

Curriculum Vitae

Gustaaf B. Jacobs

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Professional Preparation

Ph.D. 2003, Mechanical Engineering, University of Illinois at Chicago.

M.S. 1998, Aerospace Engineering, Delft University of Technology.

Appointments

- Fall 2006-present, **Assistant Professor**, Department of Aerospace Engineering and Engineering Mechanics, San Diego State University.
 - Fall 2006-present, **Adjunct Assistant Professor**, Computational Science Research Center, San Diego State University.
 - Fall 2003-Summer 2006, **Visiting Assistant Professor**, Division of Applied Mathematics, Brown University.
 - Fall 2004-Summer 2006, **Postdoctoral Associate**, Department of Mechanical Engineering, Massachusetts Institute of Technology.
 - Fall 2000 - Spring 2003, **Research Assistant**, Department of Mechanical Engineering, University of Illinois at Chicago.
 - Fall 1999-Spring 2000, **Research Assistant**, Department of Mechanical Engineering, University of Hawaii at Manoa.
 - March 1999-July 1999, **Technical Analyst**, Technical Analysis, DAF Trucks, Eindhoven, The Netherlands.
 - October 1998-February 1999, **Added Researcher**, Faculty of Aerospace Engineering, Delft University of Technology.
 - April 1997-August 1997, **R&D Intern**, R&D, Organon-Teknika, AKZO-Nobel, Boxtel, The Netherlands.
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Publications

In preparation

1. Jacobs, G.B, Lapenta, G., Hesthaven, J.S., "Characteristics of a High-Order Particle-in-Cell Method for Simulation of Plasmas."
2. Jacobs, G.B., Hesthaven, J.S., "Flexible High-Order Temporal Integration of High-Order Particle-Mesh Methods."

Completed Manuscripts

1. Weldon, M., Peacock, T., Jacobs, G.B., Haller, G., "Fixed Separation in in the Rotor-Oscillator Flow", J. Fluid Mech., - submitted (2007).
2. Surana, A. Jacobs, G.B., Grunberg O., Haller G. "Exact Theory of Three-Dimensional Flow Separation. Part II: Fixed Unsteady Separation", Phys. Fluids - submitted (2007).

Journal Publications

1. Shah, P., Rovagnati, B., Mashayek, F., Jacobs, G.B., "Subsonic Compressible Flow in Two-Sided Lid-Driven Cavity. Part II: Unequal Wall Temperatures", Int. J. Heat and Mass Transf., 50, 4219-4228, 2007.
2. Shah, P., Rovagnati, B., Mashayek, F., Jacobs, G.B., "Subsonic Compressible Flow in Two-Sided Lid-Driven Cavity. Part I: Equal Wall Temperatures", Int. J. Heat and Mass Transf., 50, 4206-4218, 2007.
3. Jacobs G.B., Kopriva D.A., Mashayek F., "Towards Efficient Tracking of Inertial Particles with High-Order Multidomain Methods, J. Comp. and Appl. Math., 206, 392-408, 2007.
4. Surana, A., Jacobs G.B., Haller, G., "Extraction of Separation and Reattachment Surfaces from 3D Steady Shear Flows", AIAA J., 45 (6), 1290-1302, 2007.
5. Jacobs G.B., Kopriva D.A., Mashayek F., "A Conservative Isothermal Wall Boundary Condition for the Compressible Navier-Stokes Equations", J. Sci. Comput., 30 (2), 177-192, 2007.
6. Kilic M.S., Jacobs G.B., Hesthaven J.S., Haller G., "Reduced Navier-Stokes Equations near a Flow Boundary", Physica D, 217 (2), 161-185, 2006.
7. Jacobs G.B., Hesthaven J.S., "High-Order Nodal Discontinuous Galerkin Particle-In-Cell Method on Unstructured Grids", J. Comp. Phys., 214 (1), 96-121, 2005.
8. Jacobs, G.B., Kopriva, D.A., and Mashayek, F., "Validation Study of a Multidomain Spectral Code for Simulation of Turbulent Flows", AIAA J., 43 (6), 1256-1264, 2005.
9. Jacobs, G.B., Kopriva, D.A., and Mashayek, F., "Compressible Subsonic Particle-Laden Flow over a Square Cylinder", AIAA J. of Prop. and Power, 20 (2), 353-360, 2004.
10. Jacobs, G.B., Kopriva, D.A. and Mashayek, F., "A Comparison of Outflow Boundary Conditions for the Multidomain Staggered-Grid Spectral Method", Num. Heat Transfer, Part B, 44: 225-251, 2003.
11. Mashayek, F. and Jacobs, G.B., "Temperature-Dependent Reaction in Droplet-Laden Homogeneous Turbulence", Num. Heat Transfer, Part A, 39:101-121, 2001.

