MOUSSA Omar

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PROFILE

- Ph.D graduate with expertise in fluid mechanics and heat transfer applied to energy systems
- Strong communication and teamwork skills with the tutoring of three Master students internship
- Experiments design skill with the design of an optical diagnostics based setup resulting in 3 publications and international conferences

SKILLS

Research expertise

- Heat Transfer
- Combustion
- Atomization and sorays
- Fluid mechanics
- Energy processes
- Diphasic systems
- Thermal metrology
- Optical diagnostics

Technical skills

- Data processing (Matlab, Origin)
- Writing and presentation skills (MS Office, Latex)
- Numerical skills (COMSOL, ANSYS, CFD, C language)
- Ability for conception of experimental setups
- Team work skills (3 interns coordination during PhD)
- Conception software (Catia, Inventor)

EDUCATION

- Ph.D. DEGREE (2016-2019)
  Heat Transfer & Energy Laboratory
  University of Nantes, France

- ENGINEERING DEGREE (2013-2016)
  Thermal and Energy Sciences Engineering Program
  School of Engineering, University of Nantes, France

- SECONDARY SCHOOL DIPLOMA (2008-2011)
  Mathematics-Science, graduated with Honors
  Al Jabr College, Casablanca, Morocco

RESEARCH EXPERIENCES

Chalmers University of Technology, Goteborg, Sweden
(June 2020-Present), Postdoctoral fellow

Heat Transfer & Energy Laboratory, Nantes, France
(Oct. 2016-Dec. 2019), Ph.D. candidate

Experimental study of emulsified fuel droplets (water-in-oil emulsions) atomization. Indeed, this kind of fuel undergo a 'secondary' atomization called micro-explosion, caused by the water sub-droplets phase change, leading to the burst of the emulsion fuel. The first step was to identify the physical parameters governing this phenomena and their influence through a parametric study. Next steps were dedicated to the quantification and evolution of size and temperature of water sub-droplets using high frequency acquisition optical diagnostics like Laser Induced Fluorescence (LIF).

GEPEA, Nantes, France
(Mar. 2016-Sep.2016), Intern

Experimental study of an adsorber-heat exchanger applied to gas separation (CO_2-CH_4). This device is a multi-bed of activated charcoal used for the adsorption of CO_2. Adsorption is an exothermic reaction, and thus, the heat produced can be used for the inverse reaction (desorption) happening in the adjacent bed. Optimization of the process of adsorption and heat transfer between beds. These experimental results are then implanted for the validation of a 3D numerical model.

MRElab, Ann arbor, MI, USA
(Jun. 2015-Sep.2015), Intern

Study of a marine energy converter based on vortex induced vibration phenomena. This device is a cylinder immerged in a water tank with an imposed flow (representing a natural river flow) and connected to a generator. The vibrations and turbulence caused by the presence of the cylinder induce its motion, and thus power production. The aim of the study was to optimize the cylinder dimensions and its surface condition for a higher power production.

LPEE, Casablanca, Morocco
(Jun. 2012-Sep.2012), Intern

Characterization of soil samples (density, viscosity…) for the construction of a highway between Casablanca and Marrakech.

INDUSTRIAL EXPERIENCES

Orange, Lanion, France,
(Jun. 2015-Sep.2015), Consultant

Modeling of the heat transfers occurring within a 3rd generation Orange Livebox by convection using both 2D and 3D models. The first step was to quantify the thermal properties of the components, the temperature distribution within the Livebox and also the thermal exchange coefficients. A numerical model (using ANSYS) is conceived using the thermal characterization results and used for optimizing the cooling by considering different situations (modification of the geometry, orientation…)

Maroc Renewables, Casablanca, Morocco,
(Jun. 2012-Sep.2012), Intern

Development of a sales strategy for the energy produced by the company (wind and solar energy). Development of a model for the energy sale based on a state of the art concerning the energy market in Morocco and its evolution.

PUBLICATIONS

Peer reviewed journals

- **O.Moussa**, D.Tarlet, P.Massoli & J.Bellettre, Investigation on the conditions leading to the micro-explosion of emulsified fuel droplet, using two-colors LIF method , *Experimental & Thermal Fluid Sciences*, Jan.2019 (Submitted)
- **O.Moussa**, D.Francelino, D.Tarlet, P.Massoli & J.Bellettre, Insight of a W/O emulsion drop under Leidenfrost heating using LIF optical diagnostics, *Atomization and Sprays*, Jan.2019
- **O.Moussa**, D.Tarlet, P.Massoli & J.Bellettre, Parametric study of the micro-explosion occurrence of W/O emulsions, *International Journal of Thermal Science*, Nov. 2018

Conference papers

- **O.Moussa**, D.Tarlet, P.Massoli & J.Bellettre, Micro-explosion characterization using optical diagnostics during the heating of W/O emulsion droplets, *ICLASS, Chicago, July 2018* **(+oral talk)**
- **O.Moussa**, D.Tarlet, P.Massoli & J.Bellettre, Etude paramétrique de la micro-explosion de gouttes d'émulsion eau/huile, *Société Française de Thermique (SFT), Pau, June 2018*
- M.A.Campesi, R.Gautier, T.Dbouk, **O.Moussa**, l.Hamon, F-X.Blanchet, Y.Gouriou, J.-l.Harion, P. Pré, Study of a novel heat exchanger adsorber concept for CO2 capture, *Physical and Chemical Phenomena in Heat Exchangers and Multifunctional Reactors for Sustainable Technology, Oct. 2016*

Work-in-progress posters

- **O.Moussa**, D.Tarlet, P.Massoli & J.Bellettre, Temperature measurements of water embedded droplets in oil thanks to optical diagnostics (LIF2C), *11th Mediterranean Combustion Symposium, Tenerife, June 2019*
- **O.Moussa**, D.Tarlet, P.Massoli & J.Bellettre, Mesure de température de gouttes d'eau dispersées dans l'huile à l'aide de diagnostiques optiques (LIF2C), *Société française de thermiqe (SFT), Nantes, June 2019*
- **O.Moussa**, D.Tarlet, P.Massoli & J.Bellettre, Etude paramétrique de la micro-explosion de gouttes d'émulsion eau/huile, *Société Française de Thermique (SFT), Pau, June 2018*
- **O.Moussa**, D.Tarlet, P.Massoli & J.Bellettre, Fluorescence visualization of water droplets in W/O emulsions, *10th Mediterranean Combustion Symposium (MCS), Napoli, Sept. 2017*
- **O.Moussa**, D.Tarlet, P.Massoli & J.Bellettre, Parametric study of micro-explosion occurrence of W/O emulsions, *10th Mediterranean Combustion Symposium (MCS), Napoli, Sept. 2017*

TEACHING EXPERIENCES

Engineering School of the University of Nantes, Nantes, France
Teaching assistant

- Turbomachinery, Oct. 2017-Jan.2018 & Oct. 2018-Jan.2019