Curriculum Vitae (October 2010)

Juan M. Lopez

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Professional preparation:

1980 B.Sc. (First Class Honours) (Mathematics), Monash University, Australia.

1985 Ph.D. (Mathematics), Monash University, Australia.
Thesis title: *Thermal and Magneto-Convection*
Thesis advisor: Prof. J. O. Murphy

Professional appointments:

- 2009–present: Associate Director, Graduate Programs, School of Mathematical and Statistical Sciences, Arizona State University.
- 2003–present: Professor, Department of Mathematics and Statistics (now School of Mathematical and Statistical Sciences), Arizona State University.
- 1998–2003: Associate Professor, Department of Mathematics, Arizona State University.
- 1993–1998: Associate Professor, Department of Mathematics, The Pennsylvania State University.
- 1990–1993: Senior Research Scientist, Fluid Dynamics Group, Defense Science and Technology Organisation (DSTO), Aeronautical Research Laboratory, Melbourne, Australia.
- 1985–1990: Research Scientist, Fluid Dynamics Group, Defense Science and Technology Organisation (DSTO), Aeronautical Research Laboratory, Melbourne, Australia.

Visiting and affiliate positions:

- 2006–present: Affiliated Professor, Department of Mechanical and Aerospace Engineering, Arizona State University.
- 1999–present: Affiliated Professor, Center for Environmental Fluid Dynamics, Arizona State University.
- 2010–present: WCU Visiting Professor, Department of Mathematics, Kyungpook National University, Daegu, Korea.
- Summers 1998–2010: Visiting Professor, Department of Applied Physics, Universitat Politècnica de Catalunya, Barcelona, Spain.
- July 2008: Visiting Fellow, Summer Program, Center for Turbulence Research, Stanford University, Stanford, CA.
- Jan–Jun 2005: Visiting Scientist, Department of Mechanical Engineering, National University of Singapore.
- 1998–2003: Affiliated Professor, System Science and Engineering Research Center, Arizona State University.

- May–Jun 1998: Visiting Professor, Department of Mechanical Engineering, University of Málaga, Málaga, Spain.
- 1995–1998: Affiliated Professor, Institute for High Performance Computer Applications (IHPCA), The Pennsylvania State University.
- 1993–1998: Affiliated Professor, Earth System Science Center, The Pennsylvania State University.
- Feb–Mar 1993: Visiting Professor, Department of Meteorology, The Pennsylvania State University.
- July 1992: Visiting Fellow, Summer Program, Center for Turbulence Research, NASA Ames & Stanford University.
- Aug 1987–Jan 1989: Visiting Scientist, Applied Aerodynamics Branch, NASA Ames Research Center, Moffett Field, CA.

Principal areas of interest:

Hydrodynamic instabilities, nonlinear dynamics and bifurcation theory, interfacial hydrodynamics, numercial methods for PDE.

Academic honors and professional recognition:

1. George Garibaldi Turri Scholarship 1976–1980
2. Commonwealth Postgraduate Research Award 1981–1984
3. The Technical Cooperation Program (Technical Defense Alliance between Australia, Britain, Canada, New Zealand, and U.S.A.) secondment to NASA Ames Research Center, CA, Aug. 1987–Jan. 1989
4. Defense Science and Technology Organisation Merit Promotion, 1990
5. Banff International Research Station "Interfacial Dynamics in Complex Fluids," Banff, Canada, May 27–June 1, 2006.
6. XIV Seminario Enzo Levi, Cuernavaca, Mexico, May 17–18, 2007.
7. Centre Research de Matimatics, "Dynamical Systems and Continuum Physics," Montreal, Canada, November 14–16, 2007.
8. Invited Plenary Speaker, 16th International Couette-Taylor Workshop, Princeton University, September 9–11, 2009.

Research grants:

1. IBM Support of University Research Award: "Instructional and research facilities for high performance computing," $275,000, Aug. 1995–Aug. 1996 (Co-PI).
2. NSF ARI DMS-9512483: "Acquisition of a multi-processor computing facility for nonlinear mathematical field problems," $303,899, Sept. 1995–Sept. 1998 (Co-PI).
3. NSF Computational Mathematics DMS-9706951: "Dynamic control and parametric resonance in hydrodynamic systems: A theoretical, computational, and experimental investigation," $94,000, Aug. 1997–Aug. 2000 (PI; Co-PI: J. Shen).
4. NSF Fluid, Particulate and Hydraulic Systems CTS-9803683: "Dynamics of surfactant-influenced gas/liquid interfaces," $48,000, July 1998–Mar. 2002 (PI).

5. NSF International INT-9732637: "U.S.–Spain Cooperative Research: Dynamic control and parametric resonance in hydrodynamic systems," $16,267, Sept. 1998–Sept. 2001(PI; Co-PI: J. Shen).
6. NSF Fluid, Particulate and Hydraulic Systems CTS-9803683: "Research Experience for Undergraduates Supplement: Dynamics of surfactant-influenced gas/liquid interfaces," $6,875, Jan. 1999–Mar. 2002 (PI).
7. NSF Fluid, Particulate and Hydraulic Systems CTS-9908599: "Spatial and temporal resonances in hydrodynamics: A theoretical, experimental, and numerical exploration," $180,000, May 2000–May 2003 (PI; Co-PI: Saric).
8. NSF Fluid, Particulate and Hydraulic Systems CTS-0116995: "Effects of bulk flow on monolayer formation at gas/liquid interfaces," $15,000, Nov. 2001–Nov. 2002 (PI).
9. Swiss NSF, Fellowships and Exchange Program P1012-100371: "Bifurcation Patterns of a Swirling Flow/Vortex Breakdown System," 15,300SF, 2003–2005 (Co-PI).
10. ASU-CLAS Grant to Advance the Quality of Undergraduate Education: "Preparing Students in Scientific Research, " (PI; Co-PIs Welfert and Renaut) $14,923 July 2004–June 2005.
11. NSF Fluid, Particulate and Hydraulic Systems CTS-0340736: "Collaborative research: The role of monolayer structure on interfacial hydrodynamics," $122,000 July 2004–July 2007 (PI).
12. NSF Fluid, Particulate and Hydraulic Systems CTS-0340736: "Research Experience for Undergraduates Supplement: The role of monolayer structure on interfacial hydrodynamics," $12,000 July 2004–July 2007 (PI).
13. Spanish Ministry of Education and Science, SAB2003-0172: 30,000 Euro Sept. 04–July 2005 (PI).
14. NSF Applied Mathematics DMS-0509594: "Collaborative research: Multiphase interfacial hydrodynamics," $57,893 July 2005–Nov. 2008 (PI).
15. NSF Applied Mathematics DMS-05052705: "Stochastic parametric forcing in hydrodynamics," $294,390 Sept. 2005–Sept. 2009 (PI; Co-PI: Welfert)
16. ASU Fulton High Performance Computing 2006: 100,000 CPU hours allocation (PI).
17. NSF Applied Mathematics DMS-0703587: "CSUMS: Undergraduate Research Experiences for Computational Math Sciences Majors at ASU," $1,029,404 Sept. 2007–Aug. 2012 (Co-PI).
18. NSF Applied Mathematics DMS-0808045: "Atomization of liquids in non-isothermal environments: multiscale modeling and simulations," $307,868 July 2008–June 2011 (PI; Co-PI: Herrmann).
19. ASU Fulton High Performance Computing 2009: 150,000 CPU hours allocation ($30,000 in-kind support) (PI).
20. NSF TeraGrid TG-DMS090029: "Turbulent rotating convection," 200,000 CPU hours, February 2009–February 2010 (PI).
21. NSF TeraGrid TG-DMS090031: "Atomization of liquids in non-isothermal environments," 200,000 CPU hours, February 2009–February 2010 (PIs: Lopez and Herrmann).
22. Korean Ministry of Education, Science & Technology (MEST) and Korea Science and Engineering Foundation(KOSEF) World Class University (WCU) grant R32-2009-000-20021-0,

"Computation and methodology in applied fluid dynamics," 2,550,000,000 Won, April 2009–August 2013 (Co-PI)

23. NSF DMS-0922864: "SCREMS: Visualization of complex spatio-temporal multiscale fluid dynamic phenomena," $113,890, August 2009–July 2010 (Co-PI).
24. Ministry of Science and Innovation, Spain FIS2009-08821 "Coherent structures and turbulence in simple domains," 90,000 Euro, September 2009–August 2012 (Co-PI).
25. ASU Fulton High Performance Computing 2010: 100,000 CPU hours allocation (PI).

