabilized burner*
- Carlos Ribeiro, IST (supervisor) (2021)
Topic: *Numerical and experimental analysis of ejector pumps for burning systems with methane and hydrogen*
- Manuel Oliveira, IST (supervisor) (2021)
Topic: *Acclimatization of a Refurbished Detached House in Sintra With Two Occupancy Modes: Study of Different HVAC Systems and Passive Measures*
- Guilherme Santos, IST (supervisor) (2021)
Topic: *Aerothermodynamic analysis of an intercooler*
- André Lisboa, IST (supervisor) (2021)
Topic: *Solar still performance and enhancement techniques analysis using an alternative thermal model approach*
- José Bento, IST (supervisor) (2020)
Topic: *Development of an optimization tool for the design of heat exchangers*

- Bruno Guerra, IST (supervisor) (2020)
Topic: *Unsteady flow and heat transfer through triply periodic minimal surfaces*
- Muhammad Raiyan, IST (supervisor) (2019)
Topic: *Experimental and Numerical Characterization of an Ejector Pump Burner for Small Scale Firing Systems*
- Marta Fidalgo, IST (supervisor) (2019)
Topic: *Multi-Parametric Analysis of Porous Radiant Burners*
- Gonçalo Cruz, IST (supervisor) (2019)
Topic: *Experimental and numerical characterization of the flow and heat transfer inside corrugated pipes*
- André Passos, IST (supervisor) (2019)
Topic: *Laminar flow and heat transfer in triply periodic minimal surfaces*
- Zaid Bin Farooq, IST (supervisor) (2018)
Topic: *Case study of Industry 4.0 concept at Tabaqueira facilities: predictive maintenance of compressors through data analysis*
- António Maione, IST-POLITO (supervisor) (2018)
Topic: *Modeling of diesel particulate filtration inside wall-flow traps based on generic channel geometry approach*
- Fanny Ruff, KIT (supervisor) (2016)
Topic: *Design of an experimental set-up for investigating diesel particulate filters*

Bachelor

- Philip Roßger, TU Freiberg (co-adviser) (2014)
Topic: *Experimental and numerical determination of the effective thermal conductivity of open-cell ceramic foams at temperatures of up to 700° C*

PROJECT EXPERIENCE

- **AC/DC** (2022-present)
Title: Ammonia as a X-Power enabler for stationary power facilities deCarbonization through Direct Combustion
Supported by: Foundation for Science and Technology (FCT)
Partners: 2 Duration: 36 months Budget: 215 k€
- **Industrial Project - Universal H2 Lda** (2021-present)
Title: Practical concept of design for an open-flame hydrogen burner
Supported by: Universal H2
Partners: 2 Duration: 18 months
- **BICEF-NH3** (2021-2022)
Title: Boosting full decarbonization for sustainable cities mobility through internal combustion engines fueled by pure ammonia
Supported by: Foundation for Science and Technology (FCT)
Partners: 2 Duration: 12 months Budget: 50 k€
- **CERES** (2020-present)
Title: Experimental and numerical investigation of the catalytic effects of inorganic matter on the gasification of biomass residues
Supported by: Foundation for Science and Technology (FCT)
Partners: 3 Duration: 36 months Budget: 215 k€

