

ALEXANDRE CABOUSSAT

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ACADEMIC POSITIONS

Fall 2005- **Department of Mathematics, University of Houston, Houston, Texas**
Assistant Professor Tenure-Track.
2005 **Department of Mathematics, University of Houston, Houston, Texas**
Research Assistant Professor (March 2005 - August 2005)
2004 **Department of Mathematics, University of Houston, Houston, Texas**
Visiting Assistant Professor. Sponsored by the Swiss National Science
Foundation, Grant PBEL2-103152 (March 2004 - February 2005).
2001-2003 **Ecole Polytechnique Fédérale de Lausanne, Switzerland**
Research Assistant, Institute of Analysis and Scientific Computing.

EDUCATION

2001-2003 **Ecole Polytechnique Fédérale de Lausanne (Swiss Federal Institute
of Technology)** Institute of Analysis and Scientific Computing.
PhD Thesis number 2893 (PhD advisor: Professor Jacques Rappaz).
PhD Thesis defense on December 15, 2003 in Lausanne.
Ph.D. thesis: Analysis and Numerical Simulation of Free Surface Flows.
Committee: Prof. Jacques Rappaz, Ecole Polytechnique Fédérale de Lausanne, Switzerland.
 Prof. Jiwen He, University of Houston, Texas, USA.
 Dr Marco Picasso, Ecole Polytechnique Fédérale de Lausanne, Switzerland.
 Prof. Olivier Pironneau, Université de Paris VI, France;
 Prof. Alfio Quarteroni, Ecole Polytechnique Fédérale de Lausanne, Switzerland.
1999-2000 **Ecole Polytechnique de Paris, France and Ecole Polytechnique Fédérale
de Lausanne, Switzerland.** Master degree in mathematical engineering.
Trends: Scientific computing, stochastic calculus, financial mathematics and management.
1995-2000 **Ecole Polytechnique Fédérale de Lausanne, department of mathematics.**
M.S. degree, mathematics engineer.
Trends: Scientific computing and Probability/Statistics.
M.S. thesis: Numerical resolution of the Navier-Stokes equations with solidification by using
C++ library Diffpack for application in continuous casting.

LIST OF PUBLICATIONS

1. A. Caboussat, R. Glowinski. *Numerical solution of a variational problem arising in stress analysis: the vector case*, submitted, 2009.
2. A. Caboussat, R. Glowinski. *Numerical Methods for the Vector-Valued Solutions of Non-Smooth Eigenvalue Problems*, submitted, 2009.
3. K. Nguyen, A. Caboussat, D. Dabdub. *Mass Conservative, Positive Definite Integrator for Atmospheric Chemical Dynamics*, submitted, 2009.
4. C. Landry, A. Caboussat, E. Hairer. *Solving Optimization-Constrained Differential Equations with Discontinuity Points, with Application to Atmospheric Chemistry*, to appear in SIAM J. Sci. Comp, 2009.
5. A. Caboussat, A. Leonard. *Numerical Solution and Fast-Slow Decomposition of a Population of Weakly Coupled Systems*, to appear in DCDS Supplements, AIMS Proceedings, 2009.
6. A. Caboussat, G. K. Miers. *Numerical Approximation of Electromagnetic Signals Arising in the Evaluation of Geological Formations*, to appear in Computers and Mathematics with Applications, DOI: 10.1016/j.camwa.2009.06.044, 2009.
7. A. Caboussat. *Primal-Dual Interior-Point Method for Thermodynamic Gas-Particle Partitioning*, Comp. Optim. and Appl., DOI: 10.1007/s10589-009-9262-5, 2009.
8. A. Caboussat, R. Glowinski, V. Pons. *An Augmented Lagrangian Approach to the Numerical Solution of a Non-Smooth Eigenvalue Problem*, J. Numer. Math., 17(1),3–26, 2009.
9. A. Caboussat, R. Glowinski. *Numerical Solution of a Non-Smooth Variational Problem Arising in Stress Analysis : The Scalar Case*, Int. J. Numerical Analysis and Modeling 6(3), 402–419, 2009.
10. A. Caboussat, R. Glowinski, V. Pons. *Numerical Methods for Non-Smooth L^1 Optimization : Applications to Free Surface Flows and Image Denoising*, Int. J. Numerical Analysis and Modeling 6(3), 355–374, 2009.
11. A. Caboussat, R. Glowinski. *A Numerical Method for a Non-Smooth Advection-Diffusion Problem Arising in Sand Mechanics*, Com. Pure. Appl. Anal. 8(1), 161–178, 2009.
12. A. Caboussat, C. Landry. *A second order scheme for solving optimization-constrained differential equations with discontinuities*, In *Numerical Mathematics and Advanced Applications*, pages 761–768, Springer Verlag, Berlin, 2008. Proceedings of Enumath 2007, the 7th European Conference on Numerical Mathematics and Advanced Applications, Graz, Austria, September 2007.
13. A. Bonito, A. Caboussat, M. Picasso and J. Rappaz. *A Numerical Method for Fluid Flows with Complex Free Surfaces*, In *Partial Differential Equations: Modeling and Simulation*, pages 187–208, R. Glowinski and P. Neittaanmaki eds., Springer, 2008.

