

# Dr Stefano Mazzone, PhD

Nationality: Italian



## Work experience

### University of Roma Tor Vergata

Rome (Italy)

March 2023 - Current

#### *Assistant Professor (Tenured)*

Energy Conversion Systems and Turbomachinery

- Working on optimization of multi-energy system and turbomachinery for clean energy environment with CCS and CCU
- Working on Innovative Cogeneration Technologies for concurrent generation of Multiple assets (H2, Water, E-Fuel)

Teaching at Master Degree Course: Methods and Techniques for advanced decarbonized energy systems

Teaching at Bachelor Degree Course: Sistemi Energetici e Fonti Rinnovabili

### Nanyang Technological University (NTU)

Singapore

July 2020 – August 2022

#### *Senior Research Fellow*

Energy Conversion Systems, Smart Multi Energy System (SMES)

- Working on optimization of multi-energy system and smart-district for clean energy environment by the ©E-OPT software platform development.
- Responsible for the design of the 8M\$ cogeneration power plant at Jurong Port, Singapore. The adoption of the ©E-OPT software platform developed by my team allowed up to **1M\$ CAPEX saving** during design of power plant and energy systems. **15% Primary Energy Savings** and up to **20% CO2 Emission Reduction** have been also proven.
- Validating Punggol Digital District (District Cooling) Design by ©E-OPT software platform utilization.

#### *Research Fellow*

July 2016 – June 2020

Energy Conversion Systems, Smart Multi Energy System (SMES)

- Leading and Coordination of the Work Package “Polygeneration” (SMES Project)
  - *Coordination of the team: Research Associates, PhD Candidates and MD students*
  - *Actively involved in the Steering Committee of the whole SMES project*
  - *Meeting and discussion with national agency (i.e. NEA, EMA) and partner companies (i.e. Shell, JTC)*
- Developed of the Optimal Planning simulation Tool (OPT)
  - *Modelling of SMES components (Engines, Chillers, Heat Exchangers, Building, Grid, Thermal Energy Storage, others); District Cooling Systems and Cooling Phase Change Material for Cooling Application.*
  - *Multi-Objective function approach for accounting techno-economic optimization*
  - *Advanced mathematics: Hybrid Evolutionary and Simultaneous Algorithms coupled with Artificial Intelligence*

### Shell

Singapore

November 2018 – June 2019

#### *Consultant*

Energy and CO<sub>2</sub> Footprint Reduction Study for Shell Jurong Island Petrochemicals Complex

- Pinch Point Analysis technique and energy optimization by integrating and retrofitting the actual plant configuration.
- Definition of a roadmap for allowing up to **95% CO<sub>2</sub> reduction** within 2035

### Sustainable Development of Energy, Water and Environment Systems (SDEWES)

August 2018 - Current

#### *Scientific Advisory Board Member*

- Evaluations of scientific journal paper, organization of conference and presentation.

### Scientific Reviewer

Singapore

January 2015 - Current

- Energy Conversion and Management, Applied Energy Paper Reviewer, Energy, Renewable Energy & Journal of Environmental Management, Applied Thermal Engineering (**ELSEVIER**), **Energies** MDPI, American Society of Mechanical Engineers (**ASME**) Turbo Expo. Appointed recently as **Review Editor** at **Frontiers Journal**.

### University of Roma Tre

Rome, Italy

June 2014 - June 2016

#### *Research Fellow*

Energy Conversion Systems – Concentrated Solar Power Plants

- Developed component models for CSP power plants (OMSoP European Project)
- Technical / economic analysis and optimization for CSP power plants (OMSoP European Project)

- Laboratory Leader for Solar and Turbomachinery Test (OMSoP European Project)

**Contract Professor**

June 2014 - June 2016

- Steering PhD candidates and MD students
- Thermodynamics and Fluid Dynamics Applied on Machines
- Machines and Energy Conversion Systems
- Member of the Examination Board for Turbomachinery, Fluid Machine and Thermodynamics and Fluid-Dynamics Applied on Machines

**Cooperation Contract**

September 2010 – May 2014

- Developed component models for IGCC power plants (H2-IGCC European Project)
  - *Gasification Isle Simulator (Matching of elementary component models – Transfer Functions)*
  - *Power Isle Simulator (Matching of elementary component models, Turbomachineries and Heat Transfer Devices)*

**Italian Ministry for University and Research**

Rome, Italy

March 2016

**Project Evaluator:** MIUR-DAAD Joint Mobility Program

**Co.Se.A**

Bologna, Italy

November 2014 - February 2016

**Consultant:** Internal Combustion Engine Failure Analysis & Litigation on the Green Certificate for Power Generation

**Education**

**University of Roma Tre**

Rome, Italy

January 2011 – June 2014

**PhD at Doctoral School of Industrial and Mechanical Engineering**

- Thesis Title: IGCC Power Plant Simulator: Gas Turbine and Steam Cycle

**Master degree of Industrial and Mechanical Engineering (110 out of 110 points cum Laude)**

Oct. 2007 – May 2010

- Thesis Title: Steam Cycle Simulator for Combined Power Plants

**Bachelor of Industrial and Mechanical Engineering (107 out of 110 points)**

Oct. 2004 - December 2007

- Thesis Title: Emulsions in reciprocating engines

**Association of Engineering**

Rome, Italy

June 2010 – October 2010

**Certification as Industrial Engineer**

**Skills**

**Technical Skills**

- Energy Conversion Systems, Development / Modelling of power plant component models, Fluid Machines and Turbomachinery, Internal Combustion Engine, Steam Cycles, Solar Power Plants, Heat Transfer Devices, Gas Turbine Cooling, Optimization Techniques, Neural Network, Unit Commitment & Master planning