Publications:

ISI Web-of-knowledge h-index=20, citations=1343.

2010:

1. Panades, C., Marques, F. and Lopez, J. M. Transitions to three-dimensional flows in a cylinder driven by oscillations of the sidewall. *Journal of Fluid Mechanics*, (submitted).
2. Marques, F., Meseguer, A., Lopez, J. M. and Pacheco, J. R. Hopf bifurcation with zero frequency and imperfect SO(2) symmetry. *Physica D*, (submitted).
3. Lim, Y., Do, Y. and Lopez, J. M. Slow passage through Hopf, Neimark-Sacker and 2-torus bifurcations. *Chaos, Solitons & Fractals*, (submitted).
4. Brady, P. T., Herrmann, M. and Lopez, J. M. Confined thermocapillary motion of a three-dimensional deformable drop. *Physics of Fluids*, (submitted).
5. Sankar, M., Park, Y., Lopez, J. M. and Do, Y. Numerical study of natural convection in a vertical porous annulus with discrete heating. *Int. J. Heat Mass Transfer*, (accepted).
6. Lopez, J. M. and Marques, F. Sidewall boundary layer instabilities in a rapidly rotating cylinder driven by a differentially co-rotating lid. *Physics of Fluids*, (accepted).
7. Blackburn, H. M. and Lopez, J. M. Modulated waves in a periodically driven annular cavity. *Journal of Fluid Mechanics*, (accepted).
8. Pacheco, J. R., Lopez, J. M. and Marques, F. Pinning of rotating waves to defects in finite Taylor-Couette flow. *Journal of Fluid Mechanics*, (accepted).
9. Do, Y., Lopez, J. M. and Marques, F. 2010 Optimal harmonic response in a confined crossflow boundary layer flow. *Physical Review E* **82**, 036301.
10. Rubio, A., Lopez, J. M. and Marques, F. 2010 Onset of Küppers–Lortz-like dynamics in finite rotating thermal convection. *Journal of Fluid Mechanics* **644**, 337–357.

2009:

11. Lopez, J. M., Marques, F., Rubio, A. M. and Avila, M. 2009 Crossflow instability of finite Bödewadt flows: transients and spiral waves. *Physics of Fluids* **21**, 114107.
12. Lopez, J. M. and Marques, F. 2009 Centrifugal effects in rotating convection: nonlinear dynamics. *Journal of Fluid Mechanics* **628**, 269–297.
13. Cui, Y. D., Lopez, J. M., Lim, T. T. and Marques, F. 2009 Harmonically forced enclosed swirling flow. *Physics of Fluids* **21**, 034106.
14. Rubio, A., Lopez, J. M. and Marques, F. 2009 Interacting oscillatory boundary layers and wall modes in modulated rotating convection. *Journal of Fluid Mechanics* **625**, 75–96.

2008:

15. Avila, M. Grimes, M., Lopez, J. M. and Marques, F. 2008 Global endwall effects on centrifugally stable flows. *Physics of Fluids* **20**, 104104.

16. Abshagen, J., Lopez, J. M., Marques, F. and Pfister, G. 2008 Bursting dynamics due to a homoclinic cascade in Taylor-Couette flow. *Journal of Fluid Mechanics* **613**, 357–384.

17. Rubio, A., Lopez, J. M. and Marques, F. 2008 Modulated rotating convection: Radially traveling concentric rolls. *Journal of Fluid Mechanics* **608**, 357–378.

18. Herrmann, H., Lopez, J. M., Brady, P. and Raessi, M. 2008 Thermocapillary motion of deformable drops and bubbles. *Center for Turbulence Research, Proceedings of the Summer Program 2008;* pp. 155–170 (Stanford/NASA Ames).

19. Azadani, A. N., Lopez, J. M. and Hirsa, A. H. 2008 Coupling between protein-laden films and a shearing bulk flow. *Journal of Colloids and Interface Science* **322**, 79–86.

20. Avila, M., Belisle, M. J., Lopez, J. M., Marques, F. and Saric, W. S. 2008 Mode competition in modulated Taylor-Couette flow. *Journal of Fluid Mechanics* **601**, 381–406.

21. Marques, F. and Lopez, J. M. 2008 Influence of wall modes on the onset of bulk convection in a rotating cylinder. *Physics of Fluids* **20**, 024109.

22. Lopez, J. M., Cui, Y. D., Marques, F. and Lim, T. T. 2008 Quenching of vortex breakdown oscillations via harmonic modulation. *Journal of Fluid Mechanics* **599**, 441–464.

2007:

23. Avila, M., Marques, F., Lopez, J. M. and Meseguer, A. 2007 Stability control and catastrophic transition in a forced Taylor-Couette system. *Journal of Fluid Mechanics* **590**, 471–496.

24. Lopez, J. M., Marques, F., Mercader, I. and Batiste, O. 2007 Onset of convection in a moderate aspect-ratio rotating cylinder: Eckhaus-Benjamin-Feir instability. *Journal of Fluid Mechanics* **590**, 187–208.

25. Allen, J. J. and Lopez, J. M. 2007 Transition processes for junction vortex flow. *Journal of Fluid Mechanics* **585**, 457–467.

26. Azadani, A. N., Lopez, J. M. and Hirsa, A. H. 2007 Protein crystallization at the air/water interface induced by shearing bulk flow. *Langmuir* **23**, 5227–5230.

27. Marques, F., Mercader, I., Batiste, O. and Lopez, J. M. 2007 Centrifugal effects in rotating convection: Axisymmetric states and three-dimensional instabilities. *Journal of Fluid Mechanics* **580**, 303–318.

2006:

28. Hirsa, A. H., Lopez, J. M., Vogel, M. J. and Leung, J. J. F 2006 Effects of shearing flow with inertia on monolayer mesoscale structure. *Langmuir* **22**, 9483–9486.

29. Lopez, J. M., Cui, Y. D. and Lim, T. T. 2006 An experimental and numerical investigation of the competition between axisymmetric time-periodic modes in an enclosed swirling flow. *Physics of Fluids* **18**, 104106.

30. Lopez, J. M., Rubio, A. and Marques, F. 2006 Traveling circular waves in axisymmetric rotating convection. *Journal of Fluid Mechanics* **569**, 331–348.

31. Marques, F. and Lopez, J. M. 2006 Onset of three-dimensional unsteady states in small aspect-ratio Taylor-Couette flow. *Journal of Fluid Mechanics* **561**, 255–277.

32. Lopez, J. M. 2006 Rotating and modulated rotating waves in transitions of an enclosed swirling flow. *Journal of Fluid Mechanics* **553**, 323–346.

2005:

33. Lopez, J. M. and Marques, F. 2005 Finite aspect ratio Taylor-Couette flow: Shil'nikov dynamics of 2-tori. *Physica D* **211**, 168–191.

34. Abshagen, J., Lopez, J. M., Marques, F. and Pfister, G. 2005 Mode competition of rotating waves in reflection-symmetric Taylor-Couette flow. *Journal of Fluid Mechanics* **540**, 269–299.

35. Abshagen, J., Lopez, J. M., Marques, F. and Pfister, G. 2005 Symmetry breaking via global bifurcations of two tori in hydrodynamics. *Physical Review Letters* **94**, 074501.

