

Paul K. Newton

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EDUCATION

1986: **Ph.D.** Applied Mathematics, Brown University
1982: **Sc.M.** Applied Mathematics, Brown University
1981: **B.S. (Cum laude)** Applied Math/Physics, Harvard University

ACADEMIC POSITIONS

1998– present: **Professor**, Aerospace & Mechanical Engineering and Mathematics, USC
2018– present: **Professor**, Lawrence J. Ellison Institute for Transformative Medicine of USC.
2012– present: **Professor**, Norris Comprehensive Cancer Center, Keck School of Medicine, USC
2018: **Visiting Scientist**, Integrative Mathematical Oncology Department, Moffitt Cancer Center, Tampa Florida, June-July.
2009– 2014: **Head of Mathematical Modeling Group**, The Scripps Research Institute Physical Science Oncology Center
Spring 2014: **Visiting Professor**, Kavli Institute for Theoretical Physics, UC Santa Barbara
Spring 2007: **Visiting Professor**, Department of Mathematics, UC Santa Barbara
Visiting Professor, Department of Mathematics, Hokkaido University
Spring 2000: **Visiting Professor**, Institute for Theoretical Physics, UC Santa Barbara
Visiting Professor, Control & Dynamical Systems, Caltech
1993-98: **Associate Professor**, Aerospace & Mechanical Engineering and Mathematics, USC
1992-93: **Associate Professor**, Department of Mathematics and
Center for Complex Systems Research, University of Illinois Urbana-Champaign
1987-92: **Assistant Professor**, Department of Mathematics and
Center for Complex Systems Research, University of Illinois Urbana-Champaign
Spring 1989: **Visiting Assistant Professor**, Division of Applied Mathematics Brown University
1985-87: **Postdoctoral Fellow** (*w/ J.B. Keller*), Department of Mathematics Stanford University

RESEARCH INTERESTS

Computational health sciences; Medical biophysics; Mathematical oncology; Evolutionary game theory; Systems biology; Nonlinear dynamics.

HONORS and AWARDS

2017: Phi Kappa Phi Faculty Recognition Award, University of Southern California
<https://academichonors.usc.edu/directory/paul-newton/>
2015: R.M. Nakamura Lecture, Scripps Green Hospital, UC San Diego
2014: H. Aref Memorial Lecture, Virginia Tech. School of Engineering
2011: Mellon Foundation Mentoring Award, Viterbi School of Engineering, USC
1993-94: Beckman Institute Research Award, UIUC.
1993: Oakley-Kund University Wide Teaching Award Finalist, University of Illinois.
1990: Fellow - Center for Advanced Study, University of Illinois.
1989-93: Listed in ‘Teachers ranked excellent by students’, University of Illinois.
1981-85: Brown University Fellowship, Division of Applied Mathematics.
1978-81: John Harvard Scholarship for Academic Achievement, Harvard University.
1977: National Merit Scholar, USA.

EDITORIAL and ADVISORY BOARDS

2016- Present: *Editor-in-Chief*: Journal of Nonlinear Science
2011- 2015: *Managing Editor*: Journal of Nonlinear Science
1998 - Present: *Editorial Board*: Texts in Applied Mathematics, Springer-Verlag
2001- Present: *Communicating Editor*: Journal of Nonlinear Science
2009-Present: *Physical Sciences Oncology Center Advisory Committee*: The Scripps Research Institute
2001 - 2006: *Advisory Board*: Strategic Analytics Inc., Santa Fe, NM
1996 - Present: *Scientific Advisor*: Applied Mathematics Inc., Gales Ferry, CT

GRANT SUPPORT

Co-PI MURI- ARO Life Sciences Division: Investigating energy efficiency, information processing and control architectures of microbial community interaction networks 2019-2024; \$5,000,000

Co-PI Novartis Pharmaceutical Corporation: Mapping Disease and Treatment Patterns in Breast Cancer 2018-2021; \$600,000

Co-PI BCRF-JKFG Foundation: Deciphering the molecular control of cancer invasion through quantitative analysis and modeling 2017-2019; \$450,000

Co-PI NIH-ARO: Expansion Feasibility Trial of Analytic Tools for the Optimization and Monitoring of Human Performance 2016; \$39,651

Co-PI ARO-SBIR: Uncertainty quantification and statistical modeling, Applied Math Inc. Sub-Contract II 2015-16 \$150,000

Co-PI ARO-SBIR: Uncertainty quantification and statistical modeling, Applied Math Inc. Sub-Contract I 2014-15 \$150,000

Co-PI NIH/NCI PS-OC Transnetwork Grant: Data assimilation and ensemble statistical forecasting methods applied to the MSKCC longitudinal breast cancer cohort, 2013-2014 \$100,000

