THE UNIVERSITY OF TEXAS AT AUSTIN
Cockrell School of Engineering
Resume

FULL NAME: **David B. Goldstein** **TITLE:** **Professor**

ENDOWED POSITION: **Hayden Head Centennial Professor**

DEPARTMENT: **Aerospace Engineering and Engineering Mechanics**

EDUCATION:

Princeton University	Mechanical-Aerospace Engineering/Physics	B.S.E.	1984
California Institute of Technology	Aeronautics	M.S.	1985
California Institute of Technology	Aeronautics	Ph.D.	1989

CURRENT AND PREVIOUS ACADEMIC POSITIONS:

Research Assistant, Aeronautics, California Institute of Technology, September 1984 - June 1989.
Teaching Assistant, Aeronautics, California Institute of Technology, September 1986 - June 1988.
Research Fellow, Aeronautics, California Institute of Technology, 1990.
Research Associate, Applied Math, Brown University, October 1990 - August 1992.
Assistant Professor, Department of Aerospace Engineering and Engineering Mechanics, The University of Texas at Austin, January 1993-August 1999.
Associate Professor, Department of Aerospace Engineering and Engineering Mechanics, The University of Texas at Austin, September 1999-August 2005.
Professor, Department of Aerospace Engineering and Engineering Mechanics, The University of Texas at Austin, September 2005-present.

OTHER PROFESSIONAL EXPERIENCE:

Engineering Assistant, Combustion Engineering Company, Summer 1981.
Engineering Assistant, Grumman Aerospace Company, Summer 1983.
Visiting Researcher, Mitsubishi Heavy Industries, Advanced Technology Research Center, Yokohama, Japan, September 1992 - December 1992
Lady Davis Visiting Professor, Asher Space Research Institute, Technion, Haifa, Israel, 2000.
Visiting Professor, Southwest Research Institute, September 2014
Visiting Professor, Caltech, October 2014

CONSULTING:

Wolk & Genter, Philadelphia, PA, 2002-06
Fireaway LLC, 2007

MEMBERSHIPS IN PROFESSIONAL AND HONORARY SOCIETIES:

Member, American Physical Society
Associate Fellow, American Institute for Aeronautics & Astronautics
Member, American Astronomical Society

PROFESSIONAL SOCIETY AND MAJOR GOVERNMENTAL COMMITTEES, EDITORIAL BOARDS, AND CONFERENCES ORGANIZED/CHAIRED:

Outside Committees

Member, AIAA Thermophysics Technical Committee, 1996-2009; No-Show Subcommittee (1999), Chairman, Publications Subcommittee (1999-2004), Best Paper Sub-committee, 2006-2009.
Chairman, AFOSR Flow Control Modeling & Experiments Sub-committee, 2002-03

Member, AIAA Fluid Dynamics Technical Committee, 2010-2013. Non-equilibrium flow working group, 2011-2015, Fluids Conf. Subcommittee, CFD Subcommittee, Thermophysics TC liaison.

Recent Conference Activities

Session Chair (several sessions), AIAA Aerospace Sciences Meeting, Reno, NV, Jan. 2006.
Session Chair (several sessions), AIAA Flow Control Meeting, San Francisco, CA, June 2006.
Session Chair (two sessions), AIAA Aerospace Sciences Meeting, Reno, NV, Jan. 2007.
Session Chair (one session), AIAA Thermophysics Meeting, Miami, FL, June 2007.
Organized Invited Session, 26th Annual Rarefied Gas Dynamics Meeting, Kyoto, Japan, July 2008.
Chaired 2 sessions, AIAA Aerospace Sci. Mtg, Orlando and 1 session AIAA Thermophysics Mtg., San Antonio, June 2009.
Chaired 1 session, AIAA Aerospace Sci. Mtg, Orlando 2010.
Program Organizing Committee, Session Chair, 27th Rarefied Gas Dynamics Symposium, July 2010.
Chaired 1 session, AIAA Aerospace Sci. Mtg, Orlando 2011.
Associate Organizer & Session Chair, AIAA Fluid Dynamics 2011 Summer Conf., June 2011
Session Chair, DSMC11, DSMC Workshop, Sante Fe, NM, Sept. 2011
Session Chair (two sessions), AIAA Aerospace Sciences Meeting, Nashville, Jan 2012
Session Chair, DSMC Meeting, Sante Fe, Oct. 2013
Session Chair, AIAA Aerospace Sci. Mtg., Maryland, 2014

OTHER PROFESSIONAL HIGHLIGHTS:

Review Activities

Journal of the Astronautical Sciences
International Journal of Engineering Science
European Journal of Mechanics, B/Fluids
Communications in Numerical Methods in Engineering
Civilian Research & Development Foundation
Cornell Theory Center (Proposals)
NASA Planetary Atmospheres (Proposals)
Journal of Computational Physics
Journal of Fluid Mechanics
Physics of Fluids
AIAA Journal
Journal of Spacecraft and Rockets
Journal of Thermophysics & Heat Transfer
Icarus
Rarefied Gas Dynamics
Computer Methods in Applied Mechanics and Engineering
Experiments in Fluids
Journal of Fluids and Structures
Reviewer, proposals in NASA Planetary Geology and Geophysics, Planetary Atmospheres, Lunar Exploration SSERVI, and in the Outer Planets Research programs
External Reviewer, *new faculty hiring, UT Dept. of Civil engineering*
External Reviewer, *Israel Science Foundation*, 2010, 2011, 2015
External Reviewer, *Deutsche Forschungsgemeinschaft (German Research Foundation), 2012*
Reviewer, NASA Planetary Atmospheres Proposal Review Panel, Tucson, AZ, Sept. 22-14, 2006.
NASA Cassini Data Analysis Program proposal review panel member, Aug. 2-6, 2010.
NASA Science Team: LCROSS Impact Science Team, Launched June 17, 2009. Impact Oct. 9, 2009.
NASA Science Team: UVS Instrument Development Team for the flagship Jovian system JEO mission, 2011-2012, launch in 2025.
External Reviewer, *NASA Lunar Science Institute, SSERVI 2013.*

Invited Lectures/Keynote Addresses

Invited Lecture, 4th Liepmann-Ludwieg Seminar, Göttingen, Germany, June 1991.
Invited Lecture, University of Notre Dame, February 18, 1997.
Invited Lecture, Rafael Aircraft-Missiles Division, Haifa, Israel, August 3, 1998.
Invited Press Conference, American Geophysical Union Annual Meeting, Boston, June 4, 1999.
Invited Lecture, American Mathematical Society 1999 Meeting, Austin, October 1999.
Keynote Address, JPL Educators Online Workshop, Nov. 1999.
Invited Lecture, Rice University, February 2000.
Invited Lecture, Institute for Mathematics and its Applications, University of Minnesota, May 24, 2000.
Invited Lecture, Technion - Israel Institute of Technology, Nov. 13, 2000.
Invited Lecture, California Institute of Technology, November 9, 2001.
Invited Lecture, Math Department, UT-Austin, February 26, 2002.
Invited Lecture, TICAM, UT-Austin, October 22, 2002.
Invited Lecture, Engineering Department, Brown University, November 12, 2002.
Invited Lecture, SWRI, May 21, 2003.
Invited Lecture, Politecnico di Milano, Milan, Italy, June 3, 2003.
Invited Lecture, UT Astronomy seminar on 'Planets and Life', March 2, 2005.
Invited Lecture, Io Volcano Workshop, Boulder, CO, June 8, 2005.
Invited Lecture, DSMC Theory, Methods and Applications Meeting, Sante Fe, NM, Sept. 2005.
Invited Lectures, Kyoto University, Oct. 11, 2006.
Invited Lectures, Kyoto University, Oct. 18, 2006.
Invited Lecture, AIAA ASM Mtg., Orlando, 2009.
Invited Lecture and Paper, Stephani, K., Goldstein, D. and Varghese, P., AIAA ASM Mtg., Orlando, 2010.
Invited Lecture, EGUVS instrument development team, SWRI, San Antonio, Feb. 9, 2010.
Invited Lecture, Texas A & M University, Jan. 28, 2010.
Invited Lecture, California Institute of Technology, April 2, 2010.
Invited Lecture, California Institute of Technology, April 3, 2010.
Vollmer Fries Lecture in Aerospace Engineering, Rensselaer Polytechnic Institute, Oct. 19, 2011
Invited Lecture, LASP at the University of Colorado, Boulder, April 19, 2012.
Invited Lecutre, LRO-LAMP Science Team Mtg. & LRO-LADEE Ops. Coordination Mtg., June 12-14, 2013
Invited Lecture, Europa Plumes Mtg., JHU-APL, Columbia MD, June 2014
Invited Colloquium, SwRI, Boulder, Sept. 18, 2014
Invited Seminar, Mechanical and Civil Engineering, Caltech, Oct. 16, 2014.

UNIVERSITY COMMITTEES/ADMINISTRATIVE ASSIGNMENTS:

University

Member, Best Paper Committee, 2008
Member, Astronaut Scholarship Committee, 2011, 2013, 2014

College

Member, Graduate Student Recruitment Committee, 1993-95
Member, Engineering Library Committee, 1995-96
Member, Study Abroad Advisors, 1996-99
Member, Scholastic Appeals Committee, 1999-2000
Member, Engineering Awards Committee, 2000-2002
Member, Equal Opportunity in Engineering Committees, 2002-03
Member, Information Technology Committee, 2003-2006
Member, Strategic Planning Committee, 2009

Department

Member, Graduate Studies Committee, 1993+
Member, Ad-hoc Committee on Mathematics, 1995
Member, Laboratory Development Committee, 1997-2008

Member, Web Site Committee, 2000-2001
Chairman, Laboratory Development Committee, 2000-05
Chairman, Undergraduate Scholarships Committee, 2000-2006
Chairman, Undergraduate Lab Courses, 2000-2005
Chairman, Staff Awards Committee, 2007-2008
Chairman, Ocampo and Akella 3rd Year Review Committee, 2008
Member, Fluid Mechanics Curriculum Committee, 1993-present
Member, Fluid Dynamics Admissions Committee, 1993-present
Member, Qualifying Exam Committee, 1993-present
Member, ASE/EM Budget Council, 2005-present
Member, Fluid Mechanics New Faculty Recruiting Committee, 2008
Member, ABET Outcomes Committee, 2008-present
Chairman, Raja 3rd Year Review Committee, 2009
Chairman, Raman Promotion Review Committee , 2009-2010
Member, ASE/EM Technical Staff Committee, 2009-2010
Member, ABET Committee representing Fluids, 2009-2010
Chairman, Raja Promotion Review Committee, 2011
Chairman, Tinney 3rd Year Review Committee, 2011
Chairman, Technical Staff Committee, 2011
Member, Faculty Annual Review Committee, 2011, 2012
Member, Undergraduate Curriculum Committee, 2013
Member, Sirohi Promotion Review Committee, 2013
Chairman, Post Tenure Review Committee, 2013
Member, Humphreys Tenure Review Committee, 2014
Member, Curriculum Committee, 2013-2015
Chairman, Acikmese Third Year Review Comm., 2015
Member, Lu Tenure Review Committee, 2015

Administrative Assignments

AIAA Advisor, 1993-97
Fluid Dynamics Admissions Coordinator, 1994-98
Student Mentor – Freshman Group, Fall 2001
Fluids Group Representative, ABET Committee, 2002-04, 2014
Fluid Dynamics Coordinator, 2009-present
ASL Director, 2010
Graduate Advisor/GSC Chair, 2014-present

HONORS AND AWARDS:

URI Summer Research Award, 1993-94
Lady Davis Fellowship, Technion, Israel, Fall 2000.
Chevron Centennial Fellowship in Engineering No. 1, 2001-2012.
ASE/EM Departmental Teaching Award, 2002
Promotion to Professor, Dept. ASE/EM, effective Sept. 1, 2005.
Visiting Professor, Kyoto University, Oct. 7 – 21, 2006.
Hayden Head Centennial Professor, effective Sept. 1, 2012.
CSE Faculty Research Award, 2013 for autumn 2014

PUBLICATIONS:

Refereed Journal Publications

1. Goldstein, D. B., Sturtevant, B. and Broadwell, J. E., "Investigations of the Motion of Discrete-Velocity Gases," *Rarefied Gas Dynamics, Progress in Astronautics and Aeronautics*, Vol. 118, pp. 100-117, 1989.
2. Goldstein, D. B., "Near-Continuum Applications of a Discrete-Velocity Gas Model," *Rarefied Gas Dynamics*, pp. 846-853, VCH Verlagsgesellschaft, Germany, 1991.

