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Juan M. Restrepo

Data · Dynamics · Scientific Computing

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Education

1987-1992 **PhD, Physics**, The Pennsylvania State University
1985-1987 **MS, Engineering Acoustics**, The Pennsylvania State University
1983-1985 **Electrical Engineering**, Columbia University
1980-1983 **BS, Music**, New York University

Honors & Awards

2019 **APS Fellow**, American Physical Society
2018 **SIAM Fellow**, Society of Industrial and Applied Mathematics
2017 **Career Prize**, Society of Industrial and Applied Mathematics, Geosciences Activity Group
2002-2005 **Young Investigator Award**, Department of Energy
1994-1995 **ORISE Distinguished Post-Doctoral Fellow**, Department of Energy
1993-1994 **Post-Doctoral Fellowship**, US Department of Energy
1992 **Simowitz Research Award**, The Pennsylvania State University
1992 **August and Ruth Homeyer Graduate Fellowship**, The Pennsylvania State University
1989 **National Hispanic Scholarship**, National Hispanic Scholarship Fund
1985-1992 **ONR Graduate Fellowship**, Office of Navy Research

Employment

2020-present **Section Head, Mathematics and Computation Section, Distinguished R&D Staff Member** , Computing & Computational Sciences Directorate, Oak Ridge National Laboratory
2020-present **Joint Faculty Appointment**, Department of Mathematics, University of Tennessee, Knoxville
2020-present **Adjunct Professor**, Department of Mathematics, Oregon State University
2014-2020 **Professor**, Department of Mathematics, Oregon State University
2014-2020 **Adjunct Professor**, Physics of Oceans and Atmospheres, Oregon State University
2014-2020 **Adjunct Professor**, Department of Statistics, Oregon State University
2009-2014 **Professor**, Mathematics Department, University of Arizona
2009-2014 **Professor**, Department of Atmospheric Sciences, University of Arizona
2009-2014 **Professor**, Physics Department, University of Arizona
2003-2009 **Associate Professor**, Mathematics Department, University of Arizona
2005-2009 **Associate Professor**, Department of Atmospheric Sciences, University of Arizona
2003-2009 **Associate Professor**, Physics Department, University of Arizona
1997-2003 **Assistant Professor**, Mathematics Department, University of Arizona
1996-1997 **CAM/PIC Visiting Assistant Professor**, Mathematics Department, UCLA
1994-1995 **ORISE/DOE Distinguished Post-doctoral Fellow**, Argonne National Laboratory
1993-1994 **DOE Post-doctoral Fellow**, Argonne National Laboratory
1994-1995 **Adjunct Professor**, The School of the Art Institute of Chicago, Chicago IL
1987-1992 **Research Assistant**, Applied Research Laboratory, Pennsylvania State University
1985 **Technician**, Columbia-Princeton Electronic Music Lab, Columbia University
1984 **Instructor**, Music Department, New York University
1984 **Staff Engineer**, Record Plant Studios, New York,NY
1984 **Staff Engineer**, Soundworks, LTD, New York, NY
1982 **Staff Engineer**, Eastern Artist Recording Studios, West Orange, NJ

Visiting Positions

2018 **Visiting Scientist**, Kavli Institute of Theoretical Physics, University of California at Santa Barbara
2014 **Rossby Fellow**, Technical University of Stockholm
2013 **J. T. Oden Fellowship**, University of Texas, Austin
2012 **Faculty Fellow**, Aspen Institute of Physics
2012 **Faculty Fellow**, Statistics and Applied Mathematical Sciences Institute, NSF
2011 **Sabbatical Visitor**, Mathematical Sciences Institute, University of Warwick
2011 **Visiting Fellow**, ICES, University of Texas
2009 **Faculty Fellow**, The Institute for Mathematics and Its Applications, University of Minnesota, NSF
2009 **Visiting Fellow**, Theoretical Division, Los Alamos National Laboratory
2005 **Distinguished Fellow**, Pacific Institute of Mathematical Sciences, Simon Fraser University
2004 **Distinguished Fellow**, Pacific Institute of Mathematical Sciences, Simon Fraser University
2005 **Sabbatical Fellow**, Theoretical Division, Los Alamos National Laboratory
2005 **Faculty Fellow**, Statistics and Applied Mathematical Institute, NSF
2001 **Visiting Fellow**, Theoretical Division, Los Alamos National Laboratory
1996 **Visiting Fellow**, Mathematics and Computer Division, Los Alamos National Laboratory
1996 **Visiting Scientist**, Mathematics and Computer Division, Argonne National Laboratory
1995 **Visiting Scientist**, Mathematics and Computer Division, Argonne National Laboratory
1994 **Visiting Scientist**, Mathematics and Computer Division, Argonne National Laboratory

Consulting Activity

AEP Acoustics, LLC *Tucson AZ, USA*
Chief Engineer & Owner *2004-2014*

- Consulting in applied mathematics: data analysis, classification schemes via machine learning, optimization, signal processing of time series.
- Consulting in computational acoustics and architectural acoustics and noise abatement.
- Computational (finite element) Vibration analyses of complex engineering structures and mounts for laser devices.
- Worked on over 50 projects.

Professional Society Membership

since 1998 **Life Member**, Society of Industrial and Applied Mathematics
since 1992 **Life Member**, American Geophysical Union
since 2012 **Member**, European Geosciences Union
since 2009 **Member**, American Physical Society
since 2020 **Member**, American Association for the Advancement of Science
1990-2009 **Member**, American Mathematical Society
1987- 2010 **Member**, Acoustical Society of America
2008-2010 **Member**, American Institute of Architecture

Grants & Contracts

2022-2024 **PI, 100%**, High Performance Ensemble Computing, ORNL *$850,000*
2021-2023 **co-PI, 25%**, Physics Based Data Reduction Schemes (with Rick Archibald (ORNL), Anne Gelb (Dartmouth), DongBin Xu (Ohio State) *$1'250,000*
2022-2023 **co-PI, 15%**, Quantifying Resilience in Ecosystems Subjected to Multiscale Perturbations (with D. Weston and J. Ramirez, ORNL *$190,000*
2022-2027 **PI, 25%**, Co-Director, MMICCs DOE Center: Statistical and Mathematical Innovations for Experimental Facilities, NexGen (with R. Joseph GA Tech, W. Di ANL, V. Maroulas UTK, pending) *$12'500.000*

