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### **Professional Preparation**

Ph.D. in Applied Mathematics, University of Pittsburgh, 2000  
M.S. in Applied Mathematics, University of Pittsburgh, 1997  
B.S. in Mathematics, University of Bucharest, Romania, 1995

### **Appointments**

Virginia Polytechnic Institute and State University, Assistant Professor (August 2002)  
Argonne National Laboratory, Wilkinson Fellow (2000—2002)

### **Honors and Awards**

1. Wilkinson Fellow (Argonne National Laboratory, 2000-2002)
2. Winner of SIAM Student Paper Prize (1999)
3. Andrew Mellon Fellowship (University of Pittsburgh, 1999)
4. Culver-Teplitz Award (University of Pittsburgh, 1997)

### **Sponsored Research**

1. National Science Foundation Grant DMS-0209309, Collaborative Research: Three-Dimensional Numerical Investigation of Density Currents, PI: Jinqiao Duan, CO-PI: Paul Fischer, Traian Iliescu, September 1, 2002 - August 31, 2005, \$94,829.
2. National Science Foundation Grant DMS-0322852, Scientific Computing Research Environment for the Mathematical Sciences (SCREMS), PI: Traian Iliescu, CO-PI: Jeff Borggaard, September 1, 2003 - August 31, 2005, \$155,858.
3. National Science Foundation Grant DMS-0513542, Computation and Analysis of Reduced-Order Models for Distributed Parameter Systems, PI: Jeff Borggaard, CO-PI: Chris Beattie, Serkan Gugercin, Traian Iliescu, June 15, 2005 - June 14, 2008, \$431,342.
4. Air Force Office of Scientific Research Grant FA9550-05-1-0449, High Performance Parallel Algorithms for Improved Reduced-Order Modeling, PI: Jeff Borggaard, CO-PI: Chris Beattie, Serkan Gugercin, Traian Iliescu, August 15, 2005 - August 14, 2008, \$157,422 (2005 budget).

## Publications

### *Books and Monographs*

1. "Mathematics of Large Eddy Simulation of Turbulent Flows", (with L.C. Berselli and W.J.Layton), *Springer Verlag*, to appear, (2005).

### *Refereed Journal Articles*

1. "Approximating the Larger Eddies in Fluid Motion III: the Boussinesq Model for Turbulent Fluctuations", (with W. J. Layton), *An. St. Univ. "Al. I. Cuza"*, vol. 44, 1998, pp. 245-261.
2. "A Flow-Aligning Algorithm for Convection-Dominated Problems", *Int. J. Num. Meth. Eng.*, vol. 46, No. 7, 1999, pp. 993-1000.
3. "A 3D Flow-Aligning Algorithm for Convection-Diffusion Problems", *Appl. Math. Letters*, vol. 4, No. 12, 1999, pp. 67-70.
4. "Mathematical Analysis for the Rational Large Eddy Simulation Model", (with L. C. Berselli, G. P. Galdi, and W. J. Layton), *Math. Models Meth. Appl. Sc.*, vol. 12 (8), 2002, pp. 1131-1152.
5. "Convergence of Finite Element Approximations of Large Eddy Motion", (with V. John and W. J. Layton), *Num. Meth. P.D.E.s*, vol. 18(6), 2002, pp. 689-710.
6. "A numerical study of a class of LES models", (with V. John, W. J. Layton, G. Matthies and L. Tobiska), *Int. J. Comput. Fluid Dyn.*, vol. 17 (1), 2003, pp. 75-85.
7. "A Higher Order Subfilter-Scale Model for Large Eddy Simulation", (with L. C. Berselli), *J. Comp. Appl. Math.*, vol. 159, 2003, pp. 411-430.
8. "Large Eddy Simulation of Turbulent Channel Flows by the Rational LES Model", (with P. Fischer), *Physics of Fluids*, vol. 15(10), 2003, pp. 3036-3047.
9. "Backscatter in the Rational LES Model", (with P. Fischer), *Computers and Fluids*, vol. 33(5-6), 2004, pp. 783-790.
10. "Three-dimensional turbulent bottom density currents from a high-order nonhydrostatic spectral element model", (with T. Ozgokmen, P. Fischer, and J. Duan), *J. Phys. Oceanogr.*, vol. 34(9), 2004, pp. 2006-2026.
11. "Entrainment in bottom gravity currents over complex topography from three-dimensional nonhydrostatic simulations", (with T. Ozgokmen, P. Fischer, and J. Duan), *Geophys. Res. Letters* vol. 31(13), L13212, 2004.
12. "Enstrophy and ergodicity of gravity currents", (with V.P. Bongolan-Walsh, J. Duan, H. Go, T. Ozgokmen, and P.F. Fischer), *Volumes in Mathematics and its Applications on SPDEs*, vol. 140 - Probability and Partial Differential Equations in Modern Applied Mathematics, eds: J. Duan and E.C. Waymire, Springer-Verlag, New York, pp. 61-74 (in press) 2005.
13. "Genuinely Nonlinear Models for Convection-Dominated Problems", *Comput. Math. Appl.* vol. 48, 2004, pp. 1677-1692.
14. "Approximate Deconvolution Boundary Conditions for Large Eddy Simulation", (with J. Borggaard), *Appl. Math. Letters*, accepted for publication, August 2005.