Book Chapter

1. Jacobs, G.B., Pandya, R.V.R., Shotorban, B., Gao, Z., and Mashayek, F., *"Deterministic and Probabilistic Approaches for Prediction of Two-Phase Turbulent Flow in Liquid-Fuel Combustors"*, in Roy, G.D., editor, *Combustion Processes in Propulsion*, Chapter 3, Elsevier Science and Technology Bookstore, 2005.

Conference Papers (Peer reviewed)

1. Jacobs, G.B. *"Inertial particle behavior in a separated, turbulent flow"*, AIAA Paper 2008-1159, 2008.
2. Sengupta, K., Mashayek, M., Jacobs, G.B., *"Direct simulation of turbulent flows using spectral methods"*, AIAA Paper 2008-1450, 2008.
3. Jacobs, G.B., Surana, A., Peacock, T., Haller, G. *"Identification of Flow Separation in Three and Four Dimensions"*, AIAA Paper 2007-1171, 2007.
4. Sengupta, K., Jacobs, G., and Mashayek, F., *"Large eddy simulation using a high-order nodal discontinuous Galerkin method on unstructured grids"*, AIAA 2007-402.
5. Sengupta, K., Jacobs, G., and Mashayek, F., *"Large eddy simulation using a high-order nodal discontinuous Galerkin method on unstructured grids"*, ASME Paper IMECE-2006-16050, American Society for Mechanical Engineers, 2006.
6. Jacobs, G.B., Lapenta, G., Hesthaven, J.S. *"Simulations of Plasmas with a High-Order Discontinuous Galerkin Particle-In-Cell Solver"*, AIAA Paper 2006-1171, 2006.
7. Jacobs, G.B., Kopriva, D.A. and Mashayek, F., *"Validation Study of a Multidomain Spectral Method for Simulation of Turbulent Flows"*, AIAA Paper 2004-0659, 2004.
8. Jacobs, G.B., Gao, Z., Pandya, R.V.R., Shotorban, B., Mashayek, F., *"Numerical Simulation of Two-Phase Flows, Prediction/Control of Combustion in Liquid-Fuel Combustors"*, International Colloquium on Combustion Control, Cranfield, UK, August 2003.
9. Jacobs, G.B., Kopriva, D.A. and Mashayek, F., *"Compressibility Effects on the Subsonic Two-Phase Flow over a Rectangular Cylinder"*, AIAA Paper 2002-3595, 2002.
10. Jacobs, G.B., Kopriva, D.A. and Mashayek, F., *"Outflow Boundary Conditions for the Multidomain Staggered-Grid Spectral Method for the Navier-Stokes Equations"*, AIAA Paper 2002-0903, 2002.
11. Mashayek, F., Pandya, R.V.R., Jacobs, G.B. and Liao, S., *"Two-Phase Models Assessment via DNS"*, The 2nd International Symposium on Turbulence and Shear Flow Phenomena, Stockholm, Sweden, June 27-29, 2001.
12. Jacobs, G.B., Kopriva, D.A. and Mashayek, F., *"A Particle-Tracking Algorithm for the Multidomain Staggered-Grid Spectral Method"*, AIAA Paper 2001-0630, 2001.

Other Conference Papers and Abstracts

1. Jacobs, G.B., *"Inertial Particle Behavior in Unsteady Separated Flow"*, APS Division of Fluid Dynamics 58th Annual Meeting, Salt Lake City, UT, Nov. 2007.
2. Sengupta, K., Jacobs, G.B., Mashayek, F., *"Large Eddy Simulation Using a Multidomain Spectral Method"*, APS Division of Fluid Dynamics 58th Annual Meeting, Salt Lake City, UT, Nov. 2007.
3. Kilic, M., Jacobs, G.B., Haller, G., *"Reduced Navier-Stokes Equations Near a Flow Boundary"*, APS Division of Fluid Dynamics 58th Annual Meeting, Chicago, IL, Nov. 2005.

