Paul E. DesJardin

Mechanical and Aerospace Engineering Department
University at Buffalo, the State University of New York
Buffalo, NY 14260
phone: (716) 645-1467, email: ped3@buffalo.edu
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EDUCATION

PURDUE UNIVERSITY, West Lafayette, Indiana
Doctor of Philosophy in Mechanical Engineering (1998)
Dissertation Title: *"Large Eddy Simulations of Strongly Radiating Turbulent Diffusion Flames"*
Grade Point Average: 3.93/4.0; Advisor: Professor Steven H. Frankel

PURDUE UNIVERSITY, West Lafayette, Indiana
Master of Science in Mechanical Engineering (1995)
Thesis Title: *"Linear Eddy Modeling of Reacting Homogeneous Turbulence: Numerical Simulations and Model Comparisons"*
Grade Point Average: 4.0/4.0; Advisor: Professor Steven H. Frankel

UNIVERSITY at BUFFALO, the STATE UNIVERSITY of NEW YORK, Buffalo, New York
Bachelor of Science in Aerospace Engineering with mathematics minor (1993), *Summa Cum Laude*
Grade Point Average: 3.79/4.0

EMPLOYMENT

University at Buffalo — Buffalo, New York
2012 – present: *Professor*
2007 – 2012: *Associate Professor*
2002 – 2007: *Assistant Professor*

Sandia National Laboratories — Albuquerque, New Mexico
1998 – 2002: *Senior Member of the Technical Staff (SMTS)*

Purdue University — West Lafayette, Indiana
1993 – 1998: *Research Assistant*
1994 – 1998: *School of Mechanical Engineering Computer Consultant*

RESEACH INTERESTS

My research interests are in the areas of numerical modeling and simulation of: 1) strongly radiating, turbulent, multiphase reacting flows and 2) fluid-structure interactions. Application areas include fire phenomena, explosives and the response of composite materials in abnormal thermal and mechanical environments.

HONORS AND AWARDS

Associate Fellow of AIAA (2016)
SUNY Chancellor's Award for Excellence in Teaching (2009) –highest teaching award from the State University of New York system
Featured in CASC (Coalition for Academic Scientific Computations) brochure that is distributed to members of congress and major research funding agencies (NSF, NIH, etc.), December, 2008
National Science Foundation Career Award (2004)
Honorary Member, PI TAU SIGMA, National Mechanical Engineering Honor Society (2004)
Sandia National Laboratories Award for Excellence (2002)
Sandia National Laboratories Award for Excellence (2001)
Air Force Office of Scientific Research fellowship winner for the First Annual International Conference on DNS/LES (1997)
Graduated SUMMA CUM LAUDE from SUNY at Buffalo (1993)
Honor Undergraduate Student Award, SIGMA GAMMA TAU (1993)
President, SIGMA GAMMA TAU, National Aerospace Honor Society (1993)
Member, TAU BETA PI, Engineering Honor Society (1992)
Member, SIGMA GAMMA TAU, Aerospace Honor Society (1992)
Member, National Golden Key Honor Society (1991)
Instrument Society of America Scholarship (1991)
Dean's List every semester at college (1988-1993)
Rochester Industrial Engineering Award (1988)

PROFESSIONAL MEMBERSHIPS AND ACTIVITIES

Associate Fellow, American Institute of Aeronautics and Astronautics (2016-present)
Senior Member, American Institute of Aeronautics and Astronautics (2011-2016)
Technical Chair Member, Propellants and Combustion Committee, American Institute of Aeronautics and Astronautics (2000-2007)
Technical Chair Member, K-11 Fire and Combustion Committee, American Society of Mechanical Engineers (2000-2008)
Member, American Society for Engineering Education (2002-present)
Member, American Society of Mechanical Engineers (1994-present)
Member, American Physical Society (1994-present)
Member, The Combustion Institute (1994-present)
Member, National Society of Professional Engineers (1992-present)
Member, SAE International (2007-present)
Member, American Institute of Aeronautics and Astronautics (1990-present)
Reviewer for: Journal of Fluid Mechanics, AIAA Journal, Combustion Science and Technology, International Journal of Multiphase Flows, Atomization and Sprays, International Journal for Numerical Methods in Fluids, Journal of Heat Transfer, International Journal of Heat and Mass Transfer, Journal of Composite Materials, International Journal for Multiscale Computational Engineering, Journal of Fluids Engineering, National Science Foundation, American Chemical Society

SERVICE

University

Member, Study Abroad Advisory Board, 2013-2015
Member, Goldwater scholarship selection committee, 2011-present
Guest expert commentary on NPR Science Friday, August 11, 2006
Member, CCR User Advisory Committee, 2005-present

Panelist, New Faculty Orientation, August 18, 2004

Professional and National

Reviewer, NSF panel, Washington, DC, 2016, 2015, 2012, 2010, 2008,2005
Session chair, 10th Symposium on Fire Science, 2011
Session chair and organizer, 6th International Conference on Fire in Composites, 2011
Reviewer, DoE Accelerated Scientific Computing Initiative (ASCI) Program, University of Utah, October 3-4, 2005
Reviewer, NSF panel, Washington, DC, November 8-9, 2004
Reviewer, DoE Accelerated Scientific Computing Initiative (ASCI) Program, University of Utah, October 8-11, 2002
Conference Organizer / Reviewer, ASME – International Mechanical Engineering Congress and Exhibition 2001-2005, AIAA Aerospace Sciences meeting 2004, International Symposium on Combustion 2004