36. Leung, J. J. F., Hirsa, A. H., Blackburn, H. M., Marques, F. and Lopez, J. M. 2005 Three-dimensional modes in a periodically driven elongated cavity. *Physical Review E* **71**, 026305.

37. Blackburn, H. M., Marques, F. and Lopez, J. M. 2005 Symmetry breaking of two-dimensional time-periodic flows. *Journal of Fluid Mechanics* **522**, 395–411.

2004:

38. Lopez, J. M., Vogel, M. J. and Hirsa, A. H. 2004 Influence of coexisting phases on the surface dilatational viscosity of Langmuir monolayers. *Physical Review E* **70**, 056308.

39. Iranzo, V., Marques, F. and Lopez, J. M. 2004 From global to local bifurcations in a forced Taylor-Couette flow. *Theoretical and Computational Fluid Dynamics* **18**, 115–128.

40. Vogel, M. J., Miraghaie, R., Lopez, J. M. and Hirsa, A. H. 2004 Flow-induced patterning of Langmuir monolayers. *Langmuir* **20**, 5651–5654.

41. Lopez, J. M. and Marques, F. 2004 Mode competition between rotating waves in a swirling flow with reflection symmetry. *Journal of Fluid Mechanics* **507**, 265–288.

42. Lopez, J. M., Marques, F., Hirsa, A. H. and Miraghaie, R. 2004 Symmetry breaking in free-surface cylinder flows. *Journal of Fluid Mechanics* **502**, 327–354.

43. Lopez, J. M., Marques, F. and Shen, J. 2004 Complex dynamics in a short Taylor-Couette annulus with the top endwall stationary and the bottom rotating. *Journal of Fluid Mechanics* **501**, 327–354.

44. Marques, F., Lopez, J. M. and Blackburn, H. M. 2004 Bifurcations in systems with Z_2 spatio-temporal and $O(2)$ spatial symmetry. *Physica D* **189**, 247–276.

2003:

45. Blackburn, H. M. and Lopez, J. M. 2003 The onset of three-dimensional standing and modulated travelling waves in a periodically-driven cavity flow. *Journal of Fluid Mechanics* **497**, 289–317.

46. Lopez, J. M. and Marques, F. 2003 Short anulus Taylor-Couette flow: Onset of a very-low-frequency three-torus state. *Physical Review E* **68**, 036302.

47. Marques, F., Gelfgat, A. Yu. and Lopez, J. M. 2003 A tangent double Hopf bifurcation in a differentially rotating cylinder flow. *Physical Review E* **68**, 016310.

48. Blackburn, H. M. and Lopez, J. M. 2003 On three-dimensional quasi-periodic Floquet instabilities of two-dimensional bluff body wakes. *Physics of Fluids* **15**, L57–L60.

49. Miraghaie, R., Lopez, J. M. & Hirsa, A. H. 2003 Flow induced patterning at the air/water interface. *Physics of Fluids* **15**, L45–L48.

50. Vogel, M., Hirsa, A. H. & Lopez, J. M. 2003 Spatio-temporal dynamics of a periodically driven cavity flow. *Journal of Fluid Mechanics* **478**, 197–226.

2002:

51. Lopez, J. M. & Marques, F. 2002 Modulated Taylor-Couette flow: Onset of spiral modes. *Theoretical and Computational Fluid Dynamics* **16**, 59–69.

52. Hirsa, A. H., Lopez, J. M. & Miraghaie, R. 2002 Determination of surface shear viscosity via deep-channel flow with inertia. *Journal of Fluid Mechanics* **470**, 135–149.

53. Blackburn, H. M. & Lopez, J. M. 2002 Modulated rotating waves in an enclosed swirling flow. *Journal of Fluid Mechanics* **465**, 33–58.

54. Sanchez, J., Marques, F. & Lopez, J. M. 2002 A continuation and bifurcation technique for Navier-Stokes flows. *Journal of Computational Physics* **180**, 78–98.

55. Lopez, J. M., Hart, J. E., Marques, F., Kittelman, S. & Shen, J. 2002 Instability and mode interactions in a differentially-driven rotating cylinder. *Journal of Fluid Mechanics* **462**, 383–409.

56. Liu, Z., Lai, Y.-C. & Lopez, J. M. 2002 Noise-induced enhancement of chemical reactions in chaotic flows. *Chaos* **12**, 417–425.

57. Marques, F., Lopez, J. M. & Iranzo, V. 2002 Imperfect gluing bifurcation in a temporal glide-reflection symmetric Taylor-Couette flow. *Physics of Fluids* **14**, L33–L36.

58. Hirsa, A. H., Lopez, J. M. & Miraghaie, R. 2002 Symmetry breaking to a rotating wave in a lid-driven cylinder with a free surface: Experimental observation. *Physics of Fluids* **14**, L29–L32.

59. Marques, F., Lopez, J. M. & Shen, J. 2002 Mode interactions in an enclosed swirling flow: a double Hopf bifurcation between azimuthal wavenumbers 0 and 2. *Journal of Fluid Mechanics* **455**, 263–281.

60. Lopez, J. M., Marques, F. & Shen, J. 2002 An efficient spectral-projection method for the Navier-Stokes equations in cylindrical geometries. II. Three dimensional cases. *Journal of Computational Physics* **176**, 384–401.

61. Lopez, J. M. & Hirsa, A. H. 2002 Non-Newtonian behavior of an insoluble monolayer: Effects of inertia. *Journal of Colloid and Interface Science* **248**, 103–110.

2001:

62. Lopez, J. M. & Hirsa, A. H. 2001 Oscillatory driven cavity with an air/water interface and an insoluble monolayer: Surface viscosity effects. *Journal of Colloid and Interface Science* **242**, 1–5.

63. Hirsa, A. H., Lopez, J. M. & Miraghaie, R. 2001 Measurement and computation of hydrodynamic coupling at an air/water interface in the presence of an insoluble monolayer. *Journal of Fluid Mechanics* **443**, 271–292.

64. Lopez, J. M., Marques, F. & Sanchez, J. 2001 Oscillatory modes in an enclosed swirling flow. *Journal of Fluid Mechanics* **439**, 109–129.

65. Marques, F., Lopez, J. M. & Shen, J. 2001 A periodically forced flow displaying symmetry breaking via a three-tori gluing bifurcation and two-tori resonances. *Physica D* **156**, 81–97.

66. Marques, F. & Lopez, J. M. 2001 Precessing vortex breakdown mode in an enclosed cylinder flow. *Physics of Fluids* **13**, 1679–1682.

2000:

67. Blackburn, H. M. & Lopez, J. M. 2000 Symmetry breaking of the flow in a cylinder driven by a rotating endwall. *Physics of Fluids* **12**, 2698–2701.

68. Hirsa, A., Lopez, J. M., & Kim, S. 2000 Evolution of an initially columnar vortex terminating normal to a no-slip wall. *Experiments in Fluids* **29**, 309–321.

69. Lopez, J. M. & Hirsa, A. H. 2000 Surfactant influenced gas/liquid interfaces: Nonlinear equation of state and finite surface viscosities. *Journal of Colloid and Interface Science* **229**, 575–583.

70. Lopez, J. M. & Marques, F. 2000 Dynamics of 3-tori in a periodically forced Navier-Stokes flow. *Physical Review Letters* **85**, 972–975.

71. Brummell, N., Hart, J. E. & Lopez, J. M. 2000 On the flow induced by centrifugal buoyancy in a differentially-heated rotating cylinder. *Theoretical and Computational Fluid Dynamics* **14**, 39–54.

72. Lopez, J. M., Marques, F. & Shen, J. 2000 Endwall effects in a periodically forced centrifugally unstable flow. *Fluid Dynamics Research* **27**, 91–108.

