



ACME
Advanced Combustion via Microgravity Experiments
PUBLICATIONS TO DATE
As of May 2014

The ACME publications and presentations are listed by experiment after the listing for general material on the project as a whole.

	Page
ACME	1
BRE (PI: J.G. Quintiere, U. of Maryland)	2
CLD Flame (PI: M.B. Long, Yale U.)	3
E-FIELD Flames (PI: D. Dunn-Rankin, UC Irvine)	7
Flame Design (PI: R.L. Axelbaum, Washington U.)	14
s-Flame (PI: C.K. Law, Princeton U.)	17

ACME (general to the project) – *as of May 2014*

Conference Papers (full papers, acceptance based on abstract)

1. T.F. O'Malley, W.A. Sheredy, and D.P. Stocker, "Combustion Research on the International Space Station," 59th International Astronautical Congress 2008, Vol. 2, pp. 756-766 (2008).
2. D.P. Stocker, F. Takahashi, J.M. Hickman, and A.C. Suttles, "Gaseous Non-Premixed Flame Research Planned for the International Space Station," Spring Technical Meeting of the Central States Section of the Combustion Institute, Tulsa, OK, 16–18 March, 2014.

Conference Presentations and Posters (only abstract required)

1. D.P. Stocker, F. Takahashi, P.V. Ferkul, and J.M. Hickman, "Gaseous Laminar Diffusion Flames for the Combustion Integrated Rack," 28th Annual Meeting of the American Society for Gravitational and Space Research, New Orleans, LA, Nov. 28 to Dec. 2, 2012.
2. D.P. Stocker, F. Takahashi, and J.M. Hickman, "Burner-Stabilized Gaseous Flames for the Combustion Integrated Rack," 29th Annual Meeting of the American Society for

Gravitational and Space Research and 5th International Symposium for Physical Sciences in Space, Orlando, FL, 3-8 Nov., 2013.

3. D.P. Stocker, F. Takahashi, J.M. Hickman, and A.C. Suttles, "Advanced Combustion via Microgravity Experiments: Planned International Space Station Research on Gaseous Flames," Work in Progress Poster, 35th International Symposium on Combustion, San Francisco, CA, 3-8 Aug., 2014 (submitted).

Burning Rate Emulator (BRE) – as of May 2014

Peer-Reviewed Journal Papers

1. Y. Zhang, M.J. Bustamante, M.J. Gollner, P.B. Sunderland, J.G. Quintiere, *Burning on Flat Wicks at Various Orientations*, Journal of Fire Sciences (accepted).

Refereed Conference Papers

2. M.J. Bustamante, Y. Zhang, K.T. Dotson, P.B. Sunderland, J.G. Quintiere, *Burning on Flat Wicks at Various Orientations*, Proceedings of the Seventh International Seminar on Fire and Explosion Hazards, D. Bradley, G. Makhviladze, V. Molkov, P. Sunderland, F. Tamanini, Eds., Providence (2013), 10 pp.
1. Y. Zhang, M.J. Bustamante, K.T. Dotson, P.B. Sunderland, J.G. Quintiere, *A Gas Burner to Emulate Condensed-Phase Burning*, Proceedings of the Seventh International Seminar on Fire and Explosion Hazards, D. Bradley, G. Makhviladze, V. Molkov, P. Sunderland, F. Tamanini, Eds., Providence (2013), 9 pp.

Conference Proceedings and Posters

5. Y. Zhang, M.J. Bustamante, P.B. Sunderland, J.G. Quintiere, P. Ferkul, *A Burning Rate Emulator for Microgravity Fire Safety*, Poster, Seventh International Seminar on Fire and Explosion Hazards, Providence (2013).
4. Y. Zhang, M.J. Bustamante, P.B. Sunderland, J.G. Quintiere, P. Ferkul, *A Burning Rate Emulator for Study in Microgravity*, Eighth U.S. National Combustion Meeting, Salt Lake City (2013) 14 pp.
3. M.J. Bustamante, K.T. Dotson, P.B. Sunderland, J.G. Quintiere, *A Tale of Seven Flames*, Art Poster, Central States Section of the Combustion Institute, Dayton (2012).
2. M.J. Bustamante, K.T. Dotson, Y. Zhang, P.B. Sunderland, J.G. Quintiere, *Laminar Burning of Flat Diffusion Flames at Various Orientations*, Central States Section of the Combustion Institute, Dayton (2012) 15 pp.