4. Jacobs, G.B., Hesthaven, J.S., " *Flexible high-order temporal integration for high-order particle-in-cell methods* ", ICOSAHOM 07, Beijing, China, June 2007.
5. Jacobs, G.B., Narayan, A., Hesthaven, J.S., " *Temporal and Spatial Adaptivity in High-Order Discontinuous Galerkin Particle-In-Cell Methods*", SIAM Annual Conference, Boston, MA, July 2006.
6. Jacobs, G.B., Mashayek, F., Kopriva, D.A., " *Turbulent subsonic particle-laden flow over an open backward-facing step with and without countercurrent shear at $Re=3000$* , APS Division of Fluid Dynamics 58th Annual Meeting, Chicago, IL, Nov. 2005.
7. Shah, P., Mashayek, F., Jacobs, G.B., " *Subsonic Compressible Flow in Two-Sided Lid-Driven Cavity*", APS Division of Fluid Dynamics 58th Annual Meeting, Chicago, IL, Nov. 2005.
8. Kilic, M., Jacobs, G.B., Haller, G., " *Reduced Navier-Stokes Equations Near a Flow Boundary*", APS Division of Fluid Dynamics 58th Annual Meeting, Chicago, IL, Nov. 2005.
9. Jacobs, G.B., Shotorban, B., Gao, Z., Pandya, R.V.R., and Mashayek, F., " *Numerical Simulation of Controlled Liquid-Fuel Combustors*", Proceedings of the 16th ONR Propulsion Meeting, Los Angeles, CA, June, 2003.
10. Jacobs, G.B., Pandya, R.V.R., Shotorban, B., Gao, Z., and Mashayek, F., " *Deterministic and Probabilistic Approaches for Prediction of Two-Phase Turbulent Flow in Liquid-Fuel Combustors*", Proceedings of the 15th ONR Propulsion Meeting, Washington, DC, August 5-7, 2002.
11. Mashayek, F., Pandya, R.V.R., Jacobs, G. B., and Shotorban, B., " *A Review of State-of-the-Art Computational Techniques to Study Heterogeneous Mixing Relevant to Deflagration and Detonation*", International Colloquium on Advances in Confined Detonations, Moscow, Russia, July 2-5, 2002.
12. Jacobs, G.B. and Mashayek, F., " *Droplet Dispersion in the Wake of a Square Cylinder at Low Reynolds Number*", The Proceedings of the 15th Annual Conference on Liquid Atomization and Spray Systems, Madison, WI, May 2002.
13. Jacobs, G.B., Pandya, R.V.R. and Mashayek, F., " *Simulation and Modeling of Two-Phase Turbulent Flows for Prediction and Control of Combustion Systems*", The Proceedings of the 14th ONR Propulsion Meeting, Chicago, IL, August 8-10, 2001.
14. Jacobs, G.B., Pandya, R.V.R. and Mashayek, F., " *Simulation and Modeling of Two-Phase Turbulent Flows for Prediction and Control of Combustion Systems*", The Proceedings of the 13th ONR Propulsion Meeting, Minneapolis, MN, August 10-12, 2000.

Presentations

Invited Seminars

2006-2007 UC San Diego, UC Irvine, UC Los Angeles, University of Twente

2005-2006 Clemson University, University of Connecticut, University of Waterloo, Wright State University, San Diego State University, University of Texas at El Paso, University of Colorado at Denver