73. Talmage, G., Shyu, S.-H., Lopez, J. M. & Walker, J. S. 2000 Inertial effects in the rotationally driven melt motion during the Czochralski growth of silicon crystals with a strong axial magnetic field. *Journal of Applied Mathematics and Physics (ZAMP)* **51**, 267–289.

74. Lopez, J. M. & Marques, F. 2000 Quasiperodic responses to parametric excitations. In *Numerical Methods for Bifurcation Problems and Large-Scale Dynamical Systems* (eds. E. Doedel & L. Tuckerman) IMA Volumes in Mathematics and its Applications **119**, 209–228 (Springer).

75. Marques, F. & Lopez, J. M. 2000 Spatial and temporal resonances in a periodically forced extended system. *Physica D* **136**, 340–352.

76. Lopez, J. M. & Marques, F. 2000 Determining the self-rotation number following a Naimark–Sacker bifurcation in the periodically forced Taylor–Couette flow. *Journal of Applied Mathematics and Physics (ZAMP)* **51**, 61–74.

1990's:

77. Stevens, J. L., Lopez, J. M. & Cantwell, B. J. 1999 Oscillatory flow states in an enclosed cylinder with a rotating endwall. *Journal of Fluid Mechanics* **389**, 101–118.

78. Lopez, J. M. & Shen, J. 1999 A numerical study of periodically forced flows using a spectral-projection method. *Lecture Notes in Physics* **515**, 189–194.

79. Lopez, J. M. & Chen, J. 1998 Coupling between a viscoelastic gas/liquid interface and a swirling vortex flow. *Journal of Fluids Engineering* **120**, 655–661.

80. Lopez, J. M. & Hirsa, A. 1998 Direct determination of the dependence of the surface shear and dilatational viscosities on the thermodynamic state of the interface: Theoretical foundations. *Journal of Colloid and Interface Science* **206**, 231–239.

81. Lopez, J. M. & Shen, J. 1998 Numerical simulation of incompressible flows in cylindrical geometries using a spectral projection method. *International Journal of Applied Science and Computations* **5**, 25–40.

82. Lopez, J. M. 1998 Characteristics of endwall and sidewall boundary layers in a rotating cylinder with a differentially rotating endwall. *Journal of Fluid Mechanics* **359**, 49–79.

83. Lopez, J. M. & Shen, J. 1998 An efficient spectral-projection method for the Navier-Stokes equations in cylindrical geometries. I. Axisymmetric cases. *Journal of Computational Physics* **139**, 308–326.

84. Marques, F. & Lopez, J. M. 1997 Taylor–Couette flow with axial oscillations of the inner cylinder: Floquet analysis of the base flow. *Journal of Fluid Mechanics* **348**, 153–175.

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86. Henderson, D. M., Lopez, J. M., & Stewart, D. L. 1996 Vortex evolution during non-axisymmetric spin-up. *Journal of Fluid Mechanics* **324**, 109–134.

87. Lopez, J. M. 1996 Flow between a stationary and a rotating disk shrouded by a co-rotating cylinder. *Physics of Fluids* **8**, 2605–2613.

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89. Lopez, J. M. 1995 Unsteady swirling flow in an enclosed cylinder with reflectional symmetry. *Physics of Fluids* **7**, 2700–2714.

90. Lopez, J. M. 1994 On the bifurcation structure of axisymmetric vortex breakdown in a constricted pipe. *Physics of Fluids* **6**, 3683–3693.

91. Lopez, J. M. & Bulbeck, C. J. 1993 Behaviour of streamwise rib vortices in a three-dimensional mixing layer. *Physics of Fluids A* **5**, 1694–1702.

92. Murphy, J. O., Lopez, J. M. & Dyt, C. P. 1993 The effect of magnetic-field strength on the oscillatory characteristics of multimode magnetoconvection. *Proceedings Astronomical Society of Australia* **10**, 275–277.

93. Lopez, J. M. & Bulbeck, C. J. 1992 Behavior of streamwise rib vortices in a three-dimensional mixing layer. *Center for Turbulence Research, Proceedings of the Summer Program 1992;* pp. 147–164 (Stanford/NASA Ames).

94. Lopez, J. M. & Perry, A. D. 1992 Periodic axisymmetric vortex breakdown in a cylinder with a rotating end wall. *Physics of Fluids A* **4**, 1871.

95. Lopez, J. M. & Perry, A. D. 1992 Axisymmetric vortex breakdown: Part 3. Onset of periodic flow and chaotic advection. *Journal of Fluid Mechanics* **234**, 449–471.

96. Brown, G. L. & Lopez, J. M. 1990 Axisymmetric vortex breakdown: Part 2. Physical mechanisms. *Journal of Fluid Mechanics* **221**, 553–576.

97. Lopez, J. M. 1990 Axisymmetric vortex breakdown: Part 1. Confined swirling flow. *Journal of Fluid Mechanics* **221**, 533–552.

1980's:

98. Murphy, J. O. & Lopez, J. M. 1989 The evolution of a horizontal scale for oscillatory magnetoconvection. *Proceedings Astronomical Society of Australia* **8**, 25–28.

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110. Lopez, J. M. & Murphy, J. O. 1984 Horizontal wave number dependence of type II solutions in Rayleigh-Benard convection with hexagonal planform. *Australian Journal of Physics* **37**, 531–547.

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131. Rubio, A., Lopez, J. M. and Marques, F. 2007 Travelling Waves in Modulated Rotating Convection. In *SIAM Conference on Analysis of Partial Differential Equations;* December 10–12, 2007, Mesa, Arizona.

132. Welfert, B. D., Castro, R. and Lopez, J. M. 2007 Reduction of dynamical systems under stochastic parametric forcing. In *SIAM Conference on Analysis of Partial Differential Equations;* December 10–12, 2007, Mesa, Arizona.

133. Lopez, J. M., Marques, F., Cui, Y. D. and Lim, T. T. 2008 Control de oscilaciones en la rotura de vórtices. In *Nolineal 2008 (Eds. F. Marques & A. Delshams), pp. 90;* June 16–19, 2008, Univ. Politec. Catalunya, Barcelona, Spain.

134. Marques, F., Lopez, J. M. and Rubio, A. 2008 Convección con rotación en cilindros: transición de los modos de pared a caos espacio-temporal. In *Nolineal 2008 (Eds. F. Marques & A. Delshams), pp. 50;* June 16–19, 2008, Univ. Politec. Catalunya, Barcelona, Spain.

135. Rubio, A., Lopez, J. M. and Marques, F. 2008 Modulated rotating convection: radially travelling concentric rolls. In *Nolineal 2008 (Eds. F. Marques & A. Delshams), pp. 100;* June 16–19, 2008, Univ. Politec. Catalunya, Barcelona, Spain.

136. Avila, M., Belisle, M., Lopez, J. M., Marques, F. and Saric, W. S. 2008 Competencia de modes en fluidos: experimentos y simulaciones. In *Nolineal 2008 (Eds. F. Marques & A. Delshams), pp. 134;* June 16–19, 2008, Univ. Politec. Catalunya, Barcelona, Spain.

137. Rubio, A., Lopez, J. M. & Marques, F. 2008 Interacting Stokes layers and wall modes in modulated rotating convection. *Bull. American Phys. Soc.* **53**, 48.

138. Lopez, J. M., Marques, F., Lim, T. T. & Cui, Y. D. 2008 Harmonically forced enclosed swirling flow. *Bull. American Phys. Soc.* **53**, 228.

139. Marques, F. & Lopez, J. M. 2008 Centrifugal effects in rotating convection: nonlinear dynamics. *Bull. American Phys. Soc.* **53**, 315.

140. Lopez, J. M. 2009 Harmonically forced enclosed swirling flow. In *SIAM Conference on Applications of Dynamical Systems;* May 17–21, 2009, Snowbird, Utah.

