

Nicole J. Labbe

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Education

Worcester Polytechnic Institute, Worcester, MA

B.S. Chemical Engineering, 2006

Undergraduate Thesis (MQP) Title: Ab initio studies of cyclohexane adsorption in zeolites

University of Massachusetts Amherst, Amherst, MA

Ph.D. Chemical Engineering, 2013

Thesis Title: Determining detailed reaction kinetics for nitrogen- and oxygen-containing fuels

Advisors: Phillip R. Westmoreland and David M. Ford

Present Position:

University of Colorado Boulder, Boulder, CO

Assistant Professor of Mechanical Engineering 2016-present

Previous Positions:

Argonne National Laboratory, Argonne, IL

Postdoctoral Associate, Chemical Sciences and Engineering, 2013-2016

Research Areas and Interests:

Dr. Labbe's research interests are motivated by this evolving energy landscape and center on understanding of the complex chemistry and thermodynamics of these energy applications to accelerate the development of new green energy technologies. Her career to date has focused on the development of chemical kinetic models, which have the opportunity to significantly assist in the co-development of new engine/turbine technology and renewable fuels to address the urgent national need for clean, sustainable energy for the transportation and power sectors. Current research interests include renewable liquid transportation fuels and fuel additives, kinetic theory and model development, pollutant formation chemical mechanisms, and mass spectrometry of reactive systems.

Selected Collaborators (over the last 5 years):

Raghu Sivaramakrishnan (Argonne), Stephen Klippenstein (Argonne), Joe V. Michael (Argonne), James Miller (Argonne), Branko Ruscic (Argonne), Michael Davis (Argonne), Scott Goldsborough (Argonne), Phil Westmoreland (NCSU), Yiguang Ju (Princeton), Ron Hanson (Stanford), David Davidson (Stanford), Katharina Kohse-Hoinghaus (Bielefeld), Nils Hansen (Sandia), Ahren Jasper (Sandia), Tina Kasper (Duisberg), C. Franklin Goldsmith (Brown), Thomas Foust (NREL), G. Barney Ellison (CU Boulder), John Daily (CU Boulder).

Students Supervised (over the last 5 years):

Cory O. Rogers (Ph.D., In progress, Started 2016)

Katherine Cummins (Ph.D., In progress, Started 2017)

Sadie Stutzman (Ph.D., In progress, Started 2018)

Jatinder Sampathkumar (M.S., In progress, Started 2018)

Tianzhu Fan (M.S. thesis, Graduated 2017)

Publications:

- Ramifications of Including Non-Equilibrium Effects for HCO in Flame Chemistry*, N. J. Labbe, R. Sivaramakrishnan, C. F. Goldsmith, Y. Georgievskii, J. A. Miller, S. J. Klippenstein. **Proceedings of the Combustion Institute** 36 (2017) 525-532.
- Weakly-bound free radicals in combustion: "Prompt" dissociation of formyl radicals and its effect on laminar flame speeds*, N. J. Labbe, R. Sivaramakrishnan, C. F. Goldsmith, Y. Georgievskii, J. A. Miller, S. J. Klippenstein, **J. Phys. Chem. Lett.** 7 (2015) 85-89.
- The role of radical + fuel-radical well-skipping reactions in ethanol and methylformate low-pressure flames*, N.J. Labbe, R. Sivaramakrishnan, S.J. Klippenstein, **Proc. Combust. Inst.** 35 (2015) 447-455.
- Direct measurements of rate constants for the reactions of CH₃ radicals with C₂H₆, C₂H₄, and C₂H₂ at high temperatures*, S.L. Peukert, N.J. Labbe, R. Sivaramakrishnan, J.V. Michael, **J. Phys. Chem. A** 117 (2013) 10228-10238.
- Shock tube measurements and model development for morpholine pyrolysis and oxidation at high pressures*, S. Li, D.F. Davidson, R.K. Hanson, N.J. Labbe, P.R. Westmoreland, P. Oßwald, K. Kohse-Höinghaus, **Combustion and Flame** 160 (2013) 1559-1571.
- Combustion chemistry of a laminar, premixed tetrahydropyran flame as a model heteroatomic biofuel* N.J. Labbe, V. Seshadri, T. Kasper, N. Hansen, P.R. Westmoreland, **Proc. Combust. Inst.** 34 (2013) 259-267.
- Combustion chemistry and fuel-nitrogen conversion in a laminar premixed flame of morpholine as a model biofuel*, A. Lucassen*, N.J. Labbe*, P.R. Westmoreland, K. Kohse-Höinghaus, **Combustion and Flame** 158 (2011) 1647-1666. (*co-authors contributed equally)

Classes Taught:

- MCEN 3012:** Thermodynamics I, Spring 2018
Undergraduate Core Course
- MCEN 4045/4085:** Mechanical Engineering Design Project 1 & 2, Fall 2018 & Spring 2019
Undergraduate Core Course
- MCEN 4152/5152:** Introduction to Combustion, Fall 2017 & 2018
Undergraduate/Graduate Technical Elective, New course.
- MCEN 6228:** Kinetics of Chemically Reacting Systems, Spring 2017 & 2019
Graduate Technical Elective. New course.
- MCEN 5022:** Classical Thermodynamics, Fall 2016
Graduate core course.

Service:

- Faculty Chair of the Graduate Engineering Annual Research & Recruitment (GEARRS) Symposium for CU Boulder Mechanical Engineering (2017-2018)
- Secretary of the Western States Section of the Combustion Institute, 2017-current
- Member of the International Early Career Advisory Committee for the Combustion Institute, 2017-2020
- Science Careers in Search of Women Panelist, Argonne National Laboratory, 2015
- Women in Combustion Lead at US & International level (2017-present)
- Journal Peer Reviewer (Combustion and Flame, International Journal of Chemical Kinetics, Journal of Physical Chemistry, Chemical Engineering Journal, Fuel, Journal of Chemical Physics)