

JUAN GABRIEL SANTIAGO
Department of Mechanical Engineering
Stanford University

Education

University of Illinois at Urbana-Champaign

Ph.D., Mechanical Engineering, August 1995, GPA 4.0/4.0

Thesis: "An Experimental Study of the Velocity Field of a Transverse Jet Injected into a Supersonic Crossflow"

University of Illinois at Urbana-Champaign

M.S., Mechanical Engineering, August 1992, GPA 4.0/4.0

Thesis: "Facility Design and Preliminary Experiments for an Endothermic Fuel Combustion Facility"

University of Florida at Gainesville

B.S., Mechanical Engineering, May 1990

Undergraduate GPA 3.95/4.0, High Honors, First in Graduating Class

Work Experience

Stanford University, Stanford, California

Department of Mechanical Engineering

Full Professor, 9/10-Present

Interests include microfluidic systems for chemical and biological assays; methods and devices for automated sample preparation; and miniature drug delivery systems. Teach undergraduate and graduate courses in fluid mechanics, transport phenomena, experimental methods, and electrokinetic phenomena.

Chair of Thermosciences Group, 9/09-10/12

Associate Professor, 4/05-9/10; Assistant Professor, 9/98-4/05.

Purigen Biosystems, Inc., Pleasanton, California, <http://www.purigenbio.com/>

Founder and Senior Consultant, 2/13-Present:

Company aims to be the first to commercialize electric field based sample extraction systems for biological applications. Raised funds, assembled team, am co-inventor on 18 related patents, and launched company. Consulting activities include developing novel microfluidic chip control strategies.

Cooligy, Inc., Mountain View, California

Founder and Senior Consultant, 1/02-1/06:

Company was the first to commercialize liquid cooling loops for microprocessors on a mass produced personal computer. Raised funds, assembled team, and launched company. Consulting activities included development of models and experiments to design and optimize pumps and liquid cooling.

University of Illinois at Urbana-Champaign

Department of Electrical and Computer Engineering, Beckman Institute for Advanced Science and Technology, BioMEMS Laboratory.

Research Scientist/Postdoctoral Fellow, 3/97-9/98:

Conducted experimental studies of flows in microfluidic devices using micron-resolution particle image velocimetry (PIV). Developed microfluidic devices for chemical and biological separation.

The Aerospace Corporation, Spacecraft Thermal Department, El Segundo, California

Senior Member of the Technical Staff, 10/95-3/97:

Worked as a research engineer in the field of thermal science. Analyzed and designed spacecraft and launch vehicle thermal technology using Monte-Carlo thermal radiation modeling, finite-difference modeling, convective heat transfer analyses, and thermal system analyses. Designed a micro-resolution particle image velocimetry (PIV) system for investigations of micro-satellite thrusters.

University of Illinois at Urbana-Champaign
Department of Mechanical and Industrial Engineering

Graduate Research Assistant, 5/92-10/95:

Conducted a study of the mixing phenomena of an underexpanded, sonic jet injected into a supersonic crossflow. Used laser Doppler velocimetry measurements of mean velocities and Reynolds stresses to study flow field structure and jet development. Investigated instantaneous mixing using planar laser-induced fluorescence (PLIF) imaging. This study provides guidance to supersonic combustor designers and helps validate numerical predictions.

Teaching Fellow, 8/94-12/94:

This departmental award offered the opportunity to teach a department course of my choice: the fluid mechanics lecture course. Solely responsible for the development of course syllabus, lecture notes, class handouts, homework assignments, and exams. Presented all lectures and assigned final grades. Graded homework and exams.

Graduate Research Assistant, 8/90-5/92:

Led the design, construction, and instrumentation of a high-speed combustion wind tunnel facility. Carried out turbulent flame speed measurements, was designed to demonstrate the performance of the combustor facility and supporting systems. The facility was designed to study the combustion characteristics of endothermic fuel mixtures at simulated Mach 6 flight conditions of a turboramjet burner.

Exxon Production/Eastern Division, New Orleans, LA

Graduate Summer Intern, 5/90-8/90: Researched and compiled reports of over 15 oil well production histories. Based on this study, presented recommendations for two well restorations and three well abandonments.

University of Florida at Gainesville

Tutor, 8/88-5/90: Self-employed tutor of thermodynamics and fluid mechanics for undergraduates. Developed class outlines to supplement class notes.

Academic Areas of Interest and Research Methods

Academic: Fluid mechanics; microfluidics; electrokinetics; colloid science; experimental methods and random data analysis; microfabrication; heat transfer; analytical and numerical modeling of transport phenomena.

Fluid Mechanics and Optical Diagnostics Research: Particle image velocimetry, particle tracking velocimetry, caged-fluorescence imaging, bleached-fluorescence imaging, planar laser-induced fluorescence imaging; digital image processing (including particle tracking, pattern recognition, and filtering); CCD and ICCD camera/computer interfacing and imaging; flow seeding techniques; schlieren and shadowgraph techniques; laser Doppler velocimetry; experimental research facility design, construction, and instrumentation; surface flow visualization techniques; phase Doppler anemometry; and hot-wire anemometry.

Microfluidics Research: Mask layout and drafting; photolithography; chemical and reactive ion plasma etching of silicon and glass wafers; and epoxy-based photoresist; thermal oxide processing of silicon; anodic, thermal, and RTV bonding; thin film deposition; epifluorescent microscopy; confocal microscopy; scanning electron microscopy; and micro-fluidic system assembly, interconnect, and control.

Awards and Honors

1. Best Poster Award for poster titled "Theory and Experimental Validation of Selective Removal of Nitrate Using Capacitive Deionization with Surface Functionalization," Materials Research Society Spring Meeting, Phoenix, Arizona, 2019.
2. Cozzarelli Prize for paper titled "Nondestructive nanostraw intracellular sampling for longitudinal cell monitoring," National Academy of Sciences, 2018.
3. Inducted into the College of Fellows of the American Institute for Medical and Biological Engineering (AIMBE), 2016.
4. 1st Place Prize Poster, "Multi-stage phasing of flow-through capacitive deionization", Stanford Mechanical Engineering Conference, Stanford, California, May 6th, 2016
5. Editor's Choice VIII author for Journal of Chromatography A, 2014.
6. Outstanding Contribution Award, ASME Industry Honors Dinner, Santa Clara Valley Section, April 11, 2013.
7. Elected Fellow of the American Society of Mechanical Engineers (ASME), 2012.
8. Advisee Supreet Bahga was awarded 2nd Place Prize for the University Michigan Modeling and Simulation of Nano/Microsystems Contest, 2012.
9. Elected Fellow of the American Physical Society (APS), 2010.
10. Best Poster Award (out of 174), "Label-Free Toxin Detection Using Fluorescent Fingerprint Assay," Association for Lab Automation, LabAutomation, Palm Springs, CA, Jan. 24-27, 2010.
11. Outstanding Alumnus Award from the Mechanical Engineering Department of the University of Florida, April 11, 2008.
12. Best Paper Award, "Physics of pumping Methanol/Water Solutions for Fuel Cell Applications", with Cullen Buie and Shawn Litster, ASME-IMECE Conference, 2007.
13. Mentorship Recognition, served as mentor to Terman Engineering (Undergrad) Scholastic Awardee David Fenning, 2008.
14. Outstanding Achievement in Academia Award from The National Consortium for Graduate Degrees for Minorities in Engineering and Science (GEM), 2006
15. Best Paper award, Conference of the Electrochemical Society, Cancun, Mexico, 2006
16. One of the top three most downloaded papers in the history of Experiments in Fluids journal (Santiago et al., 1998)
17. Invitation to National Academy of Engineering Conference "Frontiers in Engineering," 2004-2007
18. Elected Vice Chair of Gordon Conference on the Physics and Chemistry of Microfluidics, Waterville Valley, NH (7/15-20 2007)
19. Elected Chair of Gordon Conference on the Physics and Chemistry of Microfluidics, Lucca, Italy (6/28 – 7/3, 2009)
20. Invited to Co-Chair the International Congress of Theoretical and Applied Mechanics (Adelaide, Australia, 2008).
21. Best Paper Award, ASME IMECE Conference, Advanced Energy Systems Division, 2006.
22. Best Poster Award, ASME IMECE Conference, 2005.
23. Best Poster in session award, Gordon Conference on the Physics and Chemistry of Microfluidics, Oxford England, 2005
24. Presidential Early Career Award for Scientist and Engineers (PECASE), 2004
25. Named by the Hispanic Engineers National Achievement Awards Corp. as a Role Model for young Hispanic engineers, 2004
26. National Science Foundation Faculty Early Career Development (CAREER) Award, 2003
27. Best Paper Award, Symposium on Thermodynamics and the Design, Analysis, and Improvement of Energy Systems, 2005
28. Best Poster award Annual Meeting of the American Institute of Chemical Engineering and American Electrophoresis Society, San Francisco, California, 2003
29. Best Poster award Gordon Conference on the Physics and Chemistry of Microfluidics, Big Sky Montana 2003
30. Nominee 2001 Technology Review Magazine TR100 Award
31. National Inventors Hall of Fame: Collegiate Inventors Award, 2001
32. Best Paper award at SEMI-THERM XVII, San Jose, CA USA, 2001