3. Goldstein, D. B., "Discrete-Velocity Collision Dynamics for Polyatomic Molecules," *Physics of Fluids* A, Vol. 4, (8), pp. 1831-1839, August, 1992.
4. Goldstein, D. B., Handler, R. and Sirovich, L., "Modeling a No-Slip Flow Boundary with an External Force Field," *Journal of Computational Physics*, Vol. 105, No. 2, pp. 354-366, April 1993.
5. Goldstein, D. B., Nadiga, B. T., "Compressible Channel Flow Using Two Discrete-Velocity Gas Models," *Rarefied Gas Dynamics: Theory and Simulations*, ed. by B. D. Shizgal and D. P. Weaver, Vol. 159, Progress in Astronautics and Aeronautics, published by AIAA, Washington, D. C., pp. 3-15, 1994.
6. Goldstein, D. B., Handler, R. and Sirovich, L., "Direct Numerical Simulation of Turbulent Flow over a Modeled Riblet Covered Surface," *Journal of Fluid Mechanics*, Vol. 302, pp. 333-376, 1995.
7. Engblom, W., Yuceil, B., Goldstein, D. B. and Dolling, D. S., "Hypersonic Forward-Facing Cavity Flow: An Experimental and Numerical Study," *Journal of Spacecraft & Rockets*, Vol. 33, No. 3, pp. 353-359, May-June, 1996.
8. Engblom, W. and Goldstein, D. B., "Nose-Tip Surface Heat Reduction Mechanism," *Journal Thermophysics & Heat Transfer*, Vol. 10, No. 4, pp. 598-606, October-December 1996.
9. Engblom, W., Goldstein, D. B., Ladoon, D. and Schneider, S., "Fluid Dynamics of Hypersonic Forward-Facing Cavity Flow," *Journal of Spacecraft and Rockets*, Vol. 34, No. 4, pp. 437-444, July-Aug. 1997.
10. Roveda, R., Goldstein, D. B. and Varghese, P., "A Hybrid Euler/DSMC Approach for Continuum/Rarefied Flows," *Journal of Spacecraft and Rockets*, Vol. 35, No. 3, pp. 258-265, May-June 1998.
11. Goldstein, D. B. and Tuan, T-C, "Secondary Flow Induced by Riblets," *Journal of Fluid Mechanics*, Vol. 363, pp. 115-151, 1998.
12. Roveda, R., Goldstein, D. B. and Varghese, P., "A Hybrid Euler/DSMC Approach to Unsteady Flows," *Rarefied Gas Dynamics*, ed. Brun, R., Campargue, R., Gatignol, R., and Legrand, J-C., published by CEPAD., Vol. 2, pp. 117-124, 1999.
13. Austin, J. V. and Goldstein, D. B., "Simulation of Supersonic Rarefied Atmospheric Flows on Io," *Rarefied Gas Dynamics*, ed. Brun, R., Campargue, R., Gatignol, R., and Legrand, J-C., published by CEPAD., Vol. 2, pp. 681-688, 1999.
14. Goldstein, D. B., Nerem, R. S., Barker, E. S., Austin, J. V., Binder, A. and Feldman, W., "Impacting Lunar Prospector in a Cold Trap to Detect Water Ice," *Geophysical Research Letters*, Vol. 26, No. 12, pp. 1653-1656, June 15, 1999.
15. Silton, S. and Goldstein, D. B., "Ablation Onset in Unsteady Hypersonic Flow About Nose Tip with Cavity," *Journal of Thermophysics and Heat Transfer*, Vol. 14, No. 3, July-Sept. 2000.
16. Austin, J. V. and Goldstein, D. B., "Rarefied Gas Model of Io's Sublimation-Driven Atmosphere," *Icarus*, Vol. 148, pp. 370-383, Dec. 2000.
17. Roveda, R., Goldstein, D. B. and Varghese, P., "Hybrid Euler/Direct Simulation Monte Carlo Calculation of Unsteady Slit Flow," *Journal of Spacecraft and Rockets*, Vol. 37, No. 6, pp. 753-760, Nov.-Dec., 2000.
18. Lee, C. Y. and Goldstein, D. B., "Two-Dimensional Synthetic Jet Simulation," *AIAA Journal*, Vo. 40, No. 3, March 2002.
19. Goldstein, D. B., Austin, J. V., Barker, E. S. and Nerem, R. S., "Short-Time Exosphere Evolution Following an Impulsive Vapor Release on the Moon," *Journal of Geophysical Research – Planets*, Vol. 106, No. E12, pp. 32841-32845, December 25, 2001.
20. Zhang, J., Goldstein, D. B., Levin, D., Varghese, P., Gimelsheim, N., Gimelshein, N. and Trafton, L., "DSMC Modeling of Gasdynamics, Radiation and Fine Particulates in Ionian Volcanic Jets," *Rarefied Gas Dynamics*, ed. Ketsdever, A., and Muntz, P., published by American Institute of Physics, Vol. 663, pp. 704-711, July 2002.
21. Goldstein, D. B., "Rarefied Gas Dynamics of Water Vapor on the Moon," Rarefied Gas Dynamics, *Rarefied Gas Dynamics*, ed. Ketsdever, A., and Muntz, P., published by American Institute of Physics, Vol. 663, pp. 712-719, July 2002.
22. Zhang, J., Goldstein, D. B., Levin, D., Varghese, P., Gimelshein, S. and Gimelshein, N., "Simulation of Gas Dynamics and Radiation in Volcanic Plumes on Io," *Icarus*, Vol. 163, pp. 182-197, 2003.
23. Silton, S. and Goldstein, D. B., "Use of an Axial Nose-Tip Cavity for Delaying Ablation Onset in Hypersonic Flow," *Journal of Fluid Mechanics*, (2005) vol. 528, pg. 297-321.
24. Zhang, J., Goldstein, D. B., Varghese, P., Trafton, L., Moore, C. and Miki, K., "Numerical Modeling of Ionian Volcanic Plumes with Entrained Particulates," *Icarus*, 172 (2004), pg. 479-502.
25. Larignon, B., Marr, K., and Goldstein, D. B., "Monte-Carlo and Navier-Stokes Simulations of the Taylor-Couette Flow," *J. Thermophysics and Heat Transfer*, **20**, no. 3, pp. 536-543, 2006.
26. Larignon, B., Goldstein, D. B., Werntz, S., Goldstein, D. B., and Fasel, H., "Numerical Investigation of Supersonic Taylor-Couette Flow," *J. Thermophysics and Heat Transfer*, **20**, no. 3, pp 544-551, 2006.

27. Goldstein, D., B., Stern, S. A., Crider, D. H., Gladstone, G. R., Durda, D., D., Asphaug, E., Larignon, B., Varghese, P. L., and Trafton, L. M., "Free molecular simulations of vapor dynamics following a lunar impact," in *Rarefied Gas Dynamics*, Proceedings of the 25th International Symposium on Rarefied Gas Dynamics, ed., M. Ivanov & A. Rebrov, Publishing House of the Siberian Branch of the Russian Academy of Sciences, Novosibirsk, 2007.
28. Moore, C., Goldstein, D. B., Varghese, P., Trafton, L. and Stewart, B. "1-D DSMC simulation of Io's atmospheric collapse in eclipse," *Icarus*, **201**, pp 585-597, 2009.
29. Moore, C., Goldstein, D., Varghese, P., Trafton, L., Stewart, B. and Walker, A., "Io's Atmospheric Freeze-out Dynamics in the Presence of a Trace Non-condensable Species," *Rarefied Gas Dynamics* , 26th International Symposium on Rarefied Gas Dynamics, ed. T. Abe, Kyoto, AIP Conf. Proc, 1084, pp. 1079-1084, 2009.
30. Walker, A., Gratiy, S., Levin, D., Goldstein, D., Varghese, P., Trafton, L., Moore, C. and Stewart, B. "Modeling Io's sublimation-driven atmosphere: Gas Dynamics and Radiation Emission," *Rarefied Gas Dynamics* , 26th International Symposium on Rarefied Gas Dynamics, ed. T. Abe, Kyoto, AIP Conf. Proc, 1084, pp. 1085-1090, 2009.
31. Morris, A., Varghese, P. and Goldstein, D., "Optimization of a discrete velocity Boltzmann equation solver with arbitrary post-collision velocities," *Rarefied Gas Dynamics* , 26th International Symposium on Rarefied Gas Dynamics, ed. T. Abe, Kyoto, AIP Conf. Proc, 1084, pp. 458-463, 2009.
32. Goldstein, D., Summy, D., Colaprete, A.,Varghese, P., and Trafton, L., "Modeling the Vapor and Dust Dynamics Due to the Impact of the LCROSS Spacecraft on the Moon," *Rarefied Gas Dynamics* , 26th International Symposium on Rarefied Gas Dynamics, ed. T. Abe, Kyoto, AIP Conf. Proc, 1084, pp. 1061-1066, 2009.
33. Stephani, K., Goldstein, D. "An Examination of Trapped Bubbles for Viscous Drag Reduction on Submerged Surfaces", *Journal of Fluid Engineering*, *132*(4), pp. 041303-1 - 041303-9, 2010.
34. Moore, C., Miki, K., Goldstein, D., Varghese, P., Trafton, L., Karl, S., Zhang, J., Evans, R. "Modeling of Io's [OI] and [SII] Auroral Emissions of Io in Eclipse". *Icarus, 207*(2), 810-833, doi:10.1016/j.icarus.2010.01.004, 2010.
35. Walker, A., Gratiy, S., Moore, C., Goldstein, D., Varghese, P., Trafton, L., Levin, D., Stewart, B. "A Comprehensive Numerical Simulation of Io's Sublimation-Driven Atmosphere". *Icarus, 207*(2), doi:10.1016/j.icarus.2010.01.012, 2010.
36. Graity, S., Walker, A., Levin, D., Goldstein, D., Varghese, P., Trafton, L., Moore, C. "Multi-wavelength simulations of atmospheric radiation from Io with a 3-D spherical-shell backward Monte Carlo radiative transfer model." *Icarus, 207*(1), doi:10.1016/i.icarus.2009.11.004, 2010.
37. Colaprete, A., Schultz, P., Heldman, J., Shirley, M., Ennico, K., Hermalyn, B., Wooden, D., Marshall, W., Ricco, A., Elphic, R., Goldstein, D., Summy, D., Bart, G., Asphaug, E., Korycansky, D., Landis, D., Sollit, L. "The detection of water within the LCROSS ejecta plume". *Science*, **330**, Oct. 22, 2010, pp 463-468.
38. Strand, J., Goldstein, D., ``DNS of Surface Textures to Constrain the Growth of Turbulent Spots,'' *J. Fluid Mechanics*, 668, Feb. 2011, pp. 267-292, DOI: 10.1017/S0022112010005033.
39. Strand, J., Goldstein, D. "Application of the MCMC Method for the Calibration of DSMC Parameters". *Rarefied Gas Dynamics*, 27th International Symposium on Rarefied Gas Dynamics, 2010, Pacific Grove, CA, July 2010. Ed. D. Levin, I. Wysong & A. Garcia, AIP Vol. 1333, 2011.
40. Walker, A., Goldstein, D., Varghese, P., Trafton, L., Moore, C. "Loki - A Lava Lake in Rarefied Atmospheric Cross Flow". *Rarefied Gas Dynamics*, 27th International Symposium on Rarefied Gas Dynamics, 2010, Pacific Grove, CA, July 2010. Ed. D. Levin, I. Wysong & A. Garcia, AIP Vol. 1333, 2011.
41. Morris, A., Varghese, P., Goldstein, D. "Plume Impingement on a Dusty Lunar Surface". *Rarefied Gas Dynamics*, 27th International Symposium on Rarefied Gas Dynamics, 2010, Pacific Grove, CA, July 2010. Ed. D. Levin, I. Wysong & A. Garcia, AIP Vol. 1333, 2011.
42. Moore, C., Deng, H., Goldstein, D., Levin, D., Varghese, P., Trafton, L., Steward, B., Walker, A. "Simulation of Plasma Interaction with Io's Atmosphere". *Rarefied Gas Dynamics*, 27th International Symposium on Rarefied Gas Dynamics, 2010, Pacific Grove, CA, July 2010. Ed. D. Levin, I. Wysong & A. Garcia, AIP Vol. 1333, 2011.
43. Morris, A., Varghese, P., Goldstein, D. "Variance Reduction for a Discrete Velocity Gas". *Rarefied Gas Dynamics*, 27th International Symposium on Rarefied Gas Dynamics, 2010, Pacific Grove, CA, July 2010. Ed. D. Levin, I. Wysong & A. Garcia, AIP Vol. 1333, 2011.
44. Deng, H., Moore, C., Levin, D. Goldstein, D. and Varghese, P., ``Analysis of SO_2+O chemistry models for the simulations of the atmosphere of Io,'' *Rarefied Gas Dynamics*, 27th International Symposium on Rarefied Gas Dynamics, 2010, Pacific Grove, CA, July 2010. Ed. D. Levin, I. Wysong & A. Garcia, AIP Vol. 1333, 2011.

