THOMAS PEACOCK

Room 3-360, Mechanical Engineering, Massachusetts Institute of Technology, Cambridge, MA 02139-4307
email: tomp@mit.edu http://web.mit.edu/endlab tel: 617-258-0736

RESEARCH INTERESTS : Stratified Flows; Internal Waves; Nonlinear Dynamics; Experimental Methods.

EDUCATION

D. Phil. Department of Physics, Oxford University, Oxford, England, 1998.
B. Sc. Department of Physics, The University of Manchester, Manchester, England, 1994.
Graduated with highest first class honors degree in the year.

EMPLOYMENT

2010–present Associate Professor with tenure, MIT, Cambridge, MA.
2008–2010 Associate Professor, MIT, Cambridge, MA.
2007–2008 ARCO Associate Professor, MIT, Cambridge, MA.
2005–2007 ARCO Assistant Professor, MIT, Cambridge, MA.
2003–2005 Assistant Professor, MIT, Cambridge, MA.
2000–2003 Applied Mathematics Instructor, MIT, Cambridge, MA.
1998–2000 Research Associate, College of Engineering, University of Colorado, Boulder, CO.
1990-1991 Research Student, British Petroleum (BP), London, England.

RESEARCH GRANTS

2014-2016 NSF, Physical Oceanography, "The downward propagation of internal waves in the ocean" (PI: Peacock).
2013 NSF, Dynamical Systems, Workshop on Transport Barriers (PIs: Peacock, Haller & Thiffeault).
2013–2014 MIT France, "Investigating the influence of background rotation and complex stratification on arctic internal waves" (PIs: Peacock & Odier).
2012–2015 NSF, Dynamical Systems, "A new braid-theoretic approach to uncovering transport barriers in dynamical systems" (PIs: Peacock & Thiffeault).
2012–2015 ONR, Physical Oceanography, "Characterizing transport barriers in the East Sea of Vietnam" (PI: Peacock).
2011–2013 NSF, Physical Oceanography, "Assessing the importance of deep-ocean topographic scattering of internal tides" (PI: Peacock).
2011–2012 MIT HAYASHI, "Uncovering the generation mechanism of internal waves in the Luzon Strait" (PI: Peacock).
2010–2011 NSF, Dynamical Systems, Workshop on Coherent Structures (PIs: Peacock, Olascagoa & Beron-Vera).
2010–2012 MIT MISTI Australia, "Assessing the impact of continental shelves on internal tides" (PIs: Peacock & Ivey).

2010–2012 MIT France, "Realistic laboratory modeling of three-dimensional internal tide generation" (PIs: Peacock & Joubaud)

2009–2013 ONR, Physical Oceanography, "Laboratory modeling of internal tides in straits" (PI: Peacock).

2009–2010 NSF, CBET, "Propulsion through diffusion" (PI: Peacock).

2009–2010 Discovery Science & NSF, Physical Oceanography, "Internal waves documentary" (PI: Peacock).

2008–2009 MIT-France, "The role of internal tide scattering in ocean mixing" (PIs: Peacock & Dauxois).

2007–2012 NSF CAREER, Physical Oceanography, "From the lab to the ocean: experimental investigations of internal tide generation" (PI: Peacock).

2008–2009 ONR, Physical Oceanography, "Nonlinear internal tide generation at the Luzon Strait: integrating laboratory data with numerics and observations" (PI: Peacock).

2005–2007 ONR, Physical Oceanography, "Experimental investigations of nonlinear internal tide generation and propagation" (PI: Peacock).

2004–2005 James Ferry Research Grant, "A new approach to unsteady separation" (PI: Peacock).

2000–2003 NSF, "An interactive experiment/numerical simulation with applications in MEMS design" (PI: Bradley).

HONORS & AWARDS

Research

2013 Member of editorial board, *CHAOS*

2013 The American Physical Society Gallery of Fluid Motion Award.

2012 Gledden Fellowship, Institute for Advanced Studies, University of Western Australia.

2012 Visiting Professorship, ENS de Lyon.

2010 Invited guest editor, *CHAOS*.

2009 Invited young scientist, 20^{th} Anniversary *CHAOS* Meeting.

2007 NSF CAREER Award.

2006 Abkowitz International Travel Award.

2005 Atlantic Richfield Career Development Award.

2004 IUTAM Travel Award.

1999 The American Physical Society Gallery of Fluid Motion Award.

1996 The Royal Society Physics Research in Britain Award.

1995 Domus Research Scholarship, Oxford University.

1995 SHARP CASE Research Scholarship.

1994 Samuel Bright Research Scholarship, Manchester University.

1993 Hatfield Scholarship, Manchester University.

Mentoring

2013 Sasan Ghaemsaidi, MIT Martin Sustainability Fellowship.

2013 Zaim Ouazzani, APS Gallery of Fluid Motion award.

2007 Paula Echeverri, Outstanding female graduate student, Mechanical Engineering.

2007 Damon Vanderlind, Outstanding undergraduate research paper on ocean-related research.

JOURNAL PUBLICATIONS

Graduate and undergraduate students and postdocs underlined.