33. Frederick Emmons Terman Fellow (Faculty) Award, Stanford University 1998-1999
34. Ford Foundation Post-Doctoral Fellowship 1997-1998
35. UIUC Mechanical Engineering Alumni Teaching Fellow Award, 1994 – 1995
36. National Science Foundation SURGE Fellowship, 1992 – 1995
37. UIUC Mechanical Engineering Departmental Dupont Fellowship 1990-1991
38. UIUC Mechanical Engineering Departmental Chevron Fellowship 1991-1992
39. Exxon Corporation Fellowship, 1990 - 1994
40. Philip O. Yeaton Award for Excellence in Undergraduate Mechanical Engineering, University of Florida, 1990
41. National Action Council for Minorities in Engineering Scholarship ('87-'90)
42. First in Graduating Class, University of Florida, 1990
43. Graduation with High Honors, University of Florida, 1990

Keynote and Named Lectures

1. “Capacitive deionization of water: Resonance and selective extraction,” Keynote talk at the 13th International Symposium on Electrokinetics (ELKIN), Massachusetts Institute of Technology, Cambridge, MA, June 12-14, 2019.
2. “Separating and analyzing nuclear versus cytoplasmic nucleic acids from single cells,” Keynote talk at the 4BIO Summit USA Conference (4th qPCR & Digital PCR Congress and the 3rd Microfluidics Congress), San Francisco, CA, September 14, 2018.
3. “Capacitive deionization of water: Energy dissipated versus stored.” Keynote talk at the Microfluidics/Nanofluidics Symposium, American Society of Mechanical Engineering IMECE Conference 2016, November 17, Phoenix, Arizona.
4. “Capacitive deionization (CDI) of water: How much energy is dissipated and how much is stored?” Keynote talk at the 67th Annual Meeting of the International Society of Electrochemistry, August 22, 2016 in The Hague, The Netherlands.
5. “Life in the shock wave: Controlling DNA reactions with electric fields,” The Stanley Corrsin Memorial Lecture in Fluid Mechanics, Whiting School of Engineering, Johns Hopkins University, April 14, 2016.
6. “DNA assays leveraging ion concentration shock waves,” Keynote talk at the ASME NanoEngineering for Medicine and Biology Conference (NEMB), Houston, Texas, February 23, 2016.
7. “Thoughts on my background, graduate school, and a professorship,” Keynote talk at the American Indian Scientists and Engineering Society Western Regional Conference, Stanford University, April 3-4, 2015.
8. “Novel on-chip isotachopheresis assays for nucleic acid analysis,” Keynote lecture at the 29th International Symposium on MicroScale Bioseparations (MSB2013), Charlottesville, Virginia, March 10-14, 2013.
9. “Isotachopheresis for Extraction and Rapid Hybridization of Nucleic Acids,” Plenary Lecture, 19th International Symposium, Exhibit & Workshops on Electro- and Liquid Phase-Separation Techniques, ITP 2012, Baltimore, MA, October 2, 2012.
10. “Novel on-chip isotachopheresis (ITP) assays for nucleic acid extraction and analysis,” Plenary lecture presented at Microtech Conference & Expo, Santa Clara, June 19, 2012.
11. “Isotachopheresis for extraction and rapid hybridization of nucleic acids,” Plenary lecture at the International Symposium, Exhibit & Workshop on Electro- and Liquid Phase-Separation Techniques, ITP 2012, Baltimore, MD, October 1, 2012.
12. “Sample Preparation and Analysis Using Isotachopheresis,” University of Santiago, Chile, March 23, 2012.
13. “On-Chip Sample Preparation and Nucleic Acid Profiling Using Isotachopheresis,” Plenary Talk at the American Electrophoresis Society Annual Meeting, Minneapolis, MN, October 17, 2011.
14. “Nucleic acid extraction, identification, and quantitation using isotachopheresis,” Keynote Talk at the Lab-on-a-Chip World Congress, South San Francisco, September 29, 2011.
15. “On-Chip Isotachopheresis for Toxin Detection and Nucleic Acid Extraction,” Plenary Talk at 6th Annual Utah State Nanotechnology Conference, Salt Lake City, Utah, October 15, 2010.
16. “Rapid Chemical Detection and Identification with a Hand Held Device,” Association for Lab Automation, Plenary Award Finalist presentation, LabAutomation, Palm Springs, CA, January 23, 2010.

17. Santiago, J. G. "Novel Indirect Fluorescence Detection Methods Using Isotachophoresis: Minding the Gaps and Steps," Keynote talk at the 23rd International Symposium on Microscale Bioseparations Conference, Boston, Massachusetts, February, 2009.
18. Santiago, J.G., "Indirect Fluorescence Detection of Non Fluorescent Analytes Using Isotachophoresis," Plenary Speaker, Sixth International Conference on Nanochannels, Microchannels and Minichannels, June 23-25, Darmstadt, Germany May 15, 2008.
19. Santiago, J.G., "Electrokinetic Nanofluidic and Microfluidic Devices: Physics and Applications," the Distinguished Speaker at the Frontiers in Mechanical Engineering: NanoMechanical Engineering at University of Pennsylvania, Philadelphia, Pennsylvania, May 15, 2008.
20. Santiago, J.G., "Novel On-Chip Isotachophoresis Assays," the Linseth Lecture at Cornell University, January 29, 2008.
21. Santiago, J.G., "Making Shock Waves in Microfluidics: The Physics and Applications of Isotachophoresis," Keynote Address at the 60th Annual Meeting of the Division of Fluid Dynamics, Nov 18-20, Salt Lake City, Utah, 2007.
22. "Electrokinetic Microfluidics at Extreme Scales," Spanish Society of Chromatography and Related Techniques, Plenary Talk, SECyTA, Vigo, Spain, Nov. 2006
23. "Electrokinetic Microfluidics at Extreme Scales," Keynote Address at the Electrostatics Society Annual Meeting, Berkeley, CA 2006.
24. "Field Amplified Sample Stacking for On-Chip Capillary Electrophoresis," Keynote Address at the ASME International Mechanical Engineering Congress and Exposition, Irvine, California, November, 2004
25. "Electrokinetic Microfluidic Systems: Sample Stacking and Instabilities," Keynote Address at the International Electrokinetics Conference, June 13-17, Carnegie Mellon University, Pittsburgh, Pennsylvania, 2004
26. "Electrokinetic Microfluidic Systems," Keynote Address at the Seventh Annual Paul Flory Conference, Chemistry Department, Stanford University, 2004
27. "Electrokinetic Flow Instabilities in Microfluidic Systems," International Conference on Theoretical and Applied Mechanics (ICTAM '04), Plenary Lecture for Microfluidics Symposium, Warsaw, Poland 2004
28. "Electrokinetic Microfluidic Systems: Stacking and Instabilities," Massachusetts Institute of Technology, The Ronald J. Probst Lecture in Mechanical Engineering, Cambridge, Massachusetts, 2003
29. "Heterogenous Electrokinetic Systems," Keynote Address at the ASME International Mechanical Engineering Congress and Exposition, Washington D.C., November, 2003
30. "Electrokinetic Technology for Microfluidic Systems," Keynote Address of the IBC BioMEMS and Microfluidics, San Diego, CA, 2003
31. "Electrokinetic Microfluidic Systems," Keynote Address of the Joint American Institute of Chemical Engineering and American Electrophoresis Society Annual Meeting, Indianapolis, Indiana, 2002

(see also Other Invited Presentations below)

Activities and Service

External Service

Editorial Board for the journal *Micromachines*, 2019-Present

Mentorship presentation and session for Future Advancers of Science and Technology (FAST), Stanford University, April 14, 2017.

Ad hoc Editor, *Proceedings of the National Academy of Sciences*, 2015, 2016.

Editorial Advisory Board for the journal *Analytical Chemistry*, 2015-2019

Member Editorial Board of the Journal of Microfluidics and Nanofluidics, Springer-Verlag, 2003 – Present

Local Organizing Committee member, 26th International Symposium on MicroScale Bioseparations of the CASSS International Separation Society Conference, San Diego, May 2011.

Book review for Elsevier, 2010

Chair (2009) and Vice-Chair (2007) of Gordon Research Conference on Physics and Chemistry of Microfluidics. Included organizing entire program, raising funds (including proposals to NIH, NSF, Philips Corp.), moderating sessions, and managing invitations, 2007-2009.

