

Short Curriculum Vitae Prof. Sara Rainieri, Ph.D

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Education, qualifications and academic positions

Graduated summa cum laude in Physics at the University of Parma (1993), PhD in Applied Physics (1997), University Researcher (1999), Associate Professor (2002) and Full Professor (2015) in Applied Physics at the Department of Engineering and Architecture of the University of Parma.

Vice Head of the Department of Industrial Engineering (2012-2015), Rector's Delegate for Job Placement (2013-2017) and since November 2017 Pro-Rector for Teaching and Student Affairs at the University of Parma, Italy.

Research activity

The research activity is focused mainly on these main following topics:

- **Energy efficiency in heat exchangers design.** The research work, based both advanced experimental and numerical approaches, is mainly focused on the study of both active and passive heat transfer enhancement techniques. Significant research work has been directed to the study of forced convection in corrugated and curved tubes for fluids showing complex rheological behavior, with particular attention to the problems of the food industry. The Ph.D. thesis work, centered on this subject, obtained an Honorable Mention within the EURO THERM Young Scientist Prize and Awards 2000.

- **Solution Techniques of the Inverse Heat Conduction Problem.** The research activity is focused on both a theoretical and experimental study on the solution of the Inverse Heat Conduction Problem and on the validation of innovative data processing techniques, mainly based on infrared thermographic measurements, applied to the estimation of the local convective heat transfer coefficient both in single and in two-phase heat transfer modality. The same approach has been successfully applied for the estimation of other relevant engineering parameters.

- **Energy analysis.** The research activity is mainly concerned the use of cogeneration (heat and power) and trigeneration (heat, cold and power) techniques in complex systems, as university campuses and hospitals. It also concerned the estimation of short-term energy consumption of buildings, starting from the monthly bill, and the use of low-enthalpy geothermal energy, carried out through ground heat exchanger coupled heat pump. The thermal comfort in semi-outdoor spaces and its achievement by efficient cooling has also been addressed in the research work.

Scientific production and scientific projects and memberships

Author and/or coauthor of about 130 scientific publications at both national and international level and she is frequent reviewer for several International Scientific Journals.

The bibliometric parameters available on the Scopus data base are (October 13th 2020)

Documents by author:69

Total citations: 1057 by 680 documents

h-index: 19.

National coordinator of the project "Innovative techniques for the enhancement of forced convection", founded by the Italian Ministry in year 2007.

Scientist-in-Charge and PhD mentor for the University of Parma of the project "Establishing a strong and lasting international training network for innovation in food and juice industries: a 4D-research approach for fruit juice processing", HiStabJuice, proposal 956257, Innovative Training Networks (ITN) Call: H2020-MSCA-ITN-2019, MARIE SKŁODOWSKA-CURIE ACTIONS.

Associate Editor of the ASME Journal of Heat Transfer.

Member of the ASME.

Member of the Steering Committee of the Italian Union of Thermo Fluid Dynamics.

Member of the Scientific Committee of ICHMT, International Centre of Heat and Mass Transfer.

Conferences

Keynote speaker of the 32nd UIT Heat Transfer Conference 23–5 June 2014, Pisa, Italy – Invited lecture on "Passive techniques for the enhancement of convective heat transfer in single phase duct flow".

Keynote speaker of the 9th e World Conferences on Experimental Heat Transfer, Fluid Mechanics and Thermodynamics, 11-15 June 2017, Foz do Iguaçu – Paraná Brazil – Invited lecture on "Inverse Problems Approach to the Experimental Assessment of Heat Transfer Enhancement Techniques".

Teaching experience

Applied Thermo-Fluid Dynamics at the Master's Degree in Mechanical Engineering (Master of Science level).

Heat Transfer Applied to the Processes of the Food Industry at the Master's Degree in Food Science and Technology (Master of Science level).

Fire safety Engineering at the Master's Degree in Civil Engineering (Master of Science level).

