ASHWIN VAIDYA

Curriculum Vitae

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CITIZENSHIP

United States of America

EDUCATION

- **Ph.D.**, Mechanical Engineering. University of Pittsburgh, April 2004.
  (Advisor: Dr. Giovanni Paolo Galdi)
- **M.S.,** Mathematics, University of Pittsburgh, August 1999.
  (Advisor: Dr. George Sparling)
- **M.S.**, Physics, University of Pittsburgh, April 1998.
- **B.Phil.,** Physics, Astronomy & Mathematics, University Honors College, University of Pittsburgh, April 1995.
  (Advisor: Dr. Regina-Schulte Ladbeck)

PROFESSIONAL EXPERIENCE

- 08/2006 – present RTG Postdoctoral Research Associate/Lecturer, Department of Mathematics, University of North Carolina, Chapel Hill.
- 08/2005 – 05/2006 Postdoctoral Scholar/Instructor, Department of Mathematics, Florida State University.
- 09/2005 – 05/2006 Research Associate, Geophysical Fluid Dynamics Institute Florida State University.
- 08/2004 – 05/2005 Postdoctoral Associate, Department of Mathematical Sciences, Carnegie Mellon University.
- 05/2004 - 08/2004 Postdoctoral Researcher, Department of Mechanical Engineering, University of Pittsburgh.
- 08/1999 – 12/2003 Adjunct Faculty, Department of Mathematics and Science, Robert-Morris University.
- 08/1998 – 05/1999 Adjunct Faculty, Department of Physical Sciences, Community College of Allegheny County.
- 08/1999 – 04/2004 Graduate Student Researcher / Teaching Fellow, Department of Mechanical Engineering, University of Pittsburgh.
- 08/1995 – 08/1999 Teaching Assistant, Department of Mathematics, University of Pittsburgh.

- 08 / 1992 – 08 / 1995 Undergraduate Researcher, Department of Physics and Astronomy, University of Pittsburgh.

VISITING / OTHER APPOINTMENTS

- 06 / 2001 – 07 / 2001 Visiting Scholar, Department of Mathematics, Institute Superior Technico, Lisbon, Portugal.
- 06 / 2006 – 07 / 2006 Visiting Scientist, Division of Engineering Mechanics, Jawaharlal Nehru Center for Advanced Scientific Research, India.
- 05 / 12 – 05 / 20, 2007 Visiting Professor, Department of Mathematics, Institute Superior Technico, Lisbon, Portugal.
- 06 / 01- 08 / 31, 2008 Research Consultant, Prithvi Information Solutions, Analytics Division, Hyderabad, India.

RESEARCH INTERESTS

Fluid mechanics, Partial differential equations, Non-Newtonian fluids, Fluid-Structure interaction, Existence theory, Hydrodynamic stability, Pattern formation, Vortex Induced oscillations, Rheology, Pathological flows, Complex systems, Network Analysis, Software oriented architecture (SOA).

AWARDS

- Sitaramayya Memorial Award in Physics, University of Madras, India, 1992.
- Chancellors Undergraduate Research Fellowship, University Honors College, University of Pittsburgh, 1994.
- Halliday-Resnick Award, Dept. of Physics & Astronomy, University of Pittsburgh, 1994.
- REU award, American Astronomical Society, 1994
- National Honor Physics Society, 1995
- Second Place at Engineering Graduate Student Poster Fair, 2001.

PUBLICATIONS

Refereed Publications

1. G.P.Galdi and A. Vaidya, Translational fall of symmetric bodies in a Navier-Stokes liquid with applications to particle sedimentation, *Journal of mathematical fluid mechanics*, 3, 183-211, 2001.
2. G.P.Galdi, A.Vaidya, M. Pokorny, D.D.Joseph and J.Feng, Orientation of symmetric bodies falling in a second-order fluid at low Reynolds numbers, *Mathematical models and methods in applied sciences*, 12, 1653-1690, 2002.
3. A.Vaidya, Steady fall of bodies of arbitrary shape in a second-order fluid at zero Reynolds numbers, *Japan Journal of Industrial and Applied Math*., 21, 3, 299-321, 2004.
4. A.Vaidya and G.A.J.Sparling, Classical solutions of the perturbed wave equation with singular kernel, *Acta Math Univ. Comenianae*, Vol. 72, 2, 65-75, 2003.

