Hope A. Michelsen
Paul M. Rady Department of Mechanical Engineering and Environmental Engineering Program
University of Colorado Boulder
Hope.Michelsen@colorado.edu
https://www.colorado.edu/mechanical/hope-michelsen

Educational background

Stanford University Ph.D. major in Chemistry and minor in Physics 1985 – 1993
Dissertation advisors: Prof. Richard N. Zare (Stanford University)
Co-advisors: Dr. Daniel J. Auerbach and Dr. Charles T. Rettner (IBM Almaden Research Center)
Dartmouth College A.B. with High Honors in Chemistry 1979 – 1984
Thesis advisor: Prof. Joseph J. Belbruno (Dartmouth College)

Employment history

University of Colorado Boulder Professor, Mechanical Engineering 8/24 – present
University of Colorado Boulder Program faculty, Environmental Engineering 7/20 – 9/24
University of Colorado Boulder Associate professor, Mechanical Engineering 8/19 – 8/24
Sandia National Laboratories Technical staff, Combustion Research Facility 7/99 - 8/19
Atmospheric and Environmental Research, Inc. Staff scientist 12/97 - 6/99
Harvard University Postdoctoral research fellow/research associate 2/93 - 10/97
Stanford University and *IBM Almaden Research Center* Graduate research assistant 6/85 - 1/93
Standard Oil of Ohio Post-graduate research assistant 6/84 - 6/85

Awards and recognition

Fellow of the Combustion Institute (CI) 2/24
Fellow of the American Physical Society (APS) 9/19
Fellow of Optica, formerly The Optical Society (OSA) 9/17
Full member of Sigma Xi 12/19 - present
University of Colorado Mechanical Engineering Outstanding Graduate Educator Award 9/23
Distinguished Paper Award, Soot, Nanomaterials, and Large Molecules (Combustion Institute) 4/21
University of Colorado Boulder Research Impact Fellow 1/20 - 10/20
Recipient, Adams Award, Combustion Research Facility, Sandia National Labs 11/18
Awardee, Outstanding Women at Sandia National Laboratories 2/14
Inductee, Alameda County Women's Hall of Fame 1/13
Sandia National Laboratories Employee Recognition Award 6/11
Award for Excellence in Reviewing (American Geophysical Union) 12/03
NASA Group Achievement Award: POLARIS ER-2 mission 9/97
NASA Group Achievement Award: ASHOE/MAESA ER-2 mission 11/94
Postdoctoral Research Fellowship in Chemistry (National Science Foundation) 2/93 - 3/95
Nellie Yeoh Whetten Award (American Vacuum Society) 11/92
Student Award (American Vacuum Society) 11/92
Chandler T. White 1916 Research Prize (Dartmouth College) 5/84

Papers or book chapters published, in press, or under review for publication

Atmospheric 56; Combustion 56; Surface sci. 20; Other Chem. 2; Total: 133; Google scholar *h*-index: 58

Service to the community

Fellows Selection Committee (Combustion Institute) 6/24 – present
Editorial Board Member, Progress in Energy and Combustion Science (IF 35.339) 5/23 – present
Organizing Committee, International Sooting Flame Workshop 3/22 - present
Advanced Light Source (ALS) Proposal Study Panel (LBNL, Dept. of Energy) 6/19 - present
Associate Editor, Proceedings of the Combustion Institute 1/18 - present
Advisory Committee, International Workshop on Laser-Induced Incandescence 9/05 - present
Founding Co-Chair, Gordon Research Conference, Wildfire Science, Impacts, Mitigation Strategies 6/27
R. W. Wood Prize Selection Committee (Optica) 9/23 – 2/25
Co-organizer, Science Opportunities in Nonlinear Hard X-Ray Spectroscopy (LCLS, AFOSR) 5/25
Linac Coherent Light Source (LCLS) Peer Review Panel (SLAC, Dept. of Energy) 5/17 – 11/24
Combustion and Fire Systems CAREER Proposal Review Panel (NSF) 10/23