2022-2024	**co-PI, 25%**, Random Isolation Algorithm for Outlier Detection in Very Large Distributed Networks (with J. Ramirez and S. Seal ORNL, and B. Piccoli Rutgers, pending)	*$800,000*
2022-2024	**co-PI, 20%**, QUICSAND- Quantum-Inspired Classification for Semantic Segmentation and Anomaly Detection in High Energy Physics (with J. Ramirez and A. Delgado and P. Laiu K. Hamilton, ORNL, and C. Argüelles, Harvard and Y. Marzouk, MIT, pending)	*$800,000*
2015-2020	**Co-PI, 25%**, NRT-DESE: Risk and uncertainty quantification in marine science and policy, National Science Foundation (with L. Cianelli, Oregon State, and many others)	*$3'000.000*
2016	**Co-PI, 25%**, Flooding predictions and Interface for Pt. Huemene, CA, PEER grant number 1123-NCTRYH: (with H. Yeh, OSU)	*$150,000*
2014-2017	**Pi, 50%**, Experimental Design of Subscale Parametrizations of Breaking Waves, NSF 1434198 (with Ken Melville, Scripps Institute of Oceanography receiving $340,000)	*$312,471*
2011-2015	**co-PI, 50%**, CARTHE, Gulf of Mexico Research Initiative, Center for Advanced Research on Transport of Hydrocarbons in the Environment, Research Consortia Studying Effects of Deepwater Horizon Oil Spill on Gulf of Mexico (many institutions, with my team receiving $1'000.000	*$1'000.000*
2011-2015	**PI, 50%**, Contour Dynamics and Hurricane Predictions, National Science Foundation, NSF DMS-0304890, (with S. Venkataramani (UA) and A. Mariano (RSMAS))	*$450,000*
2008-2011	**PI,100 %**, CMG: Dissipative Effects in Wave/Current Interactions, National Science Foundation, DMS-0304890	*$500,000*
2003-2007	**PI, 100%**, Collaborative Research: CMG: Mathematical Theory and Modeling of Wave-Current Interaction, National Science Foundation DMS-0327642. UCLA receives separately $380,591	*$352,770*
2002-2005	**PI, 100%**, Department of Energy, Young Investigator Award, DE-FG02-02ER25533	*$300,000*
2002	**Co-Pi 33%**, NSF/ITR Free-Boundary Problems in Precipitative Growth, National Science Foundation, Grant 0219411 (with R. Goldstein, J.C. Baygents)	*$498,000*
2001-2002	**Co-Pi, 50%**, Assimilation of GPS Meteorological Data Into Weather and Climate Analyses, NASA, Goddard Space Flight Center, Grant NAG5-11163 (With Robert Kursinski, Atmospheric Sciences, U Arizona)	*$33,801*
1999	**PI, 100%**, Granular Flow Laboratory, University of Arizona Small Grant FRS 451836	*$5,000*
2001-2003	**PI, 50%**, Data assimilation and estimation in meteorology and hydrology, National Foundation Grant DMS-0113649 (with G. Eyink and Shlomo Neuman)	*$ 250,000*
1999-2000	**Co-PI, 33%**, Granular Dynamics and Fluid Dynamics, National Science Foundation, Grant DMR 9974095 (with R. Goldstein, A. Pesci)	*$388.540*
2000-2001	**Co-PI, 25%**, Front Propagation and Coiling Instabilities, National Science Foundation, Grant DMR 9812526 (with R. Goldstein, PI, A. Pesci, and J. Kessler	*$60,000*

Service

Extramural

2022	**Guest Editor**, Chaos Journal: Recent Theoretical and Computational Advances in Climate Science. Valerio Lucarini, Chief Guest Editor
2021-present	**Editorial Board**, International Journal of Uncertainty Quantification
2017-present	**Editorial Board**, Nonlinear Processes in Geophysics, European Geophysical Union
2018-present	**Associate Editor**, Big Data and Information Analytics, AIMS Publications
2016-2018	**Editorial Board**, Dynamics and Statistics of the Climate System, Oxford University Press
2013	**Associate Editor**, Recent Progress in Nonlinear Theory and its Application, NOLTA, IEICE

2021-2022 **President**, AGU Nonlinear Geophysics Section

2019-2020 **President-Elect**, AGU Nonlinear Geophysics Section

2013-2017 **Chair**, Topical Group on the Physics of Climate, American Physical Society

2015-2016 **Vice-chair**, SIAM Geosciences

2016-2017 **US Congressional Visitor**, Oregon Delegation. On behalf of the American Physical Society, on issues of science funding and research.

2014 **US Congressional Visitor**, Arizona Delegation. On behalf of the American Physical Society, on issues of science funding and research.

2022-2024 **Vice-Chair**, New SIAM Activity Group of Diversity and Equity

2022-2024 **SIAM Diversity Advisory Committee**, SIAM

2020-2022 **SIAM Diversity Advisory Committee**, SIAM

2019-2021 **SIAM Fellows Selection Committee**, SIAM

2018-2020 **Joint Math Meeting (AMS/SIAM) Committee**, SIAM Geosciences

2019-2021 **Fellowship Nominating Committee**, SIAM Geosciences

2017-2020 **Member**, SIAM Coordinating Committee for the Joint Mathematics Meetings

2011-2013 **Member**, SIAM Web Advisory Committee

2017-2020 **Member**, SIAM Membership Committee Member

2017-2018 **External Reviewer**, *Make Our Planet Great Again*, ANR, French Government

2014-2022 **Technical Reviewer**, King Abdullah University of Science and Technology

1993-present **Proposal Referee**, European Commission on Research and Innovation, 2010, Israel Science Foundation Grants, 2010, National Science Foundation, 1998-present, Department of Energy

Reviewer, Promotion Review: 6 associate-with-tenure cases, 3 associate-to-full cases

2013 **Reviewer**, Mathematics Department/Computer Science Department reviewer, Universidad de Puerto Rico

2006 **Technical Expert**, Schlumberger Study Group, Houston TX

2006 **Mentor**, 10th PIMS Industrial Problem Solving Workshop, Vancouver, Canada