School of Engineering

Faculty Mentor, 2008-present
Member, INS Multiscale Faculty Search Committee, 2009-2010
Program Director, Engineering Study Abroad Program in Troyes France, Summers 2006 & 2007
Marshall, for graduation ceremonies, Spring 2006, 2009, 2012-2014
Mentor, UB Honor Program, 2003-present
Mentor, Freshman Mentoring Program, 2003-present
Judge, Chemical and Biological Engineering Graduate Student Poster Session, October 2004
Contributor, Igniting Ideas 2 Infrastructure and Environment brochure, 2003
Contributor, Border & Transportation Security Magazine, 2003
Contributor, Igniting Ideas 5 Energy, Flows, and Materials Processing brochure, 2004

Department

Invited Speaker, Pi Tau Sigma – National Mechanical Engineering Honor Society, Feb. 11, 2016
Faculty Advisor, SEDS – Students for Exploration and Development of Space, 2007-present
Director of Undergraduate Aerospace Studies, 2011-2014
Invited Speaker, SEDS student chapter, March 19, 2008
Chair, MAE Thermal Fluids Faculty Search Committee, 2007-2008, 2012-2013, 2013-2014
Member, MAE Chair Search Committee, 2007-2008
Organizer, MAE Graduate Seminar Series, 2004-2007
Member, Undergraduate Education Committee, 2004-2005
Member, Graduate Studies Committee, 2005-2009
Coordinator for Ph.D. Qualifying Fluids and Heat Transfer Exam - Fluids section, 2006
Faculty Advisor, Pi Tau Sigma – National Mechanical Engineering Honor Society, 2002-2009
Invited Speaker, AIAA student chapter, October 11, 2003

TEACHING

University at Buffalo Buffalo, New York

Combustion (MAE 534) graduate level course, Spring 2004, 2005, 2008-present
Computational Fluid Dynamics (MAE 442/542) undergraduate/graduate level course, Spring 2003-2011
Fire Science and Safety Engineering (MAE 457) undergraduate/graduate level course, Fall 2005-2007, 2014-present
Propulsion (MAE 423) undergraduate level course, Fall 2002-2006, 2010-2011
Statics (EAS 207) undergraduate level course, Summers 2006 & 2007 in Troyes, France

Purdue University West Lafayette, Indiana

Fluids Mechanics (ME 509) graduate level course, Fall 1995, 1996 (Guest Lecturer)
Thermodynamics (ME 300) undergraduate junior level course, Spring & Fall 1997 (Guest Lecturer)

RESEARCH PERSONNEL SUPERVISION

Post-doctoral Scholars

Name	Dates of Appointment	Current Employer (if known)
William Godoy	6/1/09 – 1/30/10 (6 months)	Oak Ridge National Lab

Current and Past Graduate Students

Student	Degree	Grad. Date	Current Employer (if known)
Khaled Al-Salem	PhD	Feb. 2006	King Saud University
Mark Carrara	PhD	Feb. 2006	Los Alamos National Lab
Harman Shihn	PhD	Feb. 2007	Unifrax Corporation
William Godoy	PhD	May 2009	Oak Ridge National Lab (see above)
Changsong Luo	PhD	Aug. 2010	Global Engineering & Materials
Kevin Ruggirello	PhD	May 2011	Sandia National Laboratories
Wei Xei	PhD	May 2012	Gamma Technologies
Matthew McGurn	PhD	Feb. 2013	Reaction Engineering Int. (REI)
Brian Bojko	PhD	Feb. 2017	NAWS China Lake
Joseph Richter	PhD	May 2018	
Josh Weisberger	PhD	May 2019	
Theodore Nalesnik	PhD	May 2019	
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Ronald Aranha	MS	Aug. 2004	
Prasanth George	MS	Aug. 2004	Asst.Teaching Prof., Northeastern Univ.
Yann Colin	MS	Feb. 2005	Post-Doc, Cambridge Univ.
Changsong Luo	MS	Feb. 2006	Global Engineering & Materials
Amar Setty	MS	Feb. 2006	NASA
Wei Xie	MS	Feb. 2006	Ph.D. student SUNY Buffalo
William Godoy	MS	Sept. 2006	(see above)
Chris Gately	MS	Sept. 2006	Boeing Integrated Defense Sys
Fred Raveau-Violette	MS	Feb. 2007	John Deere European Engine
D. Wolde-Gabriel	MS	Feb. 2007	NYS Dept. of Envir. Cons.
R. Tippabhotla	MS	Feb. 2007	ZL Technologies
V. Allampalli	MS	Feb. 2007	Nextag
Amit Kumar	MS	Feb. 2007	Avadhi Finance & Tech.

Keith Koehler	MS	Feb. 2008	
Jeremiah Rauch	MS	Feb. 2008	Praxair
Kevin Ruggirello	MS	Sept. 2008	Sandia National Laboratories
Yuan Li	MS	Feb. 2009	
Marie-Pierre Budin	MS	Feb. 2009	
Jungpil Kim	MS	May 2009	LG Corp, Korea
L. Noutong	MS	Jan. 2010	
Matthew McGurn	MS	May 2010	Reaction Engineering Int. (REI)
Kirk Lefort	MS	Aug. 2010	Rolls-Royce
John Grimble	MS	Dec. 2010	ITT
Jared Kuhl	MS	May 2011	Space-X
John Sisti	MS	Aug. 2013	NSWC Carderock
Brian Bojko	MS	Aug 2014	NAWS China Lake
Josh Weisberger	MS	Feb 2015	Ph.D. student SUNY Buffalo
Sharvari Divey	MS	Feb. 2014	Honeywell
Arun Nair	MS	May 2015	
Michael Rossi	MS	May 2015	Boeing
Emily Morog	MS	Feb. 2017	