1. K.T. Dotson, M.J. Bustamante, P.B. Sunderland, J.G. Quintiere, *Laminar Burning on Flat Wicks at Various Orientations*, 7th U.S. National Combustion Meeting, Atlanta (2011) 5 pp.

Thesis

1. Bustamante, Michael J., *Experimental Investigation of Liquid and Gas Fueled Flames Towards the Development of a Burning Rate Emulator (BRE) for Microgravity Applications*, M.S. Thesis, Dept. of Fire Protection Engineering, 91 pp., Aug. 2012.
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Coflow Laminar Diffusion Flame (CLD Flame) – as of May 2014

Peer-Reviewed Journal Papers

1. S.B. Dworkin, B.C. Connelly, A.M. Schaffer, M.B. Long, M.D. Smooke, M.P. Puccio, B. McAndrews and J.H. Miller, “Computational and Experimental Study of a Forced, Time-Dependent, Methane-Air Coflow Diffusion Flame,” *Proc. Comb. Inst.*, **31**, 971-978 (2007).
2. S. B. Dworkin, A. M. Schaffer, B. C. Connelly, M. B. Long and M. D. Smooke, M. A. Puccio, B. McAndrew, and J. H. Miller, “Measurements and Calculations of Formaldehyde Concentrations in a Methane/N₂/Air, Non-Premixed Flame: Implications for Heat Release Rate,” *Proc. Comb. Inst.*, **32**, 1311–1318 (2009).
3. B. C. Connelly, M. B. Long, M. D. Smooke, R. J. Hall, and M. B. Colket, “Computational and Experimental Investigation of the Interaction of Soot and NO_x in Coflow Diffusion Flames,” *Proc. Comb. Inst.*, **32**, 777–784 (2009).
4. B. C. Connelly, B. A. V. Bennett, M. D. Smooke and M. B. Long, “A Paradigm Shift in the Interaction of Experiments and Computations in Combustion Research,” *Proc. Comb. Inst.*, **32**, 879–886 (2009).
5. S.B. Dworkin, J.A. Cooke, B.A.V. Bennett, B.C. Connelly, M.B. Long, M.D. Smooke, R.J. Hall and M.B. Colket, "Distributed-memory parallel computation of a forced, time-dependent, sooting, ethylene/air coflow diffusion flame," *Combustion Theory and Modelling*, **13**, 795 - 822 (2009).
6. P. B. Kuhn, B. Ma, B. C. Connelly, M. D. Smooke, and M. B. Long, “Soot and Thin-filament Pyrometry Using a Color Digital Camera,” *Proc. Comb. Inst.*, **33**, 743-750 (2011).
7. M. B. Long, “Imaging Flames: From advanced laser diagnostics to snapshots,” in *Optical Processes in Microparticles and Nanostructures*, A. Serpengüzel and A.W. Poon, Editors. 2011, World Scientific.
8. J.D. Herdman, B.C. Connelly, M.D. Smooke, M.B. Long and J.H. Miller, "A comparison of Raman signatures and laser-induced incandescence with direct numerical simulation of soot