2006 **Expert**, Oxford Study Group, Fields Institute, Toronto, Canada

2002-2004 **Board Member**, Board Member, the Museum of Contemporary Art, Tucson AZ

2002-2004 **Board Member**, KXCI FM, a Tucson AZ public radio station

2015-2020 **Scholarship Reviewer**, Student and faculty scholarship applications: ACM Richard Tapia Celebration of Diversity in Computing Conference, NSF Postdoctoral Fellowship

Journal Referee, Nature, Science, Reviews of Modern Physics, Physical Review Letters, New Journal of Physics, Nonlinear Processes in Geophysics, Journal of Statistical Physics, Journal of Disaster Research, Monthly Weather Review, Tellus, Journal of Fluids Engineering, Computers and Geosciences, Advances in Neural Information Processing Systems, SIAM Journal of Applied Mathematics, SIAM Journal on Scientific Computing, Journal of Fluid Mechanics, International Journal of Numerical Methods in Engineering, The European Journal of Mechanics, Journal of the Acoustical Society of America, Physica D, Journal of Theoretical Fluid Mechanics, Journal of Physical Oceanography, Nonlinear Processes in Geophysics, Physical Review E, Physics of Fluids, European Journal of Physics, American Mathematical Monthly, Advances in Water Resources, International Journal of Computer Mathematics, Ocean Modelling, Nonlinear Processes in Geophysics, Journal of Hydrology, Journal of Hydrologic Engineering

Book Reviewer,

- Publisher Reviewer: ''Primer on Data Assimilation," by John Lewis, Cambridge University Press, 2020
- Publisher Reviewer, ''Vector Calculus," by J. Fehribach, SIAM, 2018.
- Publisher Reviewer, ''Introduction to Data Analysis and Uncertainty Quantification for Inverse Problems," by L. Tenorio, SIAM 2016.
- Reviewer, AMS Mathematics of Computation, 1996. Mathematics of Climate and Environment, J. I. Diaz, J. L. Lions, Eds.
- Reviewer, SIAM Review, Lagrangian Analysis and Prediction of Coastal and Ocean Dynamics, edited by Annalisa Griffa, A.D . Kirwan, Jr., Arthur J. Mariano, Tamay Ozgokmen, and Thomas Rossby. Cambridge University Press, 978-0-521-87018-4, 500 p.

Conference Organization,

- Smoky Mountains Computational Sciences and Engineering SMC2021, Program Committee Member, 2021.
- Nonlinear Geophysics, American Geophysical Union Annual Meeting, 2020-2021.
- American Geophysical Union Annual Meeting, 2016-2021.
- Annual Meeting Program Committee Chair, American Physical Society, 2015.
- Co-organizer, Infinite Possibilities Conference, 2015.
- NOLTA Annual Meeting, Scientific Committee, 2013.
- Annual Meeting, Nonlinear Geosciences, American Geophysical Union organizer, 2012.
- Mathematics of Climate Workshop, NCAR, Boulder, 2010.
- Co-organizer IMA/NSF Science Careers for Women and Minorities, 2010.
- Uncertainty Quantification Meeting Organizer, Tucson AZ, 2008.
- AGU Ocean Meeting, Hawaii HI, Session organizer, 2008.
- Mini-Symposium on wave breaking dynamics, Ocean Sciences Meeting, 2007.
- Mini-Symposium on wave-currents, SIAM Geosciences, 2002.
- Los Alamos Days, 2000.

Intramural

2019-2020 **co-Director and Founder**, Dynamics and Data Science Institute (D2SI), Oregon State University

2014-2020 **Lead Member**, Outreach Committee, Oregon State University

2016-2020 **Member**, Computer Committee, Oregon State University

2014-2016 **Member**, Graduate Committee, Oregon State University

2014-2020 **Advisor**, Undergraduate Academic Advisor, Oregon State University

2014 **Member**, Cross disciplinary hiring committees in the Biological Sciences, Oregon State

2014 **Member**, Hiring Committee Vice President of Research, Oregon State

2014 **Member**, Marine Studies Initiative, Oregon State University, Ad-hoc committee member

2007-2014 **Founder, Group Leader**, University of Arizona Uncertainty Quantification Group

2012-2014 **Member**, Mathematics Computers and Systems committee, University of Ariona

2011-2014 **Member**, Mathematics Department, awards committee, University of Arizona

2010-2011 **Member**, Mathematics Department, hiring committee, University of Arizona

2010-2011 **Member**, Mathematics Department, promotion and tenure committee, University of Arizona

2006-2007 **Member**, Mathematics Department, hiring committee, University of Arizona

2006-2007 **Member**, Mathematics Department, promotion and tenure committee, University of Arizona

1998-2001 **Member**, Mathematics Department, computer committee, University of Arizona

2000 **Member**, Mathematics Department, department head search committee, University of Arizona

1998, 2000 **Lead Member**, Mathematics Department, computer proficiency exam, University of Arizona

1998-2014 **Member**, Program in Applied Mathematics, qualifying exams, University of Arizona

1998, 2000, 2003, 2011 **Tutor**, Program in Applied Mathematics: Research Training Group, University of Arizona

1999, 2002, 2008, 2012 **Member**, Program in Applied Mathematics, Recruitment workshops and interviews, University of Arizona

1998 **Volunteer**, Participated in university-wide phone recruitment campaigns, University of Arizona

1999 **Volunteer**, Featured speaker at Honor Student Convocation, University of Arizona

1998, 2000, 2007 **Lead**, Applied Mathematics Recruiting Workshop

1998 **Volunteer**, University of Arizona Telethon

1998-present **Supervisor**, Co-supervising four undergraduate student interns, University of Arizona, Oregon State University

2000-2002 **Co-Organizer**, Fluid Mechanics Seminar Series U Arizona Mathematics Department

2002-2014 **Co-organizer**, Non-Equilibrium Statistical Seminar Series, U Arizona Physics Department