141. Rubio, A., Lopez, J. M. and Marques, F. 2009 Transitions in irregular geostrophic turbulence. In *SIAM Conference on Applications of Dynamical Systems;* May 17–21, 2009, Snowbird, Utah.

142. Brady, P., Herrmann, M. and Lopez, J. M. 2009 A numerical method for detailed simulations of atomization in non-isothermal environments. In *11th Triennial Conference on Liquid Atomization and Spray Systems, Paper no. ICLASS2009-184;* Vail, CO, July 26–30 2009.

143. Marques, F., Rubio, A. and Lopez, J. M. 2009 Rotating convection: transitions from wall modes to quasi-geostrophic turbulence. In *Third International Symposium on Instabilities and Bifurcations in Fluid Dynamics;* August 10–13, 2009, Nottingham, UK.

144. Lopez, J. M. 2009 Invited Keynote Talk: Complex spatio-temporal dynamics in short-aspect-ratio Taylor-Couette flow. In *16th International Couette-Taylor Workshop;* September 9–11, 2009, Princeton University.

145. Belisle, M., Saric, W. S., Avila, M. and Lopez, J. M. 2009 Mode competition in experimental modulated Taylor-Couette flow. In *16th International Couette-Taylor Workshop;* September 9–11, 2009, Princeton University.

146. Pacheco, R. J., Lopez, J. M. and Marques, F. 2009 Pinning of rotating waves to defects in finite Taylor-Couette flow. In *16th International Couette-Taylor Workshop;* September 9–11, 2009, Princeton University.

147. Avila, M., Grimes, M., Lopez, J. M. and Hof, B. 2009 Transient growth effects in quasi-Keplerian Taylor-Couette flows. In *16th International Couette-Taylor Workshop;* September 9–11, 2009, Princeton University.

148. Rubio, A., Lopez, J. M. and Marques, F. 2009 Onset of Küppers-Lortz like dynamics in finite rotating convection. In *16th International Couette-Taylor Workshop;* September 9–11, 2009, Princeton University.

149. Lopez, J. M., Rubio, A. and Marques, F. 2009 Rotating convection: transitions from wall modes to quasi-geostrophic turbulence. In *16th International Couette-Taylor Workshop;* September 9–11, 2009, Princeton University.

150. Brady, P., Lopez, J. M. and Herrmann, M. 2009 A numerical method for variable surface tension effects in non-isothermal atomization. *Bull. American Phys. Soc.* **54**, LJ.00007.

151. Lopez, J. M. 2009 Crossflow instability of finite Bödewadt flows: transients and spiral waves. In *Joint Meeting of the Korean Mathematical Society and the American Mathematical Society;* December 16–20, 2009, Ewha Womans University, Seoul, Korea.

152. Lopez, J. M. 2010 Onset of Küppers–Lortz-like dynamics in finite rotating thermal convection. In *Joint Meeting of the Korean Association of Mathematical Societies;* April 24–25, 2010, Chungnam National University, Dajeon, Korea.

153. Brady, P., Herrmann, M. and Lopez, J. M. 2010 A Numerical Method for Variable Surface Tension Effects in Non-Isothermal Atomization with Overset Grids. In *ILASS-Americas 2010: 22nd Annual Conference in Liquid Atomization and Spray Systems; Paper no. ILASS2010-152;* May 16–19, 2010, Cincinnati, Ohio.

154. Rubio, A., Lopez, J. M. and Marques, F. 2010 Rotating Convection: Transitions from Wall Modes to Quasi-geostrophic Turbulence. In *SIAM Emerging Topics in Dynamical Systems and Partial Differential Equations;* May 31 – June 4, 2010, Barcelona, Spain.

155. Avila, M., Grimes, M., Lopez, J. M. and Hof, B. 2010 Hydrodynamic Stability of Keplerian Flows. In *SIAM Emerging Topics in Dynamical Systems and Partial Differential Equations;* May 31 – June 4, 2010, Barcelona, Spain.

156. Marques, F., Lopez, J. M., Avila, M. and Rubio, A. 2010 Crossflow Instability of Finite Bödewadt Flows: Transients and Spiral Waves. In *SIAM Emerging Topics in Dynamical Systems and Partial Differential Equations;* May 31 – June 4, 2010, Barcelona, Spain.

157. Lopez, J. M. 2010 Rapidly Rotating Flows: Interactions between Inertial Waves and Viscous Shear Layers. In *SIAM Emerging Topics in Dynamical Systems and Partial Differential Equations;* May 31 – June 4, 2010, Barcelona, Spain.

158. Brady, P. T., Lopez, J. M. and Herrmann, M. 2010 Multi-Scale Methods for Simulating Turbulent Atomization. In *SIAM Annual Meeting;* July 12–16, 2010, Pittsburgh PA.

159. Lopez, J. M. and Marques, F. 2010 Sidewall boundary layer instabilities in a rapidly rotating cylinder driven by a differentially co-rotating lid. In *Bull. American Phys. Soc.;* 55. CE.00009

160. Sadoughi, A., Hirsa, A. and Lopez, J. M. 2010 Newtonian to non-Newtonian flow transition in lung surfactants. In *Bull. American Phys. Soc.;* 55. EL.00002

161. Marques, F., Meseguer, A., Lopez, J. M. and Pacheco, R. 2010 Pinning of rotating waves in systems with imperfect $SO(2)$ symmetry. In *Bull. American Phys. Soc.;* 55. HZ.00006

162. Brady, P., Lopez, J. M. and Herrmann, M. 2010 A numerical method for variable surface tension effects in non-isothermal atomization with overset grids. In *Bull. American Phys. Soc.;* 55. LW.00004

163. Young, J., Posada, D., Hirsa, A. and Lopez, J. M. 2010 Effect of Reynolds number on 2-D protein crystallization at the air/water interface. In *Bull. American Phys. Soc.;* 55. MK.00000

Invited Colloquia and Seminars:

1. Sep 1986: Department of Mathematics, Monash University, Australia.
2. Oct 1986: Director's Seminar, Aeronautical Research Laboratory, Australia. "Axisymmetric vortex breakdown: A comparison between experimental visualization and numerical simulation."
3. Apr 1988: Department of Mechanical Engineering, Stanford University, CA.
4. May 1988: Review seminar, High Angle of Attack Project, NASA Ames Research Center, CA.
5. Nov 1988: Department of Mechanical Engineering, University of California, Davis, CA.
6. Feb 1989: Royal Aerospace Establishment, Farnborough, UK.
7. Feb 1989: School of Aeronautics, Polytechnic University of Madrid, Spain.
8. Apr 1989: Flight Mechanics and Propulsion Division Seminar, Aeronautical Research Laboratory, Australia.
9. Sep 1990: NASA Langley Research Center, VA.
10. May 1991: Flight Mechanics and Propulsion Division Seminar, Aeronautical Research Laboratory, Australia.
11. Jun 1991: Department of Mechanical Engineering, University of Melbourne, Australia.
12. Aug 1991: Bureau of Meteorology Research Centre, Victoria, Australia.
13. Nov 1991: Graduate Aeronautics Laboratory, California Institute of Technology, CA.
14. Aug 1992: Department of Mechanical Engineering, The Pennsylvania State University, PA.
15. Aug 1993: Department of Mathematics, The Pennsylvania State University, PA. "Some aspects of axisymmetric vortex breakdown."
16. Dec 1993: Department of Mechanical Engineering, Monash University, Australia. "On the nature of the onset of periodic swirling flow."
17. Mar 1994: Department of Mechanical Engineering, Clarkson University, NY. "Bifurcation structure of swirling flows."