Co-PI NIH/NCI Subcontract 1 U54 CA143906-05: Physical Sciences Oncology Center Award, NIH/NCI, 4DB Center: Physics and Mathematics of Metastasis over Time and Space, Sept. 1, 2013-Aug. 2014 \$137,447

PI NIH/NCI PS-OC Transnetwork Grant, ‘Data assimilation and ensemble statistical forecasting methods applied to the MSKCC longitudinal metastatic breast cancer cohort’, 2013-2014, (\$ 100,000)

Co-PI Zumberge Large Research Grant, Zumberge Foundation, ‘Establishing the Center for Integrative Computational Oncology at USC 2012-13, (\$ 50,000)

Co-PI Physical Sciences Oncology Center Award, NIH/NCI, 4DB Center: Physics and Mathematics of Metastasis over Time and Space, 2009-2014, (\$10,000,000)

PI NIH/NCI Subcontract 1 U54 CA143906-05: Physical Sciences Oncology Center Award, NIH/NCI, 4DB Center: Physics and Mathematics of Metastasis over Time and Space, Sept. 1, 2013-Aug. 2014 (\$137,447)

PI NIH/NCI Subcontract 1 U54 CA143906-04: Physical Sciences Oncology Center Award, NIH/NCI, 4DB Center: Physics and Mathematics of Metastasis over Time and Space, Sept. 1, 2012-Aug. 2013 (\$142,773)

PI NIH/NCI Subcontract 1 U54 CA143906-03: Physical Sciences Oncology Center Award, NIH/NCI, 4DB Center: Physics and Mathematics of Metastasis over Time and Space, Sept. 1, 2011-Aug. 2012 (\$140,000)

PI NIH/NCI Subcontract 1 U54 CA143906-02: Physical Sciences Oncology Center Award, NIH/NCI, 4DB Center: Physics and Mathematics of Metastasis over Time and Space, Sept. 1, 2010-Aug. 2011 (\$125,556)

- PI** NIH/NCI Subcontract 1 U54 CA143906-01: Physical Sciences Oncology Center Award, NIH/NCI, 4DB Center: Physics and Mathematics of Metastasis over Time and Space, Nov. 2009-Aug. 2010 (\$123,394)
- Co-PI** U.S. Civilian Research & Development Foundation (CRDF) and the Russian Foundation for Basic Research (RFBR) Multidisciplinary Climate Change (CGP-RFBR III) 2009-2011, (\$50,000)
- PI** N-Vortex Problems: Modeling, Analysis, Numerics, NSF-Applied Mathematics, 2008-2013, (\$250,000)
- PI** N-Vortex Problems: Analysis, computation and data acquisition, NSF-Applied Mathematics, 2005-2008, (\$220,001)
- PI** N-Vortex Problems, NSF- Applied Mathematics, 2002–2005, (\$180,000)
- Co-PI** Southwest Dynamical Systems Conference, University of Southern California, Nov. 2000, NSF (\$25,000)
- Co-PI** Geometry, Dynamics, and Mechanics Workshop, Fields Institute, AFOSR, NSF, Aug. 2002 (\$49,000)
- Co-PI** Laboratory & Analytical Study of Sonic Boom Penetration Through Wavy Air-Water Interface, AFOSR, 2000-2001 (\$150,438)
- Co-PI** Fluidic Actuator System for Local Distributed Micro-Adaptive Flow Control (MAFC), DARPA Phase II SBIR (sub-contract with Applied Math. Inc.), 2000-2002, (\$757,000)
- PI** Dynamical Models of the Interaction of Shocks with Dispersive Waves, NSF-Applied Math, 1998-2001 (\$62,000)
- Co-PI** Wind Wave Patterns, ONR, 1995-97 (\$210,000)
- PI** Oscillation Interactions in Weak Turbulence Models, NATO International Scientific Exchange Program, 1994-96 (\$7,000)
- PI** Asymptotics of Forced Amplitude Equations from Hydrodynamic Stability Theory, NSF-Applied Math 1994-97 (\$90,000)
- Co-PI** Engineering Research Equipment Grant, NSF 1995 (\$105,000)
- Co-PI** Dynamics of Fluid Mixing in Time-Dependent Viscous Wakes, Jets, and Shear Layers, NSF-SBIR 1992-93 (\$75,000)
- PI** Mathematical Computation at the Center for Complex Systems, NSF-SCREMS Program, 1991-93 (\$120,000)
- PI** Asymptotic and Computational Techniques for Amplitude Equations and Weak Turbulence Models, NSF-Applied Math 1991-93 (\$50,000)
- PI** Mathematical Techniques for Unstable Physical Systems, NSF-Applied Math 1990-91 (\$20,000)
- PI** Unstable Phenomena in Mechanical Systems, AFOSR 1988-90 (\$40,000)