2004-2005 MIT, Los Alamos National Laboratory, University of Illinois at Chicago

2003-2004 Brown University

Conference

- 2007 Jan.** *"Identification of Flow Separation in Three and Four Dimensions"*, 45th AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV.
- 2007 July** *"Temporal and spatial adaptivity in high-order discontinuous Galerkin particle-in-cell methods"*, SIAM Annual Meeting, Boston, MA.
- 2006 Jan.** *Simulations of Plasmas with a High-Order Discontinuous Galerkin Particle-in-Cell Solver*, 44th AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV.
- 2005 Nov.** *Turbulent Subsonic Particle-Laden Flow over an Open Backward-Facing Step with and without Countercurrent Shear at $Re=3000$* , APS Division of Fluid Dynamics 58th Annual Meeting, Chicago, IL.
- 2004 June** *High-Order Particle-In-Cell Methods*, International Conference on Spectral and High-Order Methods (ICOSAHOM), Brown University, Providence, RI.
- 2003 Jan.** *A Validation Study of a Multidomain Spectral Code for Simulation of Turbulent Flows*, 42nd AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV.
- 2003 July** *Compressibility Effects on the Subsonic Two-Phase Flow over a Square Cylinder*, 38th AIAA/ASME/SAE/ASEE Joint Propulsion Conference and Exhibit, Indianapolis, IN.
- 2002 May** *Droplet Dispersion in the Wake of a Square Cylinder at Low Reynolds Number*, 15th Annual Conference on Liquid Atomization and Spray Systems, Madison, WI.
- 2001 Jan.** *A Particle-Tracking Algorithm for the Multidomain Staggered-Grid Spectral Method*, 40th AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV.
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Awards, Memberships

Awards

- Who's Who in Science and Engineering, 2005-2006.
- University Fellowship, University of Illinois at Chicago, 2002.
- Provost's Award for Graduate Research, University of Illinois at Chicago, 2001.
- Honor Propaedeuse, Delft University of Technology, 1994.

Memberships

- 2001-present, Member of the American Institute for Aeronautics and Astronautics.
 - 2005-present, Member of the American Physical Society.
 - 2007-present, Member of the American Society for Engineering Education
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Service

San Diego State University

- Spring 2007-present, Member of Computer Committee for the College of Engineering.
- Spring 2007-present, Chair of Committee for the web page development and maintainance for the department of Aerospace Engineering & Engineering Mechanics.
- Master's defense Committee member for: Zaid Karim (Fall 2006, Mechanical Engineering)

External

- Member; American Institute for Aeronautics and Astronautics Technical Committee on Terrestrial Energy Systems, 2007-present.
 - Session Chair, "Session Chair, Heterogeneous Flow in Energy Systems, 45th Aerospace Sciences Meeting and Exhibit, Reno, NV, Jan. 10, 2007.
 - Organization of Minisymposium "Advances in Particle-Particle and Particle-Mesh Algorithms", SIAM Annual Meeting, July 12-13, 2006.
 - Referee: AIAA Journal, Journal of Computational Physics, Journal of Scientific Computing, Journal of Numerical Heat Transfer, Journal of Computational and Applied Mathematics, Journal of Engineering Mathematics, Aerospace Science and Technology, Academic Press.
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Teaching and Advising

Advising

Internships

Spring 2007 Stephane Silvi, l'Institute Francais de Mechanique Avancee, France.

Undergraduate Advising

Fall 2006-present Chad Smith, Aerospace Engineering & Engineering Mechanics, San Diego State University.

Fall 2006-present Brian Gaston, Aerospace Engineering & Engineering Mechanics, San Diego State University.

Graduate Advising

Fall 2005-Spring 2006 Akil Narayan, Ph.D. Applied Mathematics, Brown University.

Summer 2004 Akil Narayan, Ph.D, Applied Mathematics, Brown University.

Spring 2002 - Fall 2003 Palak Shah, M.Sc., Mechanical Engineering, University of Illinois at Chicago.

Courses

Spring 2007 AE 302, High-Speed Aerodynamics, Instructor, San Diego State University.

Fall 2006 AE 601, Computational Fluid Dynamics, Instructor, San Diego State University.

Spring 2005 AM 118, Introduction to Numerical Analysis, Instructor, Brown University.

Spring 2003 Computational Fluid Dynamics, Guest Lecturer, University of Illinois at Chicago.

Spring 2002 Computational Fluid Dynamics, Guest Lecturer, University of Illinois at Chicago.

Spring 2000 Introduction to Heat Transfer, Guest Lecturer, University of Hawaii at Manoa.

Teaching Details: <http://attila.sdsu.edu/jacobs/teaching.html>