18. Dec 1994: Department of Mechanical Engineering, Lehigh University, PA. "Vortex line bending in axisymmetric swirling flows."
19. Sep 1995: Department of Meteorology, The Pennsylvania State University, PA. "Circular waves in Bödewadt boundary layers."
20. Sep 1995: Transition and Turbulence Seminar Series, Cornell University, NY. "Circular waves in Bödewadt boundary layers".
21. Oct 1995: Department of Mechanical and Aeronautical Engineering, Rensselaer Polytechnic Institute, NY. "Circular waves in Bödewadt boundary layers."
22. Apr 1996: Department of Aeronautical Engineering and Department of Mathematics, Ohio State University, OH. "Boundary layers and free shear layers in flows between counter-rotating disks."
23. Apr 1996: Department of Aerospace and Mechanical Engineering, Princeton University, NJ. "Coupling between endwall boundary layers and rotating flows."
24. Jan 1997: Institute for High Performance Computer Applications, The Pennsylvania State University, PA. "Dynamic control of hydrodynamic instabilities."
25. Feb 1997: Department of Mechanical and Aerospace Engineering, University of California, Davis, CA. "Boundary layers due to rotating and vortex flows: Computations, experiments, and similarity considerations."
26. Feb 1997: Department of Mathematics, University of California, Davis, CA. "Dynamic control of hydrodynamic instabilities."
27. Oct 1997: IMA Workshop: Large Scale Dynamical Systems, University of Minnesota, Minneapolis, MN. "Quasiperiodic response to parametric excitation."
28. Oct 1997: Department of Applied Physics, Universitat Politècnica de Catalunya, Barcelona, Spain. "Dynamics of flows with viscoelastic interfaces."
29. Oct 1997: Department of Mechanical Engineering, University of Málaga, Spain. "Dynamics of flows with viscoelastic interfaces."
30. Dec 1997: Department of Mechanical and Aerospace Engineering, University of California, Davis, CA. "Hydrodynamic coupling between a viscoelastic gas/liquid interface and a swirling vortex flow."
31. Jan 1998: Air Products and Chemicals Inc., Allentown, PA. "Direct determination of viscoelastic properties of surfactant-influenced gas/liquid interfaces and computations of interfacial flows."
32. Feb 1998: Levich Institute for Physico-Chemical Hydrodynamics, CUNY, NY. "Hydrodynamic coupling between a surfactant influenced gas/liquid interface and a swirling vortex flow."
33. Feb 1998: Department of Mathematics, Arizona State University, AZ. "Hydrodynamic coupling between a surfactant influenced gas/liquid interface and a swirling vortex flow."
34. Mar 1998: Department of Mathematics, Tufts University, MA. "Hydrodynamic coupling between a surfactant influenced gas/liquid interface and a swirling vortex flow."
35. May 1998: Department of Aeronautical Engineering, University of Sevilla, Spain. "Quasiperiodic response to parametric excitation."

36. Sep 1998: Department of Mathematics and Department of Mechanical Engineering, Arizona State University, AZ. "Periodically forced centrifugally unstable flows."
37. Oct 1998: Department of Mathematics, University of Utah, Salt Lake City, UT. "Periodically forced centrifugally unstable flows."
38. Nov 1998: Department of Mathematics and SSERC, Arizona State University, AZ. "Peristaltic pumping."
39. Jan 1999: Program in Atmospheric and Oceanic Science, University of Colorado, Boulder, CO. "Periodically forced centrifugally unstable flows."
40. Sep 1999: Mathematics and Cognition Seminar, Arizona State University, AZ. "On the hydrodynamics of peristaltic pumping."
41. Oct 1999: Department of Aerospace Engineering, University of Southern California, LA. "Vortex breakdown: Onset of unsteadiness and multiple states."
42. Nov 1999: Department of Physics and Institute for Surface and Interface Sciences, University of California, Irvine, CA. "Aspects of interfacial flows with surfactants."
43. Feb 2000: Department of Mechanical and Aerospace Engineering, University of California, Irvine, CA. "Dynamics and bifurcations in a periodically forced Navier-Stokes flow."
44. May 2000: Department Mechanical Engineering, Georgia Institute of Technology, GA. "Multiple Unsteady Solutions and Symmetry Breaking in a Confined Swirling Flow."
45. June 2001: Mediterranean Institute for Advanced Studies Seminar, Universitat Illes Balears, Palma de Mallorca, Spain "Symmetry breaking, double Hopf bifurcations and mixed modes in flows with $SO(2)$ symmetry."
46. Oct 2001: Swiss Federal Institute of Technology, EPFL-Laussane, Switzerland "Symmetry breaking, double Hopf bifurcations and mixed modes in flows with $SO(2)$ symmetry."
47. Oct 2001: Laboratory of Thermodynamics in Emerging Technologies, Swiss Federal Institute of Technology, ETH-Zentrum Zurich, Switzerland "Symmetry breaking, double Hopf bifurcations and mixed modes in flows with $SO(2)$ symmetry."
48. Oct 2001: Computational and Applied Mathematics Proseminar, Department of Mathematics, Arizona State University, AZ. "Instabilities, Symmetry Breaking and Mode Interactions in an Enclosed Swirling Flow."
49. Mar 2002: Department of Mechanical Aeorspace and Nuclear Engineering Colloquium, Rensselaer Polytechnical Institute, NY. "Instabilities, Symmetry Breaking and Mode Interactions in Rotating Shear Flows."
50. July 2002: Department of Physics and Applied Mathematics, University of Navarra, Pamplona, Spain "Complex dynamics in a short Taylor-Couette annulus."
51. Oct 2002: Computational and Applied Mathematics Seminar, Department of Mathematics, Purdue University IN, "Complex dynamics in a short Taylor-Couette annulus."
52. Oct 2002: Applied and Computational Mathematics Seminar, Department of Mathematics, Pennsylvania State University, PA, "Complex dynamics in a short Taylor-Couette annulus."
53. Nov 2002: Environmental Fluid Dynamics seminar, Arizona State University, AZ, "Complex dynamics in a short Taylor-Couette annulus."
54. Dec 2002: Seminario de Mecánica de Fluidos y Matemática Aplicada, ETS Ingenieros Aeronáuticos, Universidad Politecnica de Madrid, Spain, "Complex dynamics in a short Taylor-Couette annulus."

55. Apr 2003: Colloquium, Department of Mathematics, University of Southern California, CA, "On 3D instabilities of 2D time-periodic flows."

56. Jul 2003: Mediterranean Institute for Advanced Studies Seminar, Universitat Illes Balears, Palma de Mallorca, Spain "On 3D instabilities of 2D time-periodic flows."

57. Nov 2003: Laboratory of Thermodynamics in Emerging Technologies, Swiss Federal Institute of Technology, ETH-Zentrum Zürich, Switzerland "Complex dynamics due to competition between instability mechanisms."

58. May 2004: Earth and Space Sciences, UCLA, "Spatio-temporal Complexity in a Short Taylor-Couette Flow."

59. Dec 2004: CSIRO, Melbourne, "Role of Surfactant Monolayers in Fluid Flow."

60. Apr 2005: Seminar, Department of Mechanical Engineering, National University of Singapore "On 3D instabilities of 2D time-periodic flows."

61. Apr 2005: Colloquium, Department of Mathematics and Department of Computational Science, National University of Singapore "Symmetry breaking and mode competition in Taylor-Couette flow."

62. Jul 2005: Seminar, Department of Applied Physics, Universitad Politecnica de Catalunia, "Symmetry breaking via global bifurcations in Taylor-Couette flow."

63. Sep 2005: Seminar, Department of Mechanical Engineering, New Mexico State University, Las Cruces, "On 3D instabilities of 2D time-periodic flows."

64. Apr 2006: Institute for Scientific Computing and Applied Mathematics Seminar, Mathematics Department, Indiana University, Bloomington,"Hydrodynamic Spatio-temporal Complexity."

65. Apr 2006: Computational and Applied Mathematics Seminar, Department of Mathematics, Purdue University, "On 3D instabilities of 2D time-periodic flows."

