

**Alina A. Alexeenko**  
Curriculum Vitae

**Personal Information**

School of Aeronautics & Astronautics  
Neil Armstrong Hall of Engineering  
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**Education**

B.S.	1997	Mathematics	Novosibirsk State University
M.S.	1999	Applied Mathematics	Novosibirsk State University
Ph.D.	2003	Aerospace Engineering	Pennsylvania State University

**Professional Experience**

*Assistant Professor*, School of Aeronautics and Astronautics, Purdue University, August 2006 – present

*Postdoctoral Scholar*, Department of Aerospace and Mechanical Engineering, University of Southern California, July 2004 – July 2006

*Consultant*, ERC Inc., Edwards Air Force Base, January 2004 – March 2006

*Research Assistant*, Department of Aerospace Engineering, The Pennsylvania State University, August 2000 – December 2003

*Research Assistant*, Department of Chemistry, George Washington University, August 1999 – July 2000

*Senior Laboratory Assistant*, Computational Aerodynamics Laboratory, Khristianovich Institute of Theoretical and Applied Mechanics, Siberian Branch of Russian Academy of Sciences, January 1998 – June 1999

**Honors/Awards**

Purdue University College of Engineering Team Excellence Award (2009)

American Society for Engineering Education /Air Force Faculty Fellow (2007)

Sun Microsystems Inc. Academic Excellence Grant (2007)

Women in Science and Engineering (WiSE) Postdoctoral Fellowship (2004 – 2006)

Zonta International Foundation Amelia Earhart Award (2003)

**Research Areas**

Computational rarefied gas dynamics, vacuum gas dynamics

**Publications**

***Refereed Journal Publications***

1. A.A. Alexeenko, D.A. Levin, S.F. Gimelshein, R.J. Collins, G.N. Markelov, G.N.,  
“Numerical Simulation of High-Temperature Gas Flows in a Millimeter-Scale

- Thruster,” *Journal of Thermophysics and Heat Transfer*, Vol. 16, No. 1, 2002, pp. 10–16.
2. S.F. Gimelshein, A.A. Alexeenko, D.A. Levin, “Modeling of the Interaction of a Side Jet with a Rarefied Atmosphere,” *Journal of Spacecraft and Rockets*, Vol. 39, No. 2, 2002, pp. 168–176.
  3. A.A. Alexeenko, N.E. Gimelshein, D.A. Levin, R.J. Collins, R. Rao, G.V. Candler, S.F. Gimelshein, J.S. Hong, T. Schilling, “Modeling of Flow and Radiation in the Atlas Plume,” *Journal of Thermophysics and Heat Transfer*, Vol. 16, No. 1, 2002, pp. 50–57
  4. A.A. Alexeenko, R.J. Collins, S.F. Gimelshein, D.A. Levin, B.D. Reed, “Numerical Modeling of Axisymmetric and Three-Dimensional Flows in MEMS Nozzles,” *AIAA Journal*, Vol. 40, No. 5, 2002, pp. 897–904.
  5. A.A. Alexeenko, S.F. Gimelshein, D.A. Levin, A.D. Ketsdever, and M.S. Ivanov, “Measurements and Simulation of Orifice Flow for Micropropulsion Testing,” *Journal of Propulsion and Power*, Vol. 19, No. 4, 2003, pp. 588–594.
  6. S.F. Gimelshein, D.A. Levin, A.A. Alexeenko, “Modeling of Chemically Reacting Flows from a Side Jet at High Altitudes,” *Journal of Spacecraft and Rockets*, Vol. 41, No. 4, 2004, pp. 582–591.
  7. A.A. Alexeenko, D.A. Levin, D.A. Fedosov, S.F. Gimelshein, “Performance Analysis of Microthrusters Based on Coupled Thermal-Fluid Modeling and Simulation,” *Journal of Propulsion and Power*, Vol. 21, No. 1, 2005, pp. 95–101.
  8. A.D. Ketsdever, M. Clarbough, S.F. Gimelshein, A.A. Alexeenko, “Experimental and Numerical Determination of Micropropulsion Device Efficiencies at Low Reynolds Numbers,” *AIAA Journal*, Vol. 43, No. 3, 2005, pp. 633–641.
  9. A.A. Alexeenko, S.F. Gimelshein, D.A. Levin, “Reconsideration of Low Reynolds Number Flows through Constriction Microchannels using the DSMC Method,” *Journal of Microelectromechanical Systems*, Vol. 14, No. 4, 2005, pp. 847–865.
  10. A.A. Alexeenko, D.A. Fedosov, S.F. Gimelshein, D.A. Levin, “Transient Heat Transfer and Gas Flow in a MEMS-based Thruster,” *Journal of Microelectromechanical Systems*, Vol. 15, No. 1, Feb. 2006, pp. 181–194.
  11. A.A. Alexeenko, S.F. Gimelshein, E.P. Muntz, A.D. Ketsdever, “Kinetic Modeling of Temperature-Driven Flows in Short Microchannels,” *International Journal of Thermal Sciences*, Vol. 45, No. 11, Nov. 2006, pp. 1045-1051.
  12. Y.-L. Han, E.P. Muntz, A.A. Alexeenko, M. Young, “Experimental and Computational Studies of Temperature Gradient Driven Molecular Transport in Gas Flows through Nano/Micro-Scale Channels”, *Nanoscale and Microscale Thermophysical Engineering*, Vol. 11, No. 1&2, Apr. 2007, pp. 151-175.
  13. W.F. Louisos, A.A. Alexeenko, D.L. Hitt, A. Zilic, Design Considerations for Supersonic Micronozzles, *International Journal of Manufacturing Research*, Vol. 3, No. 1, 2008, pp. 80-113.