45. McDoniel, W., Buchta, D., Goldstein, D., Kieffer, S., Varghese, P., Trafton, L., Freund, J., "Simulating Irregular Source Geometries for Ionian Plumes," *Rarefied Gas Dynamics*, 27th International Symposium on Rarefied Gas Dynamics, 2010, Pacific Grove, CA, July 2010. Ed. D. Levin, I. Wysong & A. Garcia, AIP Vol. 1333, 2011.
46. Strand, J., Goldstein, D. "Application of passive surface textures to control the growth of turbulent spots at moderately high Reynolds numbers". *Int. J. of Flow Control*. Vol. 2, No. 2, June 2010. DOI 10.1260/1756-8250.2.2.73
47. Morris, A., Varghese, P., Goldstein, D. "Monte Carlo Solution of the Boltzmann Equation Via a Discrete Velocity Model." *J. Computational Physics*, **230**, #4, Feb. 2011.
48. Goldstein, D. and Varghese, P., ``Rarefied gas dynamics on a planetary scale," *Phys. of Fluids*, **23**, 030608 (2011).
49. Doolittle, C., Goldstein, D. "Parametric Study of Roughness Induced Transient Growth". In prep. *AIAA J*, Aug., 2010
50. Stewart, B., Pierazzo, E., Goldstein, D., Varghese, P. and Trafton, L., ``Simulation of a comet impact on the Moon and associated ice deposition in polar cold traps," *Icarus*, v. 215, Issue 1, Sept. 2011, pp. 1-16. http://dx.doi.org/10.1016/j.icarus.2011.03.014
51. Trafton, L., Moore, C., Goldstein, D. Varghese, P. and McGrath, M. ``HST/STIS Observations and Simulation of Io's Emission Spectrum in Jupiter Shadow: Probing Io's Jupiter-facing eclipse Atmosphere", *Icarus*, **220** (July, 2012), pg. 1121-1140.
52. Kosuge, S., Aoki, K., Inoue, T., Goldstein, D. Varghese, P., ``Unsteady flows in Io's atmosphere caused by condensation and sublimation during and after eclipse: Numerical study based on a model Boltzmann equation", *Icarus*, **221**, Nov-Dec, 2012, pp. 658-669.
53. Strand, J. and Goldstein, D. ``Sensitivity analysis for DSMC simulations of high-temperature air chemistry," *J. Comp. Phys*., **246** (2013), pp 184-206.
54. Stephani, K., Goldstein, D., and Varghese, P., ``Consistent treatment of transport properties for five-species air direct simulation Monte Carlo/Navier-Stokes applications'' *Phys. Fluids 24, 077101 (July 2012)* DOI: 10.1063/1.4729610
55. Stephani, K., Goldstein, D., and Varghese, P., ``A Non-equilibrium Surface Reservoir Approach for Hybrid DSMC/Navier-Stokes Particle Generation'', *Journal of Computational Physics (August 2012)* DOI: 10.1016/j.jcp.2012.08.017
56. Walker, A., Moore, C., Goldstein, D., Varghese, P., Trafton, L. "A parametric study of Io's thermophysical surface parameters and subsequent numerical atmospheric simulations based on the best fit parameters", *Icarus*, **220**, Issue 1 July, 2012, pg. 225-253.
57. Stern, S. A., Gladstone, G., Horanyi, M., Kutter, B., Goldstein, D., Tapley, M., ``Synthetic lunar atmosphere experiments and base resupply", submitted to *Science*.
58. Morris, A, Goldstein, D., Varghese, P., and Trafton, L. ``Far field deposition of scoured regolith resulting from lunar landings," *Rarefied Gas Dynamics*, 28th International Symposium on Rarefied Gas Dynamics, 1501, pp. 1220-1227, 2012, Zaragosa, Spain.
59. Heldmann, J. and 70 others, ``LCROSS (Lunar Crater Observation and Sensing Satellite) Observation campaign: Strategies, implementation, and lessons learned,'' Space Science Reviews, volume 167, issue 1-4, year 2012, pp. 93 – 140.
60. Clarke, P, Varghese, P., Goldstein, D., Bauman, P., Morris, A., and Hegermiller, D., ``A novel discrete velocity method for solving the Boltzmann equation including internal energy on non-uniform grids in velocity space," *Rarefied Gas Dynamics*, 28th International Symposium on Rarefied Gas Dynamics, 2012, Zaragosa, Spain.
61. Yeoh, S. K., Chapman, T., Goldstein, D., Varghese, P., and Trafton, L, ``Understanding the Physics of Enceladus South Polar Plume via Direct Numerical Simulation," *Icarus*, vol. 253, June 2015, pp. 205-222. http://dx.doi.org/10.1016/j.icarus.2015.02.020
62. A. B. Morris, D. B. Goldstein, P. L. Varghese, L. M. Trafton, ``Approach for Modeling Rocket Plume Impingement and Dust Dispersal on the Moon,'' *J. Spacecraft and Rockets*, vol. 52, No. 2, (2015) pp. 362-374, doi: 10.2514/1.A33058.
63. A. B. Morris, D. B. Goldstein, P. L. Varghese, L. M. Trafton, ``Lunar dust transport and scouring resulting from single and four-engine plume impingement," submitted to *J. Spacecraft and Rockets*, Jun. 2015.
64. Stewart, B.D., Pierazzo, E., Prem, P., Goldstein, D.B., Varghese, P.L., Trafton, L.M. and Moore, C.H. "Direct Simulation Monte Carlo Solution of Large-scale Unsteady Expansions into Vacuum", *J. Comp. Phys.* (submitted), 2013.

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111. Yeoh, S. K., Goldstein, D., Varghese, P., and Trafton, L., ``Understanding the Source Conditions of Enceladus' Plume via Direct Numerical Simulation,'' 46th Annual AGU meeting, San Francisco (Paper P53B-1850, Abstr. ID 25811).
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1. Geissler, P. and Goldstein, D. "Plumes and Their Deposits," in *Io After Galileo: A New View of Jupiter's Volcanic Moon*, Eds. Lopes, R. and Spencer, J. 2006.