Undergraduate Research

Student	**Context**	**Date**
Steven Coffed	Independent Study & funded research	Spr.2014-Spr.2016
Corey Needle	Independent Study & funded research	Spr.2014-Spr.2016
Abner Bogan	Independent Study	Fall.2014-Spr.2015
Michael Halloran	funded research (NYSERDA)	Spr.2014-Spr.2015
Theodore Nalesnik	funded research (NYSERDA)	Spr.2014-Spr.2015
Timothy Brady	Honors thesis	Spr. 2013
Jimmy Lam	funded research (MURI)	Summer 2014
Michael Landau	funded research (MURI)	Summer 2014
Matthew Leibowitz	funded research (MURI)	Fall 2011-Spr 2013
Oluwatobi Busari	funded research (MURI)	Fall 2011-Spr 2012
Ryan Bierl	funded research (MURI)	Spr. 2011
Marcus Hennekens	funded research (MURI)	Spr. 2011
Asif Yeahia	funded research (MURI)	Spr. 2011
Nicholas Day	funded research (MURI)	Spr. 2011
Jonathan Jones	funded research (MURI)	Spr. 2011
John Grimble	Zimmer Scholarship	Sum. 2009
Kevin Carlin	MAE 494	Spr. 2003
Sebastian Bruneau	Senior Scholar Award	Spr. 2004
Brian Beckman	Senior Scholar Award	Spr. 2004
Sam Scorsone	MAE 494	Spr. 2005
Eun Kim	MAE 494	Spr. 2005
Cloud Ka-Fai Lee	MAE 494	Spr. 2005
Joel Ruffino	MAE 494	Spr. 2005
Geoff Wells	Zimmer Scholarship	Spr. 2005
Hang Seng Ng	MAE 499	Fall 2005
Brad Cheetham	Zimmer Scholarship	Spr. 2007

Thesis Committee Member

Student	**Deg.**	**Date**	**Student**	**Deg.**	**Date**
Cosmin Safta	PhD	Feb. 2004	Vincent Moerman	MS	Jan. 2004

Cristian Nastase	PhD	Feb. 2004	Harman Shihn	MS	June 2004
Greg Smolinski	PhD	Aug. 2004	Amit Paliwal	MS	Aug. 2004
James McCall	PhD	May 2005	Sanal George	MS	Dec. 2004
Khaled Al-Salem	PhD	Feb. 2006	Gaurav Tyagi	MS	Dec. 2004
Jeremy de Hong	PhD	Sept. 2008	Khaled Al-Salem	MS	Jan. 2005
X. Gao (Univ. Toronto)	PhD	Sept. 2008	Madan Mohan Reddy	MS	Jan. 2005
Zhendan Xue	PhD	Feb. 2009	Maynak Tiwari	MS	Aug. 2005
Keith Dalbey	PhD	May 2009	Zhendan Xue	MS	May 2006
Kareem Ahmed	PhD	Aug. 2009	Kareem Ahmed	MS	May 2006
Aaron Dufrene	PhD	Feb. 2012	Guillaume Durand	MS	Aug. 2006
Navid Vaghefi	PhD	Aug. 2014	Sebastien Bruneau	MS	Dec. 2007
Reza Jahanbakhshi	PhD	Aug. 2016	Phani Rajavolu	MS	Aug. 2007
			Yu-Cheng Liu	MS	Aug. 2007
			Ryu Yamanaka	MS	Jan. 2007
			I. Diaz-Guardamino	MS	May 2008
			Justin Tham	MS	May 2008
			Jennifer LaBuda	MS	Aug. 2008
			Michael Bonarski	MS	Aug. 2010
			Benjamin Knox	MS	Aug. 2011
			Sonja Melander	MS	May 2012
			Zakery Carr	MS	May 2012
			Prerna Gera	MS	Aug. 2012
			Tim Adowski	MS	Jan. 2017

GRANT AND CONTRACT SUPPORT (Total Funding 5M)

1. Army SBIR phase I with Reaction Engineering International, "High Fidelity Multi-Dimensional Fire Modeling and Simulation for Composite Structure Response," $49,500, 9/1/2017-3/1/2018, PI: P.E. DesJardin, Percent credit 100%.

2. National Science Foundation, "Modeling Reacting Interfaces for Biomass Combustion using Flame Generated Manifolds", 9/2017-9/2020, $280,000, PI: P. E. DesJardin, Percent credit: 100%.

3. National Science Foundation, "Modeling Reacting Interfaces for Biomass Combustion using Flame Generated Manifolds", 9/2017-9/2020, $280,000, PI: P. E. DesJardin, Percent credit: 100%.

4. NYSTAR through RPI, "High Fidelity Simulations of Secondary Combustion for Biomass Applications," $25,000, 2/1/2016-6/30/2017, PI: P.E. DesJardin, Percent credit 100%.

5. Navy STTR phase II.5 with Reaction Engineering International, "A Multiscale Modeling and Simulation Framework for Predicting After-Burning Effects from Non-Ideal Explosives," $200,000, 9/2015-2/2017, PI: P.E. DesJardin, Percent credit 100%.

6. New York State Energy Research and Development Authority (NYSERDA), "College Teams and Competitions for Advancing Woodstove and Pellet Stove Design and Innovation," 10/2015-10/2018, $75,000, PI: J.C. Mollendorf, Co-PI: P.E. DesJardin, Percent credit: 50%.

7. New York State Energy Research and Development Authority (NYSERDA), "Review of Wood Fired Boiler Combustion Chamber Design," 7/2014-4/2016, $19,974, PI: P.E. DesJardin, Percent credit: 100%.