1. "Distribucion de Temperatura en las Esquinas de una Celda de Reduccion de Aluminio Tipo Hall-Heroult", (with E. Gutierrez, N. Troyani and W. J. Layton), IV Congreso Iberoamericano de Ingenieria Mecanica, Santiago de Chile, Chile, 1999.
2. "Corner Distribution of Voltage in Hall-Heroult Aluminum Reduction Cells", (with E. Gutierrez, N. Troyani and W. J. Layton), IV International Congress: Energy, Environment and Technological Innovation, Rome, 1999, pp. 1445-1451.
3. "The Center Section Temperature Distribution in Hall-Heroult Aluminum Reduction Cells from a Three-Dimensional Finite Element Simulation", (with E. Gutierrez, N. Troyani and W. J. Layton), International Thermal Energy Congress, Cesme, Izmir, Turkey, July 2001.
4. "A 3D Channel Flow Simulation at  $Re_\tau = 180$  Using a Rational LES Model", (with P. Fischer), Proceedings of Third AFOSR International Conference on DNS/LES, eds. C. Liu, L. Sakell, and T. Beutner, Greyden Press, 2001, pp. 283-290.
5. "Comparison of Numerical Noise in Design Objectives using LES and Turbulence Models", (with J. Borggaard, D. Pelletier and K. Vugrin), in Proceedings of the 10th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference, to appear.

*Other Publications*

1. "Algoritmos Computacionales para Resolver el Problema Termoelectrico en Tres Dimensiones en Celdas de Reduccion de Aluminio del Tipo Hall-Heroult", (with E. Gutierrez, N. Troyani and W. J. Layton), Universidad Ciencia y Tecnologia, Vol. 3, No.12, pp. 17-24, 1999.
2. "Formulacion Variacional del Problema Termoelectrico de una Celda de Reduccion Hall-Heroult en Tres Dimensiones ", (with E. Gutierrez, N. Troyani and W. J. Layton), Universidad Ciencia y Tecnologia, Vol. 3, No. 9, pp. 25-29, 1999.

**Presentations**

*Invited Conference Presentations*

1. SIAM Annual Meeting, Toronto, Canada, July 1998.
2. SIAM Annual Meeting, Atlanta, Georgia, May, 1999.
3. SIAM Annual Meeting, Atlanta, Georgia, May, 1999.
4. ICIAM99, Edinburgh, Scotland, July, 1999.
5. Computational Fluid Dynamics and Related Topics summer school, Coimbra, Portugal, July, 1999.
6. Workshop in Experimental, Computational and Mathematical Fluid Dynamics, Pittsburgh, November, 1999.
7. Advanced Multiscale and Multiresolution Methods, Yosemite National Park, October 29 - November 1, 2000.
8. Third AFOSR International Conference on DNS and LES TAICDL, Arlington, Texas, August 5-9, 2001.
9. 54th Annual Meeting of the Division of Fluid Dynamics of the American Physical Society, San Diego, California, November 18-20, 2001.