Advanced Light Source (ALS) 2030 Visioning Workshop Organizing Committee	5/23 – 10/23
Executive Committee Nominating Committee, Combustion Institute	4/23 – 7/23
Guest Editor, Combustion and Flame Special Issue on Particle Formation	6/21 - 6/23
Tsuji Award Committee, Combustion Institute	9/18 – 6/23
Elected Member of the Advanced Light Source Users' Executive Committee	11/19 – 1/23
Gold Medal Nominating Committee, Combustion Institute	10/19 – 3/22
Science Advisory Board, International Sooting Flame Workshop	2/17 – 3/22
Co-organizer of the Advanced Light Source (ALS) Annual User Meeting	8/20, 8/21, 8/22
Board of Directors Candidate Nominee, Combustion Institute	2/22
Member of National Academies Consensus Study Committee	2/21 - 11/21
Member of Nominating Committee of the APS Group on the Physics of Climate	10/20 - 2/21
Program Advisory Committee, 38th International Symposium on Combustion	9/18 - 3/20
Chair, Colloquium on Soot, 37th International Symposium on Combustion	8/18
Chair, Gordon Research Conference on Laser Diagnostics in Combustion	8/17
Co-organizer, AAAS Global Climate Science Imperatives in a Post-Paris Agreement World	2/17
Co-chair, Colloquium on Soot, 36th International Symposium on Combustion	8/16
Host, 7th International Workshop on Laser-Induced Incandescence of Soot	6/16
Co-organizer, AGU Annual Meeting, session on Absorbing Aerosols and Climate Impacts	12/15
Vice chair, Gordon Research Conference on Laser Diagnostics in Combustion	8/15
Co-organizer, AGU Annual Meeting, session on Greenhouse Gas Source Attribution	12/14
Topical editor, Applied Optics (The Optical Society, now Optica)	5/02 - 11/05
SPARC international water vapor assessment panel	3/99 - 3/00
SAGE II (III) (satellite/space station instruments) science team (NASA)	1/96 - 4/99 (3/98 - 3/01)
TOMS (Total Ozone Mapping Spectrometer instrument) science team (NASA)	1/98 - 10/01
Co-organizer, AGU Annual Meeting, session on Nonpolar Stratospheric Ozone Depletion	12/96
ATMOS (space shuttle FTIR solar occultation instrument) science team (NASA)	3/94 - end

Classes taught at CU Boulder

Thermodynamics 1 (106 students)	Spring 2026
Introduction to Wildfires (26 students)	Fall 2025
Thermodynamics 1 (204 students)	Spring 2025
Thermodynamics 1 (100 students)	Spring 2024
Introduction to Research (48 graduate students)	Fall 2023
Thermodynamics 1 (130 students)	Spring 2023
Introduction to Research (51 graduate students)	Fall 2022
Introduction to Research (60 graduate students)	Fall 2021
Thermodynamics 1 (40 students)	Fall 2021
Thermodynamics 1 (114 students)	Spring 2021
Thermodynamics 1 (96 students)	Fall 2020
Thermodynamics 1 (63 students)	Spring 2020

Ph.D. students advised at CU Boulder

Emily Rogers	December 2025 – Present
Ryan Konon	October 2025 – Present
Jas Shahanand	April 2025 – Present
James Rundel (now at Exponent)	August 2019 – August 2023

M.E. students advised at CU Boulder

Mila Bergman-Ruzicka (now at Lockheed Martin)	January 2025 – Present
Zachary Livingston (now at West Point U. S. Military Academy)	May 2024 – May 2025
Chaitanya Ghole (now at Gamma Technologies)	August 2019 – November 2022

Undergraduate students advised at CU Boulder

Austin Hane (Mechanical Engineering, Class of 2026)	May 2025 – August 2025
Bela Voglund (Mechanical Engineering, Class of 2026)	May 2025 – August 2025
Joseph Selike (Mechanical Engineering, Class of 2026)	May 2025 – August 2025
Dante Fan (Mechanical Engineering, Class of 2026)	May 2025 – August 2025

Mallory Klem (Chemical Engineering, Class of 2025)	May 2025 – August 2025
Jenna Beagle (Mechanical Engineering, Class of 2026)	August 2024 – May 2025
Thomas Garcia (Mechanical Engineering, Comp. Sci., Class of 2024)	August 2023 – December 2023

Visiting Ph.D. students mentored at Sandia National Labs

Emre Cenker	KAUST	Summer 2016
Beth Rieken	Stanford University	2014 - 2015
Aziz Nanthaamornphong	University of Alabama	2013
Alexandre Flügl	Unversität Erlangen-Nürnberg	2011
Boman Axelsson	Lund University	Spring 2001

Visiting public high school teacher mentored at Sandia National Labs

Will Corning	Summer 2011

Undergraduate student intern and then postgrad intern mentored at Sandia National Labs

Mark A. Dansson	2006 - 2007
Mark A. Dansson	Summer 2005

Harvey Mudd College Physics Clinic, co-mentored undergraduates at Sandia National Labs

Team of 5 undergrads in physics (with Prof. Peter Saeta)	2005 - 2006
Team of 6 undergrads in physics (with Prof. Peter Saeta)	2004 - 2005