Management Training and Outreach

2022	**Trainee**, SLII, Management Situational Training Course
2018	**Trainee**, ADVANCE, Oregon State University (NSF) Equity and Inclusivity Workshop
2018	**Trainee**, Mentorship Training, Oregon State University
2014-2020	**Mentor**, Diversity initiatives in the College of Science, Oregon State University
2009-2013	**Mentor**, Alliance Postdoctoral Fellowship Officer
2010	**Officer**, Alliance Postdoctoral Fellowship Officer
2011-2013	**Representative**, UA AGEP Representative, fostering research opportunities for under-represented minority students, as well as graduate training in the Sciences
2005	**Panel Member**, SACNAS, Computational Science and Engineering: Minorities and Applied Mathematics - Connections to Industry and Government Laboratories
1997-2013	**Director, Career Mentor**, AIMES, University of Arizona. Creator and organizer of the Arizona Internships in Mathematics Engineering and the Sciences
2000	**Panelist and Lecturer**, XI Semana Regional de Investigación y Docencia en Matemáticas. Series of lectures for Mexican graduate students at the Universidad de Sonora
2007-2011	**Board Member**, LAGSES (Latino/a Association of Graduate Students in Engineering and Science
2007	**Mentor**, MGE/MSA Post-doctoral Mentoring
2006	**Panelist**, MGE/MSA Post-doctoral Mentoring
2004	**Panelist**, SACNAS, minority recruitment for the University as well as mentoring and supervising of science students
1997-2011	**Recruiter**, Informal student recruitment contact for all DOE laboratories
2005	**Panelist**, Professional Development, SIAM
1998	**Invited Speaker**, Study tips for technical courses. A Lecture Series for students. Department of Mathematics Department, U. Arizona

Publications

Note: author order does not always reflect relative effort.

Journal Articles

- J.M. Restrepo, J. M. Ramírez, "Calculating Probability Densities with Homotopy and Applications to Particle Filters," International Journal of Uncertainty Quantification, **12**, pp 71-89 (2021).
- D. Foster, J.M. Restrepo, "An Improved Framework for the Dynamic Likelihood Filtering Approach to Data Assimilation," Chaos, **32**, p. 053118 (2022).
- J. Krotz, M. R. Sweeney, C . W. Gable, J. D. Hyman, J. M. Restrepo, "Maximal Poisson-disk Sampling for Variable Resolution Conforming Delaunay Mesh Generation: Applications for Three-dimensional Discrete Fracture Networks and the Surrounding Volume," Journal of Computational and Applied Mathematics, **407**, p.114094, (2022).
- D. Foster, C. Victor, B. Frost, J. M. Restrepo, "Gradient Sensing Via Cell Communication," Physical Review E, **103**, 022405, (2021).
- J. M. Restrepo, A. Ayet & L. Cavalleri "The Impact of Entrained Air on Ocean Waves," Nonlinear Processes in Geophysics, **28**, pp. 1-9, (2021)
- J. M. Restrepo, J. Ramírez, "Transport due to Transient Progressive Waves," Journal of Physical Oceanography, **49**, pp. 2323-2336, (2019).
- J. Ramírez, S. Moghimi, J. M. Restrepo, and S. Venkataramani, "Mass Exchange Dynamics of Surface and Subsurface Oil in Shallow-Water Transport," Ocean Modelling, **128**, pp. 1-12, (2018).
- Y. Gil, S. A. Pierce, H. Babaie, A. Banerjee, K. Borne, R. Bust, M. Cheatham, I. Ebert-Uphoff, C. Gomes, M. Hill, J. Horel, L. Hsu, J. Kinter, C. Knoblock, D. Krum, V. Kumar, P. Lermusiaux, Y. Liu; C. North, V. Pankratius, S. Peters, B. Plale, A, Pope, S. Ravela, J. M. Restrepo, A. Ridley, H. Samet, S. Shekhar, K. Skinner, P. Smyth, B. Tikoff, L. Yarmey, J. Zhang, "Intelligent Systems for Geosciences: A Vision and Research Agenda," Communications of the ACM, **62**, pp. 76-84 (2019).
- S. Venkataramani, R. Venkataramani, J. M. Restrepo, "Dimension Reduction in Slow Relaxation Processes," Journal of Statistical Physics, doi:10.1007/s10955-017-1761-7, (2017).

- J. M. Restrepo, "A Dynamic Likelihood Approach to Filtering" Quarterly Journal of the Royal Society of Meteorology, 10.1002/qj.3143 (2017).
- A. J. Mariano, E. H. Ryan, L.C. Laurindo, E. Coelho, H. S. Huntley, A. Griffa, A. C. Poje, M. Berta, D. Bogucki, S. Chen, M. Curic, M. Gough, B. K. Haus, A. C. Haza, P. Hogan, M. Iskandarani, G. Jacobs, A. D. Kirwan, N. Laxague, B. Lipphardt, M. G. Magaldi, G. Novelli, A. Reniers, J. M .Restrepo, C. Smith, A. Valle-Levinson, and M. Wei, "Statistical properties of the surface velocity field in the northern Gulf of Mexico sampled by GLAD drifters," Journal of Geophysical Research, Oceans, **121**, pp. 5193-5216, doi:10.1002/2015JC011569, (2016).
- S. Rosenthal, S. Venkataramani, J. M. Restrepo, A. Mariano, "Displacement Data Assimilation," Journal of Computational Physics, **330**, pp. 594-614, (2017).
- D. Comeau, D. A. Kurtze, and J. M. Restrepo, "A conceptual model of oceanic heat transport in the Snowball Earth scenario," Earth Systems Dynamics, **7**, pp. 937-951, (2016).
- J. M. Restrepo, S. Venkataramani, "Stochastic Longshore Current Dynamics," Advances in Water Resources, **98**, pp. 186-197, (2016).
- J. M. Restrepo, J. Ramírez and S. Venkataramani, "An Oil Fate Model for Shallow Waters, " Journal of Marine Sciences and Engineering, **3**, pp. 1504-1543, doi:10.3390/jmse3041504 (2015).
- J.M. Restrepo, S. Venkataramani, D. Comeau, H. Flaschka, "Defining a Trend for a Time Series Using the Intrinsic Time-Scale Decomposition," New Journal of Physics **16**, 085004, doi:10.1088/1367-26301/16/8/0850004, (2014).
- J, M. Restrepo, S. Venkataramami, C Dawson, "Nearshore Sticky Waters," Ocean Modelling, **80**, pp. 49-58, (2014).
- T. M. Ozgokmen, F. J. Beron-Vera, D. Bogucki, S. Chen, C. Dawson, W. Dewar, A. Griffa, B. Haus, A. C. Haza, H. Huntley, M. Iskandarani, G. Jacobs, B. Jagers, A.D. Kirwan, Jr., N. Laxague, B. Lipphart, Jr., J. MacMahan, A. J. Mariano, J. Olascoaga, G. Novelli, A. C. Poje, A.J.H.M. Reniers, J. M. Restrepo, B. Rosenheim, E. H. Ryan, C. Smith, A. Soloviev, S. Venkataramani, G.-C. Zha, P. Zhu, "Research Overview of the Consortium for Advanced Research on Transport of Hydrocarbon in the Environment (CARTHE)," International Oil Spill Conference Proceedings, **2014**, pp 544-560 (2014).
- N. Balci, A. Mazzucato, J. M. Restrepo, G. R. Sell, "Ensemble Dynamics and Bred Vectors," Monthly Weather Review, **140**, pp2308-2334 (2012).
- J. M. Restrepo, D. E. Moulton, H. Uys, "Stably Precessive Granular Sand Bars Under Steady Shearing", Physical Review E, **83**, 031305 (2011).
- B. Weir, Y. Uchiyama, E. Lane, J. M. Restrepo, J. C. McWilliams, "A Vortex Force Analysis of the Interaction of Rip Currents and Surface Gravity Waves", **116**, C050001 Journal of Geophysical Research (2011).
- J.M. Restrepo, J. Ramírez, J.C. McWilliams, M. Banner, " Multiscale Momentum Flux and Diffusion due to Whitecapping in Wave-Current Interactions," **41**, Journal of Physical Oceanography, pp 837-856 (2011).
- S. Schofield, J. M. Restrepo, "Stability of planar buoyant jets in stratified fluids," Physics of Fluids, **22**, 053602, doi:10.1063/1.3415493 (2010).
- D. Kurtze, J. M. Restrepo, J. Ditmann, "Convective Adjustment in Box Models", Ocean Modelling, **34**, pp 92-110 (2010).
- P. Krause, J. M. Restrepo, "Lagrangian Data Assimilation Using the Kernel Diffusion Method", Monthly Weather Review, **137**, pp. 4386-4400 (2009).
- J. M. Restrepo, R. Rael, J. Hyman, " Modeling the influence of polls on elections: a population dynamics approach," Journal of Public Choice, **140**, pp. 395-420 (2009).
- J. M. Restrepo, R. Choksi, J. Hyman, Y. Jiang,"Improving the damage accumulation in a biomechanical bone remodelling model," Computer Methods in Biomechanics and Biomedical Engineering, **12**, pp. 341-352 (2009).
- Y. Uchiyama, J. C. McWilliams, J. M. Restrepo, Wave-current Interaction in Nearshore Shear Instability Analyzed with a Vortex Force Formalism," Journal of Geophysical Research, C06021, doi:10.1029/2008JC005135 (2009).
- P. Fischer, G. Leaf, J. M. Restrepo, "Torque Effects on the Lift and Drag of Particles in an Oscillatory Boundary Flow," Journal of Fluids Engineering, **130**, 101303 (2008).
- J. Barber, J. P. Alberding, J. M. Restrepo, T. Secomb, "Two-Dimensional Computational Models

of Red Blood Cell Motion in Microvessel Bifurcations and Flexibility Effects", 2008, Annals of Biomechanics Engineering, **36**, pp. 1690-1698 (2008).

- J. Barber, J. M. Restrepo, T. Secomb, "Simulated Red Blood Cell Motion in Microvessel Bifurcations: Effects of Cell-Cell Interactions on Cell Partitioning," Cardiovascular Engineering and Technology, **2**, pp. 349-360, doi: 10.1007/s13239-011-0064-4 (2008).
- J. M. Restrepo, "A Path Integral Method for Data Assimilation," Physica D, **237**, pp. 14–27 (2008).
- E. Lane, J. M. Restrepo, J. McWilliams, "Wave-Current Interaction: A Comparison of Radiation-Stress and Vortex-Force Representations," Journal of Physical Oceanography, **37** pp.1122-1141 (2007).
- J. M. Restrepo, "Wave Breaking Dissipation in a Wave-driven Circulation," Journal of Physical Oceanography, **37**, pp. 1749-1763 (2007).
- M. Hasson, J.M. Restrepo, "Approximating on Disjoint Intervals and its Application to Matrix Preconditioning,", Complex Variables and Elliptic Equations, **52**, DOI: 10.1080/17476930701524222 (2007).
- E. Lane, J. M. Restrepo, "Shoreface-connected Ridges under the Action of Currents and Waves," Journal of Fluid Mechanics, **582**, doi:0.1017/S0022112007005794 (2007).
- M. Hasson, J.M. Restrepo, J. M. Hyman, "A Strategy for Detecting Extreme Eigenvalues Bounding Gaps in the Discrete Spectrum of Self-Adjoint Operators," Computers and Mathematics with Applications, **53**, pp. 1271-1283 (2007).
- S. Peacock, E. Lane, J. M. Restrepo, "A possible sequence of events for the generalized glacial-interglacial cycle," Journal of Global Biogeochemical Cycles, **20**, GB2010 (2006).
- E. Lane, S. Peacock, J. M. Restrepo, "A dynamic-flow carbon-cycle box model and high-latitude sensitivity," Tellus B, **58**, pp.257-278 (2006).
- P. Fischer, G. K. Leaf, J. M. Restrepo, "Influence of Wall Proximity on the Lift and Drag of a Particle in an Oscillatory Flow," Journal of Fluids Engineering, **127**, pp. 583-594 (2005).
- J. F. Alexander, G. E. Eyink, J. M. Restrepo, "Accelerated Monte-Carlo for Optimal Estimation of Time Series," Journal of Statistical Physics, **119**, pp.1331-1345 (2005).
- C. Dombrowski, B. Lewellyn, A. I. Pesci, J. M. Restrepo, J. O. Kessler, R. E. Goldstein, "Coiling, Entrainment, and Hydrodynamic Coupling of Decelerated Fluid Jets", Physics Review Letters, **95** pp.184501 (2005).
- J. McWilliams, J. M. Restrepo, Emily Lane, "An Asymptotic Theory for the Interaction of Waves and Currents in Shallow Coastal Waters," Journal of Fluid Mechanics, **511**, pp. 135-178 (2004).
- K. Baamann, C. Bergeron, T. Burden, S. Kadiouglu, H. Huang, S. Lapin , A. Taylor, J. Restrepo, B. McGee and R. Westbrook," In-Situ Thermal Remediation of Contaminated Soil." Canadian Applied Mathematics Quarterly, **12**, pp. 25-37 (2004).
- G. E. Eyink, J. M. Restrepo, J. F. Alexander, "A Mean Field Approximation in Data Assimilation for Nonlinear Dynamics," Physica D, **195**, pp. 347-368 (2004).
- G. L. Eyink, J. Restrepo, and F. J. Alexander "A Statistical-Mechanical Approach to Data Assimilation for Nonlinear Dynamics". (also available as a preprint as "A Statistical-Mechanical Approach to Data Assimilation Using Moment Closures," 26 pages) Journal of Statistical Physics (2003).
- S. Kim, G. Eyink, J. M. Restrepo, J. F. Alexander, G. W. Johnson, "Ensemble Filtering for Nonlinear Dynamics," Monthly Weather Review, **131**, pp. 2586-2594 (2003).
- G. E. Eyink, J. M. Restrepo, J. F. Alexander, "A Statistical-Mechanical Approach to Data Assimilation for Nonlinear Dynamics", pp 35+12 figures, **accepted, subject to revisions**, Journal of Statistical Physics (2003).
- J. M. Restrepo, G. K. Leaf, "Noise Effects on Wave-Generated Transport Induced by Ideal Waves," Journal of Physical Oceanography, **32**, pp. 2334-2349 (2002).
- J. M. Restrepo, P. Fischer, G. K. Leaf "Forces on Particles in Oscillatory Boundary Layers," Journal of Fluid Mechanics, **468**, pp. 327-347 (2002).
- D. Kurtze, J. M. Restrepo, "Advective Time Lags in Box Models," Journal of Physical Oceanography, **31**, pp. 1828-1842 (2001).
- J. M. Restrepo, "Wave-Current Interactions in Shallow Waters and Shore-Connected Ridges," Continental Shelf Research, **21**, pp. 1331-1360 (2001).
- G. L. Eyink, J. M. Restrepo, "Most Probable Histories for Nonlinear Dynamics: Tracking Climate Transitions," Journal of Statistical Physics, **101**, pp 459-472 (2000).