- growth in non-premixed ethylene/air flames," *Carbon*, **49**, 5298-5311 (2011).
9. B. Ma and M.B. Long, "Absolute light calibration using S-type thermocouples," *Proc. Combust. Inst.* **34**, 3531–3539 (2013).
 10. B. Ma, G. Wang, G. Magnotti, R. S. Barlow and M. B. Long, "Intensity-ratio and color-ratio thin-filament pyrometry: Uncertainties and accuracy," *Combust. Flame*, **161**(4), 908–916 (2014).
 11. B. Ma and M.B. Long, "Combined soot optical characterization using 2-D multi-angle light scattering and spectrally resolved line-of-sight attenuation and its implication on soot color-ratio pyrometry," *Applied Physics B*, 1-17 (2014).
 12. B. Ma, S. Cao, D. Giassi, D.P. Stocker, F. Takahashi, B.A.V. Bennett, M.D. Smooke, and M.B. Long, "An experimental and computational study on soot formation in a coflow jet flame under microgravity and normal gravity," *Submitted to Proc. Combust. Inst.*
 13. S. Cao, B. Ma, B.A.V. Bennett, D. Giassi, D.P. Stocker, F. Takahashi, M.B. Long, and M.D. Smooke, "A computational and experimental study of coflow laminar methane/air diffusion flames: Effects of fuel dilution, inlet velocity, and gravity," *Submitted to Proc. Combust. Inst.*

Conference Proceedings and Posters

1. S.B. Dworkin, B.C. Connelly, B.A.V. Bennett, A.M. Schaffer, M.B. Long, M.D. Smooke, M.P. Puccio, B. McAndrews and J.H. Miller, "Application of a Modified Vorticity-Velocity Formulation to Steady and Unsteady Laminar Diffusion Flames," *Journée des Doctorants du CMAP*, Palaiseau, France, March 7, 2007.
2. B.C. Connelly, M.D. Smooke, M.B. Long, R.J. Hall, and M.B. Colket, "Computational and Experimental Investigation of the Interaction of Soot and NO_x in Coflow Diffusion Flames," *Proceedings of the 5th US Combustion Meeting*, University of California at San Diego, San Diego, CA, March 25-28, 2007.
3. B.C. Connelly, B.A.V. Bennett, S. B. Dworkin, M.D. Smooke and M. B. Long, "A Paradigm Shift in the Interaction of Experiments and Computations in Combustion Research," *Gordon Research Conference on Laser Diagnostics in Combustion*, Magdalen College, Oxford, UK, August 12-17, 2007.
4. M.B. Long, B.C. Connelly, B.A.V. Bennett and M.D. Smooke, "A Paradigm Shift in the Interaction of Experiments and Computations," *First International SAOT Workshop on Optical Diagnostics for Flow and Combustion Research*, Erlangen, Germany, August 19-21, 2007.
5. M.D. Smooke, "Computational and experimental study of soot formation in coflow diffusion flames." Invited talk at *Eastern States Section of the Combustion Institute, Technical Meeting*, Charlottesville, Virginia, October 21-24, 2007.
6. B.C. Connelly, B.A.V. Bennett, M.D. Smooke and M. B. Long, "A Paradigm Shift in the Interaction of Experiments and Computations in Combustion Research," *Eastern States*

Section of the Combustion Institute, Technical Meeting, Charlottesville, Virginia, October 21-24, 2007.