40. Ghaemsaidi S.J., Joubaud S., Odier P., Dauxois T. and **Peacock T.**, "On the generation of internal waves by excitation of the base of the mixed layer," in preparation.

39. Allshouse M.R., Ivey G.N., Xu J., Beegle-Krause C.J., Lowe R.J., Jones N.L. and **Peacock T.**, "The impact of wind on the Lagrangian structure of ocean surface transport," in preparation.

38. Alford M., **Peacock T.** *et al.*, "The formation and fate of internal waves in the South China Sea," in preparation.

37. Mercier M., Doyle B., Ardekani A.M. and **Peacock T.**, "Convection based propulsion," submitted.

36. Mathur M., Carter G. and **Peacock T.**, "Topographic scattering of the low-mode internal tide in the deep ocean," submitted.

35. Mercier M., Gostiaux L., Helfrich K., Sommeria J., Viboud S., Didelle H., Ghaemsaidi S.J., Dauxois T. and **Peacock T.**, "Large-scale, realistic laboratory modeling of M_2internal tide generation at the Luzon Strait," *Geophysical Research Letters*, 40, 5704 (2013).

34. **Peacock T.** and Haller G., "Lagrangian Coherent Structures: the hidden skeleton of fluid flows," *Physics Today*, 66, 41 (2013).

33. Ghaemsaidi S.J. and **Peacock T.**, "Visualization of the 3D conical internal wave field generated by an oscillating sphere using Stereo PIV," *Experiments in Fluids*, 54, 1454 (2013).

32. Echeverri P., Yokossi T., Balmforth N.J. and **Peacock T.**, "Tidally generated internal wave attractors between double ridges," *Journal of Fluid Mechanics*, 669, 354 (2011).

31. Echeverrri P. and **Peacock T.**, "Internal tide generation by arbitrary two-dimensional topography," *Journal of Fluid Mechanics*, 659, 247 (2010).

30. Mercier M.J., Martinand D., Mathur M., Gostiaux L., **Peacock T.** and Dauxois T., "New wave generation," *Journal of Fluid Mechanics*, 657, 308 (2010).

29. Allshouse M.R., Barad M.F. and **Peacock T.**, "Propulsion generated by diffusion-driven flow," *Nature Physics*, 6, 516 (2010).

28. Mathur M. and **Peacock T.**, "Internal wave interferometry," *Physical Review Letters*, 104, 118501 (2010).

27. **Peacock T.**, Mercier M.J., Didelle H., Viboud S. and Dauxois T., "A laboratory study of low-mode internal tide scattering by finite-amplitude topography," *Physics of Fluids*, 21, 121702 (2010).

26. **Peacock T.** and Dabiri J., "Introduction to focus issue: Lagrangian coherent structures," *CHAOS*, 20, 017501 (2010).

25. Tang W.E. and **Peacock T.**, "Lagrangian coherent structures and internal tide attractors," *CHAOS*, 20, 017508 (2010).

24. Mathur M. and **Peacock T.**, "Internal wave beam propagation in nonuniform stratifications," *Journal of Fluid Mechanics*, 639, 133-152 (2009).

23. Echeverri P., Flynn M.R., Winters K.B. and **Peacock, T.**, "Low-mode internal tide generation: an experimental and numerical investigation," *Journal of Fluid Mechanics*, 636, 91-108 (2009).

22. Yick K.Y., Torres C.R., **Peacock T.** and Stocker R., "Enhanced drag of a sphere settling in a stratified fluid at small Reynolds number," *Journal of Fluid Mechanics*, 632, 49-68 (2009).

21. Balmforth N.J. and **Peacock T.**, "Internal tide generation by supercritical topography," *Journal of Physical Oceanography*, 39, 1965-1974 (2009).

20. Weldon M., **Peacock T.**, Jacobs, G.B., Helu M. and Haller, G., "Experimental and numerical investigation of the kinematic theory of unsteady separation," *Journal of Fluid Mechanics*, 611, 1-11 (2008).

19. Blanchette F., **Peacock T.** and Cousin R., "Stability of a stratified fluid with a vertically moving sidewall," *Journal of Fluid Mechanics*, 609, 305-317 (2008).

18. **Peacock T.** and Bradley E., "Going with (or against) the flow," *Science*, 320 (5881), 1302-1303 (2008).

17. **Peacock T.**, Echeverri P. and Balmforth, N.J.B., "Experimental investigation of internal tide generation by two-dimensional topography," *Journal of Physical Oceanography*, 38 (1), 235-242 (2008).