- J. L. Bona, W. McKinney, J. M. Restrepo, "Stable and Unstable Solitary-Wave Solutions of the Generalized Regularized Long-Wave Equation," Journal of Nonlinear Science, **10**, pp. 603-638 (2000).
- J. P. Albert, J. L. Bona, J. M. Restrepo, "Solitary-Wave Solutions of the Benjamin Equation," SIAM Journal of Applied Mathematics, **59**, pp 2139–2161 (1999).
- J. C. McWilliams, J. M. Restrepo, "The Wave-Driven Ocean Circulation", Journal of Physical Oceanography, **29**, pp 2523-2540 (1999).
- J. M. Restrepo, G. K. Leaf, A. Griewank, "Circumventing Storage Limitations in Variational Data Assimilation," SIAM Journal on Scientific Computing, **19**, pp 1586-1605 (1998).
- J. M. Restrepo, G. K. Leaf, "Inner Product Computations Using Periodized Daubechies Wavelets", International Journal of Numerical Methods in Engineering, **40**, pp 3557-3578 (1997).
- J. M. Restrepo, "Behavior of a Sand Ridge Model," European Journal of Mechanics B/Fluids, **6**, pp 835-861 (1997).
- J. M. Restrepo, G. K. Leaf, "Wavelet-Galerkin Discretization of Hyperbolic Equations", Journal of Computational Physics, **122**, pp 118-128 (1995).
- J.M. Restrepo, J. L. Bona, "Discretization of a Model for the Formation of Longshore Sand Ridges", Journal of Computational Physics, **122**, pp 129-142 (1995).
- J. M. Restrepo, J. L. Bona, "Three-dimensional Model for the Formation of Longshore Sand Ridges on the Continental Shelf", Nonlinearity, **8**, pp 781-820 (1995).
- J. M. Restrepo, S. T. McDaniel, "Spatial Coherence in the High Frequency Limit", Waves in Random Media, **2**, pp 183-193 (1991).
- J. M. Restrepo, S. T. McDaniel, "Two Models for the Spatially Covariant Field Scattered by Randomly Rough Pressure-release Surfaces with Gaussian Spectra", Journal of the Acoustical Society of America, **87**, pp 2033-2043 (1990).

Selected Refereed Proceedings

- J. M. Restrepo, "Global Warming and Uncertainties," *Mathematics of Planet Earth: Mathematicians reflect on how to discover, organize, and protect our planet*, Hans Kaper and Christiane Rousseau, SIAM , 206p, (2014).
- J. O. Barber, T. W. Secomb, J. P. Alberding, J. M. Restrepo, " Simulated Two-dimensional Red Blood Cell Motion, Deformation and Partitioning in Micro-vessel Bifurcations," Seventh International Conference on Computational Fluid Mechanics in the Minerals and Process Industry, December, 2009, Melbourne Australia.
- J. O. Barber, T. W. Secomb, J. P. Alberding, J. M. Restrepo, " Simulated Two-dimensional Red Blood Cell Motion, Deformation and Partitioning in Micro-vessel Bifurcations," Society for Mathematical Biology Conference, July 2008, Toronto, ON, Canada.
- T. W. Secomb, J. O Barber, J. P. Alberding, J. M. Restrepo, "Computational Simulation of Red Blood Cell Motion in Microvessels and Bifurcations," XXII ICTAM Conference, August 2008, Adelaide, Australia.
- S. Peacock, E. Lane, J.M. Restrepo, "A possible sequence of events for the generalized Glacial-interglacial cycle," AGU Fall Meeting, 2006.
- J.M. Restrepo, "A Path Integral Formulation of Data Assimilation,", Proceedings of the 2006 Conference on Neural and Information Processing Systems, Vancouver 2006.
- J.M. Restrepo, P. Fischer, G. Leaf, "Lift and drag measurements of a sphere using direct numerical simulation, " Proceedings, ICTAM 2000, International Union of Theoretical and Applied Mechanics, 2000.
- H. Kaper, D. Ralley, J. M. Restrepo, S. Tipei, "Additive Synthesis with DIASS on Argonne National Laboratory's IBM POWERparallel System (SP)", Proceedings, International Computer Music Conference, Banff, pp 351-352, 1995.
- J. L. Bona, W. McKinney, J. M. Restrepo, "Numerical Investigation of the Stability of Solutions of the Generalized BBM Equation." Proceedings, IMACS 14th World Congress, **1**, pp 344-347. 1994.
- J. M. Restrepo, "Model for the Formation of Longshore Sand Ridges on the Continental Shelf, " Transactions, American Geophysical Union, p. 255, October 1993.