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2. Goldstein, D. B., Engblom, W. and Austin, J. V., "Interim IAT Report on Flow About an Axial Nose-Tip Cavity," October 1995.
3. Engblom, W. and Goldstein, D. B., "IAT Report: Fluid Dynamics of Unsteady Cavity Flow," November 1996.
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2. Goldstein, D. B., "A Discrete-Velocity Approach to Simulate Rarefied Gas Flow," **Invited Lecture**, 4th Liepmann-Ludwieg Seminar, Göttingen, Germany, June 1991.
3. Goldstein, D. B., Adachi, J. and Izumi, H., "Modeling Flow Between Concentric Cylinders with an External Force Field," 11th AIAA Computational Fluid Dynamics Conference, Orlando, FL, July 1993.
4. Goldstein, D., "Direct Numerical Simulation of Turbulent Flow Over Riblets," Mitsubishi Heavy Industries in Yokohama, Nagoya, Nagasaki and Takasago. Also at Nissan Aerospace, Tokyo, Japan, 1993.
5. Goldstein, D., "Discrete Velocity Gas Dynamics - Near Continuum Flows," Mitsubishi Heavy Industries, Adv. Tech. Research Center, Yokohama; ISAS, Tokyo; National Aerospace Lab, Tokyo; Kyoto University, Kyoto, Japan, 1993.
6. Goldstein, D., Handler, R. and Sirovich, L., "Direct Numerical Simulation of Turbulent Flow over a Modeled Riblet Covered Surface," American Physical Society Meeting, Albuquerque, NM, 1993.
7. Engblom, W. A. and Goldstein, D., "Numerical Simulation of a Helmholtz Resonator Concept," American Physical Society Meeting, Albuquerque, NM, 1993.
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15. Goldstein, D. B., "Direct Numerical Simulation of Low Density Atmospheric Flow on Io," invited lecture, University of Notre Dame, February 18, 1997.
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17. Silton, S. and Goldstein, D., " A Preliminary Investigation of Cold Gas Injection into a Forward-Facing Cavity," 35th Aerospace Sciences Meeting, Reno, NV, 1997.
18. Goldstein, D. B. and Young, D. D., "Flow Between Segments of a Hypersonic Projectile," American Physical Society Meeting, San Francisco, CA, 1997.
19. Tuan, T.-C. and Goldstein, D. B., "DNS of Turbulent Flow over a Modeled Riblet Surface," American Physical Society Meeting, San Francisco, CA, 1997.
20. Silton, S. and Goldstein, D. B., "Hypersonic Numerical and Experimental Investigation of the Reduction of Nose Tip Ablation," AIAA Paper 98-0169, 36th Aerospace Sciences Meeting, Reno, NV, 1998.
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30. Roveda, R., Goldstein, D. B. and Varghese, P., "Unsteady Continuum/Rarefied Gas Dynamics Simulations with a Hybrid Euler/Monte Carlo Approach." (given by Roveda), Invited Lecture, American Mathematical Society 1999 Meeting, Austin, October 1999.
31. Goldstein, D. B., "Water on Earth's Moon," Keynote Address, Water in the Solar System - JPL Educators Online Workshop, Nov. 1999.
32. Goldstein, D. B., "Direct Numerical Simulation for Turbulent Boundary Layer Control: Riblets and MEMS," Invited Lecture, Rice University, February 2000.
33. Goldstein, D. B., "Hybrid Solution of Unsteady Flow Problems using a Merged Euler/Kinetic Theory Approach," Invited Lecture, Simulation of Transport in Transition Regimes, Institute for Mathematics and its Applications, University of Minnesota, May 24, 2000.
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41. Zhang, J., Goldstein, D. B., Levin, D., Varghese, P., Gimelshein, S., Gimelshein, N. and Trafton, L., "DSMC Modeling of Gasdynamics, Radiation and Fine Particulates in Ionian Volcanic Jets," presented at the 23rd International Symposium on Rarefied Gas Dynamics, Whistler, Canada, July 2002.
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47. Silton, S. and Goldstein, D. B., "Optimization of a Nose-Tip Cavity for Delaying Ablation Onset in Hypersonic Flow," AIAA Aerospace Sciences Meeting, Reno, NV, January 2003.
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49. Goldstein, D. B., "DSMC: A Link Among Physical Regimes and Its Use in Novel Applications," Invited Lecture, Direct Simulation Monte Carlo: The Past 40 Years and the Future, Politecnico di Milano, Milan, Italy, June 3, 2003.
50. Lee, C., Colmenero, G., Goldstein, D. B., Wu, K., and Brever, K., "Micro-actuators for Turbulent Boundary Layer Control," American Physical Society, Division of Fluid Dynamics Meeting, AR5, November 2003.
51. Colmenero, G., and Goldstein, D. B., and "Turbulent boundary layer control using wall information," AIAA Paper No. 2004-2116, AIAA Flow Control Meeting, Summer 2004.
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55. Goldstein, D., "Simulations of Volcanic Plumes and Aurora on Io by the ASE/Astro Io Group," UT Astronomy, Invited seminar on 'Planets and Life', March 2, 2005.
56. Goldstein, D., "Simulations of Volcanic Plumes and Aurora on Io by the ASE/Astro Io Group," Io Volcano Workshop, Invited Talk, Boulder, CO, June 8, 2005.
57. Goldstein, D. B., "DNS of Riblets to Control the Growth of Turbulent Spots," AFOSR Turbulence and Rotating Flows Conference Report, Long Beach, CA, August 2005.
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69. Morris, A., Varghese, P. and Goldstein, D., "Optimization of a discrete velocity Boltzmann equation solver with arbitrary post-collision velocities," 26th Annual Rarefied Gas Dynamics Meeting, Kyoto, Japan, July 2008.
70. Goldstein, D., Summy, D., Colaprete, A.,Varghese, P., and Trafton, L., "Modeling the Vapor and Dust Dynamics Due to the Impact of the LCROSS Spacecraft on the Moon," 26th Annual Rarefied Gas Dynamics Meeting, Kyoto, Japan, July 2008.
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78. Goldstein, D. "LCROSS Simulations", **Invited Talk**, LAMP Science Team Mtg., SwRI, Boulder, Sept 25, 2009.
79. Heldmann, J. Colaprete, A., Wooden, D. and the LCROSS Science Team, "Lunar Crater Observation and Sensing Satellite (LCROSS) Mission: Preliminary Report on the LCROSS Observation Campaign Results." Talk 2063, Ann. Mtg. of LEAG, Houston, Nov. 17, 2009.
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84. Stephani, K., Goldstein, D. and Varghese, P ``Effects of rarefaction on hypersonic boundary layer flow over discrete surface roughness," **Invited talk and paper** 2010-456 AIAA ASM Mtg., Orlando, 2010.
85. Goldstein, D., ``Plume and sputtered atmospheres: Io, Enceladus, Europa?" **Invited talk** presented to EGUVS instrument development team, SWRI, San Antonio, Feb. 9, 2010.
86. Colaprete, A., Asphaug, E., Bart, G., Elphic, R., Ennico, K., Hermalyn, B., Heldmann, J., Korycansky, D., Landis, D., Wooden, D., Ricco, T., Schultz, P., Sollitt, L., Goldstein, D., Summy, D., and the LCROSS Team, ``A review of the Lunar Crater Observation and Sensing Satellite (LCROSS) impact results," **Invited talk by A. Colaprete** et al, Lunar Dust, Plasma and Atmosphere Mtg., Jan. 27, Boulder, CO.
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91. Goldstein, D., Chu, J., Drews, S., Doolittle, C. J., Stephani, K., Strand, J., and Varghese, P.,``Incompressible and hypersonic boundary layer transition over textured surfaces," **Invited talk** at Caltech, April 2, 2010.
92. Goldstein, D., Moore, C., Walker, A., McDoniel, W., Varghese, P., Trafton, L., Gratiy, S., Levin, D., Buchta, D., Kieffer, S., and Freund, J., ``Simulating atmospheric phenomena on Io: Plumes, Glows and Flows," **Invited talk** at Caltech, April 1, 2010.
93. Strand, J. and Goldstein, D., ``Application of the Metropolis-Hastings Algorithm for the Calibration of DSMC Parameters," talk to the Tri-Lab Sponsor Team for the PECOS center, April, 2010.
94. L. M. Trafton, D. Goldstein, P. L.Varghese, C. H. Moore, A. C. Walker, and W. J. McDoniel, ``Simulating atmospheric phenomena on Io: Plumes, glows, and flows," presented by Trafton at the Io Workshop, May 25-26, 2010 in Provo, UT.
95. Doolittle, C. J. and Goldstein, D., ``Comparing DNS and Experiments of subcritical surface roughness," Presented at APS-DFD 62nd annual Mtg., Minneapolis, Minn. Nov. 2009.
96. Walker, A.C., Goldstein, D., Varghese, P.L., Trafton, L.M., Moore, C.H ., ``Comparison of Observed and Simulated Ionian Column Densities," poster 26.11, 42nd annual meeting of the Division of Planetary Sciences of the American Astronomical Society, Oct. 2010.
97. Moore, C.H., Deng, H., Goldstein, D., Levin, D., Varghese, P.L., Trafton, L.M., Walker, A.C., Stewart, B.D.``Impact of Plasma Chemistry on Io's Atmosphere," Talk 32.04, 42nd annual meeting of the Division of Planetary Sciences of the American Astronomical Society, Oct. 2010.
98. Yeoh, S., Chapman, T., Goldstein, D., Varghese, P.L., Trafton, L.M., ``Hybrid simulation of gas/particle plume of Enceladus," poster 25.05, 42nd annual meeting of the Division of Planetary Sciences of the American Astronomical Society, Oct. 2010.
99. McDoniel, W., Goldstein, D., Varghese, P.L., Trafton, L.M., Buchta, D., Freund, J. Kieffer, S., ``Comparison DSMC simulations of irregular source geometries for Io's Pele plume," Talk 32.01, 42nd annual meeting of the Division of Planetary Sciences of the American Astronomical Society, Oct. 2010.
100. Heldmann, J. Colaprete, A., Goldstein, D., Summy, D., Marshall, W., Ennico, K., Wooden, D., Varghese, P. and Trafton, L, ``Evolution of the dust and water ice plume components as observed by the LCROSS visible camera and UV-Visible spectrometer," Talk 18.03, 42nd annual meeting of the Division of Planetary Sciences of the American Astronomical Society, Oct. 2010.
101. Goldstein, D., White, E., Doolittle, C., Chu, J., Drews, S. and Strand, J. "Transient Boundary Layer Disturbance Growth and Bypass Transition Due to Realistic Roughness and Continued Study of Transition Over Riblets," **Invited Talk**, Vestas, Houston TX, Sept. 2, 2010.

102. Morris, A., Goldstein, D., Varghese, P. and Trafton, L. "Modeling a dusty plume impinging on the lunar surface," **Invited Talk** given by Morris at the Workshop on Lunar/Martian Plume Effects, Cape Canaveral, Jan. 21, 2011.
103. Goldstein, D., White, E., Chu, J., Drews, S., Denissen, N., Downs, R., Kuester, M. and Stephani, K. ``Boundary layer transition over textured surfaces. " Presented at the AFOSR contractors meeting, Albuquerque NM, July 2011.
104. Varghese, P. L., Morris, A. B., and Goldstein, D.B, "Monte Carlo Solution of the Boltzmann Equation via a Discrete Velocity Model," **Invited Talk** presented by P.V. at Texas A&M University, November 4, 2010.
105. Varghese, P. L., Morris, A. B., and Goldstein, D.B, "A Discrete Velocity Boltzmann Equation Solver With Arbitrary Post-Collision Velocities," **Invited Talk** presented by P. V. at University of Houston, November 11, 2010.
106. S.A. Stern, G.R. Gladstone, M. Horanyi, B. Kutter, D.B. Goldstein, and M. Tapley. ``Synthetic Lunar Atmosphere Experiments and Base Resupply Mission Concept'' LPSC Mtg., Abstr. 1008, Houston, March 2012.
107. Goldstein, D. Moore, C., Walker, A., McDoniel, W., Varghese, P., Trafton, L., Gratiy, S., Parsons, N. and Levin, D, ``Simulating atmospheric dynamics and volcanic plumes on Io'', **Invited Talk** given at LASP at the University of Colorado, Boulder, April 19, 2012.
108. Morris, A., Goldstein, D., Varghese, P., and Trafton, L., ``Simulation of a rocket plume entraining lunar dust," presented by Morris at DSMC11, DSMC workshop, Sante Fe, NM, Sept. 2011.
109. Stephani, K, Goldstein, D., and Varghese, P., ``Development of a hybrid DSMC/Navier-Stokes solver for boundary layer flow involving polyatomic gas mixtures," presented by Stephani at DSMC11, DSMC workshop, Sante Fe, NM, Sept. 2011.
110. Strand, J. and Goldstein, D., ``Bayesian inference for the calibration of DSMC parameters,'' presented by Strand at DSMC11, DSMC workshop, Sante Fe, NM, Sept. 2011.
111. Clarke, P., Hegermiller, D., Bauman, P., Simmons, C., Morris, A., Goldstein, D., and Varghese, P., ``Discrete velocity method with variable grids in velocity space and internal energy,'' presented by Clarke at DSMC11, DSMC workshop, Sante Fe, NM, Sept. 2011.
112. Walker, A., Goldstein, D., Varghese, P., Trafton, L., and Moore, C., ``3D DSMC simulations of Io's unsteady sublimation-driven atmosphere and its sensitivity to the lower surface boundary conditions," presented by Walker at DSMC11, DSMC workshop, Sante Fe, NM, Sept. 2011.
113. Moore, C., Walker, A., Parsons, N., Goldstein, D., Varghese, P., Trafton, L., and Levin, D., ``3D simulation of Io's atmospheric interaction with the Jovian plasma torus," presented by Moore at DSMC11, DSMC workshop, Sante Fe, NM, Sept. 2011.
114. McDoniel, W., Goldstein, D., Varghese, P. and Trafton, L. ``Modeling gas and dust flow in Io's Pele plume," presented by McDoniel at DSMC11, DSMC workshop, Sante Fe, NM, Sept. 2011.
115. Goldstein, D., Chu, J., Drews, S., Doolittle, C., Stephani, K., and Varghese, P., ``Vollmer Fries Lecture in Aerospace Engineering: DNS of hypersonic and incompressible boundary layer flow over textured and rough surfaces", **Invited Lecture**, Rensselaer Polytechnic Institute, Oct. 19, 2011.
116. Goldstein, D. Varghese, P., White, E., Chu, J., Drews, S., and Stephani, K., ``I. Investigation of turbulent wedge spreading mechanism and II. BL perturbations introduced by distributed roughness," presented at the AFOSR Contractors mtg., July, 2012.
117. Stephani, K, Goldstein, D., and Varghese, P., ``Hybrid DSMC/CFD solution of hypersonic boundary layer flow over discrete surface roughness," presented by Goldstein, 28th International Symposium on Rarefied Gas Dynamics, July 2012, Zaragosa, Spain.
118. Morris, A. B., Goldstein, D. B., Varghese, P. L., Trafton, L, M.. "Modeling the Interaction between a Rocket Plume, Scoured Regolith, and a Plume Deflection Fence", presented by Morris at the 13th ASCE Aerospace Division Conference on Engineering, Science, Construction, and Operations in Challenging Environments, and the 5th NASA/ASCE Workshop On Granular Materials in Space Exploration, Pasadena, CA April 15-18, 2012.
119. Trafton, L., Goldstein, D., Varghese, P., D., Moore, C., Walker, A., McDoniel, W., Parsons, N., and Levin, D, `` Simulating Atmospheric Dynamics and Volcanic Plumes on Io," **Invited Lecture**, given by Trafton and McDoniel at the 2012 Io Workshop, LASP at the University of Colorado, Boulder, July 10.
120. Trafton, L., Moore, C., Goldstein, D., Varghese, P. and McGrath, M., ``Simulation of Io's emission spectrum in eclipse," **Invited Lecture**, given by Trafton at the 2012 Io Workshop, LASP at the University of Colorado, Boulder, July 10.