16. Alford M.H., MacKinnon J.A., Zhao Z., Pinkel R., Klymak J. and **Peacock T.**, "Internal waves across the Pacific," *Geophysical Research Letters* 34 (24), L24601 (2007).

15. Mathur M., Haller G., **Peacock T.**, Ruppert-Felsot J.E. and Swinney H.L., "Uncovering the lagrangian skeleton of turbulence," *Physical Review Letters*, 98 (14), Art. No. 144502 (2007).

14. Yick, K.Y., Stocker, R. and **Peacock, T.**, "Microscale Synthetic Schlieren," *Experiments in Fluids*, 42 (1), 41-48 (2007).

13. Heitz R., **Peacock T.** and Stocker, R., "Optimizing diffusion-driven flow in a fissure," *Physics of Fluids*, 17, Art. No. 128104 (2005).

12. **Peacock T.** and Tabaei A., "Visualization of nonlinear effects in internal wave beam reflection," *Physics of Fluids*, 17, Art. No. 061702 (2005).

11. **Peacock T.**, Blanchette F. and Bush J.W.M., "The stratified Boycott effect," *Journal of Fluid Mechanics*, 529, 33-49 (2005).

10. **Peacock T.** and Weidman, P., "The effect of rotation on conical wave beams in a stratified fluid," *Experiments in Fluids*, 39, 32-37 (2005).

9. **Peacock T.**, Stocker R. and Aristoff J., "An experimental investigation of the angular dependence of diffusion-driven flow," *Physics of Fluids*, 16, 3503-3505 (2004).

8. **Peacock T.**, Bradley E., Hertzberg J. and Lee Y.C., "Forcing a planar jet flow using MEMS," *Experiments in Fluids*, 37, 22-28 (2004).

7. Blanchette F., **Peacock T.** and Bush J.W.M., "The Boycott effect in magma chambers," *Geophysical Research Letters*, 31, L05611 (2004).

6. Ma Z.C., Bradley E., **Peacock T.**, Hertzberg J.R. and Lee Y.C., "Solder assembled large MEMS flaps for fluid mixing," *IEEE Transactions on Advanced Packaging*, 26 (3), 268-276 (2003).

5. **Peacock T.** and Mullin T., "The transition to turbulence in a microscopic fluid flow," *Physics of Fluids* 12, S8 (2000).

4. **Peacock T.** and Mullin, T., "Homoclinic bifurcations in a liquid crystal flow," *Journal of Fluid Mechanics*, 432, 369-386 (2000).

3. **Peacock T.**, Binks D.J. and Mullin, T., "From low- to high-dimensional dynamics in a microscopic fluid flow," *Physical Review Letters*, 82, 1446-1449 (1999).

2. **Peacock T.** and Mullin T., "Bifurcation phenomena in flows in a nematic liquid crystal," *International Journal of Bifurcations and Chaos*, 9, 427-441 (1999).

1. Mullin T. and **Peacock T.**, "Hydrodynamic instabilities in nematic liquid crystals under oscillatory shear," *Proceedings of the Royal Society of London A*, 455, 2635-2653 (1999).

OTHER PUBLICATIONS

Graduate and undergraduate students and postdocs underlined.

11. Sutherland, B.R., Dauxois, T. and **Peacock T.**, "Internal waves in laboratory experiments," chapter in *Modeling Atmospheric and Oceanic Fluid Flows: Insights from Laboratory Experiments*, AGU (2013).

10. **Peacock T.**, "Laboratory experimental methods," chapter in *The Handbook of Environmental Fluid Mechanics* (Ed. H.J.S. Fernando), Taylor & Francis (2012).

9. Mercier M., Gostiaux L., Saidi S.J., Sommeria J., Didelle H., Viboud S., Helfrich K., Dauxois T. and **Peacock T.**, "The Luzon Strait experiment," proceedings of the *International Symposium on Stratified Flows* (2011).

8. **Peacock T.**, Sutherland B.R., Dauxois T. and Balmforth N.B., "Coordinated mathematical modeling of internal waves," *Proceedings of the workshop at the Banff International Research Station* (2010).

7. **Peacock T.** and Stocker R., "Diffusion-driven Flow," *Proceedings of the 18th Congress of Mechanics*, Grenoble, France (2007).

6. **Peacock T.**, Coral R. and Haller G., "Experimental validation of the kinematic theory of unsteady separation," AIAA-2005-4093 (2005).

5. **Peacock T.**, Tabaei A. and Weidman P., "Images of internal waves and experimental results," published in *Environmental Stratified Flows* by C. Staquet (Eds. A. Vincenzo and S. Sutanu), 89 (2005).