Postdoctoral researchers advised at Sandia National Labs

K. Olof Johansson (now at KLA Corporation)	2013 - 2018
Matthew F. Campbell (now at University of Pennsylvania)	2014 - 2016
Zhen Liu (now at U. S. Environmental Protection Agency)	2012 - 2015
Xerxes López-Iglesias (now at General Biotics)	2012 - 2013
Andrew R. Metcalf (now at Clemson University)	2012 - 2013
Scott A. Skeen (now at Utah Tech University)	2010 - 2013
Jeffrey M. Headrick (now at Picarro, Inc.)	2010 - 2012
Anthony Gomez (now at Southwest Sciences, Inc.)	2007 - 2010
Fabian Goulay (now at West Virginia University)	2007 - 2010
Michael Y. Gershenzon (now at The Kraft Heinz Company)	2003 - 2005

Professional organizations

American Chemical Society	1992 - present
American Geophysical Union	1993 - present
American Association for the Advancement of Science	1993 - present
Optica (formerly The Optical Society, OSA) (Fellow)	2002 - present
Yoga Alliance (Registered Yoga Teacher)	2007 - present
Combustion Institute (Fellow)	2009 - present
American Physical Society (Fellow)	2016 - present
American Association for Aerosol Research	2016 - present
Sigma Xi (Full Member)	2019 - present
American Institute of Aeronautics and Astronautics	2023 - present
International Association of Wildland Fire	2024 - present

Patents

R. P. Bambha and H. A. Michelsen, "Method and system for multi-pass laser-induced incandescence", *U. S. Patent Office*, Application no. 15239634 (August 17, 2016), U.S. Patent 10067049 Issued 2018.

Recent invited conference talks and lectureships

H. A. Michelsen, "Using Synchrotron Sources to Solve the Mystery of Soot Inception", *Photon Tools for Sustainable Energy Conversion*, Keynote talk, Hefei, China hybrid (October 2025).

H. A. Michelsen, "What's the Buzz about Soot Formation?", *EPSRC Center for Doctoral Training in Aerosol Science*, University of Bristol, Bristol, UK webinar (February 2025).

H. A. Michelsen, "My Career and This Game Called Life", *American Institute for Aeronautics and Astronautics* (*AIAA*) *SciTech Forum and Exposition 2024*, Orlando, FL (January 2024).

H. A. Michelsen, "Diagnostics for Electrochemical Energy Conversion and Storage", *Gordon Research Conference on Laser Diagnostics in Energy and Combustion Science*, Topical overview and discussion lead, Newry, ME (July 2023).

H. A. Michelsen, "Particle Formation, Evolution, and Fate", *2023 Summer School on Combustion and the Environment*, Princeton, NJ (June 2023).

H. A. Michelsen, "Tracking and Controlling Inception Through Pyrolysis*", 6th International Sooting Flames Workshop*, Vancouver, Canada (July 2022).

H. A. Michelsen, "A Discussion of Terminology to Describe Soot*", 5th International Sooting Flames Workshop*, Adelaide, Australia (remote) (January 2021).

H. A. Michelsen, "Soot Particles: So Ubiquitous, So Destructive, So Important, Yet So Elusive", *American Association of Aerosol Research Annual Meeting*, Plenary talk, Portland, OR (October 2019).

H. A. Michelsen, "Using X-Ray Tools to Solve the Mystery of Soot Formation", *Advanced Light Source Annual Users' Meeting*, Session on *Challenges and Opportunities for Soft X-Ray Spectroscopy of Interfaces and Bulk Materials for Energy Applications*, Berkeley, CA (October 2019).

H. A. Michelsen, "Finding the Smoking Gun: Solving the Mystery of Soot Formation", *American Chemical Society Annual Meeting*, San Diego, CA (August 2019).

H. A. Michelsen, "Using VUV and X-Ray Tools to Solve the Mystery of Soot Formation", *The 40th International Conference on Vacuum Ultraviolet and X-Ray Physics*, Plenary talk, San Francisco, CA (July 2019).

H. A. Michelsen, "Soot Formation, Growth, and Global Impact: The Life Story of a Mass Murderer", *11th U. S. National Combustion Meeting*, Plenary talk, Pasadena, CA (March 2019).

H. A. Michelsen, "Mysteries of High-Temperature Particle Formation: Soot, Interstellar Dust, and Novel Materials", *LCLS-II-HE Workshop*, Menlo Park, CA (October 2018).

H. A. Michelsen, "Probing Soot Formation and Chemical Evolution During Combustion", *Fundamentals in Optics/Laser Science* (*OSA*/*APS*), Washington, DC (September 2018).

