# Curriculum Vitae

**Petar Dimitrov Minev**

## 1 Personal Information

**Address:**
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Phone: (780) 492 3398, e-mail: minev@ualberta.ca.

**Nationality:**
Canadian and Bulgarian.

**Languages:**
English, Bulgarian, Dutch, Russian.

## 2 Education

MSc: University of Sofia, 1986.
PhD: University of Sofia, 1991.

## 3 Summary of Research Directions and Achievements

My research activities can be divided into several major groups.

- My PhD study was focused on the development and analysis of a method for flows with free capillary interfaces between immiscible fluids and the numerical simulation of such flows. This is a very difficult (and to a large extend still open) problem in Computational Fluid Dynamics (CFD). The Lagrangian finite element method that was developed was one of the earliest methods for free boundary problems. The results were published in prestigious journals in the area of Computational Methods and Fluid Dynamics.

- After I completed my PhD study in 1991, I received a prestigious postdoctoral fellowship from the J.M. Burgers Centre for Fluid Dynamics in Holland. There, my work was focused on the development of a spectral element method for non-isothermal flows. In 1996, I proposed a projection scheme with improved accuracy for incompressible flows. I consider this to be one of my best scientific achievements since projection methods are very widely used for the numerical solution of incompressible flows and it was proved that our version of the projection scheme, together with the so-called velocity-correction scheme are the most accurate available at present. It was implemented in a commercial code developed in the Delft University of Technology called SEPRAN.

- In 1996-1997 I was a research associate in the Department of Chemical Engineering at the University of Alberta where I started my long lasting collaboration with Dr. K. Nandakumar, an internationally renowned researcher in the area of CFD applications to engineering problems. Since then we published several papers in prestigious journals like Journal of Fluid Mechanics and Journal of Computational Physics. Our work is mostly focused on the development of methods and their application to engineering flow problems (mostly multiphase flow). Our work also includes an active industrial collaboration. We were awarded a COURSE research grant for the numerical and experimental study of the corrosion/erosion mechanisms in slurry pipelines. The work was partially sponsored by Syncrude Canada Ltd. and NSERC to the average of about $100 K per year and I was the principal investigator on this project. This project was of a particular interest to the oil sands industry of Alberta.

- In 1997-1998, I was a research associate with Dr. C.R. Ethier in the Department of Mechanical Engineering at the University of Toronto, who is one of the best Canadian researchers in the area of Biofluids. We developed a very efficient algorithm for the resolution of incompressible flows in complex geometries and published the results in a prestigious journal. It is now extensively used in his research group for numerical simulation of flows in arteries and the human heart.

- In 1998, I joined the Department of Mathematical and Statistical Sciences at the University of Alberta as an associate professor. I was promoted to the rank of a full professor in 2004. My research is focused on the development and analysis of methods for multiphase Computational Fluid Dynamics (CFD) and Magnetohydrodynamics (MHD). The work was published in prestigious journals in the area of Computational Physics, Fluid Mechanics and Numerical Analysis. I developed collaborations with very renowned scientists: Dr. J.L. Guermond, Professor in the Department of Mathematics, Texas A&M University, Dr. J. Shen, Professor in the Department of Mathematics at Purdue University, Dr. Nandakumar, Professor in the Department of Chemical and Materials Engineering at the University of Alberta (currently a professor at the Louisiana State University), Dr.

Finlay from the Department of Mechanical Engineering at the University of Alberta, and Dr. Angot from CMI, University of Provence.

My most significant very recent work includes (i) the development and analysis of numerical methods for the direct simulation of the flows of many rigid or fluid particles in viscous liquids, and their parallel implementation; (ii) the development and analysis of a massive parallel scheme for the incompressible Navier-Stokes equations based on direction splitting.

- I am a member of an editorial and advisory board of two journals. I am also the organizer/co-organizer of four international workshops/ conferences, and a member of the organizing/scientific committees of several others.

# 4 List of Publications and Presentations

## 4.1 Refereed Journal Articles (under review)

1. Ph. Angot, J. Keating, P. Minev, A Direction Splitting Algorithm for Incompressible Flow in Complex Geometries. **Comp. Meth. Appl. Mech. Engng.** Submitted.

2. R. C. Martinez, A. Roshchenko, P. Minev and W.H. Finlay, Simulation of Enhanced Deposition due to Magnetic Field Alignment of Ellipsoidal Particles in a Lung Bifurcation. **Journal of Aerosol Medicine and Pulmonary Drug Delivery.** Submitted.

## 4.2 Refereed Journal Articles (published or accepted)

1. J.L. Guermond and P. Minev, Start-up flow in a three-dimensional lid-driven cavity by means of a massively parallel direction splitting algorithm. In print at **Int. J. Numer. Meth Fluids**.

2. J.L. Guermond, P. Minev, A. Salgado, Convergence Analysis of a Class of Massively Parallel Direction Splitting Algorithms for the Navier-Stokes Equations in simple Domains. In print at **Math. Comp.**

3. A. Roshchenko, W.H. Finlay, P. D. Minev, The Aerodynamic Behaviour of Fibers in a Linear Shear Flow. **Aerosol Sci. Tech.** 45 (2011), 1260 – 1271.

4. J.L. Guermond and P. Minev, A new class of massively parallel direction splitting for the incompressible Navier-Stokes equations. **Comp. Meth. Appl. Mech. Engng.**, 200 (2011), 2083–2093.

5. R Reddy, S Jin, K Nandakumar, PD Minev and J Joshi, DNS simulations of freely falling spheres: Effect of the surrounding particles on the settling velocity and drag coefficient. **Int. J. CFD** , 24 (2010) , 109 – 120.

6. JL Guermond and PD Minev, A new class of fractional step techniques for the incompressible Navier-Stokes equations using direction splitting. **Compt. Rend. Acad. Sci., Mathematique**, 348 (2010), 581–585.

7. C Huang, PD Minev, J Luo and K Nandakumar, A phenomenological model for erosion of material in a horizontal slurry pipeline flow. **Wear**, 269 (2010), 190–196.

8. R.K. Reddy, J.B. Joshi, K. Nandakumar, P. D. Minev, Direct numerical simulations of a freely falling sphere using fictitious domain method: Breaking of axisymmetric wake . **Chem. Eng. Sