

# FRANÇOIS BLANCHETTE

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L-141, James Franck Institute,  
University of Chicago,  
Chicago, IL 60637

email: blanchef@jfi.uchicago.edu  
http://jfi.uchicago.edu/~blanchef  
tel: 773-702-0946 fax: 773-702-5863  
Citizenship: Canadian

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**RESEARCH INTERESTS:** Multiphase flow; Interfacial flows; Numerical analysis; Hydrodynamic stability; Flow in a stratified ambient; Geophysical flows.

## EDUCATION

- Ph.D. Department of Applied Mathematics, **Massachusetts Institute of Technology**, Cambridge, Massachusetts, July 2003.  
Thesis entitled *Sedimentation in a Stratified Ambient*, obtained under the supervision of Professor John W. M. Bush. Investigated various aspects of sedimentation in a stratified ambient including particle clouds, Boycott effect, particle-laden double-diffusive instabilities and gravity currents.
- B. Sc. Department of Mathematics and Statistics, **Université de Montréal**, Montréal, Canada, May 1999.  
Graduated with highest grade point average in the academic year. Last semester spent at the University of British-Columbia as part of a student exchange program.

## OTHER ACADEMIC EXPERIENCE

- Organizer *Computations in Science Seminar*, University of Chicago, Chicago, IL, January 2005 to present.
- Organizer *Graduate Applied Mathematics Seminar (SPAMS)*, MIT, Cambridge, MA, September 2001 to May 2003.
- Summer School Geophysical and Environmental Fluid Dynamics summer school, DAMPT, Cambridge University, Cambridge, England, September 2002.
- Summer School Pacific Institute for Mathematical Science Fluid Dynamics summer school, University of Alberta, Edmonton, Canada, May 2001.

## RESEARCH EXPERIENCE

- 2004- Post-Doctoral researcher, University of Chicago,  
Numerical and theoretical study of microscale interfacial flows, sponsored by Wendy Zhang.
- 2003-2004 Post-Doctoral researcher, University of California Santa Barbara,  
Numerical simulations of particle-laden gravity currents, sponsored by Eckart Meiburg.
- 2001 Research Student, MIT funded by Schlumberger,  
Studied the influence of the strength of turbulence on the time evolution of the concentration of settling particles, supervised by John Bush.
- 1998 Research Student, Université de Montréal,  
Theoretical Neural Networks analysis and optimization, supervised by Yoshua Bengio.
- 1997 Research Student, CERCA Montréal, Canada,  
Study and implementation of image denoising algorithms, supervised by Anne Bourlioux.

## AWARDS

- 2005 MRSEC Fellow, University of Chicago.
- 1999-2002 Canadian National Science and Engineering Research Council Post-Graduate Scholarship, type A (1999), type B (2001).
- 1999 MIT Presidential Fellowship.
- 1997 Université de Montréal Dean's Scholarship.
- 1997 Université de Montréal, Department of Mathematics Maurice L'Abbé Prize.
- 1996 Bronze medal in the International Chemistry Olympiads, Moscow, Russia.
- 1996 Fourth place in the Canadian Chemistry Olympiads, McGill University, Montréal, Canada.

## TEACHING EXPERIENCE

Adv. Calculus	Course lecturer, for applied mathematics graduate level course <i>Advanced Calculus for Engineers</i> at MIT from the text by Hildebrand, Summer 2002.
Diff. Eqns.	Recitation instructor at MIT from the text by Edwards & Penney, spring 2002.
Calculus	Recitation instructor at MIT from the text by Simmons, spring 2001.
Fluid Dynamics	Teaching assistant at MIT, fall 2001, 2002.
Workshop	Training workshop for recitation instructors, MIT September 2001.
Elementary school	Volunteered as a teacher in Ghana, teaching French and Mathematics, summer 2000.

## PUBLICATIONS

- “Multiple coalescence at fluid interfaces ”  
F. Blanchette, T.P. Bigioni & E.I. Corwin, to be submitted to the Journal of Fluid Mechanics.
- “A Mechanism for multiple coalescence at liquid interfaces ”  
F. Blanchette, T.P. Bigioni, submitted to Nature-Physics in November 2005.
- “High-resolution numerical simulations of resuspending gravity currents: conditions for self-sustainment”  
F. Blanchette, M. Strauss, E. Meiburg, B. Kneller & M.E. Glinsky, to appear in the *Journal of Geophysical Research*, 2005.
- “Hindered settling in a stably stratified ambient”  
F. Blanchette & J. W. M. Bush, *Physics of Fluids*, July 2005, 17 (7): Art. No. 073302.
- “Evaluation of a simplified approach simulating gravity currents over slopes of varying angles”  
F. Blanchette, V. Piche & E. Meiburg, to appear in *Computers & Fluids*, 2005.
- “High Resolution Simulations of Particle-Driven Gravity Currents”  
E. Meiburg, F. Blanchette, M. Strauss, B. Kneller, M.E. Glinsky, F. Necker, C. Härtel and L. Kleiser, Proceedings of IMECE2005 2005 ASME International Mechanical Engineering Congress and Exposition, Orlando, to appear in November 2005.
- “The Boycott effect in magma chambers”  
F. Blanchette, T. Peacock & J. W. M. Bush, *Geophysical Research Letters*, March 2004, vol 31, No 5., L05611.
- “The stratified Boycott effect”  
T. Peacock, F. Blanchette & J. W. M. Bush, *Journal of Fluid Mechanics*, April 2005, vol 529, pp 33-49.
- “Particle clouds in homogeneous and stratified environments”  
J. W. M. Bush, B. A. Thurber & F. Blanchette, *Journal of Fluid Mechanics*, August 2003, vol 489, pp 29-54.

## PRESENTATIONS

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| Nov. 2005 | “Multiple Coalescence at liquid interfaces”, <i>Center for Interdisciplinary Research in Fluid Physics Seminar</i> , UCSB, Santa Barbara, Ca, USA.                                  |
| Nov. 2005 | “Multiple coalescence and pinch off at a fluid interface”, <i>APS Division of Fluid Dynamics Annual Meeting</i> , Chicago, Il, USA.   |
| Nov. 2005 | “Multiple Coalescence at liquid interfaces”, <i>Physical Mathematics Seminar</i> , MIT, Cambridge, Ma, USA.   |
| Feb. 2005 | “Sedimentation in a Stratified Ambient”, <i>Mechanical Engineering Department seminar</i> , University of British-Columbia, B.C., Canada.   |
| Jan. 2005 | “Sedimentation in a Stratified Ambient”, <i>Engineering Science and Applied Mathematics seminar</i> , Northwestern University, Chicago, IL., USA.                                   |
| Nov. 2004 | “High-resolution numerical simulations of resuspending gravity currents: conditions for self-sustainment”, <i>APS Division of Fluid Dynamics Annual Meeting</i> , Seattle, Wa, USA. |
| Mar. 2004 | “Combined Effects of Particles and Stratified Ambient”, <i>Lunch Bag Seminar</i> , University of Chicago, Il, USA.  |
| Nov. 2003 | “Hindered settling in a stratified ambient”, <i>APS Division of Fluid Dynamics Annual Meeting</i> , Meadowlands, NJ, USA.   |
| Jul. 2003 | “Sedimentation in a Stratified Ambient”, <i>Thesis Defence</i> , MIT, Cambridge, Ma, USA.   |
| May 2003  | “The Stratified Boycott Effect”, <i>Brown Bag Seminar</i> , UCSB, Santa Barbara, Ca, USA.   |
| Apr. 2002 | “Gravity Currents in a Rotating Frame”, <i>Brown Bag Seminar</i> , MIT, Cambridge, Ma, USA.   |
| Feb. 2002 | “Double-Diffusive Instabilities”, <i>Graduate Applied Math Seminar (SPAMS)</i> , MIT, Cambridge, Ma, USA.   |
| Nov. 2001 | “Sedimentation and Deposition Patterns from a Turbulent Suspension”, <i>APS Division of Fluid Dynamics Annual Meeting</i> , San Diego, Ca, USA.                                     |
| Apr. 2000 | “Skipping Stones”, <i>Graduate Applied Math Seminar (SPAMS)</i> , MIT, Cambridge, Ma, USA.  |
| Jul. 1997 | “Image Denoising”, <i>Canadian Undergraduate Mathematics Conference</i> , Université de Montréal, Montréal, Canada.   |