7. M.B. Long, "Probing Fire with Light," guest lecture at The Summer Science Program, Socorro, NM, July 3, 2007.
8. M.B. Long, "Changing the way we think about combustion experiments – the interaction of computations and experiments," Mechanical Engineering Seminar, University of Connecticut, 17 April 2009.
9. Blair Connelly, Peter Kuhn, Bin Ma, and Marshall Long, "Current state of combustion diagnostics on the International Space Station," Gordon Research Conference on Laser Diagnostics in Combustion, Waterville Valley, NH, 16-21 August, 2009.
10. Blair C. Connelly, Luca Tosatto, Mitchell D. Smooke and Marshall B. Long, "Improving the interface between experiments and computations through intelligent experimental design," Gordon Research Conference on Laser Diagnostics in Combustion, Waterville Valley, NH, 16-21 August, 2009.
11. Blair C. Connelly, Marshall B. Long, Mitchell D. Smooke, Meredith B. Colket, Robert J. Hall, "Two-dimensional laser-induced incandescence for soot volume fractions and primary particle size distributions," 6th U.S. National Combustion Meeting, The University of Michigan, Ann Arbor, Michigan, 17-20 May 2009.
12. Marshall B. Long, "Imaging Flames: From Advanced Laser Diagnostics to Snapshots," Plenary Lecture at the Eastern States Section of the Combustion Institute, Fall Technical Meeting, University of Maryland, College Park, 18-21 October 2009.
13. B. Ma, S. Cao, B. A. V. Bennett, M. D. Smooke and M. B. Long, "Experimental and computational study of lifted coflow laminar diffusion flames under elevated pressures," 7th US National Technical Meeting of the Combustion Institute, Atlanta, GA, March 20-23, 2011.
14. Marshall B. Long, "Multispectral Imaging in Combustion Analysis," Invited presentation at OSA Advanced Photonics Congress, Toronto, Canada, 12-15 June 2011.
15. Jennifer D. Herdman, Blair C. Connelly, Mitchell D. Smooke, Marshall B. Long and J. Houston Miller, "A comparison of Raman signatures and laser-induced incandescence with direct numerical simulation of soot growth in non-premixed ethylene/air flames," Gordon Research Conference on Laser Diagnostics in Combustion, Waterville Valley, NH, 14-19 August, 2011.
16. Bin Ma and Marshall B. Long, "Can SiC Fibers Serve As An Absolute Light Calibrator?" Gordon Research Conference on Laser Diagnostics in Combustion, Waterville Valley, NH, 14-19 August, 2011.
17. B. Ma and M.B. Long, "Absolute light calibration in combustion experiments," Fall Technical Meeting of the Eastern States Section of the Combustion Institute, Storrs, CT, 9-12 Oct, 2011.
18. Su Cao, Beth Anne V. Bennett, Bin Ma, Marshall B. Long, Mitchell D. Smooke,

- “Computational and experimental study of laminar coflow methane-air diffusion flames under elevated pressures,” Fall Technical Meeting of the Eastern States Section of the Combustion Institute, Storrs, CT, 9-12 Oct, 2011.
19. B. Ma and M.B. Long, “Novel soot volume fraction measurement through ratio-pyrometry and absolute light calibration,” The 5th International LII Workshop, Le Touquet, France, 9-11 May, 2012.
 20. B. Ma and M.B. Long, “Absolute light calibration using S-type thermocouples,” 34th International Symposium on Combustion, Warsaw, Poland, 29 July - 3 August, 2012.
 21. B. Ma, D. Giassi, D.P. Stocker, F. Takahashi and M.B. Long, “Structure and Liftoff in Combustion Experiment (SLICE) on the ISS,” Work in progress poster, 34th International Symposium on Combustion, Warsaw, Poland, 29 July - 3 August, 2012.
 22. F. Takahashi, R. Kulakhmetov, D.P. Stocker, B. Ma and M.B. Long, “Microgravity Enhances the Stability of Gas-Jet Diffusion Flames”, 28th ASGSR Annual meeting, Nov 28-Dec 2, 2012.
 23. S. Cao, B.A.V. Bennett, B. Ma, M.B. Long and M.D. Smooke, “Effects of Pressure and Fuel Stream Dilution on the Structure of Axisymmetric Coflow Methane-Air Laminar Diffusion Flames: A Computational and Experimental Study,” 14th SIAM International Conference on Numerical Combustion, San Antonio Texas, Apr 8-10, 2013.
 24. B. Ma, G. Wang, G. Magnotti, R.S. Barlow, and M.B. Long, “Recent developments of thin-filament pyrometry,” 8th US National Combustion Meeting, Park City UT, 19-22 May, 2013.
 25. B. Ma, S. Cao, D. Giassi, D.P. Stocker, F. Takahashi, B.A.V. Bennett, M.D. Smooke, and M.B. Long, “An experimental and computational study on soot formation in a coflow jet flame under microgravity and normal gravity,” 8th US National Combustion Meeting, Park City UT, 19-22 May, 2013.
 26. B. Ma and M.B. Long, “Two-dimensional soot aggregate sizing by multi-angle light scattering,” 8th US National Combustion Meeting, Park City UT, 19-22 May, 2013.
 27. S. Cao, B.A.V. Bennett, B. Ma, D. Giassi, D.P. Stocker, F. Takahashi, M.B. Long, and M.D. Smooke, “Effects of fuel dilution and gravity on laminar coflow methane- air diffusion flames: A computational and experimental investigation,” 8th US National Combustion Meeting, Park City UT, 19-22 May, 2013.
 28. N. Kempema, B. Ma and M. B. Long “Full field temperature measurement in sooting coflow diffusion flames,” 8th US National Combustion Meeting, Park City UT, 19-22 May, 2013.
 29. Bolun Liu, Davide Giassi, and Marshall Long, “Use of High Dynamic Range (HDR) Imaging Algorithms for Quantitative Combustion Diagnostics,” Gordon Research Conference on Laser Diagnostics in Combustion, Waterville Valley, NH, 11-16 August, 2013.
 30. B. Ma, S. Cao, D. Giassi, D.P. Stocker, F. Takahashi, B.A.V. Bennett, M.D. Smooke, and M.B. Long, “An experimental and computational study on soot formation in a coflow jet