Guest Editor for special issue on Fundamental Principles and Techniques in Microfluidics for the journal *Lab on a Chip*, 2009

Associate Editor of the journal *Lab on a Chip*, Royal Society of Chemistry Publishing, 2008 – 2013

Member of the Technical Program Committee, International Conference on Miniature Systems for Chemistry and Life Sciences (MicroTAS), 2008-2014

NSF proposal review, 2011

NSF Panel Reviewer, 2010

NIH Study Section Panel Reviewer, 2006, 2009, 2010

DOE proposal review, 2006, 2008

Reviewer of tenure cases for Mechanical Engineering at major universities, 2006, 2007 (2), 2008 (3), 2010 (2), 2011(2), 2012(1)

Reviewer of Israeli national science foundation, 2006

Panel Moderator Silicom Corporation Ventures Conference, 2006

Mentorship Panel member at The National Consortium for Graduate Degrees for Minorities in Engineering and Science (GEM), 2006

ASME Fluids Division Awards Committee, 2004 – 2005

Royal Society of Chemistry book proposal review, 2011

Springer-Verlag book proposal review, 2005, 2009

Cambridge Press book proposal review, 2005

Tutorial for Materials Research Society on Microfluidics, April 2004

Tutorial on Micron-Resolution Particle Image Velocimetry, Sponsored by TSI, Inc. September 2003

Review Panel for NSF SBIR Proposals, October 2003

Review Panel for NSF CAREER Proposals, 2003, 2005

NSF proposal reviews 2002-2006

Tutorial for American Society of Mechanical Engineers on Microfluidics, October 2002

Founder and Senior Consultant of Cooligy, Inc., Mountain View, CA; company commercialized microchannel liquid cooling devices for microelectronics, 2002 - 2006

Active supporter of the Foundation for a College Education (non-profit organization with a mission to promote access to college by students in traditionally underrepresented groups) 2001- 2006.

Chair of Minority Recruitment for the American Society of Mechanical Engineering's Micro-electro-mechanical Systems (MEMS) Sub-Division, 1999 – 2006

Member of American Society of Mechanical Engineering, American Institute of Chemical Engineering, Institute of Electrical and Electronics Engineers, American Physical Society, 1998 – Present

Member American Institute of Aeronautics & Astronautics, 1999-2000

Member Pi Tau Sigma, Golden Key, American Society of Mechanical Engineers, Society of Hispanic Engineering Students, 1988-1990

Session Conference Chair and Proceedings Reviewer

Session Chair at the 72nd Annual American Physical Society Division of Fluid Dynamics Meeting November 23-26, 2019.

Session Chair, Microfluidics, Electrokinetics Conference, Cambridge, MA, 2019.

Session Chair for Electrokinetics I, The Batsheva de Rotschild Seminar Physics of Microfluidics, Sde Boker, Israel, January 5, 2017.

Session Chair at the 67th Annual Meeting of the International Society of Electrochemistry, August 23, 2016 in The Hague, The Netherlands.

Conference Chair, Gordon Research Conference on the Physics and Chemistry of Microfluidics, Barga, Italy, July, 2009

Conference Vice Chair, Gordon Research Conference on the Physics and Chemistry of Microfluidics, Oxford, England, planning for conference in August, 2007

Plenary Session Chair, Micro-Total Analysis Systems, San Diego, 2008.

Session Chair, Gordon Conference on the Physics and Chemistry of Microfluidics, Oxford, England, August, 2005

International Conference for Theoretical and Applied Mechanics, ICTAM, Poland, August, 2004

Lab Automation Conference, Assoc. for Laboratory Automation, Microfluidics Applications Session, San Jose, February 1-5, 2004
International Mechanical Engineering Congress and Exposition, Applications of Fluid Mechanics to Microsystems Technology, Washington, D.C., November 15-21, 2003
Annual Meeting of American Institute of Chemical Engineers, San Francisco, CA, November 16-21, 2003
7th International Conference on Miniaturized Chemical and BioChemical Analysis Systems (μ TAS2003), Squaw Valley, California, October 5-9, 2003
Physics and Chemistry of Microfluidics, Gordon Conference, Big Sky Resort, Montana, August 24-29, 2003
19th Annual Joint Meeting of the Electrophoresis Society and the American Institute of Chemical Engineers, Indianapolis, Indiana, November 3-8, 2002
International Mechanical Engineering Congress and Exposition, Microfluidic Transport Phenomena, 1998 to 2006
ASME/JSME Fluids Engineering Conference, Microfluidic Devices for Liquids, 1998
Advisory Committee Member for the IEEE Aerospace Conference, 1997
ASME Fluids Engineering Division Summer Meeting, Separated and Complex Flows, 1997
AIAA 35th Aerospace Sciences Meeting, Thermophysics Technical Committee Session, 1997

Reviewer for Archived Journals

Analytical Chemistry, 2000 – 2020
Analytical Chimica Acta, 2020
ACS Sensors, 2019
Joule, 2020
IEEE Access, 2020
Journal of Chromatography A, 2009, 2011-2013, 2015-2016, 2020
Analyst, 2010, 2013, 2017, 2019
Electrophoresis, 2002 – 2003, 2007, 2009-2010, 2012-2013, 2016, 2019-2020
Proceedings of the National Academy of Sciences, 2010, 2015-2016, 2019
Journal of Fluid Mechanics, 2001 – 2006, 2010-2012, 2018-2019
Physical Review Fluids, 2016-2018, 2020
Nature, 2018
Micromachines, 2019-2020
Environmental Science and Technology, 2016-2019
PLOS One, 2019-2020
Desalination, 2019-2020
Environmental Science: Water Research and Technology, 2018-2019
Industrial & Engineering Chemistry Research, 2017
Journal of Industrial & Engineering Chemistry, 2018
Journal of the Electrochemical Society, 2008, 2015
Journal of Separation Science, 2017
Journal of Physical Chemistry, 2012, 2017-2018
Water Research, 2017-2018
Royal Society Open Science, 2018
Biomicrofluidics, 2016
SLAS Technology, 2017
Journal of Microfluidics and Nanofluidics, 2004 – 2008, 2010, 2014-2015, 2017
Journal of Applied Physics, 2015
Angewandte Chemie, 2015, 2018
Electrochimica Acta, 2014-2016
Physical Review Fluids, 2016
ASME Journal of Heat Transfer, 2016
Experiments in Fluids, 2000 – 2006, 2016.
Applied Mathematics and Mechanics, 2015
Biomicrofluidics, 2013
American Chemical Society, ACS Nano, 2010

Macromolecules, 2012
Advanced Materials, 2010, 2015.
Analytical Biochemistry, 2010, 2015.
Nature Protocols, 2010
Journal of the American Chemical Society, JACS, 2010
Lab on a Chip, 2006-2013
Journal of Micromechanics and Microengineering 2003 –2006, 2010
International Journal of Hydrogen Energy, 2009
Physics of Fluids, 2002 – 2005, 2008-2009, 2013, 2015
Fuel Cells, 2007
International Journal of Hydrogen Energy, 2008
Langmuir, 2007-2008, 2014
Biomedical Microdevices, 2007-2008
Journal of Power Systems, 2006, 2008
Physical Review E, 2004, 2005 – 2007, 2009
Physical Review Letters, 2005
Applied Physics Letters, 2005
Journal of Chemical Physics, 2005-2006, 2009
Journal of Microelectromechanical Systems, 2000 – 2004, 2006
Chemical Engineering Science, 2001, 2003 – 04
Sensors and Actuators B, 2001 – 2004
Journal of Fluids Engineering, 2002 – 2005
Journal of Colloids and Interface Science, 2003, 2006-2008
Chemical Reviews, 2003
NSF Proposals, 2002 – 2003
Journal of Microscale Thermophysical Engineering, 2003
Journal of Heat Transfer, 2003
Journal of Ophthalmology, 2003
Journal of Biomedical Microdevices, 2002
Science, 2001- 2002, 2005
Review of Optics Letters, 2000
AIAA Journal, 1999 - 2000
Journal of Thermophysics and Heat Transfer, 1997
Journal of Measurement Science and Technology, 1997
Optics Letters, Optical Society of America, 1997

Internal Service

Member of the Mechanical Engineering Graduate Studies Committee (GSC) meeting, 2019-Present.
Stanford Woods Institute for the Environment faculty affiliate, 2019-Present.
Tomkat Institute (Stanford University) faculty affiliate, 2015-Present.
Chair of Appointments and Promotions Committee, Mechanical Engineering, Stanford University, 2017-2019.
Member of Appointments and Promotions Committee, Mechanical Engineering, Stanford University, 2016-2017.
Member Graduate Diversity Steering Committee, Office of Vice Provost for Graduate Education, 2007-Present
Office of Engineering Diversity Programs and associated talks, dinners, lunches, meetings, and gatherings) 1999-2020
Stanford Summer Engineering Academy (SSEA): Curriculum planning, student host,
Includes three-hour lecture on engineering and preparation for college. Presented to students which add diversity to Stanford, 2001-2018
Faculty adviser for graduate students funded by Enhancing Diversity in Graduate Education--Science, Technology, Engineering and Mathematics (EDGE-STEM) Fellows Program, Stanford University, 2013-Present
Coordination and/or participation in ME Department admit days tours and student interviews 2001-Present

Coordination and/or participation in ME star applicant visit days, including tours and interviews 2001 – Present

Active in recruiting and retention efforts for minorities and women in engineering (including ~10 events per year such as luncheon's, group advising, presentations, dinners, etc.) 1998-Present

Bechtel International Center, Lunchtime with Faculty lunch, May 18, 2017

Reviewer of Tomkat Center proposals, 2016.