4. **Peacock T.** and Mullin T., "The transition to turbulence in a microscopic fluid flow," in *A Gallery of Fluid Motion* (Eds. M. Samimy, K.S. Breuer, L.G. Leal and P.H. Steen), Cambridge University Press (2004).

3. Ma Z., **Peacock T.**, Bradley E. and Lee Y.C., "Solder assembled flaps to enhance fluid mixing," *Proceedings of ASME IMECE*, New York, November (2001).

2. Mullin T., Juel A. and **Peacock T.**, "Silnikov chaos in fluid flows," chapter 2, 24-43, New Concepts in Turbulence (Ed. C.Vassilicos), Cambridge University Press (2000).

1. Haelsig C.P., Gregory R. and **Peacock T.**, "MTBE & TAME: The route to unleaded fuel," *Proceedings of the 150th Meeting of the Royal Society of Chemistry* (1991).

CONFERENCE PRESENTATIONS

50. "The impact of windage on the structure of ocean surface transport," contributed talk, *APS DFD*, November 2013.
49. "Lagrangian Coherent Structures in the South China Sea," invited talk, *ONR Review Meeting, Chicago*, September 2013.
48. "Large-scale, realistic laboratory modeling of M_2 internal tide generation at the Luzon Strait," invited talk, *ONR Review Meeting, Chicago*, September 2013.
47. "A wind of change across the Arctic Ocean," *MIT Future of the Oceans Symposium, San Francisco*, September 2013.
46. "Lagrangian Coherent Structures in the South China Sea," contributed talk, *ONR Review Meeting, Seattle*, August 2013.
45. "Large-scale, realistic laboratory modeling of M_2 internal tide generation at the Luzon Strait," contributed talk, *ONR Review Meeting, Seattle*, August 2013.
44. "Internal waves in the ocean," two invited lectures, *Meeting on Geophysical and Astrophysical Waves, Les Houches, France*, February 2013.
43. "Uncovering oceanic transport barriers," invited talk, *Dynamics Days, Denver*, January 2013.
42. "Luzon in the lab," invited talk, *ONR Review Meeting, Kaohsiung*, March 2012.
41. "Luzon in the lab," contributed talk, *Ocean Sciences meeting, Salt Lake City*, March 2012.
40. "Applications of Lagrangian Coherent Structures to ocean decision making strategies," contributed talk (with C.J. Beegle-Krause), *AMOP conference, Banff, Alberta*, September 2011.
39. "The Luzon Strait experiment," invited talk (with M. Mercier), *ONR IWISE Workshop, Taipei, Taiwan*, January 2011.
38. "Sub-mesoscale processes," invited talk, *ONR-Vietnam Oceanographic Workshop, Haiphong, Vietnam*, December 2010.
37. "Analytical modeling of internal tide generation and scattering by topography," contributed talk, *APS DFD*, November 2010.
36. "Laboratory modeling of internal tides," invited talk, *Workshop on Topographic generation of Internal Waves, Cargese, Corsica,* November 2010.
35. "Generation and scattering of the internal tide," invited talk, *Banff International Research Station, workshop on Coordinated Mathematical Modeling of Internal Waves, Banff, Alberta,* April 2010.
34. "A laboratory study of the generation and scattering of the low-mode internal tide," contributed talk, *Ocean Sciences meeting*, March 2010.
33. "A new way to measure molecular diffusivity," contributed talk, *APS DFD*, November 2009.
32. "Lagrangian Coherent Structures and unsteady separation," invited talk, *CHAOS 20th Anniversary Meeting, National Academy of Sciences, Woods Hole, MA*, July 2008.
31. "Propulsion through diffusion," invited talk, *WHOI GFD Summer Program, Woods Hole, MA*, July 2008.

30. "Propulsion through diffusion," invited talk, *Gordon Research Conference on Nonlinear Science, Mount Holyoke College, South Hadley, MA*, June 2009.

29. "Internal tide generation by complex topography," invited talk, *ONR Review Meeting, Chicago, OH*, June 2009.

28. "Propulsion through diffusion," contributed talk, *SIAM Dynamical Systems*, May 2009.

27. "An experimental and numerical investigation of the kinematic theory of unsteady separation," invited talk, *APS DFD, Minisymposium on Lagrangian Coherent Structures,* November 2008.

26. "Laboratory modeling of internal tides," invited talk, *ONR Northeast Regional Review*, October 2008.

25. "Laboratory modeling of internal tides," invited talk, *PIMS meeting on Geophysical Waves, Vancouver, British Columbia*, April 2008.

24. "Laboratory modeling of internal tides," contributed talk, *Ocean Sciences Meeting, Orlando*, April 2008.

23. "The diffusion fish" contributed talk, *APS DFD*, November 2007.

22. "The diffusion fish," contributed talk, *CFM Stratified Flows Meeting, Grenoble*, August 2007.