8. New York State Energy Research and Development Authority (NYSERDA), "Combustion Characterization and Optimization of Outdoor Wood Burning Hydronic Heaters," 12/2013 – 12/2016, $368,000, PI: P. E. DesJardin, co-PI: J. Mollendorf, Percent credit: 100%.

9. National Science Foundation, "High Fidelity Modeling and Simulation of Turbulent Flame Spread Over Charring Materials", 9/2010-9/2013, $325,000, PI: P. E. DesJardin, Percent credit: 100%.

10. Navy STTR phase II with Reaction Engineering International, "A Multiscale Modeling and Simulation Framework for Predicting After-Burning Effects from Non-Ideal Explosives," $404,335, 8/2011-3/2014, PI: P.E. DesJardin, Percent credit 100%.

11. Navy SBIR phase I with SURVICE Engineering, "Fire Simulation and Residual Strength Prediction Tool for Aluminum Ship Structures During and After Fire," 10/2010-3/2011, $25,000, PI: P. E. DesJardin, Percent credit: 100%.

12. AFOSR MURI Program, "Fundamental Processes in High-Temperature Hypersonic Flows," 9/2010-8/2015, $1,495,651, PI: DesJardin, Co-PI: M. R. Ringuette, Percent credit: 50%.

13. Navy STTR phase I with Reaction Engineering International, "A Multiscale Modeling and Simulation Framework for Predicting After-Burning Effects from Non-Ideal Explosives," $45,577, 8/1/2010-8/28/2011, PI: P.E. DesJardin, Percent credit 100%.

14. Sandia National Laboratories, "Probabilistic Based Mesoscale Modeling for Shocked Heterogeneous Reactive Media," $232,218, 9/1/2008-3/31/2011, PI: P.E. DesJardin, Percent credit: 100%.

15. Office of Naval Research through SBIR phase II with Global Engineering and Materials, Inc., "Modeling of Sandwich Composites in Fire Environments," $110,000, 9/1/2008-9/1/2010, PI: P.E. DesJardin, Percent credit, 100%

16. Office of Naval Research, "Flame Spread Modeling Over Composite Structures using Fully-Coupled Fluid-Structure Simulations," $408,240, 9/2006-9/2010, PI: P. E. DesJardin, Percent credit: 100%.

17. National Science Foundation, "CAREER: High Fidelity Numerical Simulation of Fire Suppression", 1/2004-5/2010, $406,064, PI: P. E. DesJardin, Percent credit: 100%.

18. Sandia National Laboratories, "Equation of State Modeling for Post-Detonation Products of Aluminized Explosives", 5/1/2007-10/1/2007, $25,777, PI: P. E. DesJardin, Percent credit: 100%.

19. Office of Naval Research, "Fluid-Structure Modeling for Wall Fires using Large Eddy Simulation", 4/30/2003-9/30/2006, $318,623, PI: P. E. DesJardin, Percent credit: 100%.

20. Sandia National Laboratories, "Numerical Modeling and Simulation of Two-Phase Metalized Combustion Systems", 8/26/2002-9/30/2006, $328,452, PI: P. E. DesJardin, Percent credit: 100%.

PUBLICATIONS (Boldface authors indicate current or former students)

Book Chapters

1. DesJardin, P.E., **Shihn, H. and Carrara, M. D.** "Combustion Subgrid Scale Modeling for Large Eddy Simulation of Fires," Transport Phenomena of Fires, editors: B. Sunden and M. Faghri, WIT Press, UK, (2008).

2. **Luo, C., Xie, W.** and DesJardin, P. E., "Fluid-Structure Simulations of Composite Material Response for Fire Environments," Chapter 7 in Modeling of Naval Composite Structures in Fire, editors: L. Couchman and A. P. Moritz, ISBN 0-646-46193-1, pp. 255-279, (2006).

3. DesJardin, P.E., and Frankel, S.H., "Large Eddy Simulation of a Nonpremixed Reacting Jet: Effects of Soot and Radiation," in Advances in DNS/LES, editors: C. Liu and Z. Liu, Greyden Press, pp. 605-613 (1997).

4. DesJardin, P.E., Zimberg, M.J. and Frankel, S.H., "Towards Large Eddy Simulation of Strongly Radiating Turbulent Diffusion Flames," in Advanced Computation & Analysis of Combustion, editors: G.D. Roy, S.M. Frolov and P. Givi, ENAS Publishers, pp. 503-519 (1997).

Journal Articles

1. **Richter, J.P., Weisberger, J.M.,** Mollendorf, J.C., DesJardin, P.E., "Predictions of Non-Homogeneous Biomass Fuel Decomposition using Emission Measurements," (in review) *Renewable Energy*, (2017).

2. **Bojko, B. T.** and DesJardin, P.E., "On the development and application of a droplet flamelet-generated manifold for use in two-phase turbulent combustion simulations," *Combustion and Flame*, 183, pp. 50-65 (2017).

3. **Richter, J.P., Weisberger, J.M.,** Mollendorf, J.C., DesJardin, P.E., "Emissions from a domestic two-stage wood-fired hydronic heater: effects of non-homogeneous fuel decomposition," (in press) *Renewable Energy*, (2017).

4. DesJardin, P.E., **Bojko, B.T.** and **McGurn, M.T**., "Initialization of High-Order Accuracy Immersed Interface Based CFD Solver using Complex CAD Geometry," *J. Num. Methods Eng.,* 109(4), pp. 487-513 (2017).