121. Morris, A., Goldstein, D., Varghese, P., Trafton, L., "Simulation of Rocket Plume Impingement and Dust Dispersal on the Lunar Surface," **Invited Talk** presented by Morris at The University of Colorado, November 17th 2012.
122. McDoniel, W., Goldstein, D., Varghese, P., Trafton, L. "DSMC Simulations of Io's Pele Plume", 2012. Talk by McDoneil. American Astronomical Society, DPS meeting #44, #301.08.
123. Prem, P; Artemieva, N. A.; Pierazzo, E.; Stewart, B. D.; Goldstein, D. B.; Varghese, P. L.; Trafton, L. M. "Cometary Delivery of Lunar Water: Transient Atmosphere Dynamics and Deposition Patterns", 2012. Talk by Prem. American Astronomical Society, DPS meeting #44, #401.03.
124. Yeoh, S; Chapman, T. A.; Goldstein, D. B.; Varghese, P. L.; Trafton, L. M. "A Hybrid DSMC/Free-Molecular Model of the Enceladus South Polar Plume", 2012. Poster presentation by Yeoh. American Astronomical Society, DPS meeting #44, #112.05.
125. Prem, P., Artemieva, N.A., Stewart, B.D., Goldstein, D.B., Varghese, P.L. and Trafton, L.M. "Collisional Processes and Parameters Influencing the Delivery of Volatiles to Lunar Cold Traps after a Comet Impact", talk by Prem at NLSI Lunar Volatiles Workshop Without Walls, May, 2013.
126. Chu, J., Brown, G., Goldstein, D.B., "Investigation of Spreading Mechanism of Turbulent Wedges and Spots", talk by Chu, 65th American Physical Society Division of Fluid Dynamics Conference, San Diego, CA, November 2012.
127. McDoniel, W.J., Goldstein, D.B., Varghese, P.L., and Trafton, L.M. ``Constraining Particle Sizes in Io's Pele Plume Using DSMC Simulations''. Presented by McDoniel. 1st Texas Fluid Dynamics Meeting, 2013.
128. Prem, P., Artemieva, N.A., Stewart, B.D., Goldstein, D.B., Varghese, P.L. and Trafton, L.M. "DSMC Simulations of Lunar Comet Impacts and the Delivery of Water to Permanently Shadowed Craters", Presented by Prem. 1st Texas Fluid Dynamics Meeting, Burnet TX, May, 2013.
129. Yeoh, S.K., Chapman, T.A., Goldstein, D.B., Varghese, P.L., Trafton, L.M., ``Modeling the Multi-regime Two-phase Plume of Enceladus.'' Presented by Yeoh. 1st Texas Fluids Dynamics Meeting, Burnet, TX, May 3rd–5th, 2013.
130. Chu, J. and, Goldstein, D.B., "Investigation of Turbulent Wedge Spanwise Spreading Mechanism", Presented by Chu. 1st Texas Fluid Dynamics Meeting, Burnet TX, May 2013.
131. Sharma, A., Drews, S. D., Kuester, M., Goldstein, D. B., White, E. B. ``Evolution of disturbances due to distributed surface roughness in laminar boundary layers", Presented by Sharma. 1st Texas Fluid Dynamics Meeting, Burnet TX, May 2013.
132. Chu, J., Kuester, M, Sharma, A., Goldstein, D., White, E., Varghese, P., Brown, G., ``I. Investigation of Turbulent Wedge Spreading Mechanism and II. BL Perturbations Introduced by Distributed Roughness." Presented by Goldstein and White at the AFOSR Annual Review, Arlington, VA, July, 2013.
133. McKeon, B., Goldstein, D., Sheplak, M., Tropp, J., ``Wall turbulence with designer properties: Identification, characterization & manipulation of dominant energy pathways." Presented by McKeon at the AFOSR – BRI annual review, Arlington, VA July 2013.
134. Ellis, J., Goldstein, D., Varghese, P., Trafton, L., Goldstein, B., ``Measuring gas-surface interactions with LADEE." **Invited Talk** by Goldstein at the LRO-LAMP Science Team Mtg. & LRO-LADEE Ops. Coordination Mtg., June 12-14, 2013.
135. P. L. Varghese, P. Clarke, D. B. Goldstein, P. Baumann, A. Morris. "An Efficient Discrete Velocity Method for the Boltzmann Equation -- Monte Carlo Simulation with Variable Mass Particles", **Invited talk** presented by P. Varghese at the University of New South Wales, Canberra, Australia, June 19, 2013.
136. Hoey, W.H., Walker, A.C., Goldstein, D.B., Varghese, P.L., Trafton, L.M., ``Simulations of Global Flows in Io's Rarefied Atmosphere ''. Poster session presented by Hoey at the 45th meeting of the Division for Planetary Sciences, Denver, CO, Oct. 2013 and the Io Workshop in Boulder.
137. McDoniel, W.J., Goldstein, D.B., Varghese, P.L., and Trafton, L.M. ``Constraining Diameters of Ash Particles in Io's Pele Plume by DSMC Simulation''. Poster session presented by McDoniel, 45th Division of Planetary Sciences meeting, October 2013. Denver, CO and at the Io Workshop, Boulder.
138. Yeoh, S. K., Goldstein, D., Varghese, P., and Trafton, L,``Modeling Enceladus' two-phase plume using DSMC,", presented by Yeoh at DSMC:2013, Sante Fe, NM, Oct. 20-23, 2013.
139. McDoniel, W.J., Goldstein, D.B., Varghese, P.L., and Trafton, L.M. ``Cracks in a Lava Lake: Boundary Conditions for Io's Pele Plume''. Presented by McDoniel. DSMC 2013: Theory, Methods, and Applications, Santa Fe, NM, October 20-23, 2013.
140. Chu, J., Brown, G., Goldstein, D.B., "Investigation of Turbulent Wedge Spreading Mechanism and How to Reduce Spreading Using Surface Textures", Presented by Chu. 66th American Physical Society Division of Fluid Dynamics Conference, Pittsburgh, PA, November 2013.

141. Prem, P., Artemieva, N. A., Goldstein, D. B., Varghese, P. L., Trafton, L. M. and Stewart, B. D..`` Transport of water in a transient impact-generated lunar atmosphere.'' Talk presented by Prem. *45th Lunar and Planetary Science Conference*, Abstract #2742, Houston, March 2014.
142. Prem, P., Artemieva, N. A., Goldstein, D. B., Varghese, P. L. and Trafton, L. M..``Comets as a source of lunar volatiles: tracking water from impact to permanent shadows.'' Talk presented by Prem. *5th Lunar and Small Bodies Graduate Conference*, NASA Ames, July 2014.
143. Goldstein, D., Varghese, P. Trafton, L., Yeoh, S., McDoniel, W., Prem, P., Hoey, W., Flemming . T.. ``Eruptions and Atmospheres – Analogies to other Satellites.'' **Invited Talk**. Europa Plume Advisory Mtg., JHU APL, Columbia, MD. June 2, 2014
144. Sharma, A., Moarref, R., Luhar, M., Goldstein, D. B., McKeon, B. J., ``An investigation of the flow modification in a turbulent channel with gain-based optimal forcing'', Presented by Sharma. APS DFD Meeting, Nov. 2013.
145. Sharma, A., Drews, S. D., Kuester, M., Goldstein, D. B., White, E. B. ``Evolution of disturbances due to distributed surface roughness in laminar boundary layers,'' Presented by Sharma. AIAA SciTech Conference, Jan. 2014.
146. Sharma, A., Moarref, R., Luhar, M., Goldstein, D. B., McKeon, B. J. ``Effects of a gain-based optimal forcing on turbulent channel flow,'' Presented by Sharma. AIAA SciTech Conference, Jan. 2014.
147. Kuester, M., Sharma, A., White, E., and Goldstein, D., `` Distributed Roughness Shielding in a Blasius Boundary Layer," Presented by Kuester. 44th AIAA Fluid Dynamics Summer mtg., 2014.
148. Stern, A., Gladstone, R., Zangari, A., Goldstein, D., Flemming, T.``Transient atmospheres on Charon and water-ice covered KBOs resulting from comet impacts.'' Presented by Stern. LPSC Mtg., Houston, March 2014.
149. Yeoh, S. K., Goldstein, D., Varghese, P., and Trafton, L., `` Understanding the Source Conditions of Enceladus' Plume via Direct Numerical Simulation,'' Presented by Yeoh, 46th Annual AGU meeting, San Francisco (Abstr. P53B-1850).
150. Yeoh, S. K., Goldstein, D., Varghese, P., and Trafton, L., ``Numerical Simulation of Enceladus Plume to Infer Physics''. Presented by Yeoh. Enceladus Focus Group 2013, Mountain View, CA, December 14th–15th.
151. Goldstein, D., White, E., Varghese, P. Brown, G, Chu, J., Kuester, M., and Sharma, A., ``I. BL perturbations introduced by distributed roughness, and II Investigation of turbulent wedge spreading mechanism." Presented by Goldstein and White, AFOSR Review Meeting, Arlington, VA, July 2014.
152. McDoniel, W.J., Goldstein, D.B., Varghese, P.L., and Trafton, L.M.. "Simulations of the Effects of Jupiter's Plasma Torus on Io's Pele Plume". Presented by McDoniel. 46th AAS Division of Planetary Sciences Mtg., November 2014. Tucson, AZ.
153. Yeoh, S. K., Goldstein, D., Varghese, P., and Trafton, L., ``Simulations of the Enceladus Plume," Presented by Goldstein. **Invited Colloquium**, Southwest Research Institute, Boulder, Sept. 18, 2014.
154. Yeoh, S. K., McDoniel, W., Goldstein, D., Varghese, P., and Trafton, L., ``Modeling multi-phase rarefied plumes into space: Examples of plumes on Jupiter's moon Io and Saturn's moon Enceladus," Presented by Goldstein. **Invited Seminar**, Dept. of Mechanical Engineering, Oct. 16, 2014.
155. Yeoh, S.K., Li, Z., Goldstein, D.B., Varghese, P.L., Levin, D.A., Trafton, L.M., 2014. "Constraining the Enceladus Plume and Understanding its Physics via Numerical Simulation from Underground Source to Infinity." Given by Yeoh. American Geophysical Union 47th Annual Fall Meeting. San Francisco, CA, December 15–19 (abstract #P51F-06).
156. Clarke, P., Varghese, P. L., and Goldstein, D., "The Discrete Velocity Method with Quantized Internal Energy," Given by Clarke. 1st Pan-American Congress on Computational Mechanics, Buenos Aires, Argentina, April 2015.
157. Varghese, P. L., Clarke, P., and Goldstein, D., "The Discrete Velocity Method for Solving the Boltzmann Equation with Quantized Internal Energy," Given by Varghese. NASA Johnson Space Center, Houston, TX, May 2015.
158. Goldstein, D., Chu, J. and Brown, G., ``Lateral spreading mechanism of a turbulent spot and a turbulent wedge.'' Presented by Goldstein, Symposium on Turbulence and Shear Flow Phenomena, July 2015.
159. Goldstein, D., White, E., and Brown, G. ``New Approached to Understanding Roughness Induced Transition,'' presented by Goldstein and White, AFOSR annual Mtg., UTSI, July 2015.