10. AMIF 2002, Third International Conference on Applied Mathematics for Industrial Flow Problems, Lisbon, Portugal, April 17-20, 2002.
11. SIAM Annual Meeting, Philadelphia, July 12, 2002.
12. SIAM Annual Meeting, Montreal, June 16, 2003.
13. AMS Southeast Regional Meeting, Chapel Hill, October 24, 2003.
14. European Geosciences Union, 1st General Assembly, Nice, France, 25-30 April, 2004.
15. SIAM Annual Meeting, Portland, July 12-16, 2004.
16. AMS Fall Eastern Section Meeting, Pittsburgh, November 6-7, 2004.
17. The 57th Annual Meeting of the Division of Fluid Dynamics of the American Physical Society, Seattle, November 21-23, 2004.
18. SIAM Conference on Computational Science & Engineering, Orlando, February 12-15, 2005.

*Invited Colloquia and Seminars*

1. Seminars on Applied Mathematics and Numerical Analysis , IST, Lisbon, Portugal, May 28, 1999.
2. Worcester Polytechnic Institute, Mathematics Department Seminar, February 2000.
3. Iowa State University, Mathematics Department Seminar, February 2000.
4. University of Nevada at Reno, Mathematics Department Seminar, February 2000.
5. Old Dominion University, Mathematics Department Seminar, February 18, 2000.
6. Argonne National Laboratory, Mathematics and Computer Science Division, March 2000.
7. University of Hawaii, Mathematics Department Seminar, March 2000.
8. University of Texas at Arlington, Mathematics Department Seminar, March 2000.
9. Texas Tech, Mathematics Department Seminar, March 2000.
10. Virginia Tech, Mathematics Department Seminar, April 2000.
11. Clemson University, Mathematics Department Seminar, November, 2000.
12. Illinois Institute of Technology, Mathematics Department Seminar, December, 2000.
13. Virginia Tech, Mathematics Colloquium, May 2, 2003.
14. Seconda Università degli Studi di Napoli, Department of Mathematics, May 23, 2005.
15. Università di Pisa, May 30, Department of Aerospace Engineering, May 30, 2005.

*Other Presentations*

1. KESPPWORK99, Kent Singular Perturbations Workshop, Kent State University, December 7, 1999.
2. Finite Element Circus, Rutgers University, October 20-21, 2000.
3. Virginia Tech, NA/PDE seminar, November 8, 2001.
4. MCS Division Seminar, Argonne National Laboratory, May 2, 2002.
5. Finite Element Circus, University of Pittsburgh, April 16-17, 2004.

6. European Geosciences Union, poster presentation, 1st General Assembly, Nice, France, 25-30 April, 2004.

### **Professional Societies**

1. Society for Industrial and Applied Mathematics (SIAM)
2. American Mathematical Society (AMS)
3. American Physical Society (APS)

### **Professional Service**

#### *Department Service*

1. Colloquium Committee (2003-2004)
2. Computing Committee (2004-2006)
3. Travel Committee (2005-2006)
4. Applied and Computational Mathematics Undergraduate Committee (2005-2006)

#### *Professional Service*

1. Refereed Proposals for: NSF
2. Refereed Papers for: SINUM, SISC, SIAP, Physics of Fluids, Computers and Fluids, International Journal for Numerical Methods in Fluids, Numerical Methods for Partial Differential Equations, Computers and Mathematics with Applications, Mathematical Modelling and Numerical Analysis, Communications in Pure and Applied Analysis.

### **Undergraduate Student Advising**

1. Brian Baitis, *Large Eddy Simulation of Gravity Currents*, 2004-2005.

### **Teaching**

1. MA2224 - Multivariable Calculus
2. MA4445, MA4446 - Introduction to Numerical Analysis (two semester sequence)
3. MA5524 - Matrix Theory
4. MA5484 - Finite Element Methods for PDEs
5. MA5474 - Finite Difference Methods for PDEs