INVITED CONFERENCE TALKS

- ◇ AMS Regional Meeting, UC Riverside, Mathematical Biology Session, Sept. 17, 2017
- ◇ Mayo Clinic, Scottsdale AZ, Mathematical Oncology Workshop, Feb. 26-28, 2017
- ◇ (Keynote) U Michigan Conference on Entropy and Information in the Natural Sciences, March 9, 2016.
- ◇ National Cancer Institute Invited Seminar, AMIGOS, March 23, 2016.
- ◇ Cancer Base Workshop, USC, Oct. 5, 2016.
- ◇ (Keynote) New York Academy of Sciences, From Molecules to Man Conference, June 18, 2015.
- ◇ NSF Workshop ‘Applications of Complex Variable Theory’, Invited Lecture, Westmont College, Santa Barbara CA July 23 2014.

- ◇ European Conference on Mathematical and Theoretical Biology, Cancer Metastasis Minisymposium, ‘Cell-trafficking evolutionary model for metastatic breast cancer’, Gothenberg, Sweden, July 16-20, 2014.
- ◇ Cedars-Sinai Lung Cancer Retreat, May 10 2014
- ◇ The Scripps Research Institute/Methodist Workshop, TSRI June 17, 2014
- ◇ Cell-to-Cell Communication in Cancer, Breast Cancer Research Foundation/NCI Conference, Invited Lecture, Memorial Sloan-Kettering Cancer Center, July 14-15, 2014.
- ◇ Kavli Institute for Theoretical Physics, Active Matter Program, Invited Lecture, Mathematical modeling at the Scripps Physical Sciences Oncology Center, Jan. 27, 2014.
- ◇ Human Performance Optimization Workshop, National Cancer Institute, Washington D.C. Dec. 6-8, 2013
- ◇ National Cancer Institute Physical Science Oncology Center Site Visit, The Scripps Research Institute, Oct. 18-19, 2013.
- ◇ Convergence of the Sciences 101: A short course on integrating the physical, engineering, and biological sciences in medicine, Invited Lecture, USC PS-OC, Keck School of Medicine, Oct. 22, 2013.
- ◇ NCI Retreat: Theoretical Viewpoints Emerging from the PS-OCs, Invited Lecture, Aug. 18-19, 2013.
- ◇ Cold Spring Harbor, The Emerging Intersection between the Physical Sciences and Oncology, July 14-16, 2013.
- ◇ Memorial Sloan-Kettering Cancer Center, Invited Presentation, May 16, 2013.
- ◇ Annual Meeting, NCI-Physical Sciences Oncology Centers, Phoenix, AZ, April 18-20, 2013.
- ◇ IUTAM Symposium on Vortex Dynamics: Formation, Structure, and Function, March 10-14, Fukuoka, Japan, 2013.
- ◇ USC Physical Science Oncology Center Annual Symposium, Sept. 27, 2012.
- ◇ USC/Scripps Research Institute Research Retreat, May 21, 2012.
- ◇ **Keynote Address:** ‘Vortex lattice theory: A particle interaction perspective’, *Nonlinear Phenomena: A View From Mathematics and Physics*, National Taiwan University, Jan. 10-14, 2011.
- ◇ Invited Lecture: ‘Markov chain/Monte Carlo models for cancer metastasis’, *Stochastic multiscale methods: Bridging the gap between mathematical analysis and scientific and engineering applications*, Banff International Research Station (BIRS), March 27, 2011.
- ◇ Invited Lecture: ‘Markov chain model describing lung cancer metastatic progression’ *Physical Sciences Oncology Meeting*, National Cancer Institute/TSRI La Jolla, April 11, 2011.
- ◇ **Keynote Address:** ‘Monte Carlo Tennis’, *2nd International Conference on Mathematics in Sport*, Gröningen, June 2009.
- ◇ Invited Lecture, Southern California Conference on Mathematical Fluid Dynamics, Santa Barbara March 2009.
- ◇ **Keynote Address:** ‘The N -vortex problem on a sphere: Breaking integrability’, *IUTAM Symposium, 150 Years of Vortex Dynamics*, Copenhagen, October 2008.
- ◇ Invited Lecture, Southern California Conference on Mathematical Fluid Dynamics, Los Angeles March 2008.
- ◇ Invited Lecture, SIAM Conference on Partial Differential Equations, Phoenix Dec. 2007.
- ◇ Invited Lecture, ICIAM, Minisymposium on Vortex Dynamics I, Zurich, June 17 2007.
- ◇ Invited Lecture, ICIAM, Minisymposium on Vortex Dynamics II, Zurich, June 18 2007.
- ◇ Invited Lecture, SIAM Dynamical Systems Meeting, Minisymposium on Geometric Dynamics, Snowbird, UT May, 2007.