- **BIOFMET** (2020-present)
Title: New metrological methods for biofuel materials analysis
Supported by: European Metrology Programme for Innovation and Research (EMPIR)
Partners: 11 **Duration:** 36 months **Budget:** 1.8 M€
- **NanoCom** (2020-present)
Title: Nanofluids as advanced cooling media
Supported by: Foundation for Science and Technology (FCT)
Partners: 1 **Duration:** 36 months **Budget:** 240 k€
- **Industrial Project - Petrogal Brasil** (2020-present)
Title: Development of micro-channel based heat sinks for high concentration photovoltaic cells
Supported by: Brazilian Industrial Research and Innovation Company (EMBRAPII)
Partners: 2 **Duration:** 36 months **Budget:** 370 k€
- **ECCO** (2017-2022)
Title: Energy Efficient Coil Coating Process
Supported by: European Commission (EC) - H2020
Partners: 12 **Duration:** 42 months **Budget:** 9.8 M€
- **BIOROBURplus** (2017)
Title: Advanced direct biogas fuel processor for robust and cost-effective decentralised hydrogen production
Supported by: European Commission (EC) - H2020
Partners: 11 **Duration:** 42 months **Budget:** 3.8 M€
- **BioRobur** (2013-2015)
Title: Biogas Robust Processing with Combined Catalytic Reformer and Trap
Supported by: European Commission (EC) - FP7
Partners: 9 **Duration:** 36 months **Budget:** 3.8 M€
- **Collaborative Research Center 920** (2011-2015)
Title: Multi-Functional Filters for Metal Melt Filtration - A Contribution towards Zero Defect Materials
Supported by: German Research Foundation (DFG)
Partners: 10 **Duration:** 48 months **Budget:** 9.2 M€
- **Priority Programme 1418 - FIRE** (2011-2015)
Title: Refractory - Initiative to Reduce Emissions
Supported by: German Research Foundation (DFG)
Partners: 17 **Duration:** 72 months **Budget:** 9 M€
- **Gestapelte Güter II** (2011-2014)
Title: Curing process of ceramic goods stacked in industrial furnaces
Supported by: Industry - AiF
Partners: 2 **Duration:** 36 months
- **FLAME-SOFC** (2008-2010)
Title: Fuel Flexible, Air-regulated, Modular, Electrically Integrated SOFC System
Supported by: European Commission (EC) - FP6
Partners: 20 **Duration:** 57 months **Budget:** 12.3 M€

MANAGEMENT EXPERIENCE

Projects:

- **Supervision activities:**

- Co-Principal Investigator (Co-PI) for AC/DC project (FCT) (2022-present)
- Responsible person at IST partner for industrial project with Universal H2 Lda (2021-present)
- Co-Principal Investigator (Co-PI) for BICEF-NH3 project (FCT) (2021-2022)
- Co-Principal Investigator (Co-PI) for CERES project (FCT) (2020-2022)
- Responsible person at IST partner for BIOFMET project (EMPIR) (2020-present)
- Assistant Coordinator of ECCO project (EC-H2020) (2017)
- Work package leader of WP4 in BIOROBURplus project (EC-H2020) (2017)
- Group leader of sub-project B02 in Collaborative Research Center 920 (DFG) (2011-2015)

- **Support in proposal writing:**

- CoGas - Catalytic co-gasification of biomass residues through multicriteria analysis (FCT) (2022)
- BioCharVal - In-situ biomass carbonization and use of biochar for soil-amendment (FCT) (2021)
- TropicalBioVal - Integrated biorefinery concept for valorisation of tropical flora (FCT) (2020)
- SunSea4Water - Low-cost and efficient solar still systems for seawater desalination (FCT) (2019)
- PAC - Portugal AutoCluster for the Future (PT2020) (2019)
- Prediction of complete liquid-vapour phase-change inside porous media (DFG) (2017)
- ECCO - Energy Efficient Coil Coating Process (EC-H2020) (2017)
- LAUD - Laser-based Audio reproduction (EC-H2020) (2016)
- 2nd phase of Collaborative Research Center 920 (DFG) (2015)

Conferences/Workshops organization:

- (local organization committee) 15th International Conference on Combustion Technologies for a Clean Environment (CleanAir2023), Lisbon, Portugal (2022)
- (local organization committee) 8th European Thermal Sciences Conference (EUROTHERM2021), Virtual Conference (2021)
- (organized) Computational Fluid Dynamic (CFD) workshops for international visiting researchers at TU Freiberg (2013-2014)
- (supported organization) 5th European Conference on Computational Fluid Dynamics (ECCOMAS CFD 2010), Lisbon, Portugal (2010)

Institutional:

- Responsible for Combustion Laboratory from IDMEC-IST (2020-present)
- Member of mentoring program for new students at IST (2022-present)

PUBLICATIONS

Complete list of journal and conference publications (provided at the end of this document)

ORCID ID: 0000-0001-9817-2334

Scopus author ID: 55760801300

Subject areas: Physics, Engineering, Energy, Chemical Engineering, Material Science, Chemistry

Citation Report from Scopus (on 7/09/2022)

| | |
|--------------------|-----|
| Documents | 41 |
| Sum of Times Cited | 869 |
| Citing Articles | 564 |
| Co-authors | 71 |
| h-index | 20 |

SCIENTIFIC COMMUNITY

Reviewer for several international journals including:

- International Journal of Thermal Sciences; International Journal of Heat and Mass Transfer; International Journal of Hydrogen Energy; Industrial & Engineering Chemistry Research; Chemical Engineering Journal; Special Topics & Reviews in Porous Media - An International Journal