Reviewer of book for Cambridge Press, 2016.

Guest lecturer EDUC 343X Navigating the Academic Profession, Diversifying Academia, Recruiting Excellence (DARE) Program, May 4, 2015

Member of School of DARE Fellowship Committee, Office of Vice Provost for Graduate Education, 2013-Present.

Member of Hiring Committee for Senior Faculty, School of Engineering, 2014-2015

Chair of Promotion Committee (to Associate Professor), School of Engineering, 2013-2014

Chair of Reappointment Committee, School of Engineering, 2014-2015

Member of Reappointment Committee, School of Engineering, 2014-2015

Talk and panel member, "The Haves and the Have Nots: First-Gen/Low Income Grad Students and the Transition into Privilege," Grad Diversity Week, Stanford University, April 2015.

Faculty sponsor and facilitator of Vice Provost for Graduate Education Twelve at Twelve discussion group, Winter Quarter 2012

Chair of Buildings 520 and 524 Teaching Lab Committee, 2012-2015

Chair of Search Committee, Mechanical Engineering Department, 2011-2012

Chair of Thermosciences Group, Mechanical Engineering Department, 2009-2012

Member of the Target of Opportunity Hiring Committee, Mechanical Engineering Department, 2011-2012

Member of the Mechanical Engineering Executive Committee, Mechanical Engineering Department, 2009-2012

Member of School of Engineering 3D Fellowship Committee, 2011-2015

Talks and meetings with students at El Centro Chicano, Stanford Univ. 2002 – 2005, 2012, 2014

Panel member for Graduate Environment of Support (HUMSCI 201) course, 2011, 2012

Assembled appointment papers for Mechanical Engineering Department, 2010, 2011

Lectures to undergraduate and graduate meetings of Region 1 (California to Washington State) of undergraduate and graduate students of the Society of Hispanic Professional Engineers, 2011

Panel member for Fellowship Application Workshop at El Centro Chicano, 2009

Panel member for Fellowship Application Workshop Consortium, 2009

Assembled appointment papers for Mechanical Engineering Department, 2008

Presentation and discussion with minority students taking enrolled in the Graduate Environment of Support (HUMSCI 201), 2006, 2010

Member Stanford Campus Residential Leaseholders (SCRL) Residential Traffic Committee, 2007-2009

Member Committee of Graduate Studies, Stanford, 2006-2008

Member of Mechanical Engineering Multiphysics Faculty Search Committee, 2005-2007

Member of Mechanical Engineering Biomechanics Faculty Search Committee, 2005-2006

Member of Stanford University Latino Faculty Committee, 2001-2006

Chair of promotion committee for Dr. Rainer Fasching (Sr. Research Assoc.), 2004-2005

Active Participation in Fluid Mechanics Search committee, 2004-2005

Presentation to Stanford Society of Chicano/Latino Engineers and Scientist (SSCLES), 2004, 2005

Presentation and reception for Graduate Diversity Admit Weekend events, 1999, 2004, 2006, 2007, 2008

Presentation for Admit Weekend to incoming freshman, April 2005

Presentation to the Latino Engineering Graduate Organization, April 2005, 2006, 2008

Admit Weekend faculty panel member and presenter, 2003 – 2005

Keynote speaker at Seoul National University/Mechanical Engineering (Thermal Sciences Group) Conference at Stanford, 2004

Center for Integrated Systems Advisory Committee Conference speaker, 2004

Presentation to Mechanical Engineering Visiting Committee (and tours), 2004

Reviewer for Stanford Office of Technology Licensing Awards, 2001, 2002, 2004

Current PhD Graduate Student Advises

Post-Qualifying Exam

1. Ali Hemmatifar, M.S. Mechanical Engineering
2. Diego Oyarzun, M.S. Mechanical Engineering
3. Ashwin Ramachandra, M.S. Aerospace Engineering

Pre-Qualifying Exam

4. Diego Huyke Villeneuve, B.S. Mechanical Engineering
5. Nguyen Ly, B.S. Mechanical Engineering

Visiting Professors

1. Kang Liu, PhD, Huazhong University of Science and Technology, China
2. Nobuyuki Futai, PhD, University of Tokyo, Japan

Graduated Students at PhD and MS level, Postdoctoral Researchers, Undergraduates, and Visitors

To date, I have served as adviser to 28 PhD's and advised 7 postdoctoral researchers and research associates. 17 of these former students and postdocs are now professors at major universities. I have also advised 13 MS students and 28 undergraduate researchers. I have hosted nine US and international visitors.

Archived Publications

(My students and postdoctoral researchers at Stanford in **bold** and *italics type*, respectively)

Submitted and Under Review

1. Saadat, A., **D.A. Huyke, D.I. Oyarzun, P.V. Escobar, I.H. Øvreeide**, E.S.G. Shaqfeh, and J.G. Santiago, "High-throughput measurement of an individual's red blood cell shear modulus distribution," under review in *Lab on a Chip*, 2020.

Published (and Accepted) Papers.

1. **Hasseler, T.D., A. Ramachandran**, W.A. Tarpeh, M. Stadermann, and J.G. Santiago, "Process design tools and techno-economic analysis for capacitive deionization," in press, *Water Research*, 2020.
2. Kuo, H.A., **A. Ramachandran, D.I. Oyarzun**, E.C. Clevenger, J.G. Santiago, M. Stadermann, P.G. Campbell, and S.A. Hawks, "Understanding Resistances in Capacitive Deionization Devices," in press, *Environmental Science: Water Research & Technology*, 2020.
3. *Terzis, A., A. Ramachandran*, K. Wang, M. Asheghi, K.E. Goodson and J.G. Santiago, "High frequency water vapor sorption cycling using fluidization of metal-organic frameworks," in press, *Cell Reports Physical Science*, 2020.
4. **Huyke, D.A., A. Ramachandran, D.I. Oyarzun**, T. Kroll, D.P. DePonte, and J.G. Santiago "On the competition between mixing rate and uniformity in a coaxial hydrodynamic focusing mixer," *Analytica Chimica Acta*, 1103, 22, pp. 1-10, 2020.
5. **Oyarzun, D.I.**, S. Hawks; P.G. Campbell, A. Hemmatifar, A. Krishna, J.G. Santiago, and M. Stadermann, "Energy transfer from and to capacitive deionization," *Journal of Power Sources*, 448, 227409, 2020.
6. *Han, C.M.*, D. Catoe, S. Munro, R. Khnouf, M. Snyder, J.G. Santiago, M.L. Salit, and C. Cenik, "Simultaneous RNA purification and size selection using an on-chip isotachopheresis with ionic spacer," *Lab on a Chip*, 19, pp. 2741-2749, 2019.
7. **Ramachandran, A., D.I. Oyarzun**. S.A. Hawks, P.G. Campbell, M. Stadermann, and J.G. Santiago "Comments on 'Comparison of energy consumption in desalination by capacitive deionization and reverse osmosis,'" *Desalination*, 461, pp. 30-36, 2019.
8. **Ramachandran, A., D.I. Oyarzun**. S.A. Hawks; M. Stadermann, and J.G. Santiago, "High water recovery and improved thermodynamic efficiency for capacitive deionization using variable flowrate operation," *Water Research*, 155, pp. 76-85, 2019.
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60. **Persat, A.** and J.G. Santiago, "On-Chip Isothermal, Chemical Cycling Polymerase Chain Reaction (ccPCR)," *61st Annual Meeting of the APS Division of Fluid Dynamics*, San Antonio, TX, November 23-25, 2008.
61. **Mani A., T.A. Zangle,** and J.G. Santiago, "Concentration Polarization in Microchannel-Nanochannel Interfaces Using Method of Characteristics," *61st Annual Meeting of the American Physical Society Division of Fluid Dynamics*. San Antonio, TX, November 2008
62. **Chamber, R.D., T. Khurana, R.B. Schoch, A. Persat, R.G. Sierra,** and J.G. Santiago, "Fast, High-sensitivity Preconcentration, Separation, and Detection of Protein, DNA, and RNA via Isotachopheresis," Twelfth NHLBI Proteomics Investigator Meeting, Rockwell, MD, September 17, 2008.
63. **Bercovici, M., S.K. Lele,** and J.G. Santiago, "Simulation and Optimization of Isotachopheresis," Thermal and Fluid Sciences Affiliates and Sponsors Conference, Stanford, CA, February 6-8, 2008.
64. **Baldessari, F.** and J.G. Santiago, "Generalized Electrokinetic Transport of Ions in Nanochannels," presented at the 60th Annual Meeting of the Division of Fluid Dynamics, Salt Lake City, UT, November 18-20; 2007.
65. **Litster, S., B. Ha, D.J. Kim,** and J.G. Santiago, "A Two-Liquid Electroosmotic Pump for Portable Drug Delivery," *ASME IMECE*, Seattle, WA, November 11-15, 2007.
66. **Zangle, T.A., A. Mani,** and J.G. Santiago, "Concentration Polarization and Focusing at a Microchannel-Nanochannel Interface," presented at the Gordon Research Conference on Microfluidics, Physics & Chemistry Of, Waterville Valley, NH, July 15-20, 2007.
67. **Buie, C.R., S.E. Litster,** and J.G. Santiago, "In Situ Visualization of Liquid Water Removal in an Operating Proton Exchange Membrane Fuel Cell," presented at the Fifth International ASME Fuel Cell Science, Engineering, and Technology Conference, New York, NY, June 18-20, 2007.
68. **Khurana T.** and J.G. Santiago, "Isotachophoretic Electrophoretic Spacers: Indirect Fluorescence Detection of Non-Fluorescent Analytes," Fourth Gordon Research Conference on Physics and Chemistry of Microfluidics, Waterville Valley, NH, June 15-20, 2007.
69. **Litster, S., C.R. Buie,** T. Fabian, J.K. Eaton, and J.G. Santiago, "Active Water Management in PEM Fuel Cells using Electroosmotic Pumps," ASME's Fifth International Conference on Fuel Cell Science, Engineering, and Technology, New York, NY, June 18-20, 2007.
70. **Litster, S., C.R. Buie,** T. Fabian, J.K. Eaton, and J.G. Santiago, "Enhanced Water with Electroosmotic Pumps for PEM Fuel Cells," Cleantech 2007, Santa Clara, CA, May 23-24, 2007.