5. A.Vaidya and G.A.J. Sparling, The perturbed massless, wave equation with singular external potential, *Trends in Mathematical Physics Series*, Ed. Charles Benton, Nova Science Publishers, 209-236, 2004.
6. A. Vaidya, A note on the orientation of symmetric rigid bodies sedimenting in a power-law fluid, *Applied Math. Letters*, 18, 1332-1338, 2005.
7. A. Vaidya, Existence of freefall of rigid bodies in a second-order fluid model with applications to particle sedimentation, *Nonlinear Analysis: Real World Applications*, 7, 4, 748-768, 2006.
8. A. Vaidya, On the transient nature of shape-tilting bodies sedimenting in polymeric liquids, *Journal of Fluids and Structures*, 22, 253-259, 2006.
9. A.Vaidya and R.Wulandana, Nonlinear stability for convection with temperature dependent viscosity, *Mathematical Methods in the Applied Sciences*, 29, 13, 1555-1561, 2006.
10. B.J. Chung, A.Vaidya and R. Wulandana, Stability of channel-flow with linear temperature dependent viscosity, *International Journal of Applied Mathematics and Mechanics*, 2, 1, 24-33, 2006.
11. M. Massoudi, A. Vaidya and R. Wulandana, Natural convection flow of a generalized second grade fluid in a vertical channel, *Nonlinear Analysis: Real World Applications*, 9(1), 80-93, 2008.
12. M. Massoudi and A. Vaidya, On some generalizations of the second grade fluid, *Nonlinear Analysis: Real World Applications*, 9(3), 1169-1183, 2008.
13. B.J.Chung and A. Vaidya, An optimal principle in fluid-structure interaction, *Physica D*, in press (doi;10.1016/j.physd.2008.04.017), 2008.
14. R. Camassa, R.M. McLaughlin, N.M. Moore and A.Vaidya, Brachistochrones in potential flow and connection to Darwin's theorem, to appear in *Physics Letters A*, 2008.
15. R.Camassa, B.J.Chung, P. Howard, R.M. McLaughlin and A.Vaidya, Vortex induced oscillations of cylinders at low and intermediate Reynolds numbers, to appear in *Mathematical Fluid Mechanics: A Tribute to Giovanni Paolo Galdi*, Ed. Sequeira, A. and Rannacher, R., Springer Verlag, 2008.

Thesis

1. A.Vaidya, Investigations into the circumstellar environment of Herbig Ae/Be stars, Dept. of Physics & Astronomy, B.Phil. Thesis, University of Pittsburgh, 1995.
2. A.Vaidya, On the classical and quantized solutions of the perturbed wave equation with external potential, M.S. Thesis, Dept. of Mathematics, University of Pittsburgh, 1999.
3. A. Vaidya, Orientation of Rigid Bodies Sedimenting in Newtonian and Non-Newtonian Fluids, Ph.D. Thesis, Dept. of Mechanical Engineering, University of Pittsburgh, 2004.

In Preparation

1. G.P. Galdi and A. Vaidya, Existence of the coupled fluid-solid problem pertaining to the translation and rotation of a rigid body in a viscoelastic fluid, in preparation.

2. B.J.Chung , G.P. Galdi and A. Vaidya, Gravitational Settling of rigid bodies in a generalized second order fluid: The tilt-angle case, in preparation.
3. A. Silvestre and A. Vaidya, Existence of solutions to the flow of a generalized second order fluid past a moving body, in preparation.
4. S. Chatla, S. Kadam, D. Kolluru, S. Sinha and A. Vaidya, A comparative study of granularity based service selection algorithms, in preparation.

CONFERENCES / SEMINARS / WORKSHOPS

- American Physical Society, Division of fluid mechanics, November, 2007 (Talk, Poster)
- Southeastern Atlantic Mathematics Conference in Hampton, Virginia, October 2007 (Talk).
- International Conference in Mathematical Fluid Mechanics, Estoril, Portugal, May 21-25, 2007 (Invited Speaker).
- Department of Mathematics, University of Evora, Evora, Portugal, May 16, 2007 (Invited Talk).
- Tata Institute of Fundamental Research, Department of Applied Mathematics, Bangalore, India, July 27, 2006 (Invited Lecture).
- Department of Engineering Mechanics, Jawaharlal Nehru Center for Advanced Scientific Research, Bangalore, India, July 25, 2006 (Fluid Dynamics Colloquium), March 28, 2006.(Talk)
- American Physics Society, March 2006 Meeting, Baltimore.(Talk)
- Geophysical Fluid Dynamics Institute, Florida State University, Tallahassee, September 12, 2005 (Colloquium talk).
- Complex Fluids Seminar, Department of Mathematics, Florida State University, Tallahassee, September 8, 2005.
- Science Division, Chatham College, Pittsburgh, May 8, 2005 (Colloquium talk).
- Center for Nonlinear Analysis - Seminar Series, Carnegie Mellon University, January 25, 2005 (Talk).
- American Mathematical Society Sectional Conference, Pittsburgh, November 3, 2004 (Talk).
- Science Division, Chatham College, Pittsburgh, October 28, 2004 (Science Colloquium lecture).
- W.G. Pritchard Fluids Lab, Department of Mathematics, Penn State University, May 27, 2004 (Invited Talk)
- Applied Mathematics Lab, Courant Institute of Mathematical Sciences, New York University, May 6, 2004 (Invited Talk)
- Department of Mathematics, University of Houston, April 6, 2004 (Invited Talk)
- Department of Mathematics, Indian Institute of Technology, Bombay, India, Dec. 3, 2003 (Invited Talk)
- Department of Engineering Mechanics, Jawaharlal Nehru Center for Advanced Scientific Research, Bangalore, India, Dec. 17, 2003 (Fluid Dynamics Colloquium)
- American Mathematical Society International Conference, India, December 2003 (Poster)
- International School on Biomathematics, Bioengineering and Clinical Aspects of Blood Flow, MSRI (Berkeley, CA), July 22-August 09, 2002.
- Society of Rheology Conference, South Carolina, Feb. 2001 (Poster).