5. **Richter, J.P.,** Mollendorf, J.C. and DesJardin, P.E., "Absolute and Relative Emissions Analysis in Practical Combustion Systems – Effect of Water Vapor Condensation," *Measurement Science and Technology*, 27(11), pp. 117002 (2016).

6. **Bojko, B.T.** and DesJardin, P.E., "Formulation and Assessment of Flamelet-Generated Manifolds for Reacting Interfaces," *Combustion and Flame*, 173, pp. 296-306 (2016).

7. **Richter, J. P., Bojko, B. T.,** Mollendorf, J. C. and DesJardin, P.E., "Characterization of Fuel Burn Rate, Emissions and Thermal Efficiency of a Two-Stage Wood-Fired Hydronic Heater," *Renewable Energy*, 96, pp. 400-409 (2016).

8. **Weisberger, J. M.,** DesJardin, P.E., MacLean, M., Parker, R. and Carr, Z., "Near-Surface CO2 Tunable Diode Laser Absorption Spectroscopy Concentration Measurements in the LENS-XX Expansion Tunnel Facility," *J. of Spacecraft and Rockets*, 52(6), pp. 1551-1562 (2015).

9. **Bojko, B. T**., DesJardin, P.E. and Washburn, E. B., "Modeling the Diffusion Limit of Micron-Sized Aluminum Particles," *Combustion and Flame*, 161, pp. 3211-3221 (2014).

10. **Sisti, J.** and DesJardin, P.E., "A Semi-Analytical, Multizone Model of Droplet Combustion with Varying Properties," *Combustion Theory and Modelling*, 17(4), pp. 657-681, (2013).

11. **McGurn, M.T., Ruggirello, K.P.** and DesJardin, P.E., "A 3D Eulerian-Lagrangian Moving Immersed Interface Method for Simulating Burning Solids," *J. Comp. Phys.*, 241, pp. 364-387, (2013).

12. MacLean, M., Marineau, E., Parker, R., Dufrene, A., Holden, M. and DesJardin, P.E., "Effect of Surface Catalysis on Measured Heat Transfer in an Expansion Tunnel Facility," *J. Spacecraft and Rockets*, 50(2), pp. 470-475, (2013).

13. **Ruggirello, K.P.,** DesJardin, P.E., Kaneshige, M. Baer, M. R. and Hertel, E. S., "A Reaction Progress Variable Modeling Approach for Non-Ideal Multiphase Explosives," *Int. J. Multiphase Flows*, 42, pp. 128-151, (2012).

14. **Luo, C**., Lua, J. and DesJardin, P.E., "Thermo-Mechanical Damage Modeling of Polymer Matrix Composites in Fire," *Composites A*, 43A(5), pp. 814-821, (2012).

15. **McGurn, M.T.**, DesJardin, P.E., and Dodd, A. "Thermal Modeling of Swelling Carbon-Epoxy Materials for Fire Environments," *Int. J. of Heat and Mass Transfer*, 55, pp. 272-281, (2012).

16. **Khul, J.** and DesJardin, P.E., "Power Production Locality of Bluff Body Flutter Mills using Fully Coupled 2D Direct Numerical Simulation," *J. of Fluids and Structures*, 28, pp. 456-472 (2012).

17. Baer, M. R., Gartling, D.K. and DesJardin, P.E., "Probabilistic Models for Reactive Behavior in Heterogeneous Condensed Phase Media," *Combustion Theory and Modeling*, 16, pp. 75-106, (2012).

18. **Luo, C., Xie, W**. and DesJardin, P.E., "Fluid-Structure Simulations of Composite Material Response for Fire Environments," *Fire Technology*, vol. 47, no. 4, pp. 887-912 (2011).

19. **Ruggirello, K.**, DesJardin, P.E., Baer M.R. and Hertel, E.S., "Modeling of Particle Compressibility and Ignition from Shock-Shock Focusing," *Combustion Theory and Modeling*, 14, pp. 41-67, (2010).

20. **Godoy, W.** and DesJardin, P.E., "On the use of Flux Limiters in the Discrete Ordinates Method for 3D Radiation Calculations in Absorbing and Scattering Media," *J. Comp. Phys.*, 229, pp. 3189-3213 (2010).

21. Mouritz, A. P., Feih, S., Kandare, E., Mathys, Z., Gibson, A.G., DesJardin, P.E., Case, S.W. and Lattimer, B.Y., "Review of Fire Structural Modelling of Polymer Composites," *Composites*, 40, pp. 1800-1814 (2009).

22. **Xie, W.** and DesJardin, P.E., "An Embedded Upward Flame Spread Model using 2D Direct Numerical Simulation," *Combustion and Flame*, 156, pp. 522-530 (2009).

23. **Godoy, W.** and DesJardin, P.E., "Radiation Driven Evaporation for Polydisperse Water Sprays," *Int. J. of Heat and Mass Transfer*, 52, pp. 2893-2901 (2009).

24. **Xie, W.** and DesJardin, P.E., "A Level Set Embedded Interface Method for Conjugate Heat Transfer Simulation of Low Speed 2D Flows," *Computers and Fluids,* 37, pp. 1262-1275 (2008).

25. **Carrara, M. D.** and DesJardin, P.E**.**, "A Filtered Mass Density Function Approach to Modeling Separated Two-Phase Flows Using LES II: Simulation of a Droplet Laden Temporally Developing Mixing Layer," *Int. J. of Multiphase Flows*, 34, pp. 748-766 (2008).

26. Glaze, D. J., Yoon, S. S., Hewson, J. C., DesJardin, P.E., "Modeling Transport Phenomena of High Mass Loadings with Applications to Fire Suppression," *Numerical Heat Transfer, Part B*, 53, pp. 118-142 (2008).