66. Oct 2006: Mechanical and Aerospace Engineering Seminar, Arizona State University, "Centrifugal Effects in Rotating Convection."

67. Feb 2007: Center for Interdisciplinary Research in Fluid Physics Seminar, University of California Santa Barbara, "Quenching of unsteady vortex breakdown."

68. Jul 2007: Seminarios de Física Nolineal y Teoría del Caos, Universidad Rey Juan Carlos, Madrid Spain, "Quenching of unsteady vortex breakdown."

69. Oct 2007: Center for Dynamical Systems and Nonlinear Sciences Colloquium, Georgia Tech, "Quenching of unsteady vortex breakdown."

70. Oct 2007: Applied Mathematics Seminar, University of Minnesota, "Quenching of unsteady vortex breakdown."

71. Dec 2007: Fluid Laboratory for Aeronautical and Industrial Research seminar, Department of Mechanical Engineering, Monash University, Melbourne, Australia, "Quenching of Vortex Breakdown Oscillations."

72. Mar 2009: Thermosciences Seminar, Centro de Investigación en Energía, Universidad Nacional Autonoma de Mexico, "Control of Instabilities via Periodic Forcing."

73. June 2009: Complex Dynamics and Turbulence Seminar, Max Planck Institute for Dynamics and Self-Organization, Göttingen Germany, "Onset of Küppers–Lortz dynamics in finite rotating convection."

74. Oct 2009: Keynote speaker for opening ceremony & workshop of WCU project "Computation and Methodology in Applied Fluid Dynamics," talk entitled "Mathematics in Fluid Dynamics: From fundamental understanding to prediction and control," Kyungpook National University, Daegu, South Korea, October 16–17.
75. Feb 2010: Computational and Applied Mathematics Seminar, "Onset of Küppers–Lortz-like dynamics in finite rotating thermal convection," Department of Mathematics, Purdue University, Indiana.
76. Sept 2010: High Performancs Computing for Space and Envirnoment seminar, "Instabilities and Transitions in Rapidly Rotating Flows," ASU.
77. Sept 2010: WCU Fluid Dynamics workshop, "Modulated waves in a periodically driven annular cavity," Department of Mathematics, Kyungpook National University, Daegu, Korea.

Editorial boards:

- Associate Editor: *Advances in Applied Mathematics and Mechanics* (Global Science Press).
- Associate Editor: *Aerospace Science and Technology* (Elsevier).
- Guest Editor: special issues of *Theoretical and Computational Fluid Dynamics* (Springer), vol. 16(1), 2002 and vol. 18(2–4), 2004.

National Panels:

1. NASA Microgravity Fluid Physics "Dynamics and Stability" panel, July 1997.
2. NASA Microgravity Fluid Physics "Dynamics and Stability" panel, July 1999.
3. NSF Applied and Computational Mathematics "Mathematics of Fluids" panel, February 2002.
4. NSF "CSUMS" panel, June 2006.
5. NSF Applied and Computational Mathematics "Mathematics of Fluids" panel, March 2007.
6. NSF Applied and Computational Mathematics and Math Biology "CAREERS" panel, October 2007.
7. NSF Division of Civil, Mechanical, and Manufacturing Innovation, Dynamical Systems Program panel, April 2009.

Reviewer for:

AIAA Journal
Applied Mathematics Letters
Communications in Computational Physics
Computers and Fluids
European Journal of Mechanics B: Fluids
European Physics Journal B
Experiments in Fluids
Fluid Dynamics Research
International Journal for Numerical Methods in Fluids
International Journal of Thermal Sciences
Journal of Applied Mechanics
Journal of Colloid and Interface Science

Journal of Computational Physics
Journal of Circuits, Systems and Signal Processing
Journal of Fluids Engineering
Journal of Fluid Mechanics
Journal of Fluids and Structures
Journal of Physics D: Applied Physics
Nonlinear Processes in Geophysics
Physica D
Physica Scripta
Physical Review E
Physics of Fluids
Proceedings of the Royal Society of London, Series A
SIAM Journal on Applied Dynamical Systems
Theoretical & Computational Fluid Dynamics

Cambridge University Press books
Institute of Physics books
SIAM books
Wiley/Pearson books

National Science Foundation proposals
American Chemical Society–Petroleum Reseach Fund proposals
Australian Academy of Science proposals
U.S. Civilian R. & D. Foundation proposals
Israel Science Foundation proposals
Swiss National Science Foundation proposals
The Danish National Research Foundation, UNIK program proposals

Graduate students: advisor

1. Dawn L. Stewart, Masters "Spin-up in a rectangular cylinder," (Mathematics, Penn State University; co-advisor with Henderson, December 1993)
2. Jinhong Janice Chen, Ph.D. "Hydrodynamic coupling between a viscoelastic gas/liquid interface and a swirling vortex flow," (Mathematics, Penn State Univ., May 1998)
3. John Valenzuela, Masters (Mech. & Aerospace Eng., ASU; co-advisor with Saric, May 2001)
4. Michael J. Belisle, Masters "Experiments in mode competetion in temporally-modulated Taylor–Couette flow," (Mech. & Aerospace Eng., ASU; co-advisor with Saric, December 2007; presently in PhD program at Texas A & M)
5. Marc Avlia, Ph.D. "Nonlinear dynamics of mode competition in annular flows," (Applied Physics, Univ. Politècnica de Catalunya, Barcelona Spain; co-advisor with Marques and Meseguer, June 2008; presently Postdoctoral Fellow Max-Planck-Institute for Dynamics and Self-Organization, Gttingen, Germany)
6. Antonio Rubio, Ph.D. (Mathematics, ASU, July 2009; presently Postdoctoral fellow Applied Mathematics, University of Colorado at Boulder)
7. Peter Brady, Ph.D. (Mech. & Aerospace Eng., ASU; co-advisor with Herrmann, expected 2011)

Graduate students: committee member

1. Jose L. Stevens, "Experimental study of vortex breakdown in a cylindrical, swirling flow," Ph.D. Aeronautics & Astronautics, Stanford University, June 1996.
2. Seokwoo Kim, "An experimental investigation of a columnar vortex terminating normal to a gas/liquid or solid/liquid interface,"Ph.D. Aeronautical Engineering, Rensselaer Polytechnic Institute, December 1996.
3. Linda B. Smolka, "On the pinch-off of a pendant drop of viscous fluid," Master of Arts, Mathematics, The Pennsylvania State University, May 1997.
4. Juan Carlos Arrese, "Sobre capas limites inducidas por torbellinos," Ph.D. Mechanical Engineering, University of Málaga, Spain, September 1997.
5. Alvaro Meseguer, "Bifurcations in fluid systems: Petrov-Galerkin schemes," Ph.D. Applied Physics, Universitat Politècnica de Catalunya, Spain, June 1998.
6. Edward B. White, "Breakdown of Crossflow Vortices," Ph.D. Department of Mechanical and Aerospace Engineering, Arizona State University, August 2000.
7. Joaquin Ortega Casanova, "Sobre la influencia de la viscosidad en la rotura de vórtices en conductos," Ph.D. Mechanical Engineering, University of Málaga, Spain, December 2000.
8. Dritan Zela, "A continuum spine model for the horizontal-cell-to-cone feedback in cat outer retina," Ph.D. Mathematics, Arizona State University, December 2001.
9. Reza Miraghaie, "Experimental investigation of interfacial hydrodynamics of swirling flow in the presence of insoluble monolayers," Ph.D. Mechanical Engineering, Rensselaer Polytechnic Institute, March 2002.
10. Mike Vogel, "Measurements of monolayer hydrodynamics at an air/water interface," Ph.D. Mechanical Engineering, Rensselaer Polytechnic Institute, July 2002.
11. Enrique Sanmiguel-Rojas, "On the autorotation phenomenon," Ph.D. Mechanical Engineering, University of Málaga, Spain, December 2002.
12. Sang-Jun Lee, Ph.D. Mechanical Engineering, Arizona State University, August 2002
13. Markus Trahe, "Attractors of 3-D Fast-Rotating Navier-Stokes Equations," Ph.D. Mathematics, Arizona State University, December 2002.
14. Jonathan J. F. Leung, "Measurements of flow-induced structuring of monolayers," Ph.D. Mechanical Engineering, Rensselaer Polytechnic Institute, May 2006.
15. Ali N. Azadani, "Flow enhanced protein crystallization at the air/water interface," Ph.D. Mechanical Engineering, Rensselaer Polytechnic Institute, May 2007.
16. Liang Huang, "Dynamics and security of complex clustered network systems," Ph.D. Electrical Engineering, Arizona State University, December 2008.
17. Rui Yang, Ph.D. Electrical Engineering, Arizona State University, qualifying exam May 6, 2009.