Registered expert reviewer for **Research & Innovation Actions - European Commission (H2020, COSME, RFCS)**

KEY SKILLS

Research

- Extensive knowledge of **applied mathematics** (integro-differential equations, numerical methods, uncertainty quantification analysis, linear stability analysis, optimization)
- Extensive knowledge of **system modeling and simulation** (CFD, parallel computation, multi-scale modeling, model reduction techniques)
- Extensive knowledge of **energy conversion systems** (combustion and reactive systems, transport processes in porous media, multi-mode heat transfer, related industrial applications)
- Knowledge of **combustion experiments** (burner design and characterization, pollutant emission measurements, biomass thermochemical conversion)

Information Technology

- **Operating systems:** WINDOWS, LINUX

- **Softwares:** Microsoft Office packages, LaTeX, CHEMKIN, Cantera, TECPLOT, various GNU packages as well as CAD and CFD softwares
 - **Programming:** FORTRAN, MPI, MATLAB, MATLAB-Simulink, bash shell scripting
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Languages

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|------------|---------------|
| Portuguese | mother tongue |
| English | fluent |
| Spanish | good |
| German | sufficient |
| French | basic |

Problem solving

- Working across distinct areas of Applied Thermodynamics, demonstrated independent thought in analyzing problems, adopting suitable strategies and developing new techniques

REFERENCES

Available upon request

Journal Publications

1. R.V. Santos, M.A.A. Mendes, C. Alexandre, M.R. Carrott, A. Rodrigues, A.F. Ferreira, “Assessment of Biomass and Biochar of Maritime Pine as a Porous Medium for Water Retention in Soils”, **Energies** 15, 5882, 2022
2. A.A.V. Lisboa, R. Segurado, M.A.A. Mendes, “Solar still performance for small-scale and low-cost seawater desalination: Model-based analysis and water yield enhancement techniques”, **Solar Energy** 238, 341-362, 2022
3. I.A.S. Ferrão, M.A.A. Mendes, A.S.O.H. Moita, A.R.R. Silva, “The addition of particles to an alternative jet fuel”, **Fuels** 3, 184-206, 2022
4. M.M. Afessa, P. Debiagi, A.I. Ferreiro, M.A.A. Mendes, T. Faravelli, A.V. Ramayya, “Experimental and Modeling Investigation on Pyrolysis of Agricultural Biomass Residues: Khat Stem and Coffee Husk for Bio-oil Application”, **Journal of Analytical and Applied Pyrolysis** 162, 105435, 2022
5. A.I. Ferreiro, R. Segurado, M.A.A. Mendes, M. Costa, P. Giudicianni, R. Ragucci, F.J. Rivas, M. Abián, M.U. Alzueta, “Effect of inorganics on pyrolysis and gasification of woody and non-woody biomass: assessment of accuracy of chemical kinetic modeling”, **European Biomass Conference and Exhibition Proceedings**, 794-800, 2022
6. F. Dias, I. Ferrão, M.A.A. Mendes, A. Moita, A.R. Silva, “Numerical Analysis of a Single Droplet Combustion of Jet-A1 and Alkanes”, **AIAA AVIATION 2022 Forum**, AIAA 2022-3878, 2022
7. A.R. Martins, A.I. Ferreiro, R. Segurado, M.A.A. Mendes, “Reduced Reaction Model for Secondary Gas Phase in Biomass Gasification”, **Energy & Fuels** 35, 16750-16759, 2021
8. G.G. Cruz, M.A.A. Mendes, J.M.C. Pereira, H. Santos, A. Nikulin, A.S. Moita, “Experimental and numerical characterization of single-phase pressure drop and heat transfer enhancement in helical corrugated tubes”, **International Journal of Heat and Mass Transfer** 179, 121632, 2021
9. I.A.S. Ferrão, A.R.R. Silva, A.S.O.H. Moita, M.A.A. Mendes, M.M.G. Costa, “Combustion characteristics of a single droplet of hydroprocessed vegetable oil blended with aluminum nanoparticles in a drop tube furnace”, **Fuel** 302, 121160, 2021
10. P. Giudicianni, V. Gargiulo, C.M. Grottola, M. Alfè, A.I. Ferreiro, M.A.A. Mendes, M. Fagnano, R. Ragucci, “Inherent Metal Elements in Biomass Pyrolysis: A Review”, **Energy & Fuels** 35, 54075478, 2021
11. G.P. Pacheco, R.C. Rocha, M.C. Franco, M.A.A. Mendes, E.C. Fernandes, P.J. Coelho, X.-S. Bai, “Experimental and Kinetic Investigation of Stoichiometric to Rich $\text{NH}_3/\text{H}_2/\text{Air}$ Flames in a Swirl and Bluff-Body Stabilized Burner”, **Energy & Fuels** 35, 72017216, 2021
12. M.F.C. Fidalgo, M.A.A. Mendes, J.M.C. Pereira, “An automated method for efficient multi-parametric analysis of porous radiant burner performance”, **International Journal of Thermal Sciences** 163, 106851, 2021
13. P. Jorge, M.A.A. Mendes, E. Werzner, J.M.C. Pereira, “Characterization of laminar flow in periodic open-cell porous structures”, **Chemical Engineering Science** 201, 397-412, 2019
14. O.R. Alomar, R.R. Mohammed, M.A.A. Mendes, S. Ray, D. Trimis, “Numerical investigation of two-phase flow in anisotropic porous evaporator”, **International Journal of Thermal Sciences** 135, 1-16, 2019