71. **Zangle, T.A.**, A. Mani, and J.G. Santiago, "Electrophoretic Separation and Preconcentration at Microchannel-Nanochannel Interfaces," Center for Integrated Systems Poster Session, Stanford, CA, May 16, 2007.
72. **Litster, S., C.R. Buie**, T. Fabian, J.K. Eaton, and J.G. Santiago, "Enhanced Water with Electroosmotic Pumps for PEM Fuel Cells," Young Scientists Workshop on Transport Phenomena in Fuel Cells, University of Victoria, Canada, May 4-5, 2007.
73. **Litster, S., C.R. Buie**, T. Fabian, *J.D. Posner*, F.B. Prinz, J.K. Eaton, and J.G. Santiago, "Fuel Cell Water Management Using Electroosmotic Pumps," 2007 Thermal and Fluid Sciences Affiliates and Sponsors Conference, Stanford, CA, February 7-8, 2007.
74. **Zangle, T.A.**, A. Mani, and J.G. Santiago, "Concentration Polarization at a Microchannel-Nanochannel Interface," 2008 Thermal and Fluid Sciences Affiliates and Sponsors Conference/, Stanford, CA, February 6-8, 2007.
75. O'Hayre, R., T. Fabian, **S. Litster**, F.B. Prinz, and J.G. Santiago, "Passive Air Breathing Fuel Cells For Portable Applications: What are the Limits to Cathode Performance?" presented at the fall meeting of the Materials Research Society, Portable Power Symposium, Hynes Convention Center & Sheraton Boston Hotel, Boston, MA, November 27-December 1, 2006.
76. **Pennathur, S., Jung, B.S., Baldessari, F., Lin, H.**, and Santiago, J.G., "Electrokinetic Microfluidics at Extreme Scales," Spanish Society of Chromatography and Related Techniques, SECyTA, Vigo, Spain, Nov. 2006.
77. **Litster S., C.R. Buie**, T. Fabian, *J.D. Posner*, and J.G. Santiago, "Water Management in a 25 cm² PEM Fuel Cell with Electroosmotic Pumping," AIChE Annual Meeting, San Francisco, CA, November 12-17, 2006.
78. *Baldessari, F., J. Sellier, T. Khurana*, and J.G. Santiago, "Isotachopheresis in Nanochannels," presented at the symposium on Transport Processes in Nanoscale Systems III, 2006 Annual Meeting of the American Institute of Chemical Engineers, San Francisco, CA, November 12-17, 2006.
79. **Buie, C.R., D.J. Kim, S. Litster**, and J.G. Santiago, "Electroosmotic Pumps for Fuel Delivery to Direct Methanol Fuel Cells," 2006 AIChE Annual Meeting, San Francisco, CA, November 12-17, 2006.
80. Fabian, T., R. O'Hayre, **S. Litster**, F.B. Prinz, and J.G. Santiago, "Water Management at the Cathode of a Planar Air-Breathing Fuel Cell with an Electroosmotic Pump," presented at Symposium on Proton Exchange Membrane Fuel Cells, 210th Meeting of The Electrochemical Society, 2006 Joint International Meeting, Cancun, Mexico, October 29-November 3, 2006.
81. *Baldessari, F., T.A. Zangle, S. Pennathur*, M. Kattah, J. Steinman, P.J. Utz, and J.G. Santiago, "Electrophoresis and Preconcentration Techniques in Nanochannels," presented at the Eighth NHLBI Proteomics Investigator Meeting, Bethesda, MD, September 20-21, 2006.
82. **Zangle, T.A., S. Pennathur**, and J.G. Santiago, "Micro-Nano Channel Interface Sample Stacking," presented at Sandia National Laboratory, Livermore, CA, August 24, 2006.
83. **Litster S., C.R. Buie**, *J.D. Posner*, T. Fabian, S.W. Cha, F.B. Prinz, J.K. Eaton, and J.G. Santiago, "Water Removal in a 25 cm² PEM Fuel Cell Using Electroosmotic Pumps," Seoul National Univ. - Stanford Univ. Student Joint Workshop, Stanford, CA, June 27-28, 2006.
84. *Posner, J.D.* and J.G. Santiago, "Quantification of Convective Electrokinetic Instability Micromixing Using Ion Indicating Dyes," presented at the 15th U.S. National Congress on Theoretical and Applied Mechanics, Boulder, CO, June 25-30, 2006.
85. Cha, S.W., T. Fabian, *J.D. Posner*, F.B. Prinz, **C. R. Buie**, J.K. Eaton, **D.J. Kim**, and J.G. Santiago, "Direct Water Removal in Gas Diffusion Layer of Proton Exchange Membrane Fuel Cells by a Flexible Electroosmotic Pump," Fourth International ASME Conference on Fuel Cell Science, Engineering and Technology, Irvine, CA, June 19-21, 2006.
86. Fabian, T., *J.D. Posner*, R. O'Hayre, S.W. Cha, J.K. Eaton, F.B. Prinz, and J.G. Santiago, "The Role of Ambient Conditions on the Performance of a Planar, Air-Breathing Fuel Cell," presented at Small Fuel Cells 2006 -Small fuel cells for portable applications, L'Enfant Plaza Hotel Washington, DC, April 2 - 4, 2006.
87. *Posner, J.D.* and J.G. Santiago. "Nonlinear Dynamics of Electrokinetic Instabilities," Meeting of American Physical Society, Division of Fluid Dynamics, Microfluidics: Mixing, Chicago, IL, November 20-22, 2005.