- ◇ Invited Lecture, Structured Integrator Workshop, USC, May 1 2007.
- ◇ **Plenary Address:** IUTAM Symposium, Vortex Dynamics, Hamiltonian Mechanics & Turbulence, Moscow, December 2006.
- ◇ Invited Lecture, 15th U.S. National Congress on Theoretical and Applied Mechanics, June 25-30 2006, UC Boulder.
- ◇ Invited Lecture, Oberwolfach Conference on Dynamical Systems Methods in Fluid Mechanics, Oberwolfach Germany, July 31-Aug. 6, 2005.
- ◇ Invited Lecture, Third MIT Conference on Computational Fluid and Solid Mechanics, Minisymposium on Vortex Dominated Flows, Cambridge, Mass June 2005.
- ◇ Invited Lecture, SIAM Dynamical Systems Meeting, Minisymposium on Probabilistic Models for Sports, Snowbird, UT May, 2005.
- ◇ Invited Lecture, SIAM Dynamical Systems Meeting, Minisymposium on Geometric Dynamics, Snowbird, UT May, 2005.
- ◇ SIAM Dynamical Systems Meeting, Coordinated dynamics of satellites, Snowbird, UT May, 2005.
- ◇ Third MIT Conference on Computational Fluid and Solid Mechanics, Minisymposium on Nonlinear Dynamics in Fluids, Cambridge, Mass June 2005.
- ◇ Workshop on Global Circulation Models, Presentation, Caltech, Nov. 4-6, 2004
- ◇ American Mathematical Society, Western Regional Meeting Seminar on ‘Atmospheric models’, University of Southern California, April 3-5, 2004
- ◇ AIMS Fifth International Conference on Dynamical Systems and Differential Equations, Invited seminar on ‘Decomposition of Weather Patterns’, Pomona CA, June 16-19, 2004
- ◇ AIMS Fifth International Conference on Dynamical Systems and Differential Equations, Invited seminar on ‘Spectral Dynamics of N-Beads on a Ring’, Pomona CA, June 16-19, 2004
- ◇ AIMS Fifth International Conference on Dynamical Systems and Differential Equations, Invited seminar on ‘The Dipole Interaction Model’, Pomona CA, June 16-19, 2004
- ◇ Workshop on Fluid Mixing, UC Santa Barbara, Invited Seminar, May 17, 2003
- ◇ American Mathematical Society Meeting, Special Session on Geophysical Fluid Dynamics, Invited Seminar, Bloomington IN, April 2003
- ◇ SIAM Dynamical Systems Meeting, Minisymposium on Geometric Dynamics, Snowbird, UT May, 2003.
- ◇ SIAM Dynamical Systems Meeting, Minisymposium on Discrete Vortex Dynamics, Snowbird, UT May, 2003.
- ◇ Invited Lecture, Oberwolfach Conference on Dynamical Systems Methods in Fluid Mechanics, Oberwolfach Germany, July 28- Aug. 3, 2002.
- ◇ 4th International Workshop on Vortex Dynamics and Related Numerical Methods UC Santa Barbara, March 2002.
- ◇ SIAM Dynamical Systems Meeting, ‘Self-similar vortex collisions on a sphere’, Snowbird, Utah, May 2001.
- ◇ Co-Organizer, Southwest Dynamical Systems Meeting, University of Southern California, April, 2000.
- ◇ Scripps Inst. Oceanography KDI Workshop, Invited Seminar, La Jolla, Nov. 2000.
- ◇ Scripps Inst. Oceanography Workshop, Invited Seminar, La Jolla, July 2000.
- ◇ Pacific Rim Dynamical Systems Meeting, Invited Seminar, Maui Hawaii, Aug. 2000.