15. V.M. Patel, M.A.A. Mendes, S. Ray, P. Talukdar, "Development of correlations for effective thermal conductivity of a tetrakaidehedra structure in presence of combined conduction and radiation heat transfer", **International Journal of Heat and Mass Transfer**, 127A, 843-856, 2018
16. O.R. Alomar, M.A.A. Mendes, S. Ray, D. Trimis, "Numerical investigation of complete evaporation process inside porous evaporator using staggered and non-staggered grid arrangements", **International Journal of Thermal Sciences** 129, 56-72, 2018
17. C. Demuth, E. Werzner, M.A.A. Mendes, H. Krause, D. Trimis, S. Ray, "Non-Isothermal simulations of aluminum depth filtration", **Advanced Engineering Materials** 19, 1700238, 2017
18. A. Loukou, M.A.A. Mendes, I. Frenzel, J.M.C. Pereira, S. Ray, J.C.F. Pereira, D. Trimis, "Experimental and numerical investigation of methane thermal partial oxidation in a small-scale porous media reformer", **International Journal of Hydrogen Energy** 42, 652-663, 2017
19. O.R. Alomar, M.A.A. Mendes, D. Trimis, S. Ray, "Numerical simulation of complete liquid-vapour phase change process inside porous media: a comparison between local thermal equilibrium and non-equilibrium models", **International Journal of Thermal Sciences** 112, 222-241, 2017
20. M.A.A. Mendes, P. Goetze, P. Talukdar, E. Werzner, C. Demuth, P. Roessger, R. Wulf, U. Gross, D. Trimis, S. Ray, "Measurement and simplified numerical prediction of effective thermal conductivity of open-cell ceramic foams at high temperature", **International Journal of Heat and Mass Transfer** 102, 396-406, 2016
21. C. Demuth, J. Hubáľková, M.A.A. Mendes, F. Ballani, D. Trimis, S. Ray, "Prediction of effective thermal conductivity of refractory materials at high temperatures based on synthetic geometry generation", **Journal of Ceramic Science and Technology** 7, 183-192, 2016
22. C. Demuth, S. Mishra, M.A.A. Mendes, S. Ray, D. Trimis, "Application and accuracy issues of TRT lattice Boltzmann method for solving elliptic PDEs commonly encountered in heat transfer and fluid flow problems", **International Journal of Thermal Sciences** 100, 185-201, 2016
23. P. Götze, M.A.A. Mendes, A. Asad, H. Jorschick, E. Werzner, R. Wulf, D. Trimis, U. Gross, S. Ray, "Sensitivity analysis of effective thermal conductivity of open-cell ceramic foams using a simplified model based on detailed structure", **Special Topics and Reviews in Porous Media: An International Journal** 6, 1-10, 2015
24. F. Heuzeroth, J. Fritzsche, E. Werzner, M.A.A. Mendes, S. Ray, D. Trimis, U.A. Peuker, "Viscous force - An important parameter for the modeling of deep bed filtration in liquid media", **Powder Technology** 283, 190-198, 2015
25. O.R. Alomar, M.A.A. Mendes, D. Trimis, S. Ray, "Simulation of complete liquid-vapour phase change process inside porous evaporator using local thermal non-equilibrium model", **International Journal of Thermal Sciences** 94, 228-241, 2015
26. O.R. Alomar, M.A.A. Mendes, D. Trimis, S. Ray, "Numerical simulation of complete liquid-vapour phase change process inside porous media using smoothing of diffusion coefficient", **International Journal of Thermal Sciences** 86, 408-420, 2014
27. R. Wulf, M.A.A. Mendes, V. Skibina, A. Al-Zoubi, D. Trimis, S. Ray, U. Gross, "Experimental and numerical determination of effective thermal conductivity of open cell FeCrAl-alloy metal foams", **International Journal of Thermal Sciences** 86, 95-103, 2014
28. M.A.A. Mendes, V. Skibina, P. Talukdar, R. Wulf, U. Gross, D. Trimis, S. Ray, "Experimental validation of simplified conduction-radiation models for evaluation of Effective Thermal Conductivity of open-cell metal foams at high temperatures", **International Journal of Heat and Mass Transfer** 78, 112-120, 2014