PATENTS/COPYRIGHTED SOFTWARE:

1. Engblom, W. and Goldstein, D. B., Yuceil, K. B., "Nose-Tip Surface Heat Reduction Device," patent procedures pending with UT, March 1995.
2. Engblom, W., Goldstein, D. B. and Reinecke, W., "Improved Tracking System Device," patent procedures pending with UT, May 1995.
3. Goldstein, D. B., "A Method for Reducing the Viscous Drag on a Submerged Surface," Patent 7,044,073, date of issue May 16, 2006.

CURRENT RESEARCH TOPICS:

Low Density Volcanic Plumes, Atmospheric Dynamics, and Atmospheric Emissions on Io, Enceladus, Pluto & Europa
Impacting Spacecraft on the Moon to Search for Water Ice
Lunar Exospheric Dynamics
Lunar Dust Mitigation and Rocket Plume Impingement
Boundary Layer Transition from Laminar to Turbulent Flow
Re-entry Vehicle Gas Dynamics and Heating
Turbulence Direct Numerical Simulation
Merging Continuum and Rarefied Gas Dynamics Codes
Discrete Velocity Models for the Boltzmann Equation
Baysian Estimation Methods for Inverse Problems

GRANTS AND GIFTS:

1. "Unrestricted Grant to Support CFD Research," Mitsubishi Heavy Industries, $17,000, 3/93 - 1/12.
2. "Detailed Direct Numerical Simulation of the Flow About a Helmholtz Resonator Nose Configuration," UT-Institute for Advanced Technology, $116,931, 6/93 - 8/96.
3. "Merging A Discrete Velocity Continuum Approach and the Direct Simulation Monte Carlo Approach," Center for Non-Linear Studies - Los Alamos National Lab, $1,300 travel grant, 7/94 - 8/94.
4. "Direct Numerical Simulation of the Modification of Turbulent Boundary Layer Structure with a Textured Surface," UT-URI, $11,389, Summer 1994.
5. "Direct Numerical Simulation of Turbulent Flows in Complex Geometries," Cray Research, Inc., $7,500 grant/$30,000 computer time, 1/95 - 12/95.
6. "Creating a Simple Single Computational Approach to Modeling Rarefied & Continuum Flow About Aerospace Vehicles," (with P. Varghese), NASA-JSC, $107,718 (D. Goldstein's portion), 6/95 - 6/98.
7. "Unrestricted Gift to Support Research in the Area of Computational Fluid Dynamics and Turbulence," Ormat Industries, Ltd., $5,000, 7/95-1/12.
8. "Direct Numerical Simulation of Low-Density Atmospheric Flow on Io," (with P. Varghese) NASA Planetary Atmospheres Program, $77,724, (D. Goldstein's portion), 6/96-6/98.
9. "Design and Testing of a Minimally Ablating Nose Tip," Institute for Advanced Technology, $14,192, 12/96 - 12/97.
10. "The Aerodynamics of Segmented Projectiles," (with H. Mark), Institute for Advanced Technology, $305,042, (D. Goldstein's portion), 2/97 –3/00.
11. "A Computational Investigation of MEMS," AFOSR, $123,969, 10/97 - 10/00.
12. "Creating a Simple Single Computational Approach to Modeling Rarefied & Continuum Flow About Aerospace Vehicles," (with P. Varghese), NASA-JSC, $24,575 (D. Goldstein's portion), 1/98 - 12/98.
13. University Research Internship, $19,000, 8/98 - 5/99.
14. "Design and Testing of a Nose-Cavity Configuration to Minimize Ablation of Hypersonic Projectiles," Institute for Advanced Technology, $103,015, 4/98 - 3/01.
15. "Improved Numerical Modeling of Low-Density Atmospheric Flow on Io," (with P. Varghese and D. Levin), NASA Planetary Atmospheres Program, $116,561, (D. Goldstein's portion), 1/99 – 12/01.
16. "Creating a Simple Single Computational Approach to Modeling Rarefied & Continuum Flow About Aerospace Vehicles," (with P. Varghese), NASA-JSC, $10,500 (D. Goldstein's portion), 5/99 – 4/00.
17. "Using the Impact of the Lunar Prospector into a Polar Cold Trap to Detect Water Ice," (with E. S. Barker and R. S. Nerem), NASA-HQ, $20,000 (D. Goldstein's portion), 7/99 – 7/00.
18. "Modeling and Observations of the Lunar Prospector Impact with the Moon," (with E. S. Barker and R. S. Nerem), Research Corporation, $3,333, (D. Goldstein's portion), 7/99 – 7/01.

19. "Modeling and Observations of the Lunar Prospector Impact with the Moon," (with R. S. Nerem), Dean Streetman's Matching Funds, $20,000, (D. Goldstein's portion), 1/99.
20. "Using the Impact of Lunar Prospector into a South Polar Cold Trap to Detect Water Ice," (with E. S. Barker, R. S. Nerem and S. A. Stern), NASA – Space Telescope Science Institute, $11,619, (D. Goldstein's portion requested), 6/99 – 6/01.
21. Lady Davis Fellowship, Technion, Israel Institute of Technology, $6,000 10/00 - 12/00.
22. "A Continued Computational Investigation of MEMS-Hybrid Surfaces," AFOSR, $44,375, 1/01 - 12/01.
23. "Computational Modeling of MEMS Microjets for Turbulent Boundary Layer Control," AFOSR, $158,175, 1/02 – 12/04.
24. Modeling of HST Observations of O(I) Emissions of Io in Eclipse," STScI, (with Varghese & Staplefeldt), $27,777 (Goldstein's portion), 8/02 – 7/04.
25. "Numerical Modeling of Particulates in Ionian Volcanic Plumes: Process vs. Composition," NASA Planetary Atmospheres (with Varghese and Trafton), $140,625 (PI Goldstein's portion), 5/02 – 4/06.
26. Viscous Drag and Heat Transfer Modeling of Windage Flow," Lockheed Martin/CEM (with Fasel), $80,000 (Goldstein's portion), 1/02 – 6/03.
27. University Research Internship, $22,000, 8/02 – 8/03 (unfilled so lost).
28. "Unrestricted Gift to Support Research on Aircraft Icing," (with R. Stearman), Wolk Law Firm, $95,000 (Goldstein's portion), 6/03 – 5/12.
29. "A Trapped Bubble Array for Reducing the Viscous Drag on a Submerged Surface," State of Texas ATP, $130,000, 1/04 – 8/07.
30. "Direct Numerical Simulation of Comet Impacts and Low Density Atmospheric Flow on the Moon and the Effects on Ice Deposition in Cold Traps," NASA Planetary Atmospheres, (with E. Pierazzo and A. Stern), grant total $204,000 ($183,000 PI Goldstein's portion), 6/1/04 – 1/15/08.
31. "Electron Impact Simulations of Io's Atmosphere," NASA STScI, (with PI L. Trafton and Co-I P. Varghese), $20,000 (Co-I Goldstein's portion), 8/1/04 – 8/06.
32. "DNS for New Applications of Surface Textures and MEMS Actuators for Turbulent Boundary Layer Control," AFOSR, grant $113,419, 3/05 – 12/06.
33. "Numerical Modeling of Io's Atmosphere," (with Co-Is D. Levin, L. Trafton and P. Varghese), NASA Planetary Atmospheres, total grant $360,000, (PI Goldstein's portion $93,189), 1/8/05 – 1/1/09.
34. Graduate Recruitment Fellowship, $10,000, 9/1/05 – 8/31/06.
35. "The use of arbitrary post-collision velocities in a discrete velocity scheme for the Boltzmann equation to solve micro-scale flow problems," UT Research Grant, (PI) $6,000, 11/06-8/07.
36. "Transient boundary layer disturbance growth and bypass transition due to realistic roughness and continued study of transition over riblets," AFOSR, (PI, but coordinated with joint work by E. White), $270,660 est, 6/07-5/10.
37. "Modeling Non-equilibrium Flow Around Small Surface Irregularities Below a Hypersonic Boundary Layer," NASA-Hypersonics NRA, (PI with co-PI P. Varghese), $137,430 (Goldstein's portion) 1/08-12/11.
38. "3-D simulations of plume dynamics on Enceladus," NASA Cassini Data Analysis Program, (PI with co-Is P. Varghese and L. Trafton), $75,000 (Goldstein's portion), 5/08-4/11.
39. "Center for predictive simulation of vehicle reentry," DOE/NNSA ASC PSAAP, (co-I among many with R. Moser as PI), $450,000 (Goldstein's portion, rough estimate), 4/08-3/13.
40. "Simulations of Cassini/Galileo nightside and eclipse observations of Io's aurorae," NASA Outer Planets Research Program, (co-I with PI L. Trafton and co-I P. Varghese), $100,000 (Goldstein's portion), 4/08-3/11.
41. "Simulation of the Effects of Vent Geometry and Canopy Interactions on the Plumes and Deposits on Io," NASA Planetary Atmospheres Program, (PI with co-Is P. Varghese, L. Trafton, and S. Kieffer), $105,600 (Goldstein's portion), 1/08-12/11.
42. "Direct numerical simulation of the gasdynamics of the LCROSS impact," NASA Ames Research Center, (PI with co-Is P. Varghese and L. Trafton), $30,500 (Goldstein's portion), 7/08-6/12.
43. "Simulation of Rocket Plume Impingement and Dust Dispersal on the Lunar Surface," NASA LASER Program, (PI with co-Is P. Varghese and L. Trafton), $216,000 (Goldstein's portion), 7/08-6/14.
44. "Transient boundary layer disturbance growth and bypass transition due to realistic roughness and continued study of transition over riblets," AFOSR, (PI, but coordinated with joint work by E. White), $248,000, 8/08-11/10.
45. "Direct Numerical Simulation of Comet Impacts and Low Density Atmospheric Flow on the Moon and the Effects on Ice Deposition in Cold Traps – Phase 2" NASA LASER , (with Co-Is P. Varghese, L. Trafton and E. Pierazzo), grant total, $458,619 ($189,000 PI Goldstein's portion), 6/15/09 – 6/14/14.