14. A. Caboussat, M. M. Francois, R. Glowinski, D. B. Kothe, J. M. Sicilian. *A Numerical Method for Interface Reconstruction of Triple Points within a Volume Tracking Algorithm*, Los Alamos National Laboratory technical report LA-UR-07-7960, Mathematical and Computer Modelling, 48, pages 1957–1971, 2008.
15. A. Caboussat, R. Glowinski. *Modeling and Computation of the Shape of a Compressed Axisymmetric Gas Bubble*, J. Numer. Math., 16(2), pages 107–117, 2008
16. A. Caboussat, A. Leonard. *Numerical Method for a Dynamic Optimization Problem arising in the Modeling of a Population of Aerosol Particles*, C. R. Acad. Sci. Paris, 346(11-12), pages 677-680, 2008.
17. A. Caboussat, C. Landry. *Dynamic Optimization and Event Location in Atmospheric Chemistry*, Proc. Appl. Math. Mech. (PAMM), 7(1), pages 2020035-2020036, 2007. Special Issue: Sixth International Congress on Industrial Applied Mathematics (ICIAM07).
18. N. R. Amundson, A. Caboussat, J. W. He, A. V. Martynenko, C. Landry, C. Tong, and J. Seinfeld. *A new atmospheric aerosol phase equilibrium model (UHAERO): organic systems*, Atmos. Chem. Phys., 7, pages 4675–4698, 2007.
19. N. R. Amundson, A. Caboussat, J. W. He, A. V. Martynenko, C. Landry, C. Tong, and J. Seinfeld. *A new atmospheric aerosol phase equilibrium model (UHAERO): organic systems*, Atmos. Chem. Phys. Discuss., 7, pages 8709–8754, 2007.
20. N.R. Amundson, A. Caboussat, J. W. He, A.V. Martynenko, and J.H. Seinfeld. *A phase equilibrium model for atmospheric aerosols containing inorganic electrolytes and organic compounds (UHAERO), with application to dicarboxylic acids*, J. Geophys. Res., 112, D24S13, doi:10.1029/2007JD008424, 2007.
21. A. Caboussat, M. Picasso, J. Rappaz. *Modeling and Simulation of Liquid-Gas Free Surface Flows*, In *Free and Moving Boundaries: Analysis, Control and Simulation*, Lecture Notes in Pure and Applied Mathematics, Volume 252. Chapman and Hall/CRC, 2007.
22. N. R. Amundson, A. Caboussat, J. W. He, C. Landry, J. Seinfeld. *A Dynamic Optimization Problem Related to Organic Aerosols*, C. R. Acad. Sci. Paris, 344(8), pages 519–522, 2007.
23. N.G. Andronova, S. Sherwood, R. Fu, I. Folkins, K. Rosenlof, M. Joshi, A. Caboussat, A. and A. Stenke. *A note on an AGU spring meeting discussion of the role of atmospheric water vapor in climate and atmospheric composition*, The SPARC Newsletter, 28, pages 22–26, January 2007.
Available at <http://www.atmosp.physics.utoronto.ca/SPARC/Newsletters.html>.
24. A. Caboussat, R. Glowinski, J. M. Sicilian. *Computation of the Normal Vector to a Free Surface by a Finite Element - Finite Volume Mixed Method*, C. R. Acad. Sci. Paris, 343(6), pages 431–436, 2006.
25. N. R. Amundson, A. Caboussat, J. W. He, A.V. Martynenko, V.B. Savarin, J.H. Seinfeld, K.-Y. Yoo. *A new inorganic atmospheric aerosol phase equilibrium model (UHAERO)*, Atmos. Chem. Phys., 6, pages 975–992, 2006.