88. **Pennathur, S.** and J.G. Santiago, "DNA Separation in Nanoscale Channels," presented at the Ninth annual European conference on Micro & Nanoscale Technologies for the Bioscience (Nanotech-montreux), November 15-17, 2005.
89. Meinhart, C.D., S. Bradford, *J.D. Posner*, and J.G. Santiago, "Electrokinetic Flow Instabilities in Microfluidics," FEMLAB (COMSOL) 2005 User Conference, Burlington, MA, October 24, 2005.
90. **Huber, D.E., S. Pennathur**, P.J. Utz, and J.G. Santiago, "Microfluidic Temperature Gradient Focusing and Separation of eTags," National Heart, Lung, and Blood Institute (NHLBI) Proteomics Meeting, Bethesda, MD, September 27-28, 2005.
91. **Pennathur, S.** and J.G. Santiago, "Introduction to Nanofluidics," presented at Osmania University, Hyderabad, India, September 13, 2005.
92. **Huber, D.E.** and J.G. Santiago, "Temperature Gradient Focusing in Microchannels," presentations at Ebara Research Corporation and Tokyo University, Tokyo, Japan, September 19-20, 2005.
93. **Huber, D.E.** and J.G. Santiago, "Temperature Gradient Focusing: Dynamics and Applications," LabAutomation Conference, San Jose, CA, January 30-February 3, 2005.
94. **Pennathur, S.** and J.G. Santiago, "Electrokinetic Separation by Ion Valence," presented in the Physics and Chemistry of Microfluidics, Gordon Research Conference, Oxford, England, August 21-26, 2005.
95. **Huber, D.E.** and J.G. Santiago, "Non-Linear Stacking Effects in Microfluidic Temperature Gradient Focusing," presented in the Physics and Chemistry of Microfluidics, Gordon Research Conference, Oxford, England, August 21-26, 2005.
96. Storey, B.D., B.S. Tilley, *H. Lin*, and J.G. Santiago, "Electrokinetic Instabilities in Thin Microchannels," presented at the Second Conference on Frontiers in Applied and Computational Mathematics (FACM '05), Newark, NJ, May 13-15, 2005.
97. Santiago, J.G. and **S. Pennathur**, "Electrophoretic Separations in Nanochannels," Microfluidics Workshop, Banff International Research Station, Banff, Canada, April 30-May 3, 2005.
98. *Lin, H.*, **R. Bharadwaj, B. Jung**, and J.G. Santiago, "Electrokinetic Microfluidics Systems: Sample Stacking Instabilities," American Physical Society Meeting, March 21-25, 2005.
99. **Hertzog, D.E.**, Bakajin, O., J.G. Santiago, "Microsecond Mixer for Measuring the Kinetics of Protein Folding," presented at the National Institute of Biomedical Imaging and Bioengineering– U.S. Department of Energy (NIBIB-DOE) Workshop on Biomedical Applications of Nanotechnology, Bethesda, MD, March 17-18, 2005.
100. **Hertzog, D.E.**, X. Michalet, M. Jager, X. Kong, J.G. Santiago, S. Weiss, and O. Bakajin, "Microsecond Mixer for Kinetic Studies of Protein Folding," presented at the 49th Annual Meeting of the Biophysical Society, Long Beach, CA, February 12-16, 2005.
101. *Posner, J.D.* and J.G. Santiago, "Convective Electrokinetic Flow Instabilities in a Cross-Shaped Microchannel," 57th Meeting of American Physical Society/Division of Fluid Dynamics (APS/DFD), Seattle, WA, November 21-23, 2004.
102. *Posner, J.D.* and J.G. Santiago, "Convective Electrokinetic Flow Instabilities in a Cross-Shaped Microchannel," Association for Laboratory Automation LabFusion, Boston, MA, June 12-16, 2004.
103. **Bharadawaj, R.** and J.G. Santiago, "A Generalized Dispersion Theory Model for Field Amplified Sample Stacking," LabAutomation, San Jose, CA, February 1-5, 2004.
104. **Huber, D.E.** and J.G. Santiago, "Temperature Gradient Focusing, Modeling and Experiments," LabAutomation, San Jose, CA, February 1-5, 2004.
105. *Lin, H.*, B.D. Storey, **M.H. Oddy, C.-H. Chen**, and J.G. Santiago, "Temporal Electrokinetic Instability and Mixing in Microchannels with Conductivity Gradients," 56th Meeting of American Physical Society, Division of Fluid Dynamics (APS/DFD), East Rutherford, NJ, November 23-25, 2003.
106. **Chen, C.-H.**, *H. Lin*, S.K. Lele, and J.G. Santiago, "Convective Electrokinetic Microflow Instability with Conductivity Gradients," 56th Meeting of American Physical Society, Division of Fluid Dynamics (APS/DFD), East Rutherford, NJ, November 23-25, 2003.
107. **Oddy, M.H.** and J.G. Santiago, "Electrokinetic Flow Instabilities," American Institute of Chemical Engineers – Annual Meeting, , San Francisco, CA, November 16-21, 2003.
108. **Devasenathipathy, S.** and J.G. Santiago, "Particle Stacking in Electrokinetic Systems with Conductivity Gradients," Gordon Research Conference on the Physics and Chemistry of Microfluidics, Big Sky, MT, August 24-29, 2003.

109. **Chen, C.-H., H. Lin, B.D. Storey, S.K. Lele, and J.G. Santiago,** "Electrokinetic Microflow Instability with Conductivity Gradients," presented at Gordon Research Conference on the Physics and Chemistry of Microfluidics, Big Sky, MT, August 24-29, 2003.
110. **Bharadwaj, R., J.G. Santiago, and B. Mohammadi,** "Investigation of Dispersive Effects in Field Amplified Sample Stacking," Second Gordon Research Conference on the Physics and Chemistry of Microfluidics, Big Sky, MT, USA, August 24-29, 2003.
111. **Huber, D.E. and J.G. Santiago,** "Dispersion Model for Temperature Gradient Focusing," Gordon Research Conference on the Physics and Chemistry of Microfluidics, Big Sky, MT, August 24-29, 2003.
112. **Oddy, M.H. and J.G. Santiago,** "Using AC and DC Electric Field Particle Displacements for Measuring Electrophoretic and Electroosmotic Mobility Distributions," Gordon Research Conference on the Physics and Chemistry of Microfluidics, Big Sky, MT, August 24-29, 2003.
113. **Santiago, J.G.,** "Electrokinetic Microfluidic Systems," Joint American Institute of Chemical Engineering and American Electrophoresis Society Annual Meeting, Indianapolis, IN, November 4, 2002.
114. **Jung, B., R. Bharadwaj, and J.G. Santiago,** "Thousand-Fold Signal Increase Using Field Amplified Sample Stacking for On-Chip Electrophoresis," Joint American Institute of Chemical Engineering and American Electrophoresis Society Annual Meeting, Indianapolis, IN, November 4, 2002.
115. **Devasenathipathy, S., R. Bharadwaj, and J.G. Santiago,** "Dynamics of Microchip-Based Field Amplified Sample Stacking," Microfluidics 2002, San Francisco, CA, September 18-20, 2002.
116. **Santiago, J.G., S. Yao, and C.-H. Chen,** "Electroosmotic Pumps with Sub-Micron Pores," Integrated Nanosystems, Berkeley, CA, September 2002.
117. **Wang, G.R., J.G. Santiago, and M.G. Mungal,** "Some Visualization Observations of Laser-Induced Cavitation Flow," 54th Annual Meeting of the American Physical Society, Division of Fluid Dynamics, San Diego, CA, Vol 46, 2001.
118. **Devasenathipathy, S. and J.G. Santiago,** "Particle Tracking in Electrokinetic Flows," 54th Annual Meeting of the American Physical Society, Division of Fluid Dynamics, San Diego, CA, Vol 46, 2001.
119. **Santiago, J.G.,** "Diagnostics for Electrokinetic Flow," presented at the LabAutomation, 2001, Palm Springs, CA, January 26-30, 2001
120. **Chen, C.-H., S. Zeng, J.C. Mikkelsen, and J.G. Santiago,** "Design and Characterization of a Planar Microfabricated Electrokinetic Pump," Abstracts of Papers of the American Chemical Society, 219th National Meeting San Francisco, CA, pp. 431-Coll., March 26-30, 2000.
121. **Oddy, M.H., A. Kumar, and J.G. Santiago,** "Microfluidic Micromixers," presented at the Lab Automation 2000, Palm Springs, CA, January 22-26, 2000.
122. **Santiago, J.G.,** "Microfluidic Processes: The Role of Micro-Scale Fluid Dynamics in BioMEMS," BioMEMS '98: Spanning the Frontiers of Engineering and Biology, University of California at San Francisco, CA, October, 1998.
123. **Meinhart, C.D., J.G. Santiago, and S.T. Wereley,** "On Interrogation Algorithms for Micro-PIV," Thirteenth U.S. National Congress on Applied Mechanics, Gainesville, FL, 1998.
124. **Santiago, J.G., D.J. Beebe, C.D. Meinhart, and R.J. Adrian,** "Particle Image Velocimetry for Microfluidics," Thirteenth U.S. National Congress on Applied Mechanics, Gainesville, FL, 1997.
125. **Santiago, J.G., C.D. Meinhart, D.J. Beebe, and R.J. Adrian,** "Micro-Imaging for Microfluidic Bioanalysis Systems," poster presented at the Sixteenth Annual Conference, of Ford Fellows, Washington, DC, 1997.
126. **Santiago, J.G., C.D. Meinhart, D.J. Beebe, and R.J. Adrian,** "Particle Image Velocimetry for Microfluidic Bioanalysis Systems," presented at American Physical Society 50th Annual Meeting of the Division of Fluid Dynamics, San Francisco, CA, November 23-25, 1997.