46. "Simulation of Io's Atmosphere", NASA Outer Planets Research, (with Co-Is P. Varghese, L. Trafton and D. Levin), grant total $615,228 ($147,000 PI Goldstein's portion), 8/2009-8/2014.
47. "Modeling the Plumes on Enceladus," (PI with co-PIs P. Varghese and L. Trafton at UT and D. Levin at Penn State (on a separate proposal)). NASA Cassini Data Analysis Program and Planetary Atmospheres, grant total $285,717 ($128,683, Goldstein's portion), 5/10-4/14
48. ``Simulation of 3-D effects in the hydrodynamic escape and the gas dynamics of the Pluto-Charon system," (PI with co-PIs P. Varghese and L. Trafton). NASA Planetary Atmospheres, grant total $445,000 ($177,000, Goldstein's portion), 1/11-1/15.
49. "Boundary layer transition over textured surfaces," (PI with co-PIs E. White (at TAMU) and P. Varghese), AFOSR, total UT portion $255,874 ($179,112, Goldstein share) 7/11-9/14.
50. ``Understanding the LCROSS impact event and characterizing the nature of the permanently shadowed region on the Moon," (co-PI with PI J. Heldmann and co-PIs A. Colaprete, P. Varghese, L. Trafton, D. Wooden and K. Ennico) NASA LASER , Oct. 2012-Sept. 2015 $316,711 ($138,73 Goldstein's share).
51. ``Wall turbulence with designer properties: Identification, characterizations & mechanical manipulation of energy pathways,'' (co-PI with PI B. McKeon and co-PIs J. Tropp and M. Sheplak) AFOSR BRI Program. $356,502 (Goldstein's share) 10/12-11/15.
52. "A Novel Highly Efficient Scheme for the Boltzmann Equation-1," NASA NSTRF for student Peter Clark $198,000, (co-PI, with PI P. Varghese) (Goldstein's share $99,000), 8/1/2011 – 7/31/2015.
53. "Coupled 3-D Simulations of Io's Plumes and Sublimation Atmosphere," NASA, $90,000, (Goldstein's share $45,000), (co-PI, with PI P. Varghese), 9/1/2012-8/31/2015.
54. ``Application of the MCMC Method for the Calibration of DSMC Parameters to NASA EAST Results for Ionizing, Radiating Hypersonic Flows,'' NASA NSTRF14 $204,000, for student Kyle Higdon, (PI with co-PI P. Varghese) (Goldstein's share $102,000), 8/1/2014-7/31/2017.
55. ``Numerical Modeling of Europa Plumes,'' JPL/NASA $90,068 (PI with co-PIs P. Varghese and L. Trafton) (Goldstein's share $40,850) July 31, 2014-Sept. 30, 2015.
56. ``An investigation into the unsteadiness of Tvashtar's plume,'' $427,390, NASA OPR (co-PI with PI L. Trafton and co-PI P. Varghese) (Goldstein's share $111,000) 2014-2017.
57. ``Highly efficient numerical solution of the Boltzmann equation for practical applications,'' $316,371 NSF (co-PI, PI P. Varghese) (Goldstein's share $158,185). July 2014 – June 2017.
58. Faculty Research Assignment for autumn, 2014. UT-CSE, Teaching release.
59. ``New Approaches to Understanding Roughness Induced Transition." AFOSR. (PI with co-I E. White from TAMU), $535,774, Start 90 day prior to Sept 1., 2015 – 2018.
60. ``Simulating Regolith Excavation, Entrainment, Dispersal and Visibility Impairment due to Rocket Plume-Surface Interaction via a Hybrid Continuum-Rarefied Flow Solver,'' NASA NSTRF15 for student Jared Berg, $296,000 (est), (PI with co-PI P. Varghese), 8/2015-7/2019.

COMPUTER TIME GRANTS:

1. "Direct Numerical Simulation of Hypersonic Flows,"(with P. Varghese), NASA - NAS Supercomputer Center, $50,000 Cray time, 3/93 - 2/94.
2. "Direct Numerical Simulation of Turbulent Flows in Complex Geometries," NSF/Pittsburgh Supercomputer, $68,000, Cray time, 10/93 - 10/94.
3. "Direct Numerical Simulation of Hypersonic Flows," (with P. Varghese), NASA - NAS Supercomputer Center, $30,000, Cray time, 3/94 - 2/95.
4. "Direct Numerical Simulation of Turbulent Flows in Complex Geometries," Cray Research, $40,000 Cray YMP time at CHPC, 5/94 - 12/94.
5. "Direct Numerical Simulation of Turbulent Flows in Complex Geometries," UT High Performance Computer Time Grant, $42,000 (3 grants of $10,000, $23,000 and $9,000) in computer time, 4/95 - 8/97.

TELESCOPE TIME GRANTS AT MAJOR OBSERVATORIES:

1. "Using the Impact of Lunar Prospector into a South Polar Cold Trap to Detect Water Ice," (with E. S. Barker, R. S. Nerem and S. A. Stern), NASA – Space Telescope Science Institute, time granted: 3 orbits of Hubble Space Telescope for OH Spectroscopic Observations.

2. "Using the Impact of Lunar Prospector into a South Polar Cold Trap to Detect Water Ice," (with E. S. Barker, T. Bida, R. S. Nerem and T. Morgan), Keck Observatory, time granted: 1 night on Keck 1 for OH Spectroscopic Observations.
3. "Using the Impact of Lunar Prospector into a South Polar Cold Trap to Detect Water Ice," (with E. S. Barker, R. S. Nerem, C. Allende and T. Farnham), McDonald Observatory, time granted: 3.5 nights on 2.1m, 2.5 nights on 2.7m and 1 night on 0.9m telescopes for spectroscopy and imaging.
4. Observing Time for the LCROSS Impact Event. Gemini North, Keck Observatory, IRTF and Hubble Space Telescope. Various time allocations, 5/09-10/09.

Proposals (Pending):

``Integrated numerical modeling of Enceladus plumes to constrain the nature of plume origin", (PI with co-PIs P. Varghese and L. Trafton), NASA CDAP program, grant request $433,796.

``Practical means of control of near-wall turbulence,'' (PI with co-PI B. McKeon), AFOSR, grant request $819,794.

``Application of the DSMC Method to Modeling Upper Atmospheres of Terrestrial Planets: First Target is Earth.'' (PI with co-PIs P. Varghese, L. Trafton and Walker, A.), NASA LWS program, grant request $600,463.

CONTINUING EDUCATION:

Workshops

Goldstein, D., "Simulations of Volcanic Plumes and Aurora on Io by the ASE/Astro Io Group," Io Volcano Workshop, **Invited Talk**, Boulder, CO, June 8, 2005.

Io Workshop, Boulder CO, Oct. 2013.

Goldstein, D., Varghese, P. Trafton, L., Yeoh, S., McDoniel, W., Prem, P., Hoey, W., Flemming . T.. ``Eruptions and Atmospheres – Analogies to other Satellites.'' **Invited Talk**. Europa Plume Advisory Mtg., JHU APL, Columbia, MD. June 2, 2014

ADDITIONAL TEACHING ACTIVITIES:

AIAA Faculty Advisor. Hosted and took students to student paper competition; organized "Face to Face" sessions; was corporate recruiter interface, 1993-97.

Created New Course - "Lagrangian Methods in Computational Fluid Dynamics" - offered for first time in Fall 1994.

Arranged development/purchase/installation of undergraduate water tunnel facility, Spring 1996-98.

Revised "Molecular Gas Dynamics" Spring 1994.

Fluid Mechanics Curriculum Committee - revising undergraduate courses.

Faculty Mentor - for freshmen, 1993, 1995, 2001.

New Faculty Teaching Seminars - August 16-18, 1993.

Participated in Equal Opportunity in Engineering, World of Engineering Program, October 1996.

Goldstein, D. B., "Impacting Lunar Prospector in a Cold Trap to Detect Water Ice," Orbital Mechanics Seminar.

Arranged development/purchase/installation of Laser Doppler Anemometer, Spring 2000

Provided several tours to FIG, WEP, etc., groups of wind/water tunnels, 2001-03.

Organized some Fluid Mechanics Seminars, 1994-present.

Taught classes on simple machines, the Wright Brothers, and liquid nitrogen magic at local elementary schools, 2003-04.

Presented classes on forensic science at local elementary schools, 2004-05.

Taught three modeling classes on Monte Carlo methods, kinetic models and applications, Sept. 27-Oct. 1, 2004

Worked with C. Tinney to revise Incompressible Flow Lab, (ASE 120k) and ASE 320

Organized WEP, FIG, ExploreUT and other visitor tours of wind/water tunnels. Two days of lectures to MITE (minority student recruits). Tours for LBJ students, and S. Kitten's advanced students class.

PH.D. SUPERVISIONS COMPLETED:

1. Engblom, William, "Numerical Investigation of Hypersonic Flow Over a Forward-Facing Cavity," Summer 1996.
2. Roveda, Roberto, (Co-supervised with P. Varghese). "A Combined Discrete Velocity/Particle Based Numerical Approach for Continuum/Rarefied Flows," Summer 2000.

3. Silton, Sidra, “Ablation Onset in Unsteady Hypersonic Flow About Nose-Tips with A Forward-Facing Cavity,” Spring 2001.
4. Zhang, Ju, (Co-supervised with P. Varghese). “Simulation of Gas Dynamics, Radiation, and Particulates in Volcanic Plumes on Io,” Spring 2004
5. Lee, Conrad, Y., “Direct Numerical Simulation of Microjets for Turbulent Boundary Layer Control,” Summer 2004.
6. Stewart, Benedicte, `` Numerical simulations of the flow produced by a comet impact on the Moon and its effects on ice deposition in cold traps,” Spring, 2010.
7. Moore, Chris H. (Co-supervised with P. Varghese). ``Monte Carlo simulation of the Jovian plasma interaction with Io’s atmosphere and the resultant aurora during eclipse’’ Summer, 2011.
8. Strand, James ``Statistical Methods for the Analysis of DSMC Simulations of Hypersonic Shocks”, Spring 2012.
9. Stephani, Kelly (Co-supervised with P. Varghese). ``Development of a Hybrid DSMC/CFD Method for Hypersonic Boundary Layer Flow Over Discrete Surface Roughness’’, Spring 2012.
10. Walker, Andrew (Co-supervised with P. Varghese). `` A Comprehensive Numerical Model of Io’s Chemically-Reacting Sublimation-Driven Atmosphere and its Interaction with the Jovian Plasma Torus”, Spring, 2012.
11. Morris, Aaron (Co-supervised with P. Varghese). ``Simulation of Rocket Plume Impingement and Dust Dispersal on the Lunar Surface”, Spring, 2013.
12. Yeoh, Seng Keat (Co-supervised with P. Varghese). ``On Understanding the Physics and Source Conditions of the Enceladus South Polar Plume via Simulation,’’ Spring, 2015.