27. **Godoy, W**. and DesJardin, P.E., "Efficient Calculation of Transmission Calculations for Polydisperse Water Sprays Using Spectral Scaling", *J. of Quant. Spec. Rad. Trans.*, 108, pp. 440-453 (2007).

28. Yoon**,** S. S., Kim, H. Y., Hewson, J. C., Suo-Antilla, J. M., Glaze, D. J. and DesJardin, P. E., "A Modeling Investigation of Suppressant Distribution from a Prototype Solid-Propellant Gas-Generator Suppression System into a Simulated Aircraft Cargo Bay," *Dying Technology*, 25, pp. 1021-1033 (2007).

29. **Shihn, H.** and DesJardin, P.E., "Near-Wall Modeling of a Heated Vertical Wall Using One-Dimensional Turbulence", *Int. J. of Heat and Mass Transfer*, 50, pp. 1314-1327 (2007).

30. **Luo, C.** and DesJardin, P.E., "Thermo-mechanical Damage Modeling of a Glass-Phenolic Composite Material", *Composites Science and Technology*, 67, pp. 1475-1488 (2007).

31. Yoon, S. S., DesJardin, P. E., Hewson, J. C., Tieszen, S. R. and Blanchat, T. K., "Unsteady RANS Modeling of Water Spray Suppression for Large Scale Compartment Pool Fires," *Atomization and Sprays*, 17, pp. 1-45 (2007).

32. Yoon, S. S., DesJardin, P. E., "Modeling Spray Impingement using Linear Stability Theories for Droplet Shattering," *Int. J. Numerical Methods in Fluids*, 50(4), pp. 469-489, (2006).

33. **Carrara, M. D**. and DesJardin, P. E., "A Filtered Mass Density Function Approach to Modeling Separated Two-Phase Flows Using LES I: Mathematical Formulation," *Int. J. of Multiphase Flows*, **32**, pp. 365-384, (2006).

34. Yoon, S. S., DesJardin, P. E., Hewson, J. C., Presser, C. and Avedisian, C. T., "Numerical Modeling and Experimental Measurements of Water Spray Impact and Transport Over a Cylinder," *Int. J. Multiphase Flows*, 32, pp. 132-157, (2006).

35. DesJardin, P.E., "Modeling of Conditional Dissipation Rate for Flamelet Models with Application to Large Eddy Simulation of Fire Plumes," *Combust. Sci. and Tech.*, 177, pp. 1881-1914, (2005).

36. DesJardin, P.E., Felske, J. D. and **Carrara, M. D.** "Mechanistic Model for Aluminum Particle Ignition and Combustion," *J. of Propulsion and Power*, 21(1), pp. 1-8 (2005).

37. Yoon, S. Hewson, J. C., DesJardin, P. E., Glaze, D. J., Black, A. R. and Skaggs, R. R., "Numerical Modeling and Experimental Measurements of a High Speed Solid-Cone Water Spray for use in Fire Suppression Applications," *Int. J. Multiphase Flows*, 30, pp. 1369-1388 (2004).

38. DesJardin, P.E., O'Hern, T. J. and Tieszen, S. R., "Large Eddy Simulations and Experimental Measurements of the Near Field of a Large Helium-Air Plume," *Phys. of Fluids*, 16, pp. 1866-1883 (2004).

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15. **Weisberger, J.,** DesJardin, P.E., MacLean, M., Parker, R. and Carr, Z. "Near-Surface CO2 Tunable Diode Laser Absorption Spectroscopy Concentration Measurement in the LENS-XX Expansion Tunnel Facility," AIAA SciTech 2016, San Diego, CA, Jan. 3-8 (2016).

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18. **Ruggirello, K.P.**, DesJardin, P.E., Baer, M. R., Kaneshige, M.J. and Hertel, E.S., "A Reaction Progress Variable Modeling Approach Non-Ideal Explosives," 50th AIAA Aerospace Sciences Meeting (2012), Nashville TN, Jan. 9-12 (2012).

19. **McGurn, M.T**., DesJardin, P.E., "Modeling the Thermal Response of Aerospace Composites to Fire Environments," 50th AIAA Aerospace Sciences Meeting (2012), Nashville TN, Jan. 9-12 (2012).

20. MacLean, M., Marineau, E., Parker, R., Dufrene, A., Holden, M., DesJardin, P.E. "Effect of Surface Catalysis on Measured Heat Transfer in an Expansion Tunnel Facility," 50th AIAA Aerospace Sciences Meeting (2012), Nashville TN, Jan. 9-12 (2012).

21. **McGurn, M.T.,** DesJardin, P.E., Dodd, A.B., "Thermal Modeling of Carbon-Epoxy Laminates in Fire Environments," 10th Int. Symp. on Fire Safety Science, Univ. of Maryland, June 20-24, (2011).

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24. **McGurn, M.**, DesJardin, P.E., Goodrich, T., Lattimer, B.Y. and Lua, J. "Thermal Modeling of Balsa Wood for Fire Environments," Society for the Advancement of Material and Process Engineering (SAMPE) Symposium & Exhibition, Baltimore, MD, May 18-21 (2009).

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49. **Richter, J. P., Bojko, B.T**., Mollendorf, J. C. and DesJardin, P.E., "Measurements of Fuel Burn Rate, Emissions and Thermal Efficiency from a Domestic Two-Stage Wood-Fired Hydronic Heater," Eastern Section Meeting of the Combustion Institute, Princeton, NJ, March 13-16, (2016).