Visiting scholars

1. Juan Carlos Arresse; Penn State University, Summer & Fall 1996. Ph.D. "Sobre capas limites inducidas por torbellinos," (Mechanical Engineering, University of Málaga, Spain, September 1997; presently working in industry.)

2. Joaquin Ortega Casanova; ASU, Fall 1998 & Fall 1999. Ph.D. "Sobre la influencia de la viscosidad en la rotura de vórtices en conductos," (Mechanical Engineering, University of Málaga, Spain, December 2000; presently Associate Professor Mech. Eng., University of Málaga.)
3. Marc Avila; ASU Aug.–Dec., 2006 & July 2007–May 2008. Ph.D. "Nonlinear dynamics of mode competition in annular flows," (Applied Physics, Univ. Politècnica de Catalunya, Barcelona Spain; Lopez co-advisor with Marques and Meseguer, June 2008; presently Postdoctoral Fellow Max-Planck-Institute for Dynamics and Self-Organization, Gttingen, Germany.)
4. Jose Nuñez; ASU Aug.–Dec., 2010. Currently Ph.D. student from the Center for Energy Research, National Autonomous University of Mexico.

Undergraduate students:

James D. Buntine, Summer Internship at The Aeronautical Research Laboratory, Melbourne, Summer 1986.

Anthony Perry, Summer Internship at The Aeronautical Research Laboratory, Melbourne, Summers 1990 & 1991.

Matt Bomhoff, NSF-REU, Mathematics, ASU, Spring/Summer/Fall 1999.

Stan Seibert, Footnote 18 Honors, Mathematics, ASU Spring 1999.

Albert Kern, Footnote 18 Honors, Mathematics, ASU Fall 1999.

Craig Thalhauser, Footnote 18 Honors, Mathematics, ASU Fall 1999.

Craig Thalhauser, ASU/NASA Space Grant Fellow, Mathematics, ASU, Fall 1999 & Spring 2000.

Melissa Blank, Footnote 18 Honors, Mathematics, ASU Fall 2001.

Jeff Casimir, Footnote 18 Honors, Mathematics, ASU Fall 2001.

Nicole Richardson, Footnote 18 Honors, Mathematics, ASU Fall 2001.

Joseph Vahabzadeh, Footnote 18 Honors, Mathematics, ASU Fall 2001.

Alison Williams, Footnote 18 Honors, Mathematics, ASU Fall 2001.

Makalika Naholowaa, ASU/NASA Space Grant Fellow, Fall 2001 & Spring 2002.

Andreas Hundseid Ronneseth, NSF-REU, Mathematics, ASU, Spring/Summer/Fall 2001; ASU/NASA Space Grant Fellow, Spring & Fall 2002.

Mark Sipperley, NSF-REU Spring 2004.

Matt Grimes: NSF-REU Fall 2007; NSF-CSUMS Spring & Fall 2008; NSF-REU Fall 2009 & Spring 2010.

Andrew Brandon: NSF-REU Fall 2009 & Spring 2010.

Professional activities:

- Scientific Committee, *Applied Mathematics Workshop for Materials Studies and Industrial Applications,* Oct. 24–26, 1996, The Pennsylvania State University.
- Computer Committee, Department Mathematics, The Pennsylvania State University, 1995–1998.
- Co-organizer, *Symposium on Interfacial Viscosities,* Rensselaer Polytechnic Institute, 15 October 1999.
- Co-organizer, *Workshop on Surfactant Flows at Interfaces,* Institute for Surface and Interface Science, University of California Irvine, April 29–30, 2000.
- Co-organizer of minisymposium "Frequency Locking in Spatially Extended Systems," *Sixth SIAM Conference on Applications of Dynamical Systems meeting,* Utah, May 20–24, 2001.

- Co-organizer, *12th International Couette-Taylor Workshop,* Northwestern University, September 6–8, 2001.
- Co-organizer, special session on "Theoretical and Computational Issues in Fluid Dynamics" at the *Fourth International Conference on Dynamical Systems and Differential Equations,* Wilmington, NC, May 24–27, 2002.
- Co-organizer, *13th International Couette-Taylor Workshop,* Universitat Politcnica de Catalunya, Barcelona, July 3–5, 2003.
- Organizer, workshop 'Modeling of Multiphase Langmuir Monolayers,' ASU, Feb. 2–6, 2006.
- Organizer, minisymposium "Nonlinear Dynamics in Extended Dynamical Systems," *SIAM Conference on Analysis of Partial Differential Equations* Mesa, Arizona Dec. 10–12, 2007.
- Session Chairman for Rotating Flows, Free Surface Flows, and Stability sessions at various *American Physical Society Division of Fluid Dynamics*, *SIAM Applications of Dynamical Systems* and *Dynamics Days* meetings.
- Scientific Advisory Committee, *16th International Couette-Taylor Workshop*, Princeton University, September 9–11, 2009.
- Co-organizer, minisymposium "Instabilities and Transition in Rapidly Rotating Flows," *SIAM Emerging Topics in Dynamical Systems and Partial Differential Equations* Barcelona Spain, May 31 – June 4, 2010.

Teaching:

The Pennsylvania State University:

- Math 140: Calculus with Analytic Geometry I (UG)
- Math 220: Matrices and Linear Algebra (UG)
- Math/CSE 451: Numerical Calculations (UG)
- Math/CSE 455: Introduction to Numerical Analysis I (UG/Grad)
- Math/CSE 456: Introduction to Numerical Analysis II (UG/Grad)
- Math 551: Numerical Solution of ODE (Grad)

Arizona State University:

- Math 242: Linear Algebra (UG)
- Math 270: Calculus I (UG)
- Math 274: Differential Equations (UG)
- Math 342: Linear Algebra (UG)
- Math 343: Applied Linear Algebra (UG)
- Math 362: Advanced Mathematics for Engineers and Scientists (UG)
- Math 421: Applied Computational Methods (UG)
- Math 423: Introduction to Numerical Analysis I (/UG/Grad qualifier)
- Math 425: Introduction to Numerical Analysis II (UG/Grad qualifier)
- Math 452: Introduction to Dynamical Systems and Chaos (UG/Grad)

- Math 462: Applied Partial Differential Equations (UG/Grad)
- Math 560: Dynamical Systems Methods in Fluid Dynamics (Grad)
- Math 598: Computational Bifurcation Theory (Grad)

Invited International Professor: Graduate course "Numerical Solution of PDE," University of Málaga, Spain, June 1998.

Invited International Professor: Graduate course "Numerical Solution of Navier-Stokes Equations," Universitat Politécnica de Catalunya (UPC), Barcelona, Spain, June 2002.

Visiting Professor: Graduate course "Topics in Fluid Dynamics," Department of Mechanical Engineering, National University of Singapore, January–April 2005.

Invited International Professor: Graduate short course "Analisis No-lineal de Estabilidad en Flujos Laminares usando Herramientas Numericas," Centro de Investigacion en Energia de la Universidad Nacional Autonoma de Mexico, March 9–13, 2009.