# Dr. Saravanan Balusamy


**Contact Information**

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**Research Areas** Fluid Mechanics, Premixed and Stratified Combustion, Oxyfuel Pulverized Coal Combustion, Thermoacoustic Instabilities, Laser Diagnostics.

**Work Experience**

**Postdoctoral Research Associate** 2011 to 2014

Department of Engineering, University of Cambridge, UK

- Funding: Engineering and Physical Sciences Research Council
- PI: Professor Simone Hochgreb

**Education**

**Ph.D in Engineering** 2006 to 2010

University and INSA of Rouen, France, October 2010

- Dissertation: *Experimental investigation of flame propagation through stratified mixture field*
- Distinction: "very honourable"
- Adviser: Dr. Armelle Cessou

**M. Tech. in Mechanical Engineering** 2004 to 2006

Indian Institute of Technology Madras, India, May 2006

- Thesis: *Development of Combustion Model for a Neat Vegetable Oil Fueled and Dual Fueled Compression Ignition Engine*
- GPA: 8.95/10.0
- Adviser: Professor A. Ramesh

**B.E. in Mechanical Engineering** 1998 to 2002

Bharathiar University, Coimbatore, India, May 2002

- Project: *Design and Fabrication of Energy Efficient Water Heater*
- GPA: 8.67/10.0
- University $10^{th}$ Rank holder

**Refereed Journal Articles**


[1] **Balusamy, S.**, Cessou, A., and Lecordier, B. Direct measurement of local instantaneous laminar burning velocity by a new PIV algorithm. *Experiments in Fluids [Special Issue on Eighth International Symposium on Particle Image Velocimetry (PIV-09)].* 50:1109–1121. 2011. doi:10.1007/s00348-010-1027-5

[2] **Balusamy, S.**, Schmidt, A., and Hochgreb, S. Flow field measurements of pulverized coal combustion using optical diagnostic techniques. *Experiments in Fluids.* 54:1534. 2013. doi:10.1007/s00348-013-1534-2

[3] Zhou, R., **Balusamy, S.**, Sweeney, M. S., Barlow, R. S., and Hochgreb, S. Flow field measurements of a series of turbulent premixed and stratified methane/air flames. *Combustion and Flame.* 160:2017-2028. 2013. doi:10.1016/j.combustflame.2013.04.007

[4] **Balusamy, S.**, Cessou, A., and Lecordier, B. Laminar propagation of lean premixed flames ignited in stratified mixture. *Combustion and Flame.* 161:427-437. 2014. doi:10.1016/j.combustflame.2013.08.023

[5] **Balusamy, S.**, Li, L. K. B., Han, Z., Juniper, M. P., and Hochgreb, S. Nonlinear dynamics of a self-excited thermoacoustic system subjected to acoustic forcing. *Proceedings of the Combustion Institute*. 2014. doi:10.1016/j.proci.2014.05.029

[6] Kamal, M. M., Zhou, R., **Balusamy, S.**, and Hochgreb, S. Favre- and Reynolds-averaged velocity measurements: interpreting PIV and LDA measurements in combustion. *Proceedings of the Combustion Institute*. 2014. doi:10.1016/j.proci.2014.06.061

[7] Muto, M., Watanabe, H., Kurose, R., Komori, S., **Balusamy, S.**, and Hochgreb, S. Large-eddy simulation of pulverized coal swirl jet flame – Effect of oxygen concentration on $NO_x$ formation. *Fuel*. 142:152-163. 2015. doi:10.1016/j.fuel.2014.10.069

[8] Han, Z., **Balusamy, S.**, and Hochgreb, S. Spatial analysis on forced heat release response of turbulent stratified flames. *Journal of Engineering for Gas Turbines and Power*. 137:061504. 2015. doi:10.1115/1.4029056

## Refereed Conference Publications

[9] **Balusamy, S.**, and Hochgreb, S. Comparison of acoustic velocity perturbation measurements using PIV vs. two-microphone technique. In: *Proceedings of the ASME Gas Turbine India Conference 2013*, GTINDIA2013-3512.

[10] Han, Z., **Balusamy, S.**, and Hochgreb, S. Spatial analysis on forced heat release response of turbulent stratified flames. In: *Proceedings of the ASME Turbo Expo 2014*, GT2014-26260.

[11] Kamal, M. M., Duwig, C., **Balusamy, S.**, Zhou, R., and Hochgreb, S. Proper orthogonal decomposition analysis of non-swirling turbulent stratified and premixed methane/air flames. In: *Proceedings of the ASME Turbo Expo 2014*, GT2014-26222.

[12] Kamal, M. M., Zhou, R., **Balusamy, S.**, and Hochgreb, S. Favre- and Reynolds-averaged velocity measurements: interpreting PIV and LDA measurements in combustion. In: *35$^{th}$ International Symposium on Combustion 2014*.