H. A. Michelsen, "Soot Inception: What do we know, and where do we go from here?*", 4th International Sooting Flames Workshop*, Keynote talk, Dublin, Ireland (July 2018).

K. O. Johansson and H. A. Michelsen, "Probing Soot Formation and Chemical Evolution During Combustion*", CLEO*, San Jose, CA (May 2018).

H. A. Michelsen, "Probing Combustion Chemistry Using Hard X-Rays: Needs, Challenges, and Opportunities", *LCLS-II-HE Workshop*, Menlo Park, CA (September 2016).

H. A. Michelsen, "Topical Overview: Probing Soot Formation, Chemical and Physical Evolution, and Oxidation: A Review of Diagnostic Techniques and Needs", *36th International Symposium on Combustion*, Seoul, South Korea (August 2016).

Peer-reviewed publications (*corresponding authors)

133. H. A. Michelsen*, M. F. Campbell, K. O. Johansson, P. E. Schrader, and K. R. Wilson*, "Experimental evidence of kinetically driven mechanisms for soot inception", *Commun. Chem.* **8**, 162 (2025) DOI: 10.1038/s42004-025-01552-9.

132. J. Hendrix, D. Hait*, H. A. Michelsen*, and M. Head-Gordon*, "Hydrogen ejection from hydrocarbons: Characterization and relevance in soot formation and interstellar chemistry", *Proc. Natl. Acad. Sci. USA*, **121**(51), e2202744121 (2024) DOI: 10.1073/pnas.2202744121.

131. A. S. Makowiecki, S. C. Coburn, S. Sheppard, B. Bitterlin, T. Breda, A. Dawlatzai, R. Giannella, A. Jaros, C. Kling, E. Kolb, C. Lapointe, S. Simons-Wellin, H. A. Michelsen, J. W. Daily, M. Hannigan, P. E. Hamlington, J. Farnsworth, and G. B. Rieker*, "WindCline: Sloping wind tunnel for characterizing flame behavior under variable inclines and wind conditions", *Rev. Sci. Instrum.*, **95**(2), 025103 (2024) DOI: 10.1063/5.0175784.

130. R. P. Lindstedt*, H. A. Michelsen*, and M. E. Mueller*, "Special issue and perspective on the chemistry and physics of carbonaceous particle formation", *Combust. Flame* **258**(1), 113042 (2023) DOI: 10.1016/j.combustflame.2023.113042.

129. J. A. Rundel, C. Martí, J. Zádor, P. E. Schrader, K. O. Johansson, R. P. Bambha, G. T. Buckingham, J. P. Porterfield, O. Kostko, and H. A. Michelsen*,"The identity and chemistry of C_7H_7 radicals observed during soot formation", *J. Phys. Chem. A*, **127**(13), 3000-3019 (2023) DOI: 10.1021/acs.jpca.2c08949.

128. C. Martí, H. A. Michelsen, H. N. Najm, and J. Zádor*, "Comprehensive kinetics on the C_7H_7 potential energy surface under combustion conditions", *J. Phys. Chem. A*, **127**(8), 1941-1959 (2023) DOI: 10.1021/acs.jpca.2c08035.

127. J. Zádor*, C. Martí, R. Van de Vijver, S. L. Johansen, Y. Yang, H. A. Michelsen, and H. N. Najm, "Automated reaction kinetics of gas-phase organic species over multiwell potential energy surfaces", *J. Phys. Chem. A*, **127**(3), 565-588 (2023) DOI: 10.1021/acs.jpca.2c06558.

126. J. A. Rundel, K. O. Johansson, P. E. Schrader, R. P. Bambha, K. R. Wilson, J. Zádor, G. B. Ellison, and H. A. Michelsen*, "Production of aliphatic-linked polycyclic hydrocarbons during radical-driven particle formation from propyne and propene pyrolysis", *Combust. Flame* **258**(1), 112457 (2023) DOI: 10.1016/j.combustflame.2022.112457.

125. H. A. Michelsen*, E. Boigné*, P. E. Schrader, K. O. Johansson, M. F. Campbell, R. P. Bambha, and M. Ihme, "Jet-entrainment sampling: A new method for extracting particles from flames", *Proc. Combust. Inst.*, **39**, 847-855 (2023) DOI: 10.1016/j.proci.2022.07.140.

124. H. A. Michelsen*, M. F. Campbell, K. O. Johansson, I. C. Tran, P. E. Schrader, R. P. Bambha, E. Cenker, J. A. Hammons, E. Schaible, C. Zhu, and A. van Buuren, "Soot particle core-shell and fractal structures from small-angle X-ray scattering measurements in a flame", *Carbon*, **196**, 440-456 (2022) DOI: 10.1016/j.carbon.2022.05.009.

123. H. A. Michelsen*, M. F. Campbell, I. C. Tran, K. O. Johansson, P. E. Schrader, R. P. Bambha, J. A. Hammons, E. Schaible, C. Zhu, and A. van Buuren, "Distinguishing gas-phase and nanoparticle contributions to small-angle X-ray scattering in reacting aerosol flows", *J. Phys. Chem. A*, **126**, 3015-3026 (2022) DOI:10.1021/acs.jpca.2c00454. Chosen by ALS to highlight as a brief: https://als.lbl.gov/distinguishing-nanoparticles-from-gas-phase-species-in-reacting-flows
Only ~4% of papers from ALS are highlighted each year.

122. J. A. Rundel, C. M. Thomas, P. E. Schrader, K. R. Wilson, K. O. Johansson, R. P. Bambha, and H. A. Michelsen*, "Promotion of particle formation by resonance-stabilized radicals during hydrocarbon pyrolysis", *Combust. Flame*, **243**, 111942 (2022) DOI:10.1016/j.combustflame.2021.111942.

121. G. Villalba*, M. Whelan, S. Monzka, P. J. Cameron-Smith, M. Fischer, A. Zumkehr, T. Hilton, J. Stinecipher, I. Baker, R. P. Bambha, H. A. Michelsen, B. W. LaFranchi, C. Estruch, and E. Campbell, "Exploring the potential of using carbonyl sulfide to track the urban biosphere signal", *J. Geophys. Res.*, **126(13)**, e2020JD034106 (2021) DOI:10.1029/2020JD034106.

120. H. A. Michelsen*, "Effects of maturity and temperature on soot density and specific heat", *Proc. Combust. Inst.*, **38**, 1197-1205 (2021) DOI: 10.1016/j.proci.2020.06.383; Distinguished Paper Award.

119. H. A. Michelsen*, M. B. Colket, P.-E. Bengtsson, A. D'Anna, P. Desgroux, B. S. Haynes, J. H. Miller, G. J. Nathan, H. Pitsch, and H. Wang, "A review of terminology used to describe soot formation and evolution under combustion and pyrolytic conditions", *ACS Nano*, **14**, 12470-12490 (2020) DOI: 10.1021/acsnano.0c06226.

118. Q. Wang, P. Elvati, D. Kim, K. O. Johansson, P. E. Schrader, H. A. Michelsen*, and A. Violi*, "Spatial dependence of polycyclic aromatic compound growth in counterflow flames", *Carbon*, **149**, 328-335 (2019) DOI: 10.1016/j.carbon.2019.03.017.

117. K. O. Johansson*, M. P. Head-Gordon, P. E. Schrader, K. R. Wilson, and H. A. Michelsen*, "Resonance-stabilized hydrocarbon-radical chain reactions may explain soot inception and growth", *Science* **361**, 997-1000 (2018) DOI: 10.1126/science.aat3417.

116. H. Graven*, M. L. Fischer, T. Lueker, S. Jeong, T. P. Guilderson, R. F. Keeling, R. P. Bambha, K. Brophy, W. Callahan, X. Cui, C. Frankenberg, K. R. Gurney, B. W. LaFranchi, S. J. Lehman, H. A. Michelsen, J. B. Miller, S. Newman, W. Paplawsky, N. C. Parazoo, C. Sloop, and S. J. Walker, "Assessing fossil fuel CO_2 emissions in California using atmospheric observations and models", *Environ. Res. Lett.* **13**, 065007 (2018) DOI: 10.1088/1748-9326/aabd43.

115. M. F. Campbell, P. E. Schrader, A. L. Catalano, K. O. Johansson, G. A. Bohlin, N. K. Richards-Henderson, C. J. Kliewer, and H. A. Michelsen*, "A small porous-plug burner for studies of combustion chemistry and soot formation", *Rev. Sci. Instrum.* **88**, 125106 (2017) DOI: 10.1063/1.5016212.

114. K. O. Johansson, F. El Gabaly, P. E. Schrader, M. F. Campbell, and H. A. Michelsen*, "Evolution of maturity levels of particle surface and bulk during soot growth and oxidation in a flame", *Aerosol Sci. Technol.* **51(12)**, 1333-1344 (2017) DOI: 10.1080/02786826.2017. 1355047.

113. K. O. Johansson*, M. F. Campbell, P. Elvati, P. E. Schrader, J. Zádor, N. K. Richards-Henderson, K. R. Wilson, A. Violi, and H. A. Michelsen*, "Photoionization efficiencies of five polycyclic aromatic hydrocarbons", *J. Phys. Chem. A* **121(23)**, 4447-4454 (2017) DOI: 10.1021/acs.jpca.7b02991.

112. K. O. Johansson*, J. Zádor, P. Elvati, M. F. Campbell, P. E. Schrader, N. K. Richards-Henderson, K. R. Wilson, A. Violi, and H. A. Michelsen*, "Critical assessment of photoionization efficiency measurements for characterization of soot-precursor species", *J. Phys. Chem. A* **121(23)**, 4475-4485 (2017) DOI: 10.1021/acs.jpca.7b02992.

111. Y. Y. Cui*, J. Brioude, W. M. Angevine, S. A. McKeen, S.-W. Kim, J. Peischl, J. A. Neuman, D. Henze, N. Bousserez, M. L. Fischer, S. Jeong, Z. Liu, R. P. Bambha, H. A. Michelsen, G. W. Santoni, B. C. Daube, E. A. Kort, G. J. Frost, T. B. Ryerson, S. C. Wofsy, and M. Trainer, "Top-down estimate of methane emissions in California using a mesoscale inverse modeling technique: The San Joaquin Valley", *J. Geophys. Res.* **122(6)**, 3686-3699 (2017) DOI: 10.1002/2016JD026398.

110. S. Jeong*, X. Cui, D. R. Blake, B. Miller, S. Montzka, A. E. Andrews, A. Guha, P. Martien, R. P. Bambha, B. F. LaFranchi, H. A. Michelsen, C. Clements, P. Glaize, and M. L. Fischer, "Estimating methane emissions from biological and fossil-fuel sources in the San Francisco Bay Area", *Geophys. Res. Lett.* **44**, 486-495 (2017) DOI: 10.1002/2016GL071794.

109. H. A. Michelsen*, "Probing soot formation, chemical and physical evolution, and oxidation: A review of *in situ* diagnostic techniques and needs", *Proc. Combust. Inst.* **36**, 717-735 (2017) DOI: 10.1016/j.proci.2016.08.027.

108. K. O. Johansson, T. Dillstrom, P. Elvati, M. F. Campbell, P. E. Schrader, D. M. Popolan-Vaida, N. K. Richards-Henderson, K. R. Wilson, A. Violi, and H. A. Michelsen*, "Radical-radical reactions, pyrene nucleation, and incipient soot formation in combustion", *Proc. Combust. Inst.* **36**, 799-806 (2017) DOI: 10.1016/j.proci.2016.07.130.

107. S. Jeong*, S. Newman, J. Zhang, A. E. Andrews, L. Bianco, J. Bagley, X. Cui, H. Graven, J. Kim, P. Salameh, B. F. LaFranchi, C. Priest, M. Campos-Pineda, E. Novakovskaia, C. D. Sloop, H. A. Michelsen, R. P. Bambha, R. F. Weiss, R. Keeling, and M. L. Fischer, "Estimating methane emissions in California's urban and rural regions using multi-tower observations", *J. Geophys. Res. Atmos.* **121**, 13,031-13,049 (2016) DOI: 10.1002/2016JD025404.

106. M. F. Campbell, A. Bohlin, P. E. Schrader, R. P. Bambha, C. J. Kliewer, K. O. Johansson, and H. A. Michelsen*, "Design and characterization of a linear Hencken-type burner", *Rev. Sci. Instrum.* **87**, 115114 (2016) DOI: 10.1063/1.4967491.

105. K. O. Johansson, T. Dillstrom, M. F. Campbell, M. Monti, F. El Gabaly, P. E. Schrader, D. M. Popolan-Vaida, N. K. Richards-Henderson, K. R. Wilson, A. Violi*, and H. A. Michelsen*, "Formation and emission of large furans and oxygenated hydrocarbons from flames", *Proc. Natl. Acad. Sci. USA* **113**, 8374-8379 (2016) DOI: 10.1073/pnas.1604772113.

104. R. P. Bambha and H. A. Michelsen*, "Effects of aggregate morphology and size on laser-induced incandescence and scattering from black carbon (mature soot)", *J. Aerosol Sci.* **88**, 159-181 (2015) DOI: 10.1016/j.jaerosci.2015.06.006.

103. H. A. Michelsen, C. Schulz, G. J. Smallwood, and S. Will*, "Laser-induced incandescence: Particulate diagnostics for combustion, atmospheric, and industrial applications", *Progress Energy Combust. Sci.* **51**, 2-48 (2015) DOI: 10.1016/j.pecs.2015.07.001.

102. K. O. Johansson, J. Y. W. Lai, S. A. Skeen, D. M. Popolan-Vaida, K. R. Wilson, N. Hansen, A. Violi, and H. A. Michelsen*, "Soot precursor formation and limitations of the stabilomer grid", *Proc. Combust. Inst.* **35**, 1819-1826 (2015) DOI: 10.1016/j.proci.2014.05.033.

101. A. Nanthaamornphong, J. C. Carver, K. Morris, H. A. Michelsen, and D. W. I. Rouson*, "Building CLiiME via test-driven development: A case study", *Comput. Sci. Eng.* **16(3)**, 36-46 (2014).

100. X. López-Yglesias, P. E. Schrader, and H. A. Michelsen*, "Soot maturity and absorption cross sections", *J. Aerosol Sci.* **75**, 43-64 (2014) DOI: 10.1016/j.jaerosci.2014.04.011.

99. N. Hansen*, S. A. Skeen*, H. A. Michelsen*, K. R. Wilson*, and K. Kohse-Höinghaus*, "Flame experiments at the Advanced Light Source: New insights into soot formation processes", *Journal of Visualized Experiments (JoVE)* **87**, e51369 (2014) DOI: 10.3791/51369.

98. Z. Liu, R. P. Bambha*, J. Pinto, T. Zeng, J. Boylan, M. Huang, H. Lei, C. Zhao, S. Liu, J. Mao, C. Schwalm, X. Shi, Y. Wei, and H. A. Michelsen, "Toward verifying fossil fuel CO_2 emissions from the CMAQ model: Motivation, model description, and initial simulation", *J. Air Waste Manage. Assoc.* **64(4)**, 419-435 (2014) DOI: 10.1080/10962247.2013.816642.

97. R. P. Bambha, M. A. Dansson, P. E. Schrader, and H. A. Michelsen*, "Effects of volatile coatings on the laser-induced incandescence of soot", *Appl. Phys. B* **112(3)**, 343-358 (2013).

96. R. P. Bambha, M. A. Dansson, P. E. Schrader, and H. A. Michelsen*, "Effects of volatile coatings and coating removal mechanisms on the morphology of graphitic soot", *Carbon* **61**, 80-96 (2013).

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Development of Detection Techniques and Diagnostics for Airborne Carbon Nanoparticles, **H. A. Michelsen** (PI, Sandia National Laboratories), P. O. Witze, T. B. Settersten (Co-Is, Sandia National Laboratories) Sandia LDRD Program, $135k/yr, 2000-2003

Investigations of the Photochemical Processes that Control Stratospheric Ozone: An Analysis of Remote and In Situ Data Sets, **H. A. Michelsen** (PI, Atmospheric and Environmental Research, Inc.), NASA Atmospheric Chemistry Modeling and Analysis Program, $80k/yr, 1998-2001

Investigations of Aerosol-Mediated Chemistry Leading to Stratospheric Ozone Loss, **H. A. Michelsen** (Awardee, Harvard University), NSF Postdoctoral Fellowship, 1993-1995

Beamtime at national user facilities

Current allocations

Exploring Unimolecular Photodissociation Dynamics of Phenoxy Radical Using Time-Resolved X-Ray Spectroscopy, T. J. A. Wolf (PI), J. Cryan (Co-PI), **H. A. Michelsen** (Co-PI), M.-F. Lin (Co-PI), M. Ahmed,

A. Lemmens, N. Dias, O. Kostko, J. Shahanand, S. Bhattacharyya (Experimental Lead), LCLS, TMO, SLAC 2025-2026

Investigating the Role of Resonance-Stabilized Radicals on Soot, Char, and H_2 Generation from Hydrocarbons, **H. A. Michelsen** (PI and Experimental Lead), R. P. Bambha, Advanced Light Source, Beamline 9.0.2, Lawrence Berkeley National Laboratory, 2024-2026

Interfacial and Multi-Phase Chemistry: Leveraging and Expanding VUV Mass Spectrometric and X-Ray Spectroscopic Capabilities, Musa Ahmed (PI and Experimental Lead), Jennifer Bergner (Co-I), **H. A. Michelsen** (Co-I), K. R. Wilson (Co-I), Advanced Light Source, Beamline 9.0.2, Lawrence Berkeley National Laboratory, 2024-2027 Approved program. This program allocates 50% of the beamtime on this beamline to this project. Part of this project involves advancing the capabilities of this beamline.

Past allocations

Stimulated Inelastic X-Ray Scattering, A. Aquila (PI and Experimental Lead), U. Bergmann (Co-PI), M. Kling, T. M. Linker, R. Alonso-Mori, R. Lucht, **H. A. Michelsen**, LCLS, CXI, SLAC 2025

Effect of Surface Modifications on Thermal Stability of Battery Materials, C. M. Thomas (Experimental Lead), **H. A. Michelsen** (PI), C. Ban, J. A. Rundel, and R. P. Bambha, Advanced Light Source, Beamline 9.0.2, Lawrence Berkeley National Laboratory, 2021-2023

Investigations into the Role of Resonance-Stabilized Radicals on Soot Formation, **H. A. Michelsen** (PI and Experimental Lead), J. A. Rundel, C. Ghole, G. B. Ellison, R. P. Bambha, and J. Zádor, Advanced Light Source, Beamline 9.0.2, Lawrence Berkeley National Laboratory, 2022-2024

Investigating the Mechanisms of Carbonaceous Particle Formation at High Temperature, **H. A. Michelsen** (PI and Experimental Lead, J. A. Rundel, J. W. Daily, R. P. Bambha, P. E. Schrader, J. Hendrix, D. Hait, and M. P. Head-Gordon, Advanced Light Source, Beamline 9.0.2, Lawrence Berkeley National Laboratory, 2019-2021

Understanding Inception in Soot Formation, A. Aquila (PI), **H. A. Michelsen**, P. Zwart, C. Yoon, K. Pande, and M. Ihme, Linac Coherent Light Source, MFX, SLAC, 2021

Investigating Carbonaceous-Particle Formation and Oxidation, K. O. Johansson, P. E. Schrader, R. P. Bambha, M. P. Head-Gordon, and **H. A. Michelsen** (PI and Experimental Lead), Advanced Light Source, Beamline 9.0.2, Lawrence Berkeley National Laboratory, 2018-2020

Investigating the Life Cycle of Soot from the Combustor to Clouds and Climate Impacts, and **H. A. Michelsen** (PI), Advanced Light Source, Beamline 9.3.2, Lawrence Berkeley National Laboratory, 2016-2018

Small- and Wide-Angle X-Ray Scattering Investigations of Soot Evolution in Flames, M. F. Campbell, K. O. Johansson, **H. A. Michelsen** (PI and Experimental Lead), J. R. I. Lee, T. van Buuren, M. Mehl, A. Violi, C. Zhu, E. Schaible, and A. Hexemer, Advanced Light Source, Beamline 7.3.3, Lawrence Berkeley National Laboratory, 2016-2018

Investigating the Growth and Oxidation Chemistry Combustion-Generated Soot Nanoparticles, K. O. Johansson (Experimental Lead), M. F. Campbell, P. E. Schrader, T. Dillstrom, A. Violi, and **H. A. Michelsen** (PI), Advanced Light Source, Beamline 9.0.2, Lawrence Berkeley National Laboratory, 2016-2018

Probing Soot Formation and Evolution In Situ in Flames using X-Ray Raman Spectroscopy, **H. A. Michelsen** (PI and Experimental Lead), M. F. Campbell, K. O. Johansson, R. P. Bambha, F. El Gabaly, P. E. Schrader, J. R. I. Lee, T. van Buuren, D. Sokaras, T. Kroll, and D. Nordlund, SSRL, Beamline 6-2, SLAC, 2016

Investigating Soot-Oxidation Mechanisms, M. F. Campbell, K. O. Johansson, **H. A. Michelsen** (PI and Experimental Lead), S. S. Skeen, T. Dillstrom, and A. Violi, and Advanced Light Source, Beamline 9.0.2, Lawrence Berkeley National Laboratory, 2014-2016

Investigating the Chemical Composition of Combustion-Generated Soot Nanoparticles, K. O. Johansson, **H. A. Michelsen** (PI), N. Hansen (Experimental Lead), S. S. Skeen, and A. Violi, and Advanced Light Source, Beamline 9.0.2, Lawrence Berkeley National Laboratory, 2013-2015

X-Ray Raman Spectroscopy Investigation on the Formation and Chemistry of Combustion Soot, T. van Buuren (PI), T. M. Willey, J. R. I. Lee, I. Tran (Experimental Lead), M. Mehl, **H. A. Michelsen**, K. O. Johansson, A. Violi, D. Nordlund, and T.-C. Weng, SSRL, Beamline 6-2, SLAC, 2013

Investigating the Chemical Composition of Combustion-Generated Soot Nanoparticles, K. O. Johansson, **H. A. Michelsen** (PI), N. Hansen (Experimental Lead), S. S. Skeen, and A. Violi, and Advanced Light Source, Beamline 9.0.2, Lawrence Berkeley National Laboratory, 2013-2015