- Conference on Contemporary Challenges in Applied Fluid Dynamics, Italy, May 31-June 5, 2001(Talk).
- First Meeting on Numerical Analysis for Applied Flow Problems, Evora, Portugal, June 20-21, 2001(Invited Talk).
- Department of Mathematics, IST, Lisbon, Portugal, June 2001(Invited talk).
- IMA Workshop on Finite Dimensional Topology, University of Iowa, June 1998.
- National Meeting of the American Astronomical Society, 1995(Poster).
- National Meeting of the American Astronomical Society, 1994(Poster).

TEACHING EXPERIENCE

Lecturing

- Department of Mathematics, University of North Carolina, Chapel Hill, 2006-present: taught *Differential Equations 1, Advanced Differential Equations and Calculus in three dimensions*.
- Department of Mathematics, Florida State University, 2005-2006: taught *Calculus 1 and Calculus 2*.
- Department of Mathematical Science, Carnegie Mellon University, 2004-2005: taught *Calculus 1, Linear Programming* and *Introduction to Mathematical Softwares.*
- Department of Science, Chatham College, Fall 2004: taught *Math Literacy for non-science majors*.
- Department of Mathematics, Robert-Morris University, 1999-2004: taught *Pre-College Algebra, College Algebra, Applied Calculus 1, Applied Statistics 1, Applied Statistics 2, Operations Management*.
- Department of Science, Robert-Morris University, 1999-2004: taught *Astronomy 101*.
- Department of Physics, Community College of Allegheny County, 1998-1999: taught *Physics for non-science majors (with lab), Physics 1 (with lab).*
- Department of Mathematics, University of Pittsburgh, Fall 1998: *taught Calculus 2 (with Mathematica Software).*

As a Teaching Assistant

- Department of Mathematics, University of Pittsburgh, 1995-1999. Conducted recitation sections, graded and gave occasional lectures for Calculus 1, Calculus 2, Calculus 3, Online Calculus 1, Business Calculus, College Algebra.
- Department of Mechanical Engineering, 1999-2003. Graded and gave occasional lectures for Freshman Engineering, Fluid Dynamics, Vibrations, Continuum Mechanics and Differential Equations.

Mentoring

- Mentored several undergraduate students in different experimental research projects at the Fluid Dynamics Laboratory, Department of Mathematics, University of North Carolina, Chapel Hill between 2006 and 2008.
- Supervised an independent study project course for two students titled 'Fluid-Structure Interaction' at the Department of Mathematics, Florida State University, Spring 2006.

- Served as Co-Advisor for Mechanical Engineering final project course (ME1043) at University of Pittsburgh for spring 2002, summer 2002, fall 2002, spring 2003, summer 2003, fall 2003 and spring 2004 terms.

Other

- Served as Teaching Assistant for course in Continuum Mechanics at Workshop on Biomathematics, MSRI (Berkeley), June 2002.
- Supervised Student for Independent Study in Physics I at Department of Science, Robert Morris University.
- Gave guest lectures in graduate Continuum Mechanics, Mathematical Methods for Engineers and Advanced Fluid Dynamics courses at the University of Pittsburgh.

PROFESSIONAL MEMBERSHIPS / SERVICE

- Member of: American Mathematical Society, Society for Industrial and Applied Math, American Physical Society
- Reviewer for *Mathematical Reviews, Mathematical Problems in Engineering, Powder Technology* and *International Journal of Applied Mathematics and Statistics.*
- Editorial board member for *International Journal of Applied Mathematics and Statistics,* 2005-present.
- Co-Editor of Buhl Planetarium (Pittsburgh, PA) Quarterly Newsletter (1995-1999).

COMPUTER SKILLS

- Taught several undergraduate courses using symbolic programming softwares such as Matlab, Mathematica, Maple and Excel.
- Programming in Fortran