Krithika Narayanaswamy

✉krithika@iitm.ac.in krithikasivaram.github.io

Academic appointment

Assistant Professor, **August 2015 – present**
#203, Thermodynamics and Combustion Engineering Lab,
Department of Mechanical Engineering,
Indian Institute of Technology Madras,
Chennai 600036.

Education

Stanford University **2008 – present**
- *Doctor of Philosophy*, Mechanical Engineering
- *Doctor of Philosophy Minor*, Aerospace Engineering
- *Master of Science*, Mechanical Engineering

Indian Institute of Technology Madras **2004 – 2008**
- *Bachelor of Technology*, Mechanical Engineering

Research Interests

Combustion chemistry, Reaction kinetics, Surrogate fuels

Research Experience

Indian Institute of Technology Madras **August 2015 – present**
Assistant Professor, Department of Mechanical Engineering
Ongoing research projects
- Kinetics of renewable fuels: biodiesel surrogates, methanol, and dimethyl-ether
- Kinetics of fuels relevant to fire research
- Simulation-driven formulation of transportation fuel surrogates

Cornell University **2014 – May 2015**
Post-doctoral associate, Sibley school of Mechanical and Aerospace Engineering
Worked with Dr. Perrine Pepiot, on
- Component library framework for deriving chemical kinetic mechanisms
- Analyzing multi-component fuel effects in flames using simulations

Stanford University **2008 – 2013**
Research Assistant, Flow Physics and Computational Engineering
Worked with Dr. Heinz Pitsch, on
- Proposing surrogates for jet fuels
- Formulating a consistent mechanism for the oxidation of surrogate components
  - Substituted aromatics, *n*-dodecane, and methylcyclohexane

Publications

Journals

Sivaram Ambikasaran, Krithika Narayanaswamy, "An accurate, fast, mathematically robust, universal, non-iterative algorithm for computing multi-component diffusion velocities", *Proceedings of the Combustion Institute*, 36 (2016).

Krithika Narayanaswamy, Heinz Pitsch, and Perrine Pepiot, "A component library framework for deriving kinetic mechanisms for multi-component fuel surrogates: Application for jet fuel surrogates", *Combustion and Flame*, 165, 2016, 288–309.

Krithika Narayanaswamy, Heinz Pitsch, and Perrine Pepiot, "A chemical mechanism for low to high temperature oxidation of methylcyclohexane as a component of transportation fuel surrogates", *Combustion and Flame*, 162, 2016, 1193–1213.

Krithika Narayanaswamy, Perrine Pepiot, and Heinz Pitsch, "A chemical mechanism for low to high temperature oxidation of *n*-dodecane as a component of transportation fuel surrogates", *Combustion and Flame*, 161, 2014.

Krithika Narayanaswamy, Guillaume Blanquart, and Heinz Pitsch, "A consistent chemical mechanism for oxidation of substituted aromatic species", *Combustion and Flame*, 157 (10) (2010) 1879–1898.

Under review
Krithika Narayanaswamy and Perrine Pepiot, "Simulation-driven formulation of transportation fuel surrogates", *Combustion Theory and Modeling*

Book chapter(s)
A. D. Lele, K. Anand, Krithika Narayanaswamy, (2017) Surrogates for Biodiesel: Review and Challenges. In: Agarwal A., Agarwal R., Gupta T., Gurjar B. (eds) Biofuels. Green Energy and Technology. Springer, Singapore

Conferences
Aditya Lele, K. Anand, Krithika Narayanaswamy, "Development of a chemical kinetic mechanism for biodiesel surrogate" 10th U.S. National Combustion Meeting, 2017.

R. Khare, V. Raghavan, Krithika Narayanaswamy, "Study of auto-ignition and extinction characteristics of diesel blended with oxygenates in laminar opposed non-premixed flames", 10th U.S. National Combustion Meeting, 2017.

M. Hunyadi-Gall, G. Mairinger, R. Khare, Krithika Narayanaswamy, V. Raghavan, K. Seshadri, "The Influence of Stoichiometric Mixture Fraction on Extinction of Laminar, Nonpremixed DME Flames", 10th U.S. National Combustion Meeting, 2017.

Sivaram Ambikasaran, Krithika Narayanaswamy, "An accurate, fast, mathematically robust, universal, non-iterative algorithm for computing multi-component diffusion velocities", 36^{th} International Symposium on Combustion, Seoul, South Korea, 2016.

Krithika Narayanaswamy, Perrine Pepiot, and Heinz Pitsch, "Jet Fuels and Fischer-Tropsch fuels - Surrogate definition and chemical kinetic modeling", 8^{th} *U.S. National Combustion Meeting*, University of Utah, Salt Lake City, May 22^{nd}, 2013

Krithika Narayanaswamy, Guillaume Blanquart, and Heinz Pitsch, "A consistent chemical mechanism for oxidation of substituted aromatic species", 6^{th} *U.S. National Combustion Meeting*, University of Michigan, Ann Arbor, 2009

Poster(s)
Krithika Narayanaswamy, Perrine Pepiot, and Heinz Pitsch, "Development of kinetic model for jet fuels and Fischer-Tropsch fuels", 34^{th} *Proceedings of Combustion Institute*, Warsaw University of Technology, Poland, August 4^{th}, 2012.

Research visits

Visited RWTH Aachen University in May–June 2016 – Supported by the Indo-German Center for Sustainability

Invited Talks

"A component library framework for deriving kinetic mechanisms for multi-component jet fuel surrogates", *International Discussion Meeting on Chemical Kinetics for Aerospace Applications*, Indian Institute of Science, Bangalore, December 8^{th}, 2016.

"Chemical kinetic modeling of jet fuel surrogates", 3^{rd} *P. J. Paul Memorial Combustion Researchers' Meeting*, VSCC Vallimala, February 26^{th}, 2016.

"Chemical kinetic modeling of jet fuel surrogates", *GE Global Research*, Bangalore, January 25^{th}, 2016.

Funding & Collaborations

- New Faculty initiation grant – Rs. 5,00,000
- Exploratory Research Project grant – Rs. 10,00,000
- Co-PI in Indo-Russian proposal (DST) on fire retardants
- Champion for signing MoU between IIT Madras and PTB
- Co-PI in INNO-INDIGO proposal (DST) on biodiesel kinetics and modeling