flame under microgravity and normal gravity,” to be presented, 35th International Symposium on Combustion, San Francisco, CA, 3-8 August, 2014.

31. S. Cao, B. Ma, B.A.V. Bennett, D. Giassi, D.P. Stocker, F. Takahashi, M.B. Long, and M.D. Smooke, “A computational and experimental study of coflow laminar methane/air diffusion flames: Effects of fuel dilution, inlet velocity, and gravity,” to be presented, 35th International Symposium on Combustion, San Francisco, CA, 3-8 August, 2014.

Ph.D. Dissertation

B.C. Connelly, “Quantitative Characterization of Steady and Time-Varying, Sooting, Laminar Diffusion Flames using Optical Techniques,” Ph.D. Thesis, Yale University, 2009.

Bin Ma, “Development of quantitative optical techniques for microgravity combustion and sooty flame characterization,” Ph.D. Thesis, Yale University, 2013.

Electric-Field Effects on Laminar Diffusion Flames (E-FIELD Flames) - as of May 2014

GRADUATE STUDENTS

Ph.D. Dissertations

- A.9 Rickard, M.A. (2005) “Ion-Driven Wind: Aerodynamics, Performance Limits, and Optimization”
- A.10 Papac, M.J. (2005) “Electrical Aspects of Gaseous Fuel Flames for Microgravity Combustion and Combustion Control.”
- A.19 Karnani, S. (2011) “Electrical Control of Combustion in Microgravity.”
- A.24 Chien, Y.-C. (2014 – expected September) “Electrical Control of Impinging Non-Premixed Flames.”

M.S. Theses

- B.22 Gonzalez, M. (2000) “Prospects for an Electrohydrodynamic Spray Burner” (project)
- B.24 Rickard, M.A. (2002) “The Study of an Electrified Air-Assisted Liquid Atomizer.”
- B.25 Papac, M.J. (2002) “N₂ CARS Thermometry and O₂ LIF Measurements of an Electrically Induced Microbuoyant Flame.”
- B.44 Tsai, H.-J. (2011) “Attempts to Model Electrical Field Effects on Flames.” (project)
- B.51 Kong, S. (2013) “Studying the Temperature Profile of a Flame-Heated Plate using Solidworks.” (project)
- B.52 Escofet-Martin, D. (2014) “OH PLIF Measurements in an Impinging Non-Premixed Flame.” (project)
- B.53 Tinajero, J. (2014 – expected June) “Flow Dynamics in an Electrically Controlled Diffusion Flame.”