Selected (unique) Non-Refereed Proceedings and Reports

- A. Buluc and Others, *Randomized Algorithms for Scientific Computing*, Department of Energy Workshop Report, (arXiV: 2104.11079)
- J.M. Restrepo, M. Mann, *This is how 'Climate is Always Changing'*, SIAM News May 2018.
- J.M. Restrepo, M. Mann, *Uncertainty in Climate Science: Not Cause for Inaction*, arXiv, 2108.08781, 2021.
- J.M. Restrepo, M. Mann, *This is how 'Climate is Always Changing'*, Focus Group on Climate Newsletter, American Physical Society, March 2018.
- J. M. Restrepo, "Global Warming, Climate Change, Climate Research," invited blog for MPE2013 (2013).
- J. M. Restrepo, "Did Exit Polls Elect Reagan? Did a Third Party Affect the Gore/Bush Election?," Arizona Daily Star, Guest Op Ed, (2012).
- D. Nychka, J.M. Restrepo, C. Tebaldi, *Uncertainties in Climate Predictions*, Mathematics Awareness Month, 2009.
- J. M. Restrepo, "Principles of Scientific Computing", **electronic course** (non-refereed), pp 500+ figures. (2001).
- J. M. Restrepo, "The Acoustics of the Advanced Photon Source Auditorium and Conference Center, " ANL Technical Report ANL/MCS-TM-212, pp 80 + 16 figures, (1995).
- J. M. Restrepo, J. L. Bona, "Model for the Formation of Longshore Sand Ridges on the Continental Shelf. The Interaction of Internal Waves and the Bottom Topography." ANL Preprint MCS-P407-1293, (1993).
- G. Schlossnagle, J. M. Restrepo, G. K. Leaf, "Periodized Wavelets, " ANL Technical Report ANL-93/34, pp 20 + 8 figures, (1993).
- J. M. Restrepo, "Student Involvement Vital to Climate Modeling Studies", Global Change Scaler, ANL/GCS-2 p. 66-67, (1993).

Submitted Papers

- C. Fox, J.M. Restrepo, "Diffusion Fields due to Reactive Conical Scatterers," J. Acoustical Society of America, in preparation.
- J. Krotz, J.M. Restrepo, "Improving Data Assimilation in Advection Diffusion Phenomena," J. Computational Physics, in preparation.

Software (used by third parties)

- N. Chitnis, J. Hyman, J.M. Restrepo, "DSDISP, A Population Dynamics Software Package," (2005). Available from the web page.
- J. M. Restrepo, G. K. Leaf, "General Model for Wave-Current Interactions with Pollution and Sediment Dynamics," (2000). Available only upon request to group users.
- J.M. Restrepo, C. Chen, "Task Farming Scheduler for Beowulf-class computers," (1999). Available from the web page.
- J. M. Restrepo, G.K. Leaf, "Connection Coefficients, calculation of inner products using periodized Daubechies wavelets and their derivatives," (1995). Available from the web page.
- J. M. Restrepo, G. K. Leaf, Andreas Griewank, "Treeverse.f, software for the evaluation of gradient using a recursive/adjoint algorithm," (1995). Available from the web page.

Scholarly Presentations

Plenary Presentations

2017	**Plenary Speaker**, SIAM Geosciences, 2017	*Erlangen, Germany*
2017	**Plenary Speaker**, SIAM Pacific Northwest Meeting, 2017	*Corvallis, US*
2016	**Distinguished Speaker**, MPE 2016, Imperial College London	*London, UK*
2015	**Distinguished Lecturer**, Edwards Lecture, Oregon State University	*Corvallis, US*
2010	**Keynote Speaker**, IMA/NSF, Workshop on Careers for Minorities and Women in the Mathematical Sciences	*Minneapolis, MN*
2008	**Plenary Speaker**, SACNAS Annual Meeting	*Salt Lake City, US*
2007	**Pascal Invited Speaker**, NIPS Annual Meeting	*Whistler, BC*
2006	**Plenary Speaker**, Congreso Agrónomo XVI	*Guanajuato MX*
2005	**Plenary Speaker**, SIAM Annual Meeting	*New Orleans, US*
2005	**PIMS Distinguished Speaker**, PIMS Distinguished Series Lectures	*Vancouver, BC*

Colloquia (Invited, 1996-present)

- American Physical Society, Annual Meeting, '21
- Oak Ridge National Laboratory, '20
- City University of New York, '20
- ISMAR, Venice, '19
- Dartmouth, '18
- Kavli Institute of Theoretical Physics, '18
- MIT, '18
- University of Illinois, University Circle, '18
- Berlin Technical University, '17
- Potsdam University, '17
- Washington State University, '14
- University of Washington, '14
- Penn State, Math, '13
- ICES, University of Texas, '13
- Lawrence Berkeley Laboratory, '13
- University of Arizona, Geosciences '13
- University of Tennessee, Mathematics, '13
- Tulane University, Mathematics, '13
- Applied Mathematics, Colorado, '12
- SAMSI Colloquium, '12
- University of North Carolina, Applied Mathematics Colloquium, '12
- University of Oxford, Numerical Analysis Seminar, '11
- University of Reading, Data Assimilation Seminar, '11
- ICES, U. Texas, '11
- University of Warwick, Applied Mathematics Seminar, '11
- Imperial College, London, Climate Dynamics Seminar, '11
- Imperial College, London, Fluid Mechanics Seminar, '11
- Colorado School of Mines, '11
- Argonne National Laboratory, '10
- University of St Thomas, '10
- Carleton College, '10
- University of Chicago, '10
- University of Michigan, '10
- Stanford University, '10
- University of Illinois at Chicago, '10
- University of Minnesota, '09
- University of Texas, ICES, '09
- Courant Institute of Mathematical Sciences, '09
- UCSD Institute for Scientific Computing, '08