26. N. R. Amundson, A. Caboussat, J. W. He, A.V. Martynenko, V.B. Savarin, J.H. Seinfeld, K.-Y. Yoo. *A computationally efficient inorganic atmospheric aerosol phase equilibrium model (UHAERO)*, Atmos. Chem. Phys. Discuss., 5, pages 9291-9324, 2005.
27. N. R. Amundson, A. Caboussat, J. W. He, J. Seinfeld. *A Primal-Dual Interior Point Method for the Resolution of an Optimization Problem related to the Modeling of Atmospheric Organic Aerosols*, Journal of Optimization, Theory and Applications, 130(3), 375–407, 2006.
28. N. R. Amundson, A. Caboussat, J. W. He, J. Seinfeld, K.-Y. Yoo. *A Primal-Dual Active Set Algorithm for Chemical Equilibrium Problems Related to the Modeling of Atmospheric Inorganic Aerosols*, Journal of Optimization, Theory and Applications, 128(3), 469–498, 2006.
29. A. Caboussat. *A Numerical Method for the Simulation of Free Surface Flows with Surface Tension*, Computers and Fluids, 35(10), pages 1205–1216, 2006.
30. A. Caboussat, J. Rappaz. *Analysis of a One-Dimensional Free Surface Problem*, Numer. Math., 101(1), pages 67–86, 2005.
31. A. Caboussat, R. Glowinski. *A Two-Grids/Projection Algorithm for Obstacle Problems*, Computers and Mathematics with Applications, 50, pages 171–178, 2005.
32. N. R. Amundson, A. Caboussat, J. W. He, J. Seinfeld. *An Optimization Problem related to the Modeling of Organic Aerosols*, C. R. Acad. Sci., 340(10), pages 765–768, 2005.
33. A. Caboussat. *Numerical Simulation of Two-Phase Free Surface Flows*, Archives of Computational Methods in Engineering, 12(2), pages 165-210, 2005.
34. N. R. Amundson, A. Caboussat, J. W. He, J. Seinfeld, K.-Y. Yoo. *An Optimization Problem related to the Modeling of Inorganic Aerosols*, C. R. Acad. Sci., 340(9), pages 683-686, 2005.
35. A. Caboussat, R. Glowinski. *On the Use of a Two-Grids Method in the Numerical Simulation of Free Boundary Problems*, Proceedings LACSI symposium, Santa Fe, NM, October 2004.
Available on-line at http://lacs.rice.edu/symposium/symposium_archive.
36. A. Caboussat, M. Picasso, J. Rappaz. *Numerical Simulation of Free Surface Incompressible Liquid Flows surrounded by Compressible Gas*, J. Comp. Phys., 203(2), pages 626-649, 2005.
37. A. Caboussat. *Analysis and Numerical Simulation of Free Surface Flows*, PhD Thesis n° 2893, Ecole Polytechnique Fédérale de Lausanne, 2003.
Available on-line at <http://library.epfl.ch/theses/?nr=2893>.
38. A. Caboussat, V. Maronnier, M. Picasso, J. Rappaz. *Numerical Simulation of Three Dimensional Free Surface Flows with Bubbles*, Lecture Notes in Computational Science and Engineering, Springer, volume 35, 2003, pages 69–86.