21. "Stratified flows: from the lab to the ocean," invited talk, *WHOI GFD Summer Program, Woods Hole, MA*, August 2007.

20. "Stratified flows: from the lab to the ocean," contributed talk, *6th International Symposium on Stratified Flows*, December 2006.

19. "The nonlinear dynamics of unsteady separation," invited talk, *USNCTAM, Nonlinear Dynamics Session, Boulder, CO*, June 2006.

18. "Experimental investigations of internal wave generation and evolution near topography," contributed poster, *Ocean Sciences Meeting, Hawaii*, March 2006.

17. "Experimental investigations of a dynamical systems approach to unsteady separation," invited talk, *Gordon Research Conference on Nonlinear Science, Colby College, ME*, June 2005.

16. "Experimental investigations of a dynamical systems approach to unsteady separation," contributed talk, *AIAA Fluids Conference*, June 2005.

15. "Experimental investigations of a dynamical systems approach to unsteady separation," contributed talk, *SIAM Dynamical Systems*, May 2005.

14. "Bumps, knives and bouncing beams: laboratory investigations of internal waves," contributed talk, *APS DFD*, November 2005.

13. "Bumps, knives and bouncing beams: laboratory investigations of internal waves," contributed talk, *IMACS Nonlinear Waves Meeting, Athens, GA*, April 2005.

12. "Experimental investigations of unsteady separation," contributed talk, *APS DFD*, November 2004.

11. "Nonlinear dynamics and pattern formation," four invited lectures, *Santa Fe Institute Complex Systems Summer School, Qingdao, China*, July 2004.

10. "Nonlinear dynamics and pattern formation," four invited lectures, *Santa Fe Institute Complex Systems Summer School, Santa Fe, NM*, June 2004.

9. "An experimental investigation of diffusion-driven flow," contributed talk, *APS DFD* November 2003.
8. "Nonlinear effects in reflecting internal wave beams," contributed talk, *ICTAM, Warsaw, Poland*, August 2003.
7. "Dynamical Systems," four invited lectures, *Santa Fe Institute Complex Systems Summer School, Santa Fe, NM*, June 2003.
6. "The stratified Boycott effect," contributed talk, *APS DFD*, November 2002.
5. "Active control of a jet using MEMS," contributed talk, *APS DFD*, November 2001.
4. "Micro-active forcing of a planar jet," contributed talk, *APS DFD*, November 1999.
3. "Micro-active forcing of a planar jet," contributed talk, *SIAM Dynamical Systems*, May 1999.
2. "Bifurcation phenomena in flows of a liquid crystal," selected talk, *Dynamics Days*, January 1997.
1. "The transition to turbulence in a liquid crystal flow," plenary talk, *International Conference on Nonlinearity, Bifurcations and Chaos, Lodz, Poland*, September 1995.

INVITED LECTURES

71. "A wind of change across the Arctic Ocean," *MIT-France*, December 2013.
70. "Uncovering the skeleton of flow transport," *Shell Research Center, Houston*, November 2013.
69. "Uncovering the skeleton of flow transport," *Mechanical Engineering, Brown University*, November 2013.
68. "Lagrangian Coherent Structures," *IMPA, Rio de Janeiro, Brazil*, June 2013.
67. "Lagrangian Coherent Structures," *Environmental Sciences, National University of Vietnam, Hanoi*, December 2012.
66. "Assesing the role of deep ocean topographic scattering of the low mode internal tide," *SESE, University of Western Australia*, November 2012.
65. "Lagrangian Coherent Structures," (three lectures) *Institute for Advanced Studies, University of Western Australia*, November 2012.
64. "Lagrangian Coherent Structures," *Physics seminar, ENS de Lyon*, June 2012.
63. "Assesing the role of deep ocean topographic scattering of the low mode internal tide," *Environmental Fluid Mechanics, Stanford University*, March 2012.
62. "Luzon in the lab," *Environmental Fluid Mechanics, Stanford University*, January 2012.
61. "Internal waves," *RV Kilo Moana, Pacific Ocean*, May 2011.
60. "Sailing on diffusion," *Mechanical Engineering, University of Rhode Island*, April 2011.
59. "Sailing on diffusion," *Physics Colloqium, Boston University*, March 2011.
58. "Sailing on diffusion," *Mechanical Engineering and Materials Science, Yale University*, December 2010.
57. "Un model realiste de la maree en mer de Chine," (in French) *Fete de la Science, Grenoble*, October 2010.

56. "Analytical modeling of internal tide generation and scattering by topography," *WHOI GFD Summer Program*, August 2010.

55. "Sailing on diffusion," *Mechanical Engineering, Duke University*, May 2010.

54. "Sailing on diffusion," *Oceanography, University of Rhode Island*, April 2010.