[13] **Balusamy, S.**, Li, L. K. B., Han, Z., Juniper, M. P., and Hochgreb, S. Nonlinear dynamics of a self-excited thermoacoustic system subjected to acoustic forcing. In: *35$^{th}$ International Symposium on Combustion 2014*.

## Conferences & Posters

[14] **Balusamy, S.**, Cessou, A., and Lecordier, B. Développement en vélocimétrie par images de particules pour la mesure locale de la vitesse de combustion laminaire. In: *11$^{th}$ Congres Francophone de Techniques Laser 2008*.

[15] **Balusamy, S.**, Cessou, A., and Lecordier, B. Measurement of laminar burning velocity - A new PIV approach. In: *Proceedings of the European Combustion Meeting 2009*. Poster abstract.

[16] **Balusamy, S.**, Cessou, A., and Lecordier, B. Direct experimental determination of laminar burning velocity using a new PIV approach. In: *8$^{th}$ International Symposium on Particle Image Velocimetry 2009*.

[17] **Balusamy, S.**, Cessou, A., and Lecordier, B. Experimental investigation of laminar stratified flame propagation using simultaneous PIV/PLIF techniques. In: *Proceedings of the European Combustion Meeting 2011*. Poster abstract.

[18] Schmidt, A., **Balusamy, S.**, Hochgreb, S., and Dennis, J. Coal particle combustion in $CH_4/O_2/CO_2$. In: *34$^{th}$ International Symposium on Combustion 2012*. Work-in-Progress Poster abstract.

[19] Zhou, R., **Balusamy, S.**, Sweeney, M. S., Hochgreb, S., Barlow, R. S. Flow field studies of a series of turbulent premixed and stratified methane/air flames. In: *34$^{th}$ International Symposium on Combustion 2012*. Work-in-Progress Poster abstract.

[20] **Balusamy, S.**, and Hochgreb, S. Flow field measurements of pulverized coal combustion in oxyfuel condition using laser diagnostic techniques. In: *Proceedings of the European Combustion Meeting 2013.* Poster abstract.

[21] Zhou, R., **Balusamy, S.**, and Hochgreb, S. Flow field measurements of turbulent premixed and stratified methane/air flames using LDA and PIV. In: *Proceedings of the European Combustion Meeting 2013.* Poster abstract.

[22] Muto, M., Watanabe, H., Kurose, R., Komori, S., **Balusamy, S.**, and Hochgreb, S. Large-eddy simulation of pulverized coal swirl jet flame. In: *Bulletin of the American Physical Society 2013.* Abstract.

[23] Zhou, R., **Balusamy, S.**, and Hochgreb, S. High speed measurements of flow fields of a series of turbulent premixed and stratified methane/air flames. In: *24th International Colloquium on the Dynamics of Explosions and Reactive Systems 2013.*

[24] Kamal, M. M., Sweeney, M. S., **Balusamy, S.**, and Hochgreb, S. Species dynamics in premixed and stratified flames. In: *The British and Scandinavian-Nordic sections of the combustion institute 2014.* Extended abstract.

[25] Tian, B., **Balusamy, S.**, and Hochgreb, S. High spatial resolution laser cavity extinction measurements of soot volume fraction in low soot producing flames. In: *The British and Scandinavian-Nordic sections of the combustion institute 2014.* Extended abstract.

Other Publications

[26] **Balusamy, S.** Etude expérimentale de la propagation de flammes dans un mélange stratifié. PhD thesis, *L'Institut National de Sciences Appliquées de Rouen, France, 2010.*

[27] Zhou, R., **Balusamy, S.**, Sweeney, M., and Hochgreb, S. A Tool for the spectral analysis of the laser doppler anemometer data of the cambridge stratified swirl burner. Tech. report: *DSpace at Cambridge, University of Cambridge, 2012.*

[28] Macquisten, M., **Balusamy, S.**, and Hochgreb, S. Report on velocity measurements using PIV and two-microphone technique, as well as high speed chemiluminescence and Mie scatter. *KIAI-DEL-D2.4.1-001-R1.0, 2012.*

Papers in Preparation

[29] **Balusamy, S.**, Li, L. K. B., Schmid, P., and Hochgreb, S. Time-series analysis and modal decomposition of heat release rate images from forcing and self-excitation of a thermoacoustic system. *Combustion and Flame.* Under preparation.

[30] **Balusamy, S.**, and Hochgreb, S. Pulverized coal combustion in $O_2/N_2$ and $O_2/CO_2$ conditions: reaction zone mapping by simultaneous Mie/OH-PLIF techniques. *Experiments in Fluids.* Under preparation.