- ◇ Workshop on ‘Physics of Hydrodynamic Turbulence’, Invited participant Institute for Theoretical Physics, UC Santa Barbara, Jan-July 2000.
- ◇ SIAM Dynamical Systems Meeting, Snowbird Utah, May 1999, Minisymposium Chairman, ‘Vortex Dynamics and Statistical Mechanics on Spheres’.
- ◇ APS Annual Fluid Dynamics Meeting, New Orleans, 1999
- ◇ Workshop on Vortex Dynamics and Geophysical Flows, Castro Marina Italy, 1998.
- ◇ SIAM Dynamical Systems Meeting, Snowbird Utah, May 1997, Minisymposium Chairman , ‘Applications of the Geometric Phase’.
- ◇ SIAM Annual Meeting, Kansas City, 1996
- ◇ APS Annual Fluid Dynamics Meeting, Irvine, 1995
- ◇ Second International Workshop on Vortex Flows and Related Numerical Methods Montreal, Canada, August 1995
- ◇ APS Annual Fluid Dynamics Meeting, Atlanta, 1994
- ◇ Ocean Waves Workshop, University of Arizona, March 1994
- ◇ Invited Lecture, IUTAM Symposium on Nonlinear Defects, Technion University, Israel, June 1993
- ◇ Invited Lecture, Special Session: “Mathematical Topics in Fluid Dynamics’ American Mathematical Society, May 1993
- ◇ SIAM Annual Meeting 1992, Los Angeles, CA
- ◇ Canadian Applied Mathematics Society, Wave Phenomena II, 1992, Edmonton, Alberta
- ◇ SIAM International Meeting 1991, Washington D.C.
- ◇ Invited Presentation, Research Trends in Chaotic Dynamics and Transport in Fluids and Plasmas, La Jolla, CA, Feb. 1991
- ◇ IUTAM Symposium on Fluid Mechanics of Stirring and Mixing, UC San Diego, Aug. 1990
- ◇ International Conference on Mathematical Physics: Birmingham, AL, 1990.
- ◇ APS Annual Fluid Dynamics Meeting, NASA Ames, CA, 1989
- ◇ SIAM Annual Meeting 1989, San Diego, CA.
- ◇ SIAM Annual Meeting 1988, Minneapolis, MN.
- ◇ Los Alamos NM: Advances in Fluid Turbulence, May 1988.
- ◇ AMS Summer Session: The Connection between Infinite and Finite Dimensional Dynamical Systems, Boulder, CO, July, 1987.
- ◇ Nonlinear Science Conference, Santa Barbara, CA, 1987.
- ◇ International Conference on Differential Equations: Birmingham, AL, 1986.
- ◇ APS Annual Fluid Dynamics Meeting, Providence, RI, 1985.

CONFERENCE & WORKSHOP ORGANIZATION

- ◇ Member of the International Scientific Committee, IUTAM Symposium, Vortex Dynamics in Science, Nature, and Technology, La Jolla CA June 24-28, 2019
- ◇ Member of the International Scientific Committee, Mathematics Center, Oxtapa Mexico, June 2016.
- ◇ Member of the International Scientific Committee, Perspectives in Nonlinear Dynamics 2013, Hyderabad India, July 2013
- ◇ Member of the International Scientific Committee, IUTAM Symposium, Vortex Dynamics: Formation, Structure, and Function, Fukuoka Japan, March 2013
- ◇ Member of the International Scientific Committee, 3rd International Conference on Mathematics in Sport, The Lowry, Salford Quays UK, June 2011
- ◇ Member of the International Scientific Committee, IUTAM Symposium, 150 Years of Vortex Dynamics, Copenhagen, October 2008ex dynamics: New results and emerging applications', SIAM Dynamical Systems Meeting, Snowbird, UT May, 2009
- ◇ Member of the International Scientific Committee, IUTAM Symposium, Hamiltonian Dynamics, Vortex Structures, Turbulence, Moscow, August 2006
- ◇ SoCAMS Organizing Committee 2006-present
- ◇ *Minisymposium Chairman*: 'Probabilistic Models for Sports', SIAM Dynamical Systems Meeting, Snowbird, UT May, 2005
- ◇ AIMS Fifth International Conference on Dynamical Systems and Differential Equations, Minisymposium Organizer, 'Recent Advances in Vortex Dynamics', Pomona CA, June 16-19, 2004
- ◇ CIMMS Workshop on Space Sciences, Session Chair, Caltech, Oct. 7-9, 2004
- ◇ *Minisymposium Chairman*: 'Geometric Dynamics', SIAM Dynamical Systems Meeting, Snowbird, UT May, 2003.
- ◇ *Minisymposium Chairman*: 'Discrete Vortex Dynamics', SIAM Dynamical Systems Meeting, Snowbird, UT May, 2003
- ◇ *Chairman of Organizing Committee*: Workshop on Geometry, Mechanics, and Dynamics in Honor of the 60th Birthday of J.E. Marsden, August 2002, Fields Institute, Toronto, Canada.
- ◇ *Organizing Committee*: 4th International Conference on Vortex Flows and Related Numerical Methods, March 2002, UC Santa Barbara
- ◇ *Co-Chairman of Organizing Committee*: Southwest Dynamical Systems Meeting, April 2000, University of Southern California
- ◇ *Minisymposium Chairman*: 'Locomotion and Control of Biomechanical Systems in a Fluid Environment', SIAM Conference on Dynamical Systems and Applications, May 2003, Snowbird Utah
- ◇ *Minisymposium Chairman*: 'Dynamics of Discrete Vortices', SIAM Conference on Dynamical Systems and Applications, May 2003, Snowbird Utah
- ◇ *Minisymposium Chairman*: 'Control of Vortex Motion', SIAM Conference on Dynamical Systems and Applications, May 2003, Snowbird Utah
- ◇ *Minisymposium Chairman*: 'Vortex Dynamics and Statistical Mechanics on Spheres', SIAM Conference on Dynamical Systems and Applications, May 1999, Snowbird Utah
- ◇ *Minisymposium Chairman*: 'Applications of the Geometric Phase', SIAM Conference on Dynamical Systems and Applications, May 1997, Snowbird Utah