50. **Weisberger, J. M.** and DesJardin, P.E., "Tunable Diode Laser Absorption Spectroscopy for CO_2, H_2O and Soot Concentration Measurements in Biomass Combustion Systems," Eastern Section Meeting of the Combustion Institute, Princeton, NJ, March 13-16, (2016).

51. **Bojko, B. T., Richter, J. P** and DesJardin, P.E., "A Reaction Progress Variable Modeling Description for Biomass Combustion," Eastern Section Meeting of the Combustion Institute, Princeton, NJ, March 13-16, (2016).

52. **Sisti, J.** and DesJardin, P.E., "A Semi-Analytical Variable Property Droplet Combustion Model," Combustion Institute, US National Meeting, Salt Lake City, UT, May 19-22, (2013).

53. **Bojko, B. T.**, DesJardin, P.E. and Washburn, E. B. "Modeling Transitional Burning Modes of Aluminum Particles," Combustion Institute, US National Meeting, Salt Lake City, UT, May 19-22, (2013).

54. DesJardin, P. E., "Multiscale Modeling of Post-Detonation Ignition for Al Particle," SHAMRCK DTRA workshop, Santa Fe, NM, June 28-July 2nd (2010).

55. DesJardin, P. E., **Xie, W.** and **Luo, C**., "Flame Spread Modeling for Composite Panels," ONR Fire Research Workshop, Washington, D.C., February 5-6 (2009).

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58. **Ruggirello, K.** and DesJardin, P.E., "Post Detonation Dispersal and Ignition of Aluminized Explosives," Combustion Institute / Canadian Section, Spring Technical Meeting, Toronto, Canada, May 11-14, (2008).

59. **Xie, W.** and DesJardin, P.E., "New Insights into Upward Flame Spread using 2D Direct Numerical Simulations," Combustion Institute / Canadian Section, Spring Technical Meeting, Toronto, Canada, May 11-14, (2008).

60. **Xie, W**. and DesJardin, P.E., "Numerical Simulation of Concurrent Flame Spread Over PMMA Slab with Different Thicknesses and Orientations," 9th U.S. National Congress on Computational Mechanics (USNCCM IX), San Francisco, CA**,** July 23-26 (2007).

61. **Luo, C.** and DesJardin, P.E., "Thermo-mechanical Damage Modeling for Composite Materials," 9th U.S. National Congress on Computational Mechanics (USNCCM IX), San Francisco, CA**,** July 23-26 (2007).

62. DesJardin, P. E., "Fire Protection Opportunities for Next Generation Buildings using Sensor Technology," Joint US-Japan Workshop on Next Generation Buildings, Honolulu, HI, Feb. 26-27, (2007).

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68. **Shihn, H.** and DesJardin, P.E., "Simulation of a Vertical Wall Fires with One-Dimensional Turbulence Modeling", Combustion Institute / Canadian Section, Spring Technical Meeting, Kingston, Ontario, Canada, May 9-12, (2004).

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71. **Aranha, R.S.** and DesJardin, P.E**.**, "Flow Instability Dynamics of Helium Plumes," IMECE paper International Mechanical Engineering Congress and Exposition, Washington, D.C., November 11-16 (2003)

72. DesJardin, P.E., "On the Modeling of the Flamelet Model Conditional Dissipation Rate for use in LES of Pool Fires," 3rd Joint Meeting of the U.S. Sections of the Combustion Institute, Chicago, IL, March 16-19 (2003).

73. Smith, T., Shadid, J., DesJardin, P.E. and Lin, P., "Large-Eddy Simulation of a Pool Fire Using a Galerkin Least-Squares Finite-Element Method," Computational Methods for Multidimensional Flows Conference, Heidelberg, Germany, December 2-4 (2002) .

74. Bell, R. and DesJardin, P.E., "CTH Time Step Modification Based on Pressure Gradient Scaling," Fourth Biennial Tri-Laboratory Engineering Conference on Computational Modeling, Albuquerque, NM, October 22-24 (2001).

75. DesJardin, P.E., Tiesen, S.R., Shienson, R., Maranghides, A. and Ayers, S., "Pool Fire Numerical Simulation and Modeling of Water Spray Suppression," Water Mist Fire Suppression Workshop, Colorado School of Mines, Golden, CO, October 10-11 (2001).

76. DesJardin, P.E., Roy, C.J. and Smith, T.M. "Large Eddy Simulation of a Turbulent Reacting Plume," International Conference on Numerical Combustion, Amalia Island, FL, March 5-8 (2000).

77. DesJardin, P.E., "Large Eddy Simulation of a Buoyant Turbulent Plume," APS Fluid Dynamics Meeting, New Orleans, LA, November 19-24 (1999) .

78. DesJardin, P.E. and Frankel, S.H., "Large Eddy Simulation of Soot Formation in a Strongly Radiating Nonpremixed Acetylene-Air Jet Flame using Parallel Computations," Central States Section of the Combustion Institute, KN, June (1998).

79. DesJardin, P.E. and Frankel, S.H., "A New Subgrid-Scale Combustion Model for Large Eddy Simulation," APS Fluid Dynamics Meeting, San Francisco, CA, November 23-25 (1997) .

80. DesJardin, P.E. and Frankel, S.H., "Large Eddy Simulation of a Nonpremixed Reacting Jet: Effects of Soot and Radiation," First AFOSR International Conference on DNS/LES (FAICDL), Ruston, LA, August 4-8 (1997) .

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83. DesJardin, P.E. and Frankel, S.H., "Numerical Simulations and Modeling of Homogeneous and Nonhomogeneous Turbulent Reacting Flows: SLFM and CMC Validity," Joint Central, Western, and Mexican Sections of the Combustion Institute, San Antonio, TX, April 23-26 (1995) .