- UCSD Mechanical and Aerospace Engineering, ’06
- U. Washington Applied Mathematics, ’07
- Scripps Institute of Oceanography, ’06
- Duke Mathematics Department, ’05
- SAMSI, Special Lecture, ’05
- College of Ocean Sciences, U. Washington, ’04
- Mathematics Department, U. Victoria, ’04
- Mathematics Department, U. British Columbia, ’04
- Mathematics Department, Simon Fraser University, ’04
- Rice University, ’03
- University of Arizona, ’03
- Simon Fraser University, ’02
- Duke University, ’00
- University of Toronto, ’00
- Lawrence Berkeley Laboratory, ’99
- Arizona, ’97 and ’99
- Courant Institute of Mathematical Sciences, ’97
- Maryland, ’97
- MIT, ’97
- California Institute of Technology, ’97
- University of California, Irvine, ’97
- UCLA, ’96, ’97, ’99
- Northwestern University, ’96
- Woods Hole Oceanographic Institute, ’96
- MIT, ’96
- University of Chicago, ’93 and ’96
- Harvard, ’96

Symposia, Conferences, and Workshops (Invited, 1996-present)

- APS Annual Meeting ’16
- AGU Annual Meeting ’16
- EGU Meeting, Vienna, ’15
- IMA Uncertainty Quantification Workshop, ’14
- CARTHE Meeting in Miami, ’12, ’13
- Santa Fe Meeting on Large Data, ’13
- AGU Meeting of the Americas, ’13
- BANFF Workshop on Data Assimilation, ’13
- AGU Annual Meeting, ’12
- Max-Planck Institute, Physics of Complex Systems in Dresden, ’12
- SACNAS, Seattle ’12
- AIMS Conference, Orlando ’12
- SIAM, Annual meeting, Invited, UQ ’12
- LAPCOD Annual meeting, Miami FL ’12
- GISS/Large Data Meeting, Asheville NC, ’12
- SAMSI, Invited Speaker, Methodology Workshop, UQ Year, ’11
- AMS John von Neumann Workshop on Multiscale Methods, ’11
- SAMSI, Invited Speaker, Climate Workshop, UQ Year, ’11
- IMA/NSF, Invited Speaker, Uncertainty Quantification Workshop, ’11
- IMA/NSF, Invited Speaker, Societally-Relevant Computing Workshop, ’11
- SIAM Annual Conference, 2010, Invited Speaker, Conference on Climate Dynamics, ’10
- Blackwell-Tapia Celebration, ’10
- IMA/NSF, Invited Speaker Complex Flows workshop ’10
- NCAR, Earth Systems Invited speaker ’08
- Universidad de Puerto Rico, Graduate Student Workshop ’08

- SIAM, 2007, Mathematical Fluid Dynamics Symposium
- MSRI, Mathematical Issues in Stochastic Approaches for Multiscale Modeling, '07
- AMS, 2007 Spring Western Section, Invited Speaker '07
- Stochastic Dynamical Systems and Climate Dynamics, BIRS Research Station, Banff, Invited Speaker '07
- SIAM Phoenix Meeting, Invited Speaker 07

Contributed (Partial Listing, 2011-present)

- SIAM Dynamical Systems, 2016, 2019
- SIAM Geosciences 2015,2017
- EGU, Vienna, 2014, 2018
- IMUM, 2014, 2019
- Gulf of Mexico Conference, 2013, 2014, 2016, 2017
- DFD/APS: Minneapolis 2011, 2013
- Ocean Sciences Meeting: 2010 2012, 2014, 2018
- AGU Meeting, contributed poster 2012, 2014, 2017-2022
- APS: 2011-2022

Students and Junior Scientists Supervised

Post-Doctoral

Saeed Moghimi, Oregon State University
Jorge Ramirez, University of Arizona
Nusret Balci, University of Arizona
Paul Krause, University of Arizona

PhD (* completed degree).

Dr. Emily Lane*, University of Arizona
Dr. Bradley Weir*, University of Arizona
Dr. Sangil Kim*, University of Arizona
Dr. Samuel Schofield*, University of Arizona
Dr. Jared Barber*, University of Arizona
Darin Comeau*, University of Arizona
Steven Rosenthal*, University of Arizona
Rosalyn Rael*, co-supervised, University of Arizona
Evgenia Chunikhina*, Oregon State University
Will Mayfield, Oregon State University
Dallas Foster, Oregon State University
A. S. Nguemto, Oregon State University
David Guillory, Oregon State University
Barton Gattis, Oregon State University
L. Greg Detweiller, Oregon State University
Johannes Krutz, Oregon State University
Diane McMillan, Oregon State University

MS (* completed degree).

Romain Boutelet*, Université de Lyon
Andrew Jensen*, Oregon State University
Kirana Olympia Bergstrom*, Oregon State University
John Nangle*, University of Arizona
David Patterson*, University of Arizona
Yun Kang*, University of Arizona

Undergraduate

Matthew Purvis, Oregon State University
Jessica Peterson, Oregon State University
Antonio Sam, Oregon State University
Geoff Gonzalez, Oregon State University
Jesse Rodriguez, Oregon State University
Mesa Walker, Oregon State University
Michael Lopez, Oregon State University
Ben Keitges, University of Arizona
Mason Quick, University of Arizona
Alex Salce, University of Arizona
Jason Dittmann, University of Arizona
Shi Xin, University of Arizona
Chifu Chen, University of Arizona
Samantha Zaplinski, University of Arizona
Will Goble, University of Arizona
Rex Cook, University of Arizona
Peter Manning, University of Arizona
Andres Tejada-Martinez, Argonne National Laboratory