Davy Brouzet

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Education

Doctor of Philosophy (Computational Fluid Dynamics)   Oct 2015 - Oct 2019
The University of Melbourne
Thesis: Investigation of direct combustion noise in turbulent premixed jet flames using DNS.

Master of Science in Mechanical Engineering - Average 92 %   Sep 2012 - Aug 2014
EPFL - Swiss Federal Institute of Technology in Lausanne
Specialization: Aero/Hydrodynamics and Fluid Mechanics.
Thesis: Mechanical and fluidic integration of scintillating liquid in micro-fluidic channels for particle detection.

Bachelor of Science in Mechanical Engineering - Average 88 %   Sep 2009 - Aug 2012
EPFL - Swiss Federal Institute of Technology in Lausanne

Professional Experience

Research Assistant   Apr 2020 - Jun 2020
Thermodynamics Research Group, The University of Melbourne

- Alteration of the numerical methods in the DNS code for reacting flows NTMIX-Chemkin to convert it to a LES solver.

Research Assistant   Nov 2019 - Mar 2020
Thermodynamics Research Group, The University of Melbourne

- Performing a literature review on the use of biogas/biomethane in Australia and investigating its potential for the transport sector.
- Writing a grant proposal to secure the long-term funding of the project.

CFD Researcher (PhD Candidate)   Oct 2015 - Oct 2019
Thermodynamics Research Group, The University of Melbourne

- Development and optimization of NTMIX-Chemkin, a compressible, parallelized, 3D DNS code for reacting flows.
- Conducting DNS of turbulent premixed jet flames featuring high acoustic fidelity.
- Analysis of the contribution of flame interactions and the impact of chemistry modelling on turbulent premixed flame acoustics.
- Collaboration with researchers from CERFACS and Caltech (see below).
- Participation and presentation in three conferences, as well as publication of several articles.

Visiting Researcher at CERFACS   Mar 2017 - Apr 2017
Centre Européen de Recherche et de Formation Avancée en Calcul Scientifique

- Upgrading the numerical finite difference methods, filtering and boundary conditions of NTMIX-Chemkin, to be compatible with parallel processing.
- Participation in the training course 'Numerical methods for Large Eddy Simulation'.

Visiting Researcher at Caltech   Dec 2016 - Feb 2017
Division of Engineering and Applied Science, California Institute of Technology

- Application of the spectral proper orthogonal decomposition method to DNS datasets of turbulent flame aero-acoustics.

Research Intern — Jan 2015 - Jul 2015
Thermodynamics Research Group, The University of Melbourne

- Development of an optimization algorithm to identify flame interactions in a DNS dataset.

Design & Research Intern — Feb 2014 - Aug 2014
CERN - European Organization for Nuclear Research

- Mechanical and fluidic integration of scintillating liquid in micro-fluidic channels for particle detection.
- Design of experiments to determine the advantages of liquid pumping, the temperature dependence of the scintillation process, and to quantify the radiation damage by proton beam.

Tutor — Sep 2011 - Dec 2013
EPFL - Swiss Federal Institute of Technology in Lausanne

- Subjects: Mathematics, Physics, Vibration Mechanics, Solid Mechanics, Fluid Mechanics and Finite Element Method.
- Deep fundamental understanding of taught classes.

Skills in Computer Science

- **CAD:** Dassault CATIA
- **Programming:** C++ , Fortran , Matlab , Python , OpenMP , MPI , Linux Environment
- **Word Processing:** LaTeX , MS Office
- **FEM:** Abaqus CAE , FreeFEM++
- **CFD:** OpenFOAM , NTMIX-Chemkin , S3D , Ansys Fluent
- **Post-Processing:** Paraview , Adobe Photoshop

Language Skills

- **French:** Native speaker
- **English:** Fluent
- **Spanish & Portuguese:** Good written and oral comprehension

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Awards & Scholarships

- Best oral presentation in the Power Generation & Transport stream at the Melbourne Energy Institute Symposium 2019.
- Melbourne Abroad Travelling Scholarship awarded in 2018.
- Melbourne International Research Scholarship and Melbourne International Fee Remission Scholarship awarded in 2015.
- EPFL Youth Prize 2014.

Peer-Reviewed Papers

- **D. Brouzet**, A. Haghiri, M. Talei, M. J. Brear, O. T. Schmidt, G. Rigas, T. Colonius, Role of coherent structures in turbulent premixed flame acoustics, *AIAA Journal*, **58**(6), 2635-2642, 2020.
- J. E. Rivera, R. L. Gordon, **D. Brouzet**, M. Talei, Exhaust CO emissions of a laminar premixed propane-air flame interacting with cold gas jets, *Combustion and Flame*, **210**, 374-388, 2019.
- **D. Brouzet**, A. Haghiri, M. Talei, M. J. Brear, Annihilation events topology and their generated sound in turbulent premixed flames, *Combustion and Flame*, **204**, 268-277, 2019.

Conference Proceedings

- **D. Brouzet**, M. Talei, M. J. Brear, B. Cuenot, Sound generation by turbulent premixed flames with reduced chemistry, *Presented at the 2019 Australian Combustion Symposium.*
- P. Panek, **D. Brouzet**, M. Talei, R. L. Gordon, M. J. Brear, An a priori analysis of DNS data for LES of sound generation by turbulent premixed flames, *Proceedings of ISABE 2019*, no. 24351. International Society of Air-breathing Engines, 2019.
- **D. Brouzet**, X. Dou, R. L. Gordon, M. Talei, M. J. Brear, Sound generation by planar, CH4/air flame annihilation with several chemical mechanisms, *Proceedings of the* 21th *Australasian Fluid Mechanics Conference*, vol. 21, 2018.
- **D. Brouzet**, A. Haghiri, T. Colonius, M. Talei, M. J. Brear, Proper Orthogonal Decomposition analysis of sound generation in a turbulent premixed flame, *Proceedings of the* 20th *Australasian Fluid Mechanics Conference*, vol. 20, 2016.
- **D. Brouzet**, A. Haghiri, T. Kulkarni, M. Talei, M. J. Brear, E. R. Hawkes, Flame interaction identification in turbulent premixed flames, *Proceedings of the Australian Combustion Symposium*, 2015.