Relevant scientific publications

Bernardi, P., Michelini, E., Sirico, A., Rainieri, S., Corradi, C. (2020). Simulation methodology for the assessment of the structural safety of concrete tunnel linings based on CFD fire – FE thermo-mechanical analysis: a case study. *ENGINEERING STRUCTURES*, 225, 111193

Vocale P., Bozzoli F., Mocerino A., Navickaite K., Rainieri S. (2020). Application of an improved parameter estimation approach to characterize enhanced heat exchangers. *INTERNATIONAL JOURNAL OF HEAT AND MASS TRANSFER*, vol. 147, ISSN: 0017-9310, doi: 10.1016/j.ijheatmasstransfer.2019.118886

Bozzoli F., Cattani L., Rainieri S. (2020). Cross-helix corrugation: The optimal geometry for effective food thermal processing. *INTERNATIONAL JOURNAL OF HEAT AND MASS TRANSFER*, vol. 147, ISSN: 0017-9310, doi: 10.1016/j.ijheatmasstransfer.2019.118874

Bozzoli F., Cattani L., Mocerino A., Rainieri S., Bazan F. S. V. (2019). A novel method for estimating the distribution of convective heat flux in ducts: Gaussian filtered singular value decomposition. *INVERSE PROBLEMS IN SCIENCE & ENGINEERING*, vol. 27, p. 1595-1607, ISSN: 1741-5977, doi: 10.1080/17415977.2018.1540615

Cattani L., Bozzoli F., Rainieri S. (2017). Experimental study of the transitional flow regime in coiled tubes by the estimation of local convective heat transfer coefficient. *INTERNATIONAL JOURNAL OF HEAT AND MASS TRANSFER*, vol. 112, p. 825-836, ISSN: 0017-9310, doi: 10.1016/j.ijheatmasstransfer.2017.05.003

Pagliarini G., Rainieri S., Vocale P. (2014). Energy efficiency of existing buildings: optimization of building cooling, heating and power (BCHP) systems. *ENERGY & ENVIRONMENT*, vol. 25, p. 1423-1438, ISSN: 0958-305X, doi: 10.1260/0958-305X.25.8.1423

Rainieri S., Bozzoli F., Cattani L., Vocale P. (2014). Parameter estimation applied to the heat transfer characterisation of scraped surface heat exchangers for food applications. *JOURNAL OF FOOD ENGINEERING*, vol. 125, p. 147-156, ISSN: 0260-8774, doi: 10.1016/j.jfoodeng.2013.10.031

Bozzoli F., Cattani L., Rainieri S., Viloche Bazán F.S., Borges L.S. (2014). Estimation of the local heat-transfer coefficient in the laminar flow regime in coiled tubes by the Tikhonov regularisation method. *INTERNATIONAL JOURNAL OF HEAT AND MASS TRANSFER*, vol. 72, p. 352-361, ISSN: 0017-9310, doi: 10.1016/j.ijheatmasstransfer.2014.01.019

Pagliarini G., Corradi C., Rainieri S. (2012). Hospital CHCP system optimization assisted by TRNSYS building energy simulation tool. *APPLIED THERMAL ENGINEERING*, vol. 44, p. 150-158, ISSN: 1359-4311, doi: 10.1016/j.applthermaleng.2012.04.001

Pagliarini G., Rainieri S. (2012). Restoration of the building hourly space heating and cooling loads from the monthly energy consumption. *ENERGY AND BUILDINGS*, vol. 49, p. 348-355, ISSN: 0378-7788, doi: 10.1016/j.enbuild.2012.02.030

Rainieri S., Bozzoli F., Pagliarini G. (2012). Experimental Investigation on the Convective Heat Transfer in Straight and Coiled Corrugated Tubes for Highly Viscous Fluids: Preliminary Results. *INTERNATIONAL JOURNAL OF HEAT AND MASS TRANSFER*, vol. 55, p. 498-504, ISSN: 0017-9310, doi: 10.1016/j.ijheatmasstransfer.2011.08.030

Bozzoli F., Pagliarini G., Rainieri S., Schiavi L. (2011). Estimation of soil and grout thermal properties through a TSPEP (two-step parameter estimation procedure) applied to TRT (thermal response test) data. *ENERGY*, vol. 36, Issue 2, p. 839-846, ISSN: 0360-5442, doi: 10.1016/j.energy.2010.12.031

Rainieri S., Pagliarini G. (2002). Convective Heat Transfer to Temperature Dependent Property Fluids in the Entry Region of Corrugated Tubes. *INTERNATIONAL JOURNAL OF HEAT AND MASS TRANSFER*, vol. 45, p. 4525-4536, ISSN: 0017-9310, doi: 10.1016/S0017-9310(02)00156-4