Visiting Researchers

- C.7 Francesco Borgatelli, Polytechnic Milano – Engineering Degree student, 2006 – Feedback control of flames with electric fields, “Behavior of a Small Diffusion Flame Affected by an Electric Field,” degree conferred 2008/2009.
- C.11 Kiyotaka Yamashita, Post Doctoral Scientist, University of Tokyo, summer 2008 – Numerical Simulation of Electric Effects in Diffusion Flames
- C.13 Julian Glorian, Universite D’Orleans, France – Engineering Degree student 2011 –

- Computational study of ions and excited state species in a methane/air laminar diffusion flame
- D.2 Benjamin Debareix, ISAE, ENSMA, France – Engineering Degree student 2011 (no formal report) – Open FOAM Computation of Jet Diffusion Flame Impinging on a Surface
- D.3 Mishal Francis, University of Glasgow -- Intern student 2011/2012 -- IR detection of electrical effects on small diffusion flames
- D.4 Joshua Jacobs, University of Glasgow -- Intern student 2011/2012 -- Soot imaging in small diffusion flames
- C.24 Valentina Ricchiuti – Polytecnico Milano – 2013/2014 – CFD of Electric Fields and Flames using Open FOAM.

INVITED TECHNICAL LECTURES

- Louisiana State University Seminar – Electrical Actuation of Small Diffusion Flames, April 4, 2014
- UCLA Mechanical Engineering Departmental Seminar -- Using Old Fuels in New Ways and New Fuels in Old Ways, December 11, 2009
- UCI MAE Departmental Seminar -- Recent Research in the Lasers, Flames, and Aerosols Laboratory, October 14, 2009
- NASA Glenn Research Center, Cleveland, Ohio – Electric Field Effects in a Small Co-Flow Diffusion Flame (with S. Karnani), May 21, 2009
- Japanese Combustion Symposium, Kyoto, Japan – Electrical Manipulation of Flames, December 4, 2008
- University of Hawaii, Honolulu, HI, “Flame and Corona Ion Driven Winds,” October 19, 2007
- University of California, San Diego Fluid Seminar, San Diego, CA – Convective Transport in Flame and Corona Ion-Driven Winds, January 22, 2007.
- National Cheng-Kung University, Tainan, Taiwan – Control of Ion Winds from Flames and Corona Discharges, March 23, 2006.
- Interdisciplinary Transport Phenomena in Microgravity and Space Sciences IV, Tomar, Portugal – Using Large Electric Fields to Control Transport in Microgravity, August 11, 2005
- California Institute of Technology – Characterizing Ionic Winds from Flames and Corona Discharges, February 25, 2005.
- University of Southern California, Los Angeles, California – Electric Field Manipulation of Flames: and other tales of combustion control, March 7, 2001