**Computer Skills**

- Programming Fortran 77, Matlab, Python, Neuro Dimension, Aspen Suite, ANSYS, AutoCAD, Microsoft Office Suite, Web Browser, Photoshop Suite, Windows and Mac OS

**Personal Skills**

- Team Work, Leading PhD candidates, Master Degree students and technicians, Speaking at conferences
- Awarded as Outstanding Reviewer for Applied Energy International Journal, ELSEVIER.
- Awarded as Distinguished Scientist by Sustainable Development of Energy, Water and Environment Systems

**Languages**

- Native speaker: **Italian**
- Professional (spoken/written): **English**
- School Level (spoken/written): **German**

**Interest**

- Photography (Professional Level), Travelling, Chess Playing (semi-Pro Level) , Sport (Cycling, Soccer, Horse Riding, Swimming, Diving), Cinema, Music and Art

**Publications**

1. Nastasi, B., **Mazzoni, S.** Renewable Hydrogen Energy Communities layouts towards off-grid operation (2023) 291, art. no. 117293 DOI: 10.1016/j.enconman.2023.117293

2. Gambini, M., **Mazzoni, S.**, Vellini, M., The Role of Cogeneration in the Electrification Pathways towards Decarbonization (2023) 16 (15), art. no. 5606, DOI: 10.3390/en16155606
3. Nastasi, B., **Mazzoni, S.**, Groppi, D., Romagnoli, A., Astiaso Garcia, D.: ‘*Comparing optimal Hydrogen solutions in Renewable Energy Community in Islands*’, SDEWES 2020
4. **Mazzoni S.**, Ooi S., Desideri U., Nastasi B., Comodi G., Romagnoli A.: ‘*The Adoption of a Planning Tool Software Platform for Optimized Polygeneration Design and Operation - a District Cooling Application in South-East Asia*’, Applied Thermal Engineering, 199, art. no. 117532, 2021
5. Bartolini, A., **Mazzoni, S.**, Comodi, G., Romagnoli, A. ‘*Distributed energy systems to lower carbon emissions in future industrial districts*, Applied Energy, 2021, 301, art. no. 117324.
6. Nastasi, B., **Mazzoni, S.**, Groppi, D., Romagnoli, A., Astiaso Garcia, D.: ‘*Optimized integration of Hydrogen technologies in Island energy systems*, (2021) Renewable Energy, 174, 850-864, 2021
7. **Mazzoni, S.**, Sze, J.Y., Nastasi, B., Ooi, S., Desideri, U., Romagnoli, A.: ‘*A techno-economic assessment on the adoption of latent heat thermal energy storage systems for district cooling optimal dispatch & operations*’ (2021) Applied Energy, 289, art. no. 116646.
8. Nastasi, B., **Mazzoni, S.**, Groppi, D., Romagnoli, A., Astiaso Garcia, D.: ‘*Solar power-to-gas application to an island energy system*’, (2021) Renewable Energy’, 164, pp. 1005-1016.
9. Rigo-Mariani, R., Chea Wae, S.O., **Mazzoni, S.**: ‘*Impact of the Economic Environment Modelling for the Optimal Design of a Multi-Energy Microgrid*’, (2020) IECON Proceedings (Industrial Electronics Conference), 2020-October, art. no. 9254730, pp. 1837-1842.
10. Baldasso E, Mondejar ME, **Mazzoni S**, Romagnoli A, Haglind F.: ‘*Potential of liquefied natural gas cold energy recovery on board ships*’ J Clean Prod 2020;271:122519. doi:10.1016/j.jclepro.2020.122519.
11. Benedetto Nastasi , **Stefano Mazzoni** , Daniele Groppi, Davide Astiaso Garcia, Alessandro Romagnoli: ‘*Optimized integration of Hydrogen technologies in Island energy systems*’, SDEWES 2020.
12. Rigo-Mariani R., Ooi S., **Mazzoni S.**, Romagnoli A.: ‘*Comparison of Optimization Frameworks for the Design of a Multi-Energy Microgrid*’, Applied Energy, Volume 257, 2020, ISSN 0306-2619, Elsevier
13. **Mazzoni S.**, Ooi S., Nastasi B., Romagnoli, A.: ‘*Energy Storage Technologies as techno-economic parameters for Master-planning and Optimal Dispatch in Smart Multi Energy Systems*’, Applied Energy, Volume 254, 2019, ISSN 0306-2619, Elsevier
14. **Mazzoni S.**, Ooi S., Desideri U., Comodi G., Romagnoli A.: ‘*The Role of Multi-Energy Polygeneration Plants in the Optimization Process of District Cooling & Heating Design and Operation*’, 14th Conference on Sustainable Development of Energy, Water and Environment System (SDEWES), 01-05 October 2019, Dubrovnik, Croatia.
15. Li Z., Xu Y., Fang S., **Mazzoni, S.**: ‘*Optimal Placement of Heterogeneous Distributed Generators in a Multi-Energy Microgrid under Uncertainties*’, IET Renewable Power Generation, August 2019.
16. **Mazzoni S.**, Ooi S., Romagnoli A.: ‘*Cogeneration Power Plants for Smart-District Optimal Operations: CO2 and Primary Energy Savings in a real industrial application*’, AIP Volume 2123, July 2019, Article 020099.
17. Bartolini A., Romagnoli A., **Mazzoni S.**, Comodi G.: ‘*Influence of users type on costs and primary energy savings potential for decentralized energy systems*’, International Conference on Efficiency, Cost, Optimization, Simulation and Environmental impact of Energy System, ECOS, Wroclaw, June 2019.