M.S. SUPERVISIONS COMPLETED:

1. Silton, Sidra, “A Combined Numerical and Experimental Investigation of a Forward-Facing Cavity for the Reduction of Nose Tip Ablation of a Hypersonic Projectile,” Fall 1997
2. Young, David, “A Computational Study of Unsteady Hypersonic Segmented Projectile Aerodynamics,” Fall 1999
3. Shim, Jeong Yeon, “The Numerical Study of the Temporal Evolution of the Lunar Exosphere,” Summer 2001
4. Larignon, Benedicte, “Numerical Simulations of the Compressible Flow between Concentric Cylinders using an External Force Field in a Pseudo-spectral Code,” Spring 2004.
5. Colmenero, Gerardo, “Turbulent Boundary Layer Control with Discrete Actuators Using Wall Information,” Fall 2004.
6. Marr, Kevin, “Drag Reduction on a Flat Plate by Trapping Bubbles on the Surface,” Summer, 2005
7. Stephani, Kelly, “Drag Reduction Using Trapped Bubbles on a Submerged Flat Plate Surface,” Fall 2006
8. Strand, James, “DNS of Surface Textures to Control the Growth of Turbulent Spots,” Fall 2007
9. Morris, Aaron, “Investigation of a Discrete Velocity Monte Carlo Boltzmann Equation Solver”, Spring 2009
10. Doolittle, Charles, ``Near-field flow structures and transient growth due to subcritical surface roughness,” Spring, 2010.
11. Hegermiller, David, ``A New Method to Incorporate Internal Energy in the Context of a Discrete Velocity Monte Carlo Boltzmann Equation Solver’’ Summer, 2011.
12. Drews, Scott. ``Direct Numerical Simulations of Flow Past Quasi-Random Distributes Roughness’’. Spring, 2012.
13. Hawkins, Aaron. Research that ended with a coursework MS, Summer 2013.
14. Lamb, Justin. ``Parametric study of LCROSS impact plume,’’ Spring, 2014.
15. Higdon, Kyle. Coursework MS, Spring 2014.

Ph.D.’s IN PROGRESS:

McDoniel, William (Co-supervised with P. Varghese)
Higdon, Kyle(Co-supervised with P. Varghese)
Prem, Parvathy (Co-supervised with P. Varghese)
Hoey, William (Co-supervised with P. Varghese)
Yeoh, Seng (Co-supervised with P. Varghese)

M.S.’s IN PROGRESS:

Poondla, Yasvanth (Co-supervised with P. Varghese)
Berg, Jared (Co-supervised with P. Varghese)

Chu, Jeff
Peter Clarke (Co-supervised with P. Varghese)

Post-doctoral Research Fellows:

Dr. Soyoung You, 2015+
Dr. Arjun Sharma, 2012-2015
Dr. Amanda Zangari, 2013 (2 weeks)
Dr. Seng Yeoh, 2015+

OTHER STUDENT RESEARCH COMMITTEES (Current):

Ph.D. – 4 (Mula, Lietz, Heye, Stephenson, Karpatne, 2 in ME, 1 in ICES)
M.S. – 0

OTHER RESEARCH SUPERVISION

Weber, George, Ph.D. research on virtual surface methods at Brown University, 1991-92.
Kwong, Sunny, undergraduate research on 3D turbulent flow visualization, Spring, Summer 1994.
Phillips, Wyatt, undergraduate research on low density plumes, 1994-1996. Cornell
Dunn, John, undergraduate and graduate research on hot spot impingement onto missile nose, Summer 1996-December 1997. Dunn won 1st place in AIAA student paper competition for write-up of our work and presented it at Reno, 1998. UT
Barth, William, undergraduate research on experimental study of sloshing flow, Summer 1996. UT
Meyer, Alex and Niedzwiecki, Chris, undergraduate project on wind tunnel flow improvement, Fall 1996.
Melhaff, Chris, undergraduate research on vortex ring simulation, Spring/Fall 1997.
Holt, G., Wagner, I., Bronstad, D. and Grahame, E., prepared undergraduate paper on segmented projectiles for AIAA Student Paper Competition, Spring 1999.
Braun, A. and Fitzgerald, T., prepared undergraduate paper on surface textures for viscous drag reduction for AIAA Student Paper Competition, Spring 1999.
Graham, S. and Mouton, C., prepared undergraduate paper on surface textures for viscous drag reduction for AIAA Student Paper Competition, Spring 2000.
Mouton, C., Undergraduate paper on simulations of comet impacts on the moon, Fall/Spring 2000-2001. Caltech
Moore, Chris, Undergraduate Assistant, Fall, Spring 2002, Graduate Research Assistant Summer 2003. Co-supervising (with P. Varghese) working on particulate condensation in rarefied plumes, Sp. 2002- 6/03. UT
Anderson, M., Diaz, R., Foxworth, J. and Thompson, J, Undergraduate Volunteer Researchers preparing experimental paper on viscous drag on a bubble-coated plate, Summer 2001 – 6/03.
Liu, Ignatius, Undergraduate Volunteer Researcher preparing experimental paper on flow about rotating sphere, Summer 2001-1/03.
Shinagawa, Yuto, Undergraduate Research Assistant, examining unsteady 3D CFD solutions and aircraft icing, Summer 2002-03. UT/MIT
Marr, Kevin, Undergraduate Research Assistant, developing rarefied gas solutions for Taylor-Couette flow and aircraft icing, Spring 2002-Winter 2003. UT/Michigan
Trueblood, Natasha, Undergraduate Research Assistant, library survey of drag reduction via bubbles, Spring 2004.
Marder, Philip, Undergraduate Research Assistant, modeling free molecular gas flow on the Moon, 2003-05.
Foxworth, Josh, R. Stearman's graduate student, but I helped supervise some research, 2004-2005.
Newman, Clark, Undergraduate Research Assistant, modeling free molecular gas flow on the Moon, 2005.
Jackson, Matthew, Undergraduate Research Assistant, simulations of turbulent boundary layers, 2005-2006, GTech
McCarty, Travis, Undergraduate Research Assistant, commercialization of bubble coatings, 2005-2006. NI
Endhrun, Claus, Stearman's graduate student, but I helped supervise some research, 2005-2006.
Albright, Javan M., Undergraduate Research Assistant, simulations of turbulent boundary layers, 2006-2007. UT
Summy, Dustin, paid Undergraduate Research Assistant, simulations of lunar impacts, 2008-10 (co-supervised with P. Varghese), Caltech
Hanna, Ben, paid Undergraduate Research Assistant, "Simulations of plumes on Enceladus," 2008-9 (co-supervised with P. Varghese), UT
Kizer, Justin, paid Undergraduate Research Assistant, "Simulations of plumes on Enceladus," 2009 (co-supervised with P. Varghese), GTech

Chapman, Todd, paid Undergraduate Research Assistant, “Simulations of plumes on Enceladus,” 2010-2011 (co-supervised with P. Varghese), Stanford, NDSEG

Asturias, Daniel, paid Undergraduate Research Assistant, “Simulations of LCROSS impact on the Moon,” 2011-2012(co-supervised with P. Varghese), Stanford

Kalb, Michael, paid Undergraduate Research Assistant, “Simulations of sputtered atmosphere on Europa,” 2010 (co-supervised with P. Varghese), TFA

Ellis, Josh, HS student RA, ``Simulations of LADEE plume impacts on the Moon,'' Summer 2011, (co-supervised with P. Varghese), Princeton

Knerr, Nathan , paid Undergraduate Research Assistant, “Simulations of Pluto’s Atmosphere,” 2011- 2013 (co-supervised with P. Varghese), Cornell

Flemming, Thaddeus, paid Undergraduate Research Assistant, “Simulations of Pluto’s Atmosphere,” 2013-2014 (co-supervised with P. Varghese)

Puccini, Gabriel, paid Undergraduate Research Assistant, “LCROSS Gas Plume,” 2014-2015 (co-supervised with P. Varghese)

Harmon, Ryan, paid Undergraduate Research Assistant, “Simulations of the Escape of Pluto’s Atmosphere,” 2014-2015 (co-supervised with P. Varghese)

Lin, Chin, paid Undergraduate Research Assistant, “Plasma Based Shear Stress Sensor,” 2014 (co-supervised with L. Raja)

David B. Goldstein, Professor
The University of Texas at Austin
Department of Aerospace Engineering
and Engineering Mechanics

Dr. David B. Goldstein received a Bachelor of Science in Engineering Physics from the Mechanical and Aerospace Engineering Department of Princeton University in 1984. He obtained a M.S. and Ph.D. from the Aeronautics Department of the California Institute of Technology in 1985 and 1990, respectively. His graduate research involved simulation of non-equilibrium supersonic flows on massively parallel computers with the direct simulation Monte Carlo and discrete-velocity molecular models. During 1990 he served as a Research Fellow at Caltech, working with Prof. Brad Sturtevant. From Sept. 1990 to Sept. 1992 Dr. Goldstein served as a Research Associate at the Center for Fluid Mechanics at Brown University and developed a method for modeling solid surfaces in an unsteady flow. He investigated turbulent channel flow with spectral method simulations using this model. During this time he also expanded a model of discrete-velocity molecular dynamics to include discrete-energy collision dynamics of polyatomic molecules. For the remainder of 1992 Dr. Goldstein was a Visiting Researcher at Mitsubishi Heavy Industries' Advanced Technology Research Center in Yokohama. There he worked on moving boundary problems related to flow induced structural oscillation.

In 1993 Dr. Goldstein was appointed as an Assistant Professor in the Department of Aerospace Engineering and Engineering Mechanics at The University of Texas at Austin. In 1998 he was promoted to Associate Professor effective September 1999. In 2004 he was promoted to Professor effective September 2005. His teaching involves undergraduate and graduate classes in fluid mechanics. His research interests continue to be centered on the fundamental physics of high speed and non-equilibrium flows and the direct numerical simulation of turbulent flows in complex geometries. His work on rarefied flow involves developing efficient models for extending rarefied flow simulations far into the continuum flow regime, investigating the physics of a discrete-velocity gas and modeling the supersonic atmospheric flow and radiation on several planets and moons. In addition, he is interested in drag reduction techniques in turbulent boundary layers through surface modifications (i.e., riblets, bubbles or microjets) and the use of force fields in spectral method techniques to model solid surfaces. Dr. Goldstein is doing experiments in the water tunnel and has worked in the Mach 5 facility and the 5′ x 7′ low speed wind tunnel at PRC. In 1999-2000 Dr. Goldstein led an interdisciplinary team searching for water in permanently shadowed craters on the Moon and is continuing such work as a member of NASA'S LCROSS Science Team.