Issued Patents

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|----|--------------|--|-----------|
| 1. | US 6,606,251 | Power conditioning module | |
| 2. | US 6,653,651 | Micron resolution particle image velocimeter | |
| 3. | US 6,678,168 | System including power conditioning modules | |
| 4. | US 6,881,039 | Micro-fabricated electrokinetic pump | |
| 5. | US 6,882,543 | Apparatus for conditioning power and managing thermal energy in an electronic device | |
| 6. | US 6,942,018 | Electroosmotic microchannel cooling system | |
| 7. | US 6,991,024 | Electroosmotic microchannel cooling system | molecules |

8. US 7,019,972 Apparatus for conditioning power and managing thermal energy in an electronic device
9. US 7,050,308 Power conditioning module
10. US 7,057,198 Depth-of-field micron resolution velocimetry with pulsed images of injected solid particles
11. US 7,061,104 Apparatus for conditioning power and managing thermal energy in an electronic device
12. US 7,070,681 Electrokinetic instability micromixer
13. US 7,086,839 Micro-fabricated electrokinetic pump with on-frit electrode
14. US 7,131,486 Electroosmotic microchannel cooling system
15. US 7,134,486 Control of electrolysis gases in electroosmotic pump systems
16. US 7,185,697 Electroosmotic microchannel cooling system
17. US 7,231,839 Electroosmotic micropumps with applications to fluid dispensing and field sampling
18. US 7,316,543 Electroosmotic micropump with planar features
19. US 7,334,630 Closed-loop microchannel cooling system
20. US 7,449,122 Micro-fabricated electrokinetic pump
21. US 7,458,783 Method and apparatus for improved pumping medium for electro-osmotic pumps
22. US 7,645,368 Orientation independent electroosmotic pump
23. US 7,799,453 Fuel cell with electroosmotic pump
24. US 7,846,593 Heat and water management device and method in fuel cells
25. US 7,951,278 Method of detecting directly undetectable analytes using directly detectable spacer
26. US 8,017,408 Device and methods of detection of airborne agents
27. US 8,821,704 Control of chemical reactions using isotachopheresis
28. US 8,247,238 Device and methods of detection of airborne agents
29. US 8,277,628 Method and apparatus using electric field for improved biological assays
30. US 8,382,460 Peristaltic pump with constrictions at fixed locations
31. US 8,394,251 Improved control of chemical reactions using isotachopheresis
32. US 8,414,754 Electrophoretic sample analysis and approach therefor
33. US 8,431,409 Device and methods of detection of airborne agents
34. US 8,460,530 Method for modifying the concentration of reactants in a microfluidic device
35. US 8,524,061 On-chip hybridization coupled with ITP based purification for fast sequence specific identification
36. US 8,562,804 Fluorescent finger prints for indirect detection in isotachopheresis
37. China 2,459,6.1 Method and Apparatus Using Electric Field for Improved Biological Assays
38. US 8,702,948 Method and Apparatus Using Electric Field for Improved Biological Assays
39. US 8,721,858 Non-focusing tracers for indirect detection in electrophoretic displacement techniques
40. US 8,821,704 Control of chemical reactions using isotachopheresis
41. US 8,431,409 Device and methods of detection of airborne agents
42. US 8,846,314 Isotachopheretic focusing of nucleic acids
43. US 8,986,529 Isotachopheresis having interacting anionic and cationic shock waves
44. US 8,999,129 Liquid and gel electrodes for transverse free flow electrophoresis
45. US 9,057,673 Method of preparing RNA from ribonuclease-rich sources
46. US 9,097,676 Device and methods of detection of airborne agents
47. US 9,151,732 Enhanced isotachopheresis assays using additives with spatial gradients, 2015
48. US 9,297,039 Control of chemical reactions using isotachopheresis, 2016
49. US 9,574,232 Devices and methods for controlling reversible chemical reactions at solid-liquid interfaces by rapid preconcentration and phase replacement, 2017
50. US 9,719,930 Device and methods of detection of airborne agents
50. US 9,753,007 Isotachopheretic focusing of nucleic acids, 2017
51. US 9,758,392 Phased charging and discharging in capacitive desalination, 2017
52. US 9,939,435 Detection of biological molecules using surface plasmon field enhanced fluorescence spectroscopy (SPFS) combined with isotachopheresis (ITP)
53. US 10,073,054 Control of chemical reactions using isotachopheresis, 2018
54. US 10,132,775 Enhanced isotachopheresis assays using additives with spatial gradients, 2018

55. US 10,233,441 Capillary barriers for staged loading of microfluidic devices, 2019
56. US 10,392,653 Devices and methods for controlling reversible chemical reactions at solid-liquid interfaces by rapid preconcentration and phase replacement, 2019
57. US 10,408,827 Detection of biological molecules using surface plasmon field enhanced fluorescence spectroscopy (SPFS) combined with isotachopheresis (ITP), 2019
58. US 10,416,082 Device and methods of detection of airborne agents, 2019

Selected published patent applications

1. CA2906730 A1 Capillary barriers for staged loading of microfluidic devices
2. WO 2014153092 A1 Capillary barriers for staged loading of microfluidic devices
3. US 20150037784 A1 Flow regulation in fluidic systems using a phase-change material at system Ports
4. US20150072267 A1 Energy harvesting with flow-through porous electrodes
5. US 20150191717 A1 Simultaneous extraction and separation of rna and dna from single cells using electrophoretic techniques
6. WO 2015106146 A2 Simultaneous extraction and separation of rna and dna from single cells using
7. WO 2014186238 A1 Persistent collocation in time series imagery
8. EP 2972185 A1 Barrières capillaires pour chargement étagé de dispositifs microfluidiques

Other Invited Presentations

1. "Isotachopheresis for Separations and DNA Hybridization," Thermo Fisher Scientific, January, 2020.
2. "Electric Field Control of DNA Hybridization Reactions," Physics and Chemistry of Microfluidics, Gordon Conference, Hong Kong, June 19, 2019.
3. "Reaction Capacitive deionization of water: Resonant desalination and selective nitrate extraction," University of Tokyo, June 24, 2019.
4. "DNA extraction, hybridization, and enrichment using isotachopheresis," RIKEN, Wako City, Tokyo, Japan, June 25, 2019.
5. "Fast hybridization, single-cell fractionation, and high-throughput cell deformability: An update on the Stanford Microfluidics Lab," Sony Corporation Headquarters, Tokyo, Japan, June 26, 2019.
6. "Electrokinetics applied to water and biology," Kyoto University, Kyoto, Japan, June 27, 2019.
7. "Microfluidic Sheet Jets for X-ray Spectroscopy Studies at SLAC," Fluid Mechanics Seminar, Stanford University, May 21, 2019.
8. "Micromixers and microjets for SLAC National Laboratory," B. Ha, A. Ramachandra, D. DePonte, JG Santiago. Mathematical Nanosystems Workshop, Simon Foundation, University of California at Los Angeles, January 17-18, 2018.
9. The Batsheva de Rothschild Seminar Physics of Microfluidics, Sde Boker, Israel, "Flow-through capacitive deionization models and experiments," A. Hemmatifar, Y. Qu, J. Palko, M Stadermann, and JG Santiago, January 6, 2017.
10. Okinawa Institute of Science and Technology, "Life in the shock wave: Controlling DNA reactions with electric fields," JG Santiago, April 24, 2016.
11. University of Houston, "Life in the shock wave: Accelerating DNA reactions with electric fields," Houston, Texas, February 25, 2016.
12. CADMIM NSF Consortium Meeting, University of California at Irvine, February 17, 2016.
13. International Conference and Expo on Separation Techniques, August 10-12, 2015 San Francisco, USA
14. Mechanical Engineering Seminar, Princeton University, October 24, 2014.
15. Shintaku, H. and J.G. Santiago, "Extraction and Fractionation of RNA and DNA from Single Cells Using Selective Lysing and Isotachopheresis," SPIE BiOS, San Francisco, CA, February 7-12, 2015.
16. Shintaku, H., J.W. Palko, G.M. Sanders, and J.G. Santiago, "Coupling Isotachopheresis with Bead-Based Assay for Rapid and Multiplexed Nucleic Acids Detection," Lab-on-a-Chip Asia- Microfluidics and Point Of Care Diagnostics, Singapore, November 20-21, 2014.