Ph.D. STUDENTS/POSTDOCS MENTORED

Postdoctoral Mentoring:

- ◇ R. Axel (Ph.D. UIUC), 1996-1997.
- ◇ M. Jamaloodeen (Ph.D. USC), 2000-2001
- ◇ S.D. Ross (Ph.D. Caltech Control and Dynamical Systems), NSF-Postdoctoral Fellowship in Applied Mathematics 2004-2006.
- ◇ R Tiron (Ph.D. U North Carolina Applied Math), 2009-2010.
- ◇ A. Tchieu (Ph.D. Caltech), 2010-2011.
- ◇ J. Mason (Ph.D. USC), 2014-2018.

Ph.D. Theses Supervised:

1. Q. Bu, On initial-boundary value problems: Nonlinear Schrödinger equations and the Ginzburg-Landau equations, Ph.D. Mathematics UIUC, 1992
2. R. Axel, The interaction of shock waves and dispersive waves, Ph.D. Mathematics UIUC, 1996
3. B. Shashikanth, Vortex motion and the geometric phase, Ph.D. Aerospace Engineering, USC, 1998
4. R. Kidambi, Integrable point vortex motion on a sphere, Ph.D. Aerospace Engineering, USC, 1999
5. M. Jamaloodeen, Hamiltonian methods for some geophysical vortex dynamics problems, Ph.D. Mathematics, USC, 2000
6. B. Khushalani, Symplectic sub-cluster methods and periodic vortex motion on a sphere, Ph.D. Aerospace Engineering, USC, 2004
7. E. Upchurch, Miscible flooding of porous media, Ph.D. Aerospace Engineering, USC, 2005
8. B. Cooley, Regular and chaotic dynamics of N-beads on a ring, Ph.D. Aerospace Engineering, USC, 2006
9. H. Shokraneh, N-vortex problem on a rotating sphere, Ph.D. Aerospace Engineering, USC, 2007
10. R. Basilio, Controlled and uncontrolled motion in the circular, restricted three-vortex problem: Dynamically natural spacecraft formations, Ph.D. Aerospace Engineering, USC, 2007
11. G. Chamoun, Vortex lattice theory: A linear algebra approach, Ph.D. Aerospace Engineering, USC, 2008
12. J. Chen, Multiple degree of freedom inverted pendula, Ph.D. Aerospace Engineering, USC, 2008
13. S. Campagnola, New techniques in astrodynamics for moon systems exploration, Ph.D. Aerospace Engineering, USC, 2010
14. K. Aslam, A stochastic Markov chain approach for tennis: Monte Carlo simulation and modeling, Ph.D. Aerospace Engineering, USC, 2012
15. V. Ostrovskiy, Point singularities on 2D surfaces, Ph.D. Mathematics, USC, 2013.
16. J. Mason, Markov chain models for metastatic cancer progression, Ph.D. Aerospace and Mechanical Engineering, USC 2013.
17. Ardeshir Kianercy (joint with Aram Galstyan), Aerospace and Mechanical Engineering Dept. USC, Defended Spring 2013.
18. A. Lee, Modeling and simulation of procoagulant circulating tumors cells, Ph.D. Aerospace and Mechanical Engineering, USC 2014.

19. P. Tsifillis (joint with Roger Ghanem), Stochastic models in applied mathematics, Ph.D. Applied Mathematics, 2016.
20. J. West, Computational tumor ecology: A model of tumor evolution, heterogeneity, and chemotherapeutic response, Ph.D. Aerospace and Mechanical Engineering, USC 2017.
21. Z. Hasnain, Mathematical models of cancer metastasis, Ph.D. Aerospace and Mechanical Engineering, USC 2018.
22. Yongqian Ma, Mathematical models of cancer metastasis, Ph.D. Physics, USC, expected 2020.
23. Jiyeon Park, Mathematical models of cancer metastasis, Ph.D. Mathematics, USC, expected 2020.