53. "Sailing on diffusion," *Courant Institute, NYU*, November 2009.

52. "Sailing on diffusion," *Applied Mathematics, MIT*, October 2009.

51. "Sailing on diffusion," *Mathematics, Penn State University*, October 2009.

50. "Sailing on diffusion," *Theoretical Geophysics, DAMTP, Cambridge University, England*, October 2009.

49. "Sailing on diffusion," *DTU, Copenhagen, Denmark*, October 2009.

48. "Laboratory modeling of internal tides," *University of Texas, Austin, TX*, September 2009.

47. "Propulsion through diffusion," *DEAS, Harvard University*, May 2009.

46. "Propulsion through diffusion," *Applied Mathematics, UC Santa Cruz*, May 2009.

45. "Internal tides: from the lab to the ocean," *Physical Oceanography, Scripps Institution of Oceanography*, May 2009.

44. "Propulsion through diffusion," *MAE, UC San Diego*, May 2009.

43. "Internal tides: from the lab to the ocean," *GALCIT seminar, Caltech*, May 2009.

42. "Propulsion through diffusion," *Mechanical and Aerospace Engineering, Arizona State University*, November 2008.

41. "Internal wave beam propagation in nonuniform stratifications," *Physics, University of Alberta, Edmonton*, October 2008.

40. "An experimental and numerical investigation of the kinematic theory of unsteady separation," *Mathematics, University of British Columbia*, April 2008.

39. "Laboratory modeling of internal tides," *DAMTP, Cambridge University, England*, February 2008.

38. "Two experiments at low Reynolds number," *BP Institute, Cambridge University, England*, February 2008.

37. "Laboratory modeling of internal tides," *LadHyx, Paris, France*, February 2008.

36. "The diffusion fish," *Ecole Normale Superieure de Paris, Paris, France*, February 2008.

35. "The diffusion fish," *Physics, Universite de Lyon, Lyon, France*, February 2008.

34. "Laboratory modeling of internal tides," *Universite Jospeh Fourier, Grenoble, France*, February 2008.

33. "Stratified flows: from the lab to the ocean," *Civil and Environmental Engineering, Cornell University*, November 2007.

32. "Stratified flows: from the lab to the ocean," *Physics, Boston College*, October 2007.

31. "Laboratory modeling of internal tides," *ONR NLIWI Meeting, Alyeska, AK*, August 2007.

30. "Stratified flows: from the lab to the ocean," *Schlumberger, Cambridge, MA*, May 2007.

29. "Stratified flows: from the lab to the ocean," *Mathematics, MIT*, March 2007.
28. "Stratified flows: from the lab to the ocean," *Oceanography, University of Washington*, March 2007.
27. "Internal waves in the ocean," *Schlumberger, Oslo, Norway*, January 2007.
26. "Stratified flows: from the lab to the ocean," *Mathematics, University of Oslo, Norway*, January 2007.
25. "Stratified flows: from the lab to the ocean," *Civil and Environmental Engineering, Stanford University*, January 2007.
24. "Internal tides from bumps and knives," *ONR NLIWI contractors meeting, Kaohsiung, Taiwan*, November 2006.
23. "Experimental investigations of internal wave generation and evolution near topography," *EAPS, MIT*, November 2006.
22. "Experimental investigations of internal wave generation and evolution near topography," *Civil and Environmental Engineering, MIT*, November 2006.
21. "Experimental investigations of internal wave generation and evolution near topography," *Duke University*, October 2006.
20. "Experimental investigations of internal wave generation and evolution near topography," *Applied Mathematics, University of British Columbia*, March 2006.
19. "Nonlinear internal wave generation and evolution," *ONR NLIWI contractors meeting, Kona, HI*, February 2006.
18. "Reflecting and rotating internal wave beams," *Physical Oceanography, WHOI*, May 2005.
17. "Experimental investigations of unsteady separation," *AFOSR, Arlington, VA*, November 2004.
16. "Reflecting and rotating internal wave beams," *Civil and Environmental Engineering, MIT*, April 2004.
15. "Reflecting and rotating internal wave beams," *Mechanical Engineering, MIT*, October 2003.
14. "Control of a planar jet using MEMS," *Mechanical Engineering, Brown University*, October 2003.
13. "The stratified Boycott effect," *DEAS, Harvard University*, March 2003.
12. "Control of a planar jet using MEMS," *Mechanical Engineering, UC Santa Barbara*, April 2002.
11. "Control of a planar jet using MEMS," *MAE, UCLA*, March 2002.
10. "Control of a planar jet using MEMS," *Mathematics, Penn State University*, March 2002.
9. "Micro-active forcing of a planar jet," *Applied Mathematics, University of Colorado, Boulder*, June 2001.
8. "Micro-active forcing of a planar jet," *DEAS, Harvard University*, April 2001.
7. "Micro-active forcing of a planar jet," *Mechanical Engineering, University of Toronto*, February 2001.
6. "Micro-active forcing of a planar jet," *Mathematics, MIT*, February 2000.