TALKS AND CONFERENCES

1. *Coupling Differential Equations and Constrained Optimization: Application to Atmospheric Chemistry*. Invited talk. Conference on Scientific Computing, Geneva, Switzerland, June 17-20, 2009.
2. *Numerical Simulation of Non-Smooth Advection-Diffusion Problems Arising in Sand Mechanics*. Invited talk. ICMS Conference, Xi'an, China, July 9-13, 2008.
3. *Numerical Methods for Optimization-Constrained Differential Equations with Discontinuities*. AIMS International Conference on Dynamical Systems, Differential Equations and Applications, Dallas, Texas, May 18-21, 2008.
4. *Augmented Lagrangian Approach for a Non-Smooth Eigenvalue Problem*. Finite Element Circus and Rodeo, Baton Rouge, Louisiana, March 7-8, 2008.
5. *Modeling of Thermodynamics and Dynamics of Organic Aerosol Particles*. Invited talk. IAMA Conference, UC Davis, California, December 4-7, 2007.
6. *Interior-Point Methods for Dynamic Optimization*. Invited talk. INFORMS Annual Meeting, Seattle, Washington, November 4-7, 2007.
7. *Modeling and Computation of Thermodynamic Equilibrium for Mixtures of Aerosol Inorganic and Organic Species*. Parallel session (peer-reviewed). AAAR 2007 Annual Conference, Reno, Nevada, September 24-28, 2007.
8. *Interior-Point Methods for Dynamic Optimization*. Contributed talk (peer-reviewed). Second Mathematical Programming Society International Conference on Continuous Optimization ICCOPT II & MOPTA-07, August 13-16, 2007, Hamilton, Ontario, Canada.
9. *Primal-Dual Interior-Point Methods for Thermodynamic Phase Calculations*. Parallel session (peer-reviewed). Optimization 2007, Porto, Portugal, July 22-25, 2007.
10. *Dynamic Optimization and Nonlinear Differential-Algebraic Equations in Computational Chemistry*. Contributed talk (peer-reviewed). 6th International Congress on Industrial and Applied Mathematics, Zurich, Switzerland, July 16-20, 2007.
11. *Modeling and Computation of Thermodynamic Equilibrium for Mixtures of Inorganic and Organic Species*. Parallel session A33C-07 (peer-reviewed). AGU 2007 Joint Assembly, Acapulco, Mexico, May 22-25, 2007.
12. *A Primal-Dual Interior-Point Method for Dynamic Constrained Global Minimization in Thermodynamic Phase Calculations*. Contributed talk (peer-reviewed). SIAM Conference on Computational Science and Engineering, Costa Mesa, California, February 19-23, 2007.
13. *Modeling of Phase Equilibrium and Mass Transfer for Organic Aerosol Particles*. Parallel session (peer-reviewed). International Aerosol Conference, St-Paul, Minnesota, September 10-15, 2006.
14. *A Primal-Dual Interior-Point Method for the Determination of the Convex Hull*. Parallel session (peer-reviewed). International Symposium on Mathematical Programming, Rio de Janeiro, Brazil, July 30 - August 4, 2006.