17. Shintaku, H. and J.G. Santiago, "Sample Preparation for Simultaneous Analysis of RNA and DNA from Single Cells Using Electrophoretic Techniques," 2nd Annual Single Cell Genomics & Transcriptomics Asia Congress 2014, Singapore, October 7-8, 2014.
18. Mechanical Engineering Seminar, Northwestern University, March 28, 2014
19. Exxon Production Research Visit, Stanford University, February 5, 2013
20. MF4 Consortium Meeting, Stanford University, February 4, 2013
21. Bay Area Separation Science Forum (BASSF) – *Applications of Microfluidic Technologies in the Biotechnology Industry*, CASS International Separation Society, South San Francisco, April 20, 2012.
22. Physics and Chemistry of Microfluidics, Gordon Conference, Waterville Valley, NH, June 26-July 1, 2011
23. DARPA and SPAWAR PI Meeting, Stanford, September 16, 2010
24. DARPA MF3 Center Meeting, UC Irvine, June 23, 2010
25. SPARK Meeting, Stanford University, August 10, 2010
26. ITP 2010 Conference, Baltimore, Aug 31, 2010
27. ONSET Ventures, Palo Alto, CA, May 6, 2010
28. Agilent Technologies, Santa Clara, April 20, 2010
29. SPARK Meeting, Clark Center, Stanford University, April 21, 2010
30. Lab Automation 2010 Conference, Palm Springs, January 23-27, 2010
31. Immunometrics Workshop Meeting, Stanford University, Stanford, CA, January 2010.
32. DARPA Microtechnology Office Workshop, Minneapolis, MN, 2009
33. DARPA PI Meeting, Bend, Oregon, July 6-7, 2009.
34. Life Technologies, Carlsbad, CA, 2009
35. Arizona State University, 2009
36. Seoul National University, 2009
37. Material Research Society, Electro-Fluids Symposium, San Francisco, 2009.
38. Biorad Inc., Hercules, CA, 2009
39. Stanford University Fluid Mechanics Seminar, Stanford, CA, 2008
40. Ebara Corporation, Tokyo, Japan, 2008
41. University of Florida, Gainesville, 2008
42. Stanford University Mechanical Engineering Advisory Committee, 2007
43. Bosch Inc., Stanford, CA 2007
44. General Electric Corp. Research, Niscayuna, NY, 2007
45. University of Twente, Twente, The Netherlands, Dec. 2006
46. Spanish Society of Chromatography and Related Techniques, SECyTA, Vigo, Spain, Nov. 2006
47. Univ. California at Santa Cruz, Biochemistry Dept., 2006
48. 30th Annual GEM Conference, Chicago, IL, 2006
49. Institute for Pure and Applied Mathematics, UCLA, 2006
50. Biodesign Group, Stanford University, Stanford, CA 2005
51. Applied Biosystems, Foster City, CA, 2005
52. BIRS Research Conference on Micro- and Nano-fluidics, Banff, Canada 2005
53. American Physical Society Conference, Los Angeles, March 2005
54. Florida International University, Miami, Florida, 2005
55. Hewlett-Packard Laboratories, Palo Alto, 2004
56. Seoul National University/Stanford University Conference, Stanford, 2004
57. Predicant Biosciences, South San Francisco, 2004
58. Research Center International Conference on Theoretical and Applied Mechanics (ICTAM '04), Warsaw, Poland 2004
59. University of Illinois at Urbana-Champaign, Mech. Engineering Department, 2004
60. University of California at Santa Barbara, Mech. Engineering Department, 2004
61. Lab Automation Conference, Association for Laboratory Automation, San Jose, 2004
62. Annual American Chemical Society Meeting, Anaheim, CA 2004
63. Lab Automation Conference, Association for Laboratory Automation, San Jose, California, 2004
64. American Society of Mechanical Engineering IMECE, Washington, Microfluidics Symposium, Washington D.C., 2003

65. University of Minnesota, Mech. Engineering Department, Minneapolis, MN, 2003
66. University of California at Berkeley, Mech. Engineering Department, Berkeley, CA, 2003
67. University of California at Davis, Mech. Engineering Department, Davis, CA, 2003
68. Carnegie-Mellon University, Chemical Engineering Department, Pittsburg, PA, 2003
69. National Institute of Standards and Technology, Gaithersburg, Virginia, 2003
70. Gordon Conference on the Physics and Chemistry of Microfluidics, Big Sky, Montana, 2003
71. Joint American Institute of Chemical Engineering and American Electrophoresis Society, San Francisco, California, 2003
72. University of Pennsylvania, Mechanical Engineering Department, Philadelphia, Pennsylvania, 2003
73. California Institute of Technology, Mechanical Engineering Department, 2003
74. Gordon Conference on the Physics and Chemistry of Microfluidics, Big Sky, Montana, 2003
75. Joint American Institute of Chemical Engn. and American Electrophoresis Society, San Francisco, CA, 2003
76. University of Tokyo, Tokyo, Japan, 2003
77. Keio University, Tokyo, Japan, 2003
78. IBC BioMEMS and Microfluidics, Keynote Address, San Diego, CA, 2003
79. Joint American Institute of Chemical Engineering and American Electrophoresis Society, Indianapolis, Indiana, Keynote Address, 2002
80. Target Discovery, Palo Alto, California, 2002
81. Integrated Nanosystems, Berkeley, California, 2002
82. ASME Microfluids Mini-Course, Boston, Massachusetts, 2002
83. Sandia National Laboratories, Albuquerque, New Mexico, 2002
84. Intel Corporation Thermal Research, Chandler, 2002
85. Gordon Research Conference on the Physics and Chemistry of Microfluidics, Oxford, England, 2001
86. Poa Sana Corporation, San Jose, California, 2001
87. Lawrence Livermore National Laboratories, Livermore, California, 2001
88. Sandia National Laboratories, Livermore, California, 2001
89. Zyomix Corporation, Hayward, California, 2001
90. Agilent Corporation, Palo Alto, California, 2001
91. LabAutomation '01, Palm Springs, California, 2001
92. Intel, Portland, Oregon, 2000
93. Endovasix Corporation, Redwood, California, 2000
94. LabAutomation '00, Palm Springs, California, 2000
95. Committee on Microfluidic Interconnects, ASME International ME Congress and Exposition, Nashville, Tennessee, 1999
96. ACLARA Biosystems: Flow Visualization for Electrokinetic Flow, Menlo Park, California 1999
97. Hewlett-Packard Laboratories, Palo Alto, California, 1999
98. Endovasix Corporation, Redwood City, California, 1999
99. BioMEMS '98: Spanning the Frontiers of Engineering and Biology, University of California at San Francisco, 1998
100. 3M Corporate Research, St. Paul, Minnesota, 1998
101. University of Florida, Gainesville, FL, 1997, 1998.
102. University of California at Santa Barbara, CA, 1998.
103. University of Maryland at College Park, MD, 1998.
104. Stanford University, Stanford, CA, 1998.
105. University of Illinois at Urbana-Champaign, Urbana, IL, 1998.
106. Harvard University - Division of Engineering and Applied Sciences, 1998.
107. University of Minnesota, Minneapolis, MN, 1998.
108. Carnegie Mellon University, Pittsburgh, PA, 1998.
109. University of Illinois at Urbana-Champaign, Urbana, IL, 1995, 1997.
110. Harvard University - Medical School, Boston, MA, 1996.
111. The Aerospace Corporation, El Segundo, CA, 1995, 1996.
112. Air Products Corporation, Allentown, PA, 1995.
113. Exxon Production Research, Houston, TX, 1995.

Other Presentations

1. DARPA MicroFlumes Contractors Meeting, June 1998.
2. DARPA CCAD Contractors Meeting, September 1998.
3. DARPA MicroFlumes Contract Update, February 1999.
4. DARPA CCAD Contract Update, February 1999.
5. DARPA CCAD Contract Update, September, 1999.
6. DARPA HERETIC Contractors Meeting, June 1999.
7. DARPA CCAD Contractors Meeting, October 1999.
8. DARPA MicroFlumes PI Meeting, January 2000.
9. DARPA CCAD PI Meeting, August 2000.
10. DARPA MicroFlumes PI Meeting, August 2000.
11. DARPA Bioflips PI Meeting, August 2000.
12. DARPA HERETIC Contractors Meeting, November 2000.
13. DARPA Bioflips PI Meeting, February 2001.
14. DARPA CCAD PI Meeting, May 2001.
15. DARPA HERETIC Contractors Meeting, May 2001.
16. DARPA Simbiosys PI Meeting, August 2001.
17. DARPA Simbiosys PI Meeting, February 2002.
18. DARPA Simbiosys Contractors Meeting, September 2002.
19. DARPA Simbiosys Contractors Meeting, February 2003.
20. Intel Contract Meeting, December 2002.
21. Intel Contract Meeting, July 2003.
22. Honda Contract Meeting, September 2003.
23. DARPA Simbiosys Contractors Meeting, September 2003.
24. NIH Contract Meeting, October 2003.
25. Honda Contract Meeting, December 2003.
26. DARPA Simbiosys Contractors Meeting, January 2004.
27. Honda Contract Meeting, December 2004
28. DARPA Simbiosys Contractors Meeting, January 2005.
29. Honda Contract Meeting, October 2005
30. Honda Contract Meeting, January 2006
31. Honda Contract Meeting, August, 2006
32. DARPA MF3 Center PI Meeting, November, 2006
33. Honda Contract Meeting, November, 2006
34. Honda Contract Meeting, February 2007
35. DARPA PI Meeting, UC Irvine, 2009
36. DARPA PI Meeting, UC Irvine, 2010
37. DARPA PI Meeting, Washington DC, 2012

References Available Upon Request