5. "Codimension-2 bifurcations in a liquid crystal flow," *Physics, University of Colorado, Boulder*, March 1998.
4. "Codimension-2 bifurcations in a liquid crystal flow," *Chemical Engineering, Stanford University*, January 1997.
3. "Bifurcation phenomena in a liquid crystal flow," *Mathematics, Warwick University*, May 1996.
2. "Bifurcation phenomena in a liquid crystal flow," *DAMPT, Cambridge University*, April 1996.
1. "Bifurcation phenomena in a liquid crystal flow," *Physics, Oxford University*, March 1996.

CONSULTING

Co-producer of pilot documentary on Internal Waves for *The Shop Productions* and *Baddog Productions*, 2008–present.

TEACHING EXPERIENCE

Dynamics & Control	Principal lecturer for core undergraduate course 2.003 (formerly 2.004). Contributions include: streamlining and re-organizing of lab (FT04); redesigning curriculum (Summer05); introduction of compulsory recitations with worked problems (FT04, ST06, ST07, FT08,FT13); inclusion in OpenCourseWare (ST07); improved integration of lecture and MATLAB content (FT08). Average rating 5.6/7. Also principal lecturer for graduate course 2.032 (FT05). Rating 5.6/7.
Nonlinear Dynamics	Introduced undergraduate course 2.050J *Nonlinear Dynamics I: Chaos* (FT07,FT09,FT11). Rating 6.35/7. Course lecturer for *Nonlinear Dynamics II: Continuum Mechanics* (ST03,ST04). Developed extensive course notes and experiments for psets. Average rating 6.6/7. Developed short course (five lectures) on *Lagrangian Coherent Structures* and taught in Vietnam (FT12).
Instrumentation	Laboratory professor for undergraduate course 2.671 *Measurement & Instrumentation* (ST04, ST05, FT06, ST09, ST11). Involves overseeing student laboratory experiments, and design and execution of individual student projects. Average rating 6.17/7.
Fluid Dynamics	Teaching assistant at Oxford university for senior-level course *Viscous Flow*, from the text by Acheson (FT 95). Several stand in lectures for graduate course 18.355 *Fluid Dynamics*. Module on *Experimental Methods in Environmental Fluid Mechanics* in 2.21J (ST10).
Calculus	Recitation instructor for core undergraduate course 18.01 and 18.02 (FT00, FT02). Introduced playing card technique to encourage student participation. Average rating 6.6/7.
Diff. Eqns.	Recitation instructor for core undergraduate course 18.03 (ST01). Rating 6.7/7. Co-developed new ODEs course 2.087 for Mechanical Engineering Department (ST13, ST14). Average rating 6.0/7.

ACADEMIC SERVICE

Member of editorial board, *CHAOS* (2013-present).
Member of organizing committee, APS DFD 2015 (2013-present).
Member of organizing committee, USNCTAM Internal Waves meeting 2014 (2013-present).
Media Moghul for Mechanical Engineering Department (2013-present).
Member of MIT Distinguished Scholarships committee (2013-present).
Volunteer freshman advisor (2013-present).
Lead Organizer of *Uncovering Transport Barriers in Geophysical Flows* workshop at the Banff International Research Station (2013).
Invited author on *Lagrangian Coherent Structures*, Physics Today (2013).
Taught one week short courses on *Lagrangian Coherent Structures* at *Institute of Oceanography, Nha Trang* and *Vietnam National University, Hanoi*, Vietnam (2012).
Faculty lead on MIT Mechanical Engineering ECM Nexus renovation project, involving 10 research groups (2011-2012).
Scientific crew member on NSF EXITS (May 2011) and ONR IWISE (August 2011) research cruises.
LA EPSCoR reviewer (2011).
European Hydralab reviewer (2011).
Co-organizer of workshop on *Lagrangian Coherent Structures*, Leiden, The Netherlands (2011).
Co-organizer of workshop on *Geophysical and Astrophysical Internal Waves*, Les Houches, France (2011).
USNCTAM10 Session Organizer, Nonlinear Dynamics (2010).
External thesis examiner, University of Alberta (2010).
Lead Editor for *CHAOS* Special Issue on *Lagrangian Coherent Structures* (2009–2010).
Lead Organizer of *Coordinated Mathematical Modeling of Internal Waves* workshop at the Banff International Research Station (2009–2010).
Referee (2002–present)
Physical Review Letters, Physical Review E, Journal of Fluid Mechanics, Physics of Fluids, Experiments in Fluids, Journal of Geophysical Research, Deep-Sea Research, Applied Physics Letters, CHAOS, AFOSR National Science Foundation.
Graduate admissions committee (2009–2011).
AGU General Assembly session organizer on *Internal Waves* (2008).
NSF Physical Oceanography panel review (2008).
European HYDRALAB panel review (2008).
APS DFD Acrivos Dissertation Committee (2008–2009).
ICTAM08 Referee (2008).
MIT SEPT summer program coordinator (2007).
APS DFD Session Chair (2007, 2008, 2009).
Volunteer crew member on ONR NLIWI cruise (2007).
MIT-France coordinator (2006–present).
Pi Tau Sigma faculty advisor (2006–2011).
USNCTAM06 Session Organizer (2006).
Volunteer crew member on NSF IWAP cruise (2006).
Co-Organizer for Dynamics Days Conference. Raised $40K from ONR and ARO (2006).
Independent Activities Period coordinator (2005-2011).
Mechanical Engineering mathematics representative (2005–present).
Mechanics seminar coordinator (2005–2011).
External thesis examiner, University of Colorado (2005).