15. *Thermodynamics of Organic Aerosols*. Plenary talk (peer-reviewed). Aerosol Workshop on Climate Prediction Uncertainties, Santa Fe, New Mexico, July 17-21, 2006.
16. *Modeling of Organic Effects on Aerosols Growth*. Parallel session (peer-reviewed). AGU 2006 Joint Assembly, Baltimore, Maryland, May 23-26, 2006.
17. *Computational Methods for Multi-phase Multi-reaction Thermodynamic Equilibrium Problems*. Poster (peer-reviewed). 24th AAAR Joint Assembly, Austin, Texas, October 17-21, 2005.
18. *Computational Methods for Multi-phase Multi-reaction Thermodynamic Equilibrium Problems*. Poster (peer-reviewed). AGU Joint Assembly, New Orleans, Louisiana, May 23-27, 2005.
19. *Numerical Simulation of Free Surface Flows in the Frame of Mold Filling*. Invited Plenary session. IFIP Conference, Free and Moving Boundaries Analysis, Simulation and Control, Houston, Texas, December 2-4, 2004.
20. *On the Use of a Two-Grids Method in the Numerical Simulation of Free Boundary Problems*. Plenary session (peer-reviewed). LACSI Symposium, Santa Fe, New Mexico, October 12-14, 2004.
21. *Numerical Simulation of Free Surface Fluid Flow in the Frame of Mould Filling*. Invited plenary session. Truchas Workshop, Los Alamos National Laboratory, New Mexico, June 21-24, 2004.
22. *Numerical Simulation of Free Surface Flows with Bubbles*. Poster (peer-reviewed). Free Boundary Problems 2003 workshop, Université de St-Etienne, France, Saint-Etienne September 04-06, 2003.
23. *A Finite Element-Characteristics Method for Free Surface Flows with Bubbles*. Parallel session (peer-reviewed). MAFELAP 2003, Brunel University, Uxbridge June 21-24, 2003.

SEMINARS

1. *From Least Squares to Monge-Ampère*. Graduate Student Seminar, Department of Mathematics, University of Houston, Houston, Texas, April 10, 2009.
2. *Finite Element Methods for Non-Smooth Optimization Problems*. Numerical Analysis Seminar (invited), Department of Mathematics, University of Texas, Austin, Texas, March 5, 2009.
3. *Numerical Methods for Non-Smooth Eigenvalue Problems*. Scientific Computing Seminar, Department of Mathematics, University of Houston, Houston, Texas, February 26, 2009.
4. *Numerical Methods for Non-Smooth Eigenvalue Problems*. Numerical Analysis Seminar (invited), Department of Mathematics, Texas A&M University, College Station, Texas, February 12, 2009.

5. *Ordinary Differential Equations with Discontinuities: Applications in Air Quality Modeling*. Graduate Student Seminar, Department of Mathematics, University of Houston, Houston, Texas, February 29, 2008.
6. *Interior-Point Methods and Event Location for Dynamic Optimization*. Scientific Computing Seminar, University of Houston, October 18, 2007.
7. *Dynamic Optimization in Air Quality Modeling*. Invited Seminar, Université Blaise Pascal, Clermont-Ferrand, France, July 3, 2007.
8. *Dynamic Optimization in Air Quality Modeling*. Invited Seminar, Rice-UH Optimization Seminar, Rice University, March 30, 2007.
9. *Coupling Differential Equations and Constrained Optimization in Air Quality Modeling*. Invited Seminar, The University of Edinburgh, Scotland, UK, March 12, 2007.
10. *Modeling and Computation of the Chemical and Physical State of Atmospheric Aerosol Particles*. Invited Seminar. Paul Scherrer Institute, Switzerland, January 9, 2007.
11. *Modeling and Computation of the Chemical and Physical State of Inorganic and Organic Atmospheric Aerosol Particles*. Invited Seminar. Atmospheric Chemistry Modelling Laboratory, EPFL, Switzerland, December 20, 2006.
12. *Interface Reconstruction in Triple-Point Configurations and Smoothing of Volume Fractions*. Invited Seminar. Institute of analysis and scientific computing, EPFL, Switzerland, December 19, 2006.
13. *Interface Reconstruction in Triple-Point Configurations and Smoothing of Volume Fractions*. Invited Seminar. Los Alamos National Laboratory, New Mexico, July 10, 2006.
14. *Dynamic Optimization in Air Quality Modeling*. Invited colloquium, Department of Mathematics, University of Houston, Houston, Texas, April 12, 2006.
15. *Modeling and Computation of Multi-phase Multi-reaction Thermodynamic Equilibrium Problems*. Poster. Research and Scholarship day, University of Houston, March 31, 2006.
16. *Numerical Methods for Dynamic Optimization*. Invited Seminar. Institute of analysis and scientific computing, EPFL, Switzerland, December 21, 2005.
17. *Modeling and Computation of the Physical State of Atmospheric Aerosol Particles*. Invited Seminar. Harvard University, Boston, September 23, 2005.
18. *Modeling and Computation of the Physical State of Atmospheric Aerosol Particles and Application to 3D Air Quality Models*. Presentation. UCAR Membership Committee Visit, University of Houston, Houston, September 13, 2005.
19. *Modeling and Computation of the Physical State of Atmospheric Aerosol Particles*. Invited Seminar. Los Alamos National Laboratory, New Mexico, July 19, 2005.
20. *A Two-Grids method for the Numerical Simulation of Liquid-Gas Free Surface Flow*. Invited Seminar. Los Alamos National Laboratory, New Mexico, July 14, 2005.