14. X. Guo\*, C. Huang, A. Alexeenko, J. Sullivan, "Numerical and Experimental Study of Gas Flows in 2D and 3D Microchannels," *Journal of Micromechanics and Microengineering*, Vol. 18, No. 2, February 2008, 025034. Also in *IOP Select*, a free service from Institute of Physics (IOP) journals "comprising articles chosen by editors for their novelty, significance and potential impact on future research," and in *JMM Highlights of 2008*, "a showcase of the top contributions published in 2008."
15. W. B. Stein\*, A. Alexeenko, I. Hrbud, "Performance Modeling of a Coaxial Radio-Frequency Gas Discharge Microthruster," *Journal of Propulsion and Power*, Vol. 24, No. 5, September-October 2008, pp. 1007-1017.
16. N. Selden, C. Ngalande, S. Gimelshein, E.P. Muntz, A. Alexeenko, A. Ketsdever, "Area and Edge Effects in Radiometric Forces", *Physical Review E*, Vol. 79, 041201, April 2009.
17. X. Guo\* and A. Alexeenko, "Compact Model of Squeeze-Film Damping based on Rarefied Flow Simulations," *Journal of Micromechanics and Microengineering*, Vol. 19, 045026, April 2009.
18. R. Bidkar, R. Tung, A. Alexeenko, H. Sumali, A. Raman, "Unified Theory of Gas Damping of Flexible Microcantilevers at Low Ambient Pressures," *Applied Physics Letters*, Vol. 94, 163117, April 2009.
19. D. Singh, X. Guo\*, A. A. Alexeenko, J.Y. Murthy, and T.S. Fisher, "Modeling of Subcontinuum Thermal Transport Across Semiconductor-Gas Interfaces," *Journal of Applied Physics*, Vol. 106, 024314 (2009).
20. A. Alexeenko, A. Ganguly\* and S. L. Nail, "Computational Analysis of Fluid Dynamics in Pharmaceutical Freeze-Drying," *Journal of Pharmaceutical Sciences*, Vol. 98 (9), pp. 3483-3494, September 2009.
21. X. Guo\*, D. Singh, J. Murthy, and A. A. Alexeenko, "Numerical Simulation of Gas-phonon Coupling in Thermal Transpiration Flows", *Physical Review E*, Vol. 80, 046310 (2009).
22. S. Chigullapalli\*, V. Ayyaswamy\*, M.S. Ivanov, and A.A. Alexeenko, "Entropy Considerations in Numerical Simulation of Non-Equilibrium Rarefied Flows", accepted to *Journal of Computational Physics*, November 2009.

### **Conference Proceedings**

40+ papers in conferences and symposia. See [Addendum](#) for a complete list.

### **Patent**

W. Stein, A. Alexeenko, I. Hrbud, D. Hitt, "Method of Enhancing Microthruster Performance". U.S. Utility Patent Application No. 61/127,553 filed May 14, 2009.

### **Software & Online Tools**

1. Co-Developer, "SMILE: Statistical Modeling in Low-Density Environment." A general purpose 2D/3D parallel DSMC solver.

\* Denotes graduate student author

2. Author and Developer, “Gas Dynamics Toolbox”:  
<http://web.ics.purdue.edu/~alexenk/GDT>
3. Co-Author, “Q-UQ: Q-factor Calculator with Uncertainty Quantification”:  
<http://nanohub.org/resources/6759>

### **Courses Taught**

1. AME599, Introduction to Numerical Gas Kinetics (USC), Spring 2006.
2. AAE590D, Molecular Gas Dynamics, Fall 2007, Fall 2008, Fall 2009.
3. AAE333, Introduction to Fluid Mechanics, Spring 2007, Fall 2007, Spring 2008, Fall 2008.

### **Graduate Advisees**

William Stein (Ph.D. '08, co-advisor: I. Hrbud; thesis: “*Performance Characterization of a RF Capacitively Coupled Discharge Microthruster*”; now at NASA Marshall)  
Xiaohui Guo (Ph.D. '09; thesis: “*Investigations of Microscale Fluid-Thermal Phenomena Based on the Deterministic Boltzmann-ESBGK Model*”; now at Intel, Scottsdale, AZ),  
Sruti Chigullapalli (M.S. '08; thesis: “*Application of High-Order Numerical Schemes for the Boltzmann Transport Equations to Non-Equilibrium Flows*”; now at Purdue)  
Venkattraman Ayyaswamy (M.S. '09; thesis: “*Simulations of Low-Density Gas Droplet Supersonic Flows Expanding into Vacuum*”; now at Purdue)

Arnab Ganguly (M.S., expected May 2010)  
Jeremy Nabeth (M.S., expected May 2010)  
Andrew Weaver (M.S., expected May 2010)  
Sruti Chigullapalli (Ph.D., expected May 2011)  
Venkattraman Ayyaswamy (Ph.D., expected May 2012)

### **Professional Activities**

#### ***Society Affiliations***

American Institute of Aeronautics and Astronautics (AIAA), 1999 – present.  
Society for Women Engineers (SWE), 2004 – 2007.  
American Association for Advancement of Science (AAAS), 2004 – present.  
American Vacuum Society (AVS), 2007 – present.

#### ***Professional / Technical Committee Positions***

AIAA Thermophysics Technical Committee (TPTC): Member, 2007 – present; Liaison to Fluid Dynamics Technical Committee, 2008 – present; Member, Awards Subcommittee, 2009 – present.  
Educational Coordinator, National Nuclear Security Administration (NNSA) Center for Prediction of Reliability, Integrity and Survivability of Microsystems (PRISM), Purdue University, 2008 – present.