External thesis examiner, Manchester University (2005).
WHOI GFD Summer Program, participant (2005, 2007, 2009).
General Institute Requirements Committee Meeting (2005).
Mechanical Engineering graduate committee member (2004–2005).
Graduate Association of Mechanical Engineers host (2004).
Invited Principal Lecturer, Santa Fe Institute for Complex Systems Summer Program (2003, 2004).
Health & Safety Officer, Mathematics Department (2003).
Brown Bag Seminar Coordinator, MIT Mathematics Department (2001–2003).

CURRENT GRADUATE STUDENTS & POSTDOCS

Margaux Filippi B.Sc. (U. Hawaii).
Maha Haji, B.Sc. (UC Berkeley).
Matthieu Leclair, Postdoc (U. Grenoble).
Sasan Ghaemsaidi, B.Sc. (UT Austin).

FORMER GRADUATE STUDENTS & POSTDOCS

Ali Tabaei, Postdoc, Internal Waves, supported by T.R. Akylas (2004).
Raul Coral, M.Sc., Unsteady Separation (2005).
Matthew Weldon, M.Sc., Unsteady Separation (2007).
Morris Flynn, Postdoc, Internal Tides (2008).
Wenbo Tang, Postdoc, Internal Wave Attractors, supported by G. Haller (2008).
Paula Echeverri, M.Sc., Ph.D., Internal Tides (2009).
Manikandan Mathur, Ph.D., Internal Waves (2010).
Arezoo Ardekani, Postdoc, Thermal Propulsion (2010).
Matthieu Mercier, Postdoc, Internal Waves (2013).
Michael Allshouse, M.Sc., Ph.D., Lagrangian Coherent Structures (2013).

Ph.D. COMMITTEES

Ali Tabaei, Mechanical Engineering (2004).
Ivan Skopovi, Mechanical Engineering (2006).
Sungwhan Jung, Mechanical Engineering (2007).
Amit Surana, Mechanical Engineering (2007).
Steve Przesmitzki, Mechanical Engineering (2008).
King-Yeung Yick, Mathematics (2008).
Matthew DeJong, Architecture (2009).
James Munroe, Physics (2009).
Sungyon Lee, Mechanical Engineering (2009).
Joanna Gyory, Physical Oceanography (2010).
Yeunwoo Cho, Mechanical Engineering (2010).
Rebecca Walsh Dell, Physical Oceanography (2012).
Chris Dimitriou, Mechanical Engineerin (2013).
John Hong, Mechanical Engineering, pending.

OTHER RESEARCH ADVISEES

Sarah Novak, UROP (2003).
Jeffery Aristoff, UROP (2003).
Renaud Heitz, visiting student, Ecoles des Mines (2003–2004).
Martha Buckley, UROP (2004).
Tom Bienamé, visiting student, ENS de Lyon (2005).
Remi Cousin, visiting student, Ecoles des Mines (2006-2007).
Damon Vanderlind, UROP (2006–2007).
Pauline Steinmetz, visiting student, Ecoles des Mines (2007–2008).
William Etheridge, undergrad thesis (2007).
Maria Monks, UROP (2007).
Moneer Helu, undergrad thesis (2007).
Victoris Harris, undergrad thesis (2007).
Chris Dimitriou, undergrad thesis (2008).
Michael Allshouse, undergrad thesis (2008).
Conor Lenehan, undergrad thesis (2009).
Tite Yokossi, visiting student, Ecoles des Mines (2008–2009).
Brian Doyle, UROP (2009–2011).
Zaim Ouazzani, visiting student, Universite Joseph Fourier (2013).

PROFESSIONAL AFFILIATIONS

American Geophysical Union
American Physical Society
Society for Industrial and Applied Mathematics