21. *Numerical Simulation of Free Surface Flows: An Overview and Some Applications to Mold Filling*. Graduate Student Seminar, Department of Mathematics, University of Houston, Houston, Texas, February 18, 2005.
22. *Computational Methods for Optimization Problems in Aerosol Modeling*. Invited Seminar. Institute of analysis and scientific computing, EPFL, Switzerland, November 17, 2004.
23. *Computational Methods for Two Minimization Problems in Air Quality Modeling*. Invited Seminar. University of Houston, Texas, September 30, 2004.
24. *A Two-Grids method for the Numerical Simulation of Free Surface Flow with Surface Tension*. Invited Seminar. Los Alamos National Laboratory, New Mexico, April 16, 2004.

TEACHING EXPERIENCE

- *Special Problems*, University of Houston, Summer 2009 (1 student).
- *Master's tutorial*, University of Houston, Spring 2009 (1 student).
- *Calculus I*, Undergraduate (freshmen) course, University of Houston, Spring 2009 (45 hours - 215 students).
- *Numerical Analysis*, Undergraduate (senior) course, University of Houston, Spring 2009 (45 hours - 12 students).
- *Introduction to PDE*, Undergraduate (junior) course, University of Houston, Fall 2008 (45 hours - 60 students).
- *Numerical Analysis*, Undergraduate (senior) course, University of Houston, Fall 2008 (45 hours - 25 students).
- *Special Problems*, University of Houston, Fall 2008 (1 student).
- *Master's tutorial*, University of Houston, Fall 2008 (1 student).
- *Master's tutorial*, University of Houston, Summer 2008 (1 student).
- *Numerical Analysis*, Graduate course, University of Houston, Spring 2008 (45 hours - 8 students).
- *Numerical Analysis*, Graduate course, University of Houston, Fall 2007 (45 hours - 6 students).
- *Senior Research Project*, University of Houston, Spring 2007 (1 student).
- *Numerical Analysis*, Undergraduate (senior) course, University of Houston, Spring 2007 (45 hours - 15 students).
- *Numerical Analysis*, Undergraduate (senior) course, University of Houston, Fall 2006 (45 hours - 20 students).
- *Introduction to Statistics*, Undergraduate course, University of Houston, Spring 2006 (45 hours - 150 students).

- *Introduction to Statistics*, Undergraduate course, University of Houston, Fall 2005 (45 hours - 80 students).
- *Introduction to Statistics*, Undergraduate course, University of Houston, Spring 2005 (45 hours - 60 students).
- *Finite Maths with Applications*, Undergraduate course, University of Houston, Fall 2004 (On-line course - 140 students).
- *Compléments d'analyse numérique* (Numerical Analysis), Graduate course within the Master program in electrical engineering, EPFL, Fall 2003 (20 hours - 10 students).
- *Systèmes différentiels continus et discrets* (Continuous and discrete differential systems), Graduate course within the Master program in Computer Science and Modeling, Université libanaise de Beyrouth, Beirut, Lebanon, Spring 2003 (15 hours - 20 students).
- *Compléments d'analyse numérique* (Numerical Analysis), Graduate course within the Master program in electrical engineering, EPFL, Fall 2002 (10 hours - 10 students).
- Research assistant (exercises, \sim 120 hours) for the course *Analyse Numérique pour Ingénieurs* (Numerical Analysis for engineers, Undergraduate course), Ecole Polytechnique Fédérale de Lausanne, Spring 2001 - Spring 2003. Courses given by Prof. J. Rappaz and Dr M. Picasso. Organization of the exercises and exams for approximately 400 students.