INVITED UNIVERSITY SEMINARS

- ◇ CAMS Jr. Fellow Program, Keck School of Medicine, USC, June 18, 2019.
- ◇ Systems Biology Institute, Seattle Washington, March 28, 2019.
- ◇ Integrative Mathematical Oncology Dept., Moffitt Cancer Center, Tampa Florida, Feb 22, 2018.
- ◇ Okinawa Institute of Science and Technology (OIST), Japan, March 11-18, 2017.
- ◇ UC Santa Barbara CIRF Seminar, April 19, 2017.
- ◇ Center for Applied Molecular Medicine (CAMM) Junior Fellows Program Seminar, June 14, 2017.
- ◇ MD Anderson Oncology Seminar, Jan. 6, 2016.
- ◇ City of Hope Cancer Center Oncology Seminar, Jan. 15, 2016.
- ◇ Springer-Verlag Nonlinear Science Workshop Seminar, Aug. 1, 2016.
- ◇ USC Human Performance Optimization Workshop, Sept. 9, 2015.
- ◇ USC Physical Sciences Oncology Workshop, Feb. 20, 2015.
- ◇ USC ZAP Workshop Seminar, Jan. 26, 2015.
- ◇ UC Santa Barbara Math. Colloquium, Oct. 29, 2015.
- ◇ R.M. Nakamura Lecture, Scripps Green Hospital, UC San Diego, June 10, 2015.
- ◇ San Diego State University, Nonlinear Science Colloquium, March 18, 2015.
- ◇ UC San Diego Mechanical and Aerospace Eng. Dept. Fluids Seminar, Feb. 9, 2015.
- ◇ Cedars-Sinai Cancer Center Retreat, May 10. 2014.
- ◇ USC, Aerospace & Mechanical Engineering Seminar, Oct.15, 2014.
- ◇ Hassan Aref Memorial Lecture, Virginia Tech. School of Engineering, Nov. 17, 2014.
- ◇ U. British Columbia, Vancouver, Distinguished Applied Mathematics Colloquium, Feb. 24, 2014.
- ◇ UCSB CIRF Seminar, April 16, 2014
- ◇ USC Computational and Molecular Biology Seminar, April 24, 2014.
- ◇ Cedar-Sinai Medical Center Grand Rounds Talk, Nov. 5, 2013
- ◇ UC Santa Barbara Applied Mathematics Seminar, April 24, 2013
- ◇ Indiana University Applied Mathematics Colloquium, April 15, 2013
- ◇ Northwestern U. Applied Math Colloquium, March 5, 2012
- ◇ U. of Illinois, Champaign-Urbana, Eng. Sci. Seminar, April 24, 2012
- ◇ UC Santa Barbara, CCDS Seminar, May 11, 2012

- ◇ The Scripps Research Institute Seminar, May 21, 2012
- ◇ Memorial Sloan-Kettering Cancer Center, Sept. 26, 2011
- ◇ The Scripps Research Institute, PS-OC Seminar, March 4, 2011
- ◇ The Scripps Research Institute, NCI Annual Site Visit Seminar, Sept. 15, 2011
- ◇ UC Irvine, Applied Mathematics Seminar, March 1, 2010
- ◇ The Scripps Research Institute, PS-OC Seminar Sept. 9, 2010
- ◇ Penn State U., Applied Mathematics Colloquium, April 30, 2010
- ◇ UC San Diego, Fluid Mechanics Seminar, Jan. 25, 2008
- ◇ McMaster University, Mathematics Colloquium, March 4, 2008
- ◇ U. North Carolina, Applied Mathematics Seminar, Nov. 14, 2008
- ◇ Engineering, Neuroscience & Health Seminar, USC Nov. 10, 2008
- ◇ UC Santa Cruz, Applied Mathematics Seminar, Jan. 19, 2007
- ◇ Hokkaido University, Mathematics Colloquium, April 12, 2007
- ◇ Kyoto University, Dynamical Systems Colloquium, April 5, 2007
- ◇ Ibaraki University, College of Science Colloquium, April 9, 2007
- ◇ Indiana University, Mathematics Colloquium, April 27, 2007
- ◇ U. Michigan, Applied Mathematics Seminar, Nov. 16, 2007
- ◇ UC Santa Barbara, Applied Mathematics Seminar, March 2007
- ◇ USC Pi Mu Epsilon Seminar, April 17, 2006
- ◇ UC Santa Barbara, Applied Mathematics Seminar, March 11, 2005
- ◇ UC Berkeley, Mechanical Engineering Seminar, Nov. 4, 2005
- ◇ Cal State Long Beach Mathematics Colloquium, Nov. 19, 2004
- ◇ USC, Department of Mathematics Analysis/PDE seminar, Sept. 15, 2004
- ◇ USC, Department of Mathematics Applied Mathematics seminar, April 5, 2004
- ◇ Indiana University Applied Mathematics Seminar, April 7, 2003
- ◇ UC Santa Cruz, Mathematics Colloquium, Nov. 4th, 2003
- ◇ Wichita State University, Mathematics Colloquium, Oct. 17th, 2003
- ◇ University of Southern California, Applied Math Seminars: Oct. 27, Nov. 10, Nov. 17th, 2003
- ◇ Georgia Tech, Center for Dynamical Systems Colloquium, 2002
- ◇ UCLA, Atmospheric Sciences Seminar, 2002
- ◇ UC Santa Barbara, Mechanical Engineering Seminar, 2001
- ◇ UC Santa Barbara, Applied Mathematics Seminar, 2001
- ◇ USC Applied Mathematics Seminar, 2001
- ◇ UMich Ann Arbor, Applied Math Seminar, 2000
- ◇ UMich, VIGRE Seminar, 2000
- ◇ UC Santa Barbara, Institute for Theoretical Physics Seminar, 2000
- ◇ UC Santa Barbara, Mechanical Engineering Seminar, 1999

