

Ruth Anne Lambert

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CAREER SUMMARY

Highly motivated and hardworking individual with experience developing and writing computational fluid dynamics (CFD) code for research projects in multiphase flows. Current research includes fluid and elastic structure interactions, fluid mixing analysis, flow effects on mass transport and surface reaction rates. Completed a two-year postdoc in Sweden, attended four International conferences, and participated in a three month research exchange with a leading research university in India. Future goals are to obtain a position as a research scientist or an assistant professor in the area of fluid and solid interaction modeling with applications in the environmental sciences.

EDUCATION

The University of California, Irvine, Irvine, CA

Ph.D. in Mechanical and Aerospace Engineering March 2010
(GPA: 3.8/4.0)

- Dissertation Title: The role of slender beam motion on fluid mixing in a microchannel.

M.S. in Mechanical and Aerospace Engineering, Sept. 2002
(GPA: 3.7/4.0)

- Thesis Title: Solidification of a supercooled liquid in a half-space: stagnation-point flow and interface instability.

California Polytechnic State University, San Luis Obispo, CA

B.S. in Environmental Engineering June 1998
Magna cum Laude (GPA: 3.75/4.0)

- Senior Project: Modeling of diluent plumes in groundwater.

AWARDS

- Zonta International Amelia Earhart Fellow 2004
- Department of Education Fellowship 2004-2005
2006-2007

RESEARCH EXPERIENCES

The Royal Institute of Technology, Stockholm, Sweden

Postdoctoral Researcher Jan. 2011-Dec. 2012

- Developed a two dimensional fluid and solid interaction model using the fictitious domain method to evaluate the swimming motion of a free moving cellular organism with two flagella.
- Studied the fluid mixing and nutrient uptake of finite sized swimming cells in a thin film with a high precision, parallelized numerical code that resolves fluid and solid interactions using the Immersed Boundary Method .

PUBLICATIONS

The University of California, Irvine, Irvine, CA

Graduate Research Student

2002-March 2010

- Developed a fluid and solid interaction model using the fictitious domain method to evaluate mass transport and fluid mixing in a microchannel.
- Visited the Indian Institute of Technology, Kharagpur for 3 months and worked as part of a collaborative effort in analyzing concepts for fast DNA hybridization.
- Developed a numerical flow solver to evaluate the effects of forced motion of thin rigid flaps on surface hybridization processes.
- Designed a numerical flow solver to evaluate particle and wall interactions in a time dependent wall driven flow with applications in crystal growth and particle sedimentation.

Journal Articles to be Submitted

R.A. Lambert, F. Picano, W.-P. Breugem, L. Brandt, "Nutrient uptake and swimming particle motion in an active suspension", to be submitted for publication to J. Fluid Mech., November 2012.

Journal Publications

R.A. Lambert and R.H. Rangel, "The role of elastic flap deformation on fluid mixing in a microchannel", Physics of Fluids 22 (2010) 052003.

X. Casadevall i Solvas, **R.A. Lambert**, L. Kulinski, R.H. Rangel, M.J. Madou, "Au/PPy actuators for active micromixing and mass transport enhancement", Micro and Nanosystems, 1 (2009) 2-11.

R.A. Lambert, S. Das, M.J. Madou, S. Chakraborty, R.H. Rangel, "Rapid macromolecular synthesis in a microfluidic channel with an oscillating flap", Int. J. Heat Mass Transfer 51 (2008) 4811-4819.

C.F.M. Coimbra, D. L'Esperance, **R.A. Lambert**, J.D. Trolinger, R.H. Rangel, "An experimental study on stationary history effects in high-frequency Stokes' flows" JFM 504 (2004) 353-363.

R.A. Lambert and R.H. Rangel, "Solidification of a supercooled liquid in stagnation point flow", Int. J. Heat Mass Transfer 46 (2003) 4013-4021.

R.A. Lambert and R.H. Rangel, "Linear stability analysis of the solidification of a supercooled liquid in a half-space", Int. J. Heat Mass Transfer 45 (2002) 4577-4587.

Conference Papers/Abstracts

R.A. Lambert, F. Picano, W.-P. Breugem, L. Brandt, "Mass flux and particle motion in an active suspension", Euro Mech, 9th European Fluid Mechanics Conference, University of Rome, Rome, Italy, Sept. 9-13, 2012.

R.A. Lambert and L. Brandt, "Numerical study of free moving ciliar microorganisms at low Reynolds numbers", Euro Mech Colloquium 251, ETH, Zurich, Switzerland, August 2011.

R.A. Lambert and R.H. Rangel, "Micro-mixing and the role of multiple rotating and bending flaps", Proceedings of Interdisciplinary Transport Phenomena VI, Volterra, Italy, Oct. 2009.

R.A. Lambert, S. Chakraborty, M.J. Madou, R.H. Rangel, "Moving flap model for fast DNA hybridization in microchannel flow", Special Session, 32nd International Conference on Micro- and Nano- Engineering, Barcelona, Spain, Sept. 2007.

PUBLICATIONS
CONTINUED...

R.A. Lambert and R.H. Rangel, "Motion of a circular particle in wall driven flow at low Reynolds numbers", 44th AIAA Aerospace Sciences Meeting, Reno, NV, Jan. 2006.

TEACHING
EXPERIENCES

University of California, Irvine, Irvine, CA
Department of Mechanical and Aerospace Engineering

Instructor (Teaching Associate) Aug. 2009

- Heat Transfer (MAE 120)

Fully responsible for course development and all aspects of instructions including discussion sections.

Teaching Assistant April 2003 – Dec. 2009

- Thermodynamics (MAE 91): Spring 2003, 2004
- Introduction to Fluid Mechanics (MAE 130A): Fall 2005, 2008, 2009
- Viscous/Compressible Flows (MAE 130B): Winter 2006, 2009

Conducted discussion sessions, graded homework and exams, held office hours.

WORK
EXPERIENCES

Camp Dresser & McKee, Irvine, CA June 1999 – Dec. 2001

Air Quality Engineer

- Ran air dispersion models, conducted risk and air quality analysis, and prepared air quality permits for various projects in the Southern California area.

PROFESSIONAL
QUALIFICATIONS

Engineer in Training Oct. 2000

SERVICE

Member of Zonta International, Service Organization

- Irvine Club Secretary 2005 - 2009
- Irvine Club Treasurer June 2009 - present

TECHNICAL
SKILLS

- Proficiency in Matlab, Tecplot
- Programming Languages: Fortran
- Commercial Codes: Familiarity with Comsol

LANGUAGES

Fluent in Spanish

References available upon request