STUDENTS AND POSTDOCTORAL FELLOWS SUPERVISION

- Postdoctoral Associate :
 - A. V. MARTYNENKO , University of Houston, (second supervisor). Thermodynamics of inorganic aerosols (2005-2008).
- PhD Students :
 - V. PONS (co-advisor with R. Glowinski). Ph.D. student (University of Houston). Numerical Methods for Non-Smooth Problems from Calculus of Variations: Applications (PhD defended December 2008).
 - C. LANDRY (co-advisor with J. Rappaz). Ph.D student (EPFL). Numerical Analysis of Optimization-Constrained Differential Equations: Applications to Atmospheric Chemistry (PhD defended March 2009).
- Master Students :
 - A. LEONARD (supervisor). M.S. student. (University of Houston). Numerical Methods for multiscale modeling of a population of atmospheric particles (Spring-Summer 2008); Numerical methods for non-smooth problems (Fall 2008-Summer 2009).
 - M. LEWIS (supervisor). M.S. student. Master's tutorial (University of Houston). Augmented Lagrangian methods for non-smooth problems (Spring-Summer 2009).
 - G. MIERS (supervisor). M.S. student. Master's tutorial (University of Houston). Numerical Analysis of Selected Topics in Oil Drilling (Summer-Fall 2008).

- S. NAGARAJAN (supervisor). M.S. student. (University of Houston). Development of software for remote computations in the Air Quality web site (in collaboration with TLC²) (2006-2007).
- B. GHAZAL (second supervisor) (EPFL, *Université de Beyrouth*), Turbulence models (July-September 2003).
- A. CHATTI (second supervisor) (EPFL, *Université de Tunis*), Implementation of boundary conditions in free surface flows (September-November 2001).
- Undergraduate Students :
 - A. LEONARD (supervisor). Senior research project and summer undergraduate research (University of Houston). Numerical Methods for Linear Systems arising in the modeling a population of atmospheric particles (Spring-Summer 2007). A. Leonard has been accepted in the graduate student program of the department of mathematics with a teaching fellowship and the presidential graduate fellowship award.
 - V SAVARIN (second supervisor). Summer project (ENSTA, Paris). Thermodynamics of inorganic aerosols (Summer 2005).
 - A. ANANTHARANAM (second supervisor). Summer project (Ecole Polytechnique, Paris). Convex analysis in the modeling of atmospheric particles (Summer 2005).

SERVICE

- Spring 2009 : Amundson Lectures Series committee, Department of Mathematics, University of Houston.
- Fall 2008 - Spring 2009 : Graduate studies committee, Department of Mathematics, University of Houston.
- Fall 2008 - Spring 2009 : Colloquium committee, Department of Mathematics, University of Houston.
- Spring 2008 : Amundson Lectures Series chair, Department of Mathematics, University of Houston, <http://www.math.uh.edu/amundsonlectureseries>.
- Fall 2007 - Spring 2008 : Colloquium committee, Department of Mathematics, University of Houston.
- Fall 2006 - Spring 2007 : Colloquium chair, Department of Mathematics, University of Houston, <http://www.math.uh.edu/colloquium>.
- Summer 2006-present : Creation, development and management of the Air Quality Group web site <http://aero.math.uh.edu>. In collaboration with the *Texas Learning and Computation Center* (UH).
- Reviewing service:

- JOURNALS: Mathematical Modelling and Numerical Analysis M²AN (x3), Applied Mathematical Modelling, European Journal of Mechanics B/Fluids, Modeling and Simulation in Materials Science and Engineering, Numerische Mathematik, Atmospheric Chemistry and Physics, Journal of Physics A: Mathematical and Theoretical, Revista de Metalurgia Madrid, Journal of Physics D: Applied Physics (x2), International Journal of Heat and Mass Transfer, Journal of Computational and Applied Mathematics.
- PROPOSALS: KU Leuven Grants (Belgium) internal grants, Bentham E-book series.
- Thesis committees:
 - V. Gvozdev (Ph.D Thesis), Department of Mathematics, University of Houston, April 2007.
 - T. Wang (Ph.D Thesis), Department of Mathematics, University of Houston, November 2008.
 - V. Pons (Ph.D Thesis, PhD advisor), Department of Mathematics, University of Houston, November 2008.
 - C. Landry (Ph.D Thesis, PhD advisor), Section of Mathematics, Ecole Polytechnique Fédérale de Lausanne, February 2009.

GRANTS AND AWARDS

- NSF DMS-computational mathematics, *Collaborative Research: Numerical Methods for Fully or Implicitly Nonlinear Elliptic Equations* (pending, \$300,000, UH share: \$180,000). Co-PI (PI Roland Glowinski, Co-PI: D. Sorensen), submitted in December 2008.
- University of Houston New Faculty Internal Grants *Primal-Dual Optimization Methods for the Minimization of the Gibbs Free Energy in Atmospheric Aerosol Particles* (awarded, \$6,000). Single PI, January 2007 - September 2007.
- EPA Star Grant *Fundamental Modeling of the Physical State of Atmospheric Particles and Application to 3D Air Quality Models* (awarded, \$969,300). PI: J.W. He, May 2005-April 2007. Listed as senior personnel.
- Swiss NSF, Postdoctoral Fellowship (\$32,000). PI. March 2004-February 2005.
- Best PhD Thesis Award of the Swiss Federal Institute of Technology in Lausanne (CHF15,000), 2003.
- Finalist for the European ECCOMAS award for the Best PhD Thesis, 2003 (elected candidate for Switzerland).

COMMERCIAL EXPERIENCE / INDUSTRIAL EXPERTISE

- 2007- : **YCoor-Systems SA**, Switzerland. Partner in the creation of a start-up company in the field of scientific computing, and consulting activities.

- 2004-2008 : **Los Alamos National Laboratory**, USA. Consulting in simulation of multiphase flows with application to casting processes.
- Summer 2000 : **Calcom SA**, Parc Scientifique EPFL, Lausanne, Switzerland. Computer consultant in scientific computing (5 months). Development and validation of a part of a software on the resolution of the Navier-Stokes equations with solidification. Research and development in C++ with library DiffPack. Work in a 6-7 persons group.
- 1998-1999 : **Unicile, Computing Engineering specialized in banking**, Prilly, Switzerland. Consultant (20%) in a 5-6 persons project group. Elaboration of interfaces for a sophisticated software of portfolio management with Backoffice system. Development in UNIX scripts, Visual Basic and SQL database.
- Summer 1998 : **Unicile, Computing Engineering specialized in banking**. Trainee of 2 months.

COMPUTING SKILLS

LANGUAGES: Fortran 77 & 90, C++, C, scripts UNIX, Pascal, \LaTeX .

SOFTWARES: Matlab, Splus (statistics), Fidap, CalcoSOFT, Truchas (scientific computing), Modulef, Paraview, MS Office, Adobe Creative Suite.

SYSTEMS: UNIX, Windows (2000,XP), Linux, Mac OS X.

WEB: HTML, PHP, Javascript, Zope and Plone, Java.

LANGUAGES

FRENCH: Native language.

ENGLISH: Fluent (advanced high).

SPANISH: Conversation (Intermediate high).

GERMAN: Knowledge (Novice high).