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86. DesJardin, P.E. and Frankel, S.H., "Numerical Validations of Turbulent Combustion Submodels," Central Section Meeting of the Combustion Institute, Madison, WI, June 5-7 (1994).

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87. DesJardin, P.E., Baer, M.R., Bell, R. L. and Hertel, E. S. "Towards Numerical Simulation of Shock Induced Combustion using Probability Density Function Approaches," Sandia National Laboratories Technical Report, SAND2002-2175 (2002).

88. DesJardin, P.E. and Gritzo, L.A., "A Dilute Spray Model for Fire Simulations: Formulation, Usage and Benchmark Problems," Sandia National Laboratories Technical Report, SAND2002-3419 (2002).

89. Schmidt, R. C., Smith, T.M., DesJardin, P.E., Voth, T.E., Christon, M.A., Kerstein, A.R. and Wunsch, S.E., "On the Development of the Large Eddy Simulation Approach for Modeling

Turbulent Flow: LDRD Final Report," Sandia National Laboratories Technical Report , SAND2002-0807 (2002).

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INVITED TALKS

1. "Emission Sensitivity to Non-homogeneous Fuel Decomposition," Symposium on Reducing Emissions from Residential Wood Heating – Albany, NY, November 30, (2016).

2. "Modeling Transitional Burning Modes of Aluminum Particles," US/France DEA Working Group 1 Meeting, Naval Air Warfare Center Weapons Division – China Lake, China Lake, CA, September 23-24, (2013).

3. "New Insights into Upward Flame Spread using High Fidelity Numerical Simulations," University of Maryland, Department of Fire Protection Engineering, October 25th, (2013)

4. "Multi-scale Modeling of Non-Ideal Multiphase Explosives," Naval Air Warfare Center Weapons Division – China Lake, China Lake, CA, September 17th, (2012).

5. "New Insights into Flame Spread Phenomena using Direct Numerical Simulation," Brigham Young University, Department of Chemical Engineering, March 15th, (2012).

6. "Coupled Fluid Structure Simulations of Thermal and Mass Transport for Fire Environments," Sandia National Laboratories, Albuquerque, NM, June 25th (2010).

7. "Energy Transport in Chemically Reactive Systems," Buffalo Niagara Investor / Entrepreneurship Forum, NYS Center of Excellence in Bioinformatics and Life Sciences, SUNY Buffalo, May 14th, (2009).

8. "Modeling, Simulation and Computing for Abnormal Thermal-Mechanical Environments," Workshop on information, computing and technology (ICT day), SUNY Buffalo, May 1st, (2009).

9. "Multiscale Modeling of Turbulent Two-Phase Reactive Flows using Large Eddy Simulation," University at Buffalo, Department of Chemical and Biological Engineering, January 28th (2009).

10. "Large Eddy Simulation of Two-Phase Reactive Flows," Argonne National Laboratories, Argonne, IL, August 21st (2008).

11. "New Challenges in Flame Spread Modeling for Fire Environments," University of New Castle, New Castle, UK, April 26, (2007).

12. "Fire Challenges, Opportunities and Considerations for Next Generation Buildings," NSF sponsored US-Japan Workshop on Next Generation Buildings, Honolulu, HA, February 26-27, (2007).

13. “Numerical Simulation of Fire Phenomena,” University at Buffalo, Civil, Structure and Environmental Engineering, Buffalo, NY, November 10, (2006).

14. “High Fidelity Numerical Simulation of Fire Phenomena: Plume Dynamics and Fluid-Structure Modeling,” Virginia Polytechnic Institute and State University, Blacksburg, VA, March 15, (2006).

15. “Large Eddy Simulation of Fire Phenomena and Coupled Structure Response”, FM Global, Johnson, RI, February 27-28, (2006).

16. “Numerical Simulation of Composite Structure Response from a Fire Plume,” 4th International Conference on Composites in Fire, New Castle, England, September 15-16 (2005).

17. “Modeling Smoke and Fire Transport using Large Eddy Simulation ,” Tongji University, Shanghai, China, May 23 (2005).

18. “State-of-the-Art Understanding of Fire and Smoke Transport and its Implications to Mitigation,” US-PRC Workshop on Multi-Hazard Resilient Mass Assembly Buildings, Guangdong, Hotel, Shanghai, China, May 21-22 (2005).

19. “Numerical Simulation of Composite Structure Response from a Fire Plume,” Solid Propellant Hazard Issues Meeting at the Air Force Research Laboratories (AFRL), Edwards Air Force Base, CA, May 17 (2005).

20. “Towards LES Model Validation using FLAME Facility Test Data from the Methane and JP-8 Pool Fire Test Series,” Workshop on Heat Transfer in Pool Fires, Combustion Research Facility, Sandia National Laboratories, Livermore, CA, April 12 (2005).

21. “Composite Structure Response in a Fire,” as part of the Grand Challenges for Fire and Combustion Panel in the International Mechanical Engineering Congress and Exposition, Anaheim, CA, November 13-19 (2004).

22. “Dilute Spray Modeling for Fire Suppression,” Sandia National Laboratories, Albuquerque, NM, January 8th (2003).

23. “Fire Plume Dynamics using Large Eddy Simulation,” New Jersey Institute of Technology, Newark, NJ, October 2nd (2002).

24. “Numerical Simulation and Subgrid Modeling for Application to Fire Phenomena”, State University of New York at Buffalo, Buffalo, NY, November 1st (2001).

25. “Large Eddy Simulation of a Large Buoyant Helium Plume,” Purdue University, West Lafayette, IN October 25th (2000).