29. C. Demuth, M.A.A. Mendes, S. Ray, D. Trimis, "Performance of thermal lattice Boltzmann and finite volume methods for the solution of heat conduction equation in 2D and 3D composite media with inclined and curved interfaces", **International Journal of Heat and Mass Transfer** 77, 979-994, 2014
30. O.R. Alomar, M.A.A. Mendes, D. Trimis, S. Ray, "Simulation of complete liquid-vapor phase change inside divergent porous evaporator", **International Journal of Materials, Mechanics and Manufacturing** 2, 223-229, 2014
31. R. Zehmisch, C. Demuth, A. Al-Zoubi, M.A.A. Mendes, F. Ballani, S. Ray, D. Trimis, "Numerical prediction of effective thermal conductivity of refractory materials: Methodology and sensitivity analysis", **Journal of Ceramic Science and Technology** 5, 145-154, 2014
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Journal Publications (Submitted/ Awaiting)

Conference Publications

1. R.C. Rocha, G.P. Pacheco, M.A.A. Mendes, E.C. Fernandes, P.J. Coelho, X.-S. Bai, “Numerical and experimental characterization of partially premixed NH₃/H₂/air flames on a laboratory scale combustor”, **10th European Combustion Meeting**, Virtual Edition, 14-15 April, 2021
2. I.A.S. Ferrão, M.A.A. Mendes, A.S.O.H. Moita, A.R.R. Silva, “The influence of aluminum particles in a Hydroprocessed Vegetable Oil combustion”, **10th European Combustion Meeting**, Virtual Edition, 14-15 April, 2021
3. A. Martins, A.I. Ferreiro, R. Segurado, M.A.A. Mendes, “Reduced reaction model for secondary gas phase in biomass gasification”, **10th European Combustion Meeting**, Virtual Edition, 14-15 April, 2021
4. I. Ferrão, M.A.A. Mendes, A.S. Moita, A. Silva, “Single droplet combustion of aluminum nanoparticles added to a biofuel: effect of particle concentration and ambient temperature”, **15st Triennial International Conference on Liquid Atomization & Spray Systems - ICLASS 2021**, Virtual Edition, 30 August - 2 September, 2021
5. I. Ferrão, A. Silva, A.S. Moita, M.A.A. Mendes, M. Costa, “Single droplet combustion of aluminum nanoparticles added to a biofuel”, **21st Annual Conference on Liquid Atomization and Spray Systems - Asia - ILASS-ASIA2020**, Zhenjiang, China, 23-26 October, 2020
6. M. Sentko, M.A.A. Mendes, B. Stelzner, S. Voss, D. Trimis, “On the Accuracy of Determining the Laminar Burning Velocity using the Heat-Flux Method”, **8th European Combustion Meeting**, Dubrovnik, Croatia, 18-21 April, 2017
7. C. Demuth, E. Werzner, M.A.A. Mendes, D. Trimis, S. Ray, “Simulation of aluminium depth filtration”, **FILTECH Conference 2016**, Cologne, Germany, 11-13 October, 2016
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9. E. Werzner, M.A.A. Mendes, S. Ray, D. Trimis, “Numerical Modeling of Aluminum Melt Purification Inside Ceramic Foam Filters During Continuous Casting”, **10. Freiburger-St.Petersburger Kolloquium junger Wissenschaftler**, Freiberg, Germany, 18-19 June, 2015. Proceedings published in: **Scientific Reports on Resource Issues Vol. 1 - Innovations in Mineral Resource Value Chain**, 267-271

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