PUBLICATIONS**Refereed Publications**

- A.40 Strayer, B.A., Posner, J.D., Dunn-Rankin, D., and Weinberg, F.J. (2002) "Simulating microgravity in small diffusion flames by using electric fields to counterbalance natural convection," *Proceedings of the Royal Society of London A*, 458 2021, 1151-1166.
- A.41 Regele, J., Papac, M., Rickard, M., and Dunn-Rankin, D. (2002) "Effects of Capillary Spacing on EHD Spraying from an Array of Cone-Jets," *Journal of Aerosol Science*, Volume 33, Issue 11, November 2002, Pages 1471-1479.
- A.45 Papac, M.J., Dunn-Rankin, D., Stipe, C.B., and Lucas, D. (2003) "N₂ CARS Thermometry and O₂ LIF Concentration Measurements in an Electrically Induced Microbuoyant Flame," *Combustion and Flame*, 133, 241-254.
- A.46 Weinberg, F.J., Carleton, F.A., and Dunn-Rankin, D. (2003) "Electrically Charged Dispersions of Extinguishants for use in Microgravity Environments," *Combustion Science and Technology*, 175, 2161-2179.
- A.48 Rickard, M., Dunn-Rankin, D., Weinberg, F., and Carleton, F. (2005) "Characterization of Ionic Wind Velocity," *Journal of Electrostatics*, 63, 711-716.
- A.49 Weinberg, F., Carleton, F.A., and Dunn-Rankin, D. (2003) "Electrically Charged Dispersions of Extinguishants for use in Microgravity Environments," *Combustion Science and Technology*, 175, 2161-2179.
- A.51 Rickard, M.A., Dunn-Rankin, D., Weinberg, F.J., and Carleton, F. (2006) "Maximizing Ion Driven Gas Flows," *Journal of Electrostatics*, 64, 368-276.
- A.54 Papac, M.J. and Dunn-Rankin, D. (2008) "Modeling Electric Field Driven Convection in Small Combustion Plasmas and Surrounding Gases," *Combustion Theory and Modeling*, 12, 23-44.
- A.55 Rickard, M.A. and Dunn-Rankin, D. (2007) "Numerical Simulation of a Tubular Ion-Driven Wind Generator," *Journal of Electrostatics*, 65, 646-654.
- A.56 Weinberg, F.J., Carleton, F., and Dunn-Rankin, D. (2008) "Electric Field-Controlled Musclic Burners," *Combustion and Flame*, 152, 186-193.
- ICA.1 Weinberg, F.J., Carleton, F., (2009) "Ionization and chemiluminescence during the progressive aeration of methane flames," *Combustion and Flame*, 156, 2276-2284.
- A.64 Yamashita, K., Karnani, S., and Dunn-Rankin, D. (2009) "Numerical prediction of ion current from a small methane jet flame," *Combustion and Flame*, 156, 6, 1227-1233.
- A.68 Weinberg, F.J., Carleton, F., Houdmont, R., Dunn-Rankin, D., and Karnani, S. (2011) "Syngas Formation in Methane Flames and Carbon Monoxide Release during Quenching," *Combustion and Flame*, 158, 273-280.

- A.73 Borgatelli, F. and Dunn-Rankin, D. (2011) "Behavior of a Small Diffusion Flame as an Electrically Active Component in a High-Voltage Circuit," *Combustion and Flame*, 159, 210–220.
- A.76 S. Karnani, D. Dunn-Rankin, F. Takahashi, Z-G. Yuan, D. Stocker (2012) "Simulating Gravity in Microgravity Combustion using Electric Fields," *Combustion Science and Technology*, 184, 1891--1902.
- A.80 Karnani, S. and Dunn-Rankin, D. (2013) "Visualizing CH* Chemiluminescence in Sooting Flames," *Combustion and Flame*, in press, May.

Refereed Conference Proceedings (full peer-review)

- B.8 Carleton, F., Dunn-Rankin, D., and Weinberg, F.J. (1998) "Optics of Small Diffusion Flames in Micro-gravity," *Proceedings of the 27th International Symposium on Combustion*, 2567-2572.
- B.11 Rickard, M. and Dunn-Rankin, D. (2002) "Experimental study of an electrohydrodynamic, air-assisted liquid atomizer," *SAE Transactions: Journal of Fuels and Lubricants*, 1523-1531
- B.14 Dunn-Rankin, D. and Weinberg, F.J. (2006) "Using Large Electric Fields to Control Transport in Microgravity," *Annals of the New York Academy of Sciences*, 1077, 570-584.
- B.15 Papac, M.J. and Dunn-Rankin, D. (2006) "Canceling Buoyancy of Gaseous Fuel Flames in a Gravitational Environment using an Ion Driven Wind," *Annals of the New York Academy of Sciences*, 1077, 585-601.
- B.19 F.J. Weinberg, F.J., Dunn-Rankin, D., Carleton, F.B., Karnani, S., Markides, C., and Zhai, M. (2012) "Electrical aspects of flame quenching," *Proceedings of the Combustion Institute*, 2012, available online.

