Alejandra URANGA

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Education

Massachusetts Institute of Technology   *Cambridge, MA, USA*   *expected May 2010*
Ph.D. candidate in Aeronautics and Astronautics
Topic: Prediction of Transition to Turbulence Using High-Order Numerical Simulations
Supervisors: Jaime Peraire and Mark Drela. GPA: 5.0/5.0

University of Victoria   *Victoria, BC, Canada*   *Aug. 2006*
Master of Applied Sciences in Mechanical Engineering
Thesis title: Assessment of Turbulence Modeling for Compressible Flow Around Stationary and Oscillating Cylinders
Supervisors: Ned Djilali and Afzal Suleman. GPA: 8.83/9.0

Florida Institute of Technology   *Melbourne, FL, USA*   *May 2004*
Bachelor of Science in Aerospace Engineering, Magna Cum Laude, GPA: 3.75/4.0

Euro American Institute of Technology   *Sophia Antipolis, France*   *Sept. 2000 - June 2002*
Undergraduate student in Aerospace Engineering, transferred to Florida Inst. of Technology. GPA: 3.76/4.0

Université Paris 7 Denis Diderot   *Paris, France*   *June 2000*
DEUG MIAS, major in Mathematics (General University Studies Diploma; Mathematics, Computer Science, Applications to Sciences; equivalent to first two years of North-American Bachelor of Science degree)

Research Experience

Massachusetts Institute of Technology   *Cambridge, MA, USA*   *Jan. 2009 - present*
Research Assistant for Prof. Jaime Peraire   *Jan. - Aug. 2008*
Aeronautics and Astronautics Dept., Aerospace Computational Design Laboratory   *Sept. 2006 - Aug. 2007*
Part of a Multi-University Research Initiative (MURI) on Biologically-Inspired Flight for Micro-Air Vehicles. Involved in the high-order numerical simulation of low Reynolds number aerodynamic flows inspired by bat flight.

Advanced Magnet Lab and Florida Inst. of Technology   *Melbourne, FL, USA*   *Oct. 2005 - April 2006*
Research Consultant (and ***Visiting Research Scholar*** during Nov. 2005)
Performed computational fluid dynamics analysis of the aerodynamic and aerothermal loads on a vehicle accelerating between rest and Mach 20 in the channel of an electromagnetic launcher. Part of a large project that proved the feasibility of a high-speed electro-magnetically driven launcher for rockets and missiles.

Mountain Power Inc.   *Delta, BC, Canada*   *July - Sept. 2005*
Research Consultant
Conducted a computational fluid dynamics analysis on the thermal characteristics of a Li-ion battery stack for a Hybrid-Electric Vehicle (HEV). Contributing to the re-design of the stack for better cooling.

Fluid Mechanics Institute of Toulouse (IMFT)   *Toulouse, France*   *May - Aug. 2003*
Research Laboratory of the French National Center for Scientific Research (CNRS)
Research Internship
Supervisors: Henri-Claude Boisson and Frédéric Péneau
Analyzed transition to turbulence using advanced signal methods applied to the Large Eddy Simulation of a flat plate boundary layer subjected to high free-stream turbulence. Conducted advanced post-processing analysis, including statistical, spectral analysis, and BIPOD (bi-proper orthogonal decomposition) analysis. Programmed the necessary post-processing codes in FORTRAN, including time and space spectra, and BIPOD computations.

Publications

A. Uranga, D. Kirk, H. Gutierrez, R. Meinke, and K. Barker, "Rocket performance analysis using electrodynamic launch assist", *Proceedings of the 43rd AIAA Aerospace Sciences Meeting and Exhibit*, Paper Number AIAA-2005-1449, Reno, Nevada, Jan. 10-13, 2005.

F. Péneau, H.C. Boisson, A. Kondjoyan, and A. Uranga, "Bypass transition of a boundary layer subjected to free-stream turbulence", *Proceedings of the International Conference on Boundary and Interior Layers Computational and Asymptotic Methods*, Toulouse, France, July 5-9, 2004.

Teaching Experience

Massachusetts Institute of Technology   *Cambridge, MA, USA*   *Sept. 2008 - Dec. 2009*
Teaching Assistant in Numerical Methods for Partial Differential Equations   *and Sept. - Dec. 2007*
Advanced Graduate level course. Selected and graded the four course projects. Conducted interactive lectures based on students' questions. Coordinated the lectures and lecture notes with the three faculty members and the two visiting lecturers involved in the course.

University of Victoria   *Victoria, BC, Canada*
Teaching Assistant in Fundamentals of Engineering 2 (B.S. Sophomore level course)   *May - July 2006*
Teaching Assistant in Mechanics of Solids 1 (B.S. Sophomore level course)   *May - July 2005*
Conducted weekly tutorial lectures (1 hour/week for 12 weeks).
Teaching Assistant in Advanced Thermodynamics (Graduate level course)   *Jan. - April 2006*
Marked six homework assignments.
Teaching Assistant in Mechanics of Fluids 1 (B.S. Junior level course)   *Jan. - April 2005*
Conducted 3 weekly tutorial lectures (1 hour/week for 3 weeks). Prepared and conducted one laboratory experiment (4 sessions). Marked laboratory reports and quiz examinations.

Florida Institute of Technology   *Melbourne, FL, USA*   *Jan. 2003 - May 2004*
Academic Tutor at the Academic Support Center. Conducted 10 hours/week for 3 semesters of tutorials on demand in all courses of the B.S. in Aerospace Engineering curriculum, including but not limited to mathematics, physics, mechanics of structures and fluids, thermodynamics, air-breathing engines, rockets.

Euro American Institute of Technology   *Sophia Antipolis, France*   *May - Aug. 2003*
Teaching Assistant in Applied Mechanics: Statics, and in Physics Laboratory 1 (B.S. Sophomore-level courses)
For Applied Mechanics: Statics: conducted tutorials and supervised weekly quiz sessions.
For Physics Laboratory 1: prepared and conducted 6 laboratory experiments.

Memberships and Academic Recognitions

- MIT Institute Graduate Student Council Teaching Award for the School of Engineering, May 2009
- AIAA Space Systems Technical Committee member, since Feb. 2005
- AIAA Student member, since Jan. 2003
- Tau Beta Pi member, Florida Zeta Chapter, since Nov. 2003
- University of Victoria Special Research Fellowship, 2005 - 2006
- Florida Institute of Technology Transfer Scholarship, 2002 - 2004
- Best student in School of Engineering, Euro American Institute of Technology, June 2002
- Distinguished Student Scholar, Euro American Institute of Technology, April 2002
- Executive Committee member and responsible for the Proceedings, Presentations, and Posters group, 2nd Annual Mechanical Engineering Graduate Research Colloquium, University of Victoria, BC, Canada, May 2005.

Computer Skills

- Computational Fluid Dynamics: extensive knowledge of Finite Volume Methods, Finite Element Methods, Discontinuous Galerkin Methods; experience with both research and commercial codes
- Programming languages: FORTRAN, C, Python
- Scientific software: Matlab, Maple, Mathematica, Tecplot, ICEMCFD, parallel computing with MPI
- Operating systems: Windows, Linux, Mac OS X; network and cluster administration under Linux

Other Skills

- Languages: Spanish mother-tongue; fluency in French and English
- Glider pilot, licensed in France, June 2002