- ◇ UC Santa Barbara, Mechanical Engineering Seminar, 1998
- ◇ UC Santa Barbara, Applied Mathematics Seminar, 1998
- ◇ U. Illinois, Aeronautical Engineering Seminar, 1998
- ◇ Duke University, Mathematics Colloquium, 1997
- ◇ U. Illinois, Theoretical and Applied Mechanics Colloquium, 1996
- ◇ USC Applied Mathematics Seminar, 1996
- ◇ CalTech, Control and Dynamical Systems Seminar, 1996
- ◇ UC San Diego, AMES Department Fluid Mechanics Seminar, 1996
- ◇ Oxford University, OCIAM Seminar, 1996
- ◇ USC Mechanical Engineering Seminar, 1994
- ◇ USC Applied Mathematics Seminar, 1994
- ◇ UC Irvine, Applied Mathematics Seminar, 1994
- ◇ Carnegie Mellon University, Applied Mathematics Colloquium, 1993
- ◇ Indiana University Applied Mathematics Seminar, 1993
- ◇ Beckman Institute Directors Seminar, U. Illinois, 1993
- ◇ U. Illinois Differential Geometry Seminar, 1993
- ◇ University of Washington, Seattle, Applied Mathematics Seminar, 1993
- ◇ Fama Mathematica Colloquium, U. Illinois, 1992
- ◇ UCLA, Applied Math Seminar, 1992
- ◇ Texas A&M, Applied Math Colloquium, 1992
- ◇ U. Illinois, Nonlinear Science Seminar, Physics Dept., 1992
- ◇ USC Applied Mathematics Colloquium, 1991
- ◇ USC Fluid Dynamics Seminar, 1991
- ◇ University of Wisconsin, Madison, Applied Mathematics Seminar, 1991
- ◇ Rensselaer Polytechnic Institute, Applied Mathematics Colloquium, 1990
- ◇ Northwestern University, Applied Mathematics Colloquium, 1990
- ◇ Indiana University, Department of Mathematics PDE Seminar, 1990
- ◇ University of Wisconsin, Madison, Applied Math. Seminar, 1990
- ◇ U. Illinois, Nonlinear Science Seminar, Physics Dept., 1990
- ◇ Brown University, Applied Mathematics Seminar, 1989
- ◇ Applied Mathematics Inc., Research Seminar, 1989
- ◇ University of Illinois, Theoretical & Appl. Mech. Dept., 1988
- ◇ University of Illinois, Department of Mathematics, 1988
- ◇ University of Illinois, Nonlinear Science, Physics Dept., 1988
- ◇ University of Illinois, Nonlinear Colloquium, Aeor. & Astro. Eng., 1988
- ◇ University of Michigan, Department of Mathematics, 1988
- ◇ CalTech Applied Math Seminar, 1987

- ◇ Stanford University, Applied Math Seminar, 1987
- ◇ University of Chicago, Applied Math Seminar, 1987
- ◇ University of Wisconsin, Applied Math Seminar, 1987
- ◇ Southern Methodist University, Applied Math Seminar, 1987
- ◇ Boston University, Applied Math Seminar, 1987
- ◇ SUNY, Buffalo, Applied Math Seminar, 1987
- ◇ Purdue University, Applied Math Seminar, 1987
- ◇ IUPUI, Applied Math Seminar, 1987
- ◇ U.C. Santa Barbara, Applied Math Seminar, 1987
- ◇ Georgia Inst. of Tech. Applied Math Seminar, 1987
- ◇ Ohio State University, Applied Math Seminar, 1987
- ◇ University of Virginia, Applied Math Seminar, 1987

Publications of P. K. Newton

Books authored:

The N-Vortex Problem: Analytical Techniques, 430pp, Springer-Verlag, Applied Mathematical Sciences Vol. 145, 2001.

Books/Journals Edited:

Journal of Mathematical Physics: Special Focus Issue on Mathematical Fluid Mechanics. co-edited with C.R. Doering, June 2007.

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