Conference Papers (full papers, acceptance based on abstract)

- D.41 Strayer, B.A., Posner, J.D., and Dunn-Rankin, D. (1999) "Temperature Field Measurements of a Non-premixed Flame under Electric Field Control," Western States Section/The Combustion Institute Fall Meeting, University of California, Irvine, CA, October 25-26.
- D.43 Strayer, B.A., Posner, J.D., and Dunn-Rankin, D. (2000) "CARS Temperature Measurements of a Non-premixed Flame under Electric Field Control," Western States Section/The Combustion Institute Spring Meeting, Colorado School of Mines, Golden, CO, March 13-14.
- D.47 Dunn-Rankin, D., Papac, M., Regele, J., and Rickard, M. (2001) "EHD Spraying from Single and Multiple Capillaries," 14th Annual International Liquid Atomization and Spray Systems (ILASS)-Americas Conference, Dearborn, Michigan, May 21-23. (see A.41)

- D.49 Dunn-Rankin, D., Strayer, B.A., Carleton, F.A., and Weinberg, F.J. (2001) "Electrical Aspects of Microgravity Combustion," 6th Microgravity Combustion Workshop, Cleveland, Ohio, May 22-24.
- D. 50 Strayer, B.A. and Dunn-Rankin, D. (2001) "Control of the Vaporization Rate in a Droplet Stream Flame using Electric Fields," Proceedings of NHTC'01, the 35th ASME National Heat Transfer Conference, Anaheim, California, June 10-12.
- D.51 Strayer, B.A. and Dunn-Rankin, D. (2001) "Response of a Non-Premixed Flame to Electric Field Forcing," 18th International Colloquium on the Dynamics of Explosions and Reactive Systems, Seattle, Washington, July 29-August 3.
- D.53 Weinberg, F.J., Carleton, F.A., and Dunn-Rankin, D. (2002) "Electrically Charged Dispersions of Extinguishants for use in Microgravity Environments," Mediterranean Combustion Symposium, Sharm El-Sheikh, Egypt, January 6-11. (see A.46)
- D.55 Papac, M.J., Dunn-Rankin, D., Stipe, C.B., and Lucas, D. (2002) "CARS Temperature and LIF Oxygen Concentration Measurements in an Electrically Induced Microbuoyant Flame," Paper-072 of the Western States Section/The Combustion Institute Spring Meeting, San Diego, CA, March 25-26. (see A.45)
- D.58 Lengsfeld, C.S., Lentz, Y., Anchordoquy, T., Dunn-Rankin, D., and Manning, M. (2002) "Suitability of Electrostatic Spraying for Macromolecular Therapeutics," 15th Annual ILASS Americas Conference, Madison, WI, May.
- D.59 Rickard, M. and Dunn-Rankin, D. (2002) "Experimental study of a hybrid electrohydrodynamic, air-assisted liquid atomizer," SAE Paper FFL02-15, Fuels and Lubricants Conference, San Diego, CA, October 21-24. (see B.11)
- D.62 Dunn-Rankin, D. and Weinberg, F.J. (2003) "Flames and Electric Fields in Microgravity," 7th International Workshop on Microgravity Combustion, Cleveland, Ohio, June 2-5.
- D.63 Rickard et al. (2003) "Ionic Wind as a Controllable Air Source for an Electric Burner," Western States Section/The Combustion Institute Fall Meeting, UCLA, October 20-21.
- D.69 Rickard, M.A., Carleton, F., Dunn-Rankin, D., and Weinberg, F.J. (2005) "Characterization of Ionic Wind Velocity," Paper PFA-19, Proceedings of Electrostatics 2005, Helsinki, Finland, June.
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Flame Design - as of May 2014

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Theses and Dissertations

S. W. Yoo, '06

"On the structure and dynamics of stationary and rotating spherical diffusion flames"

Staff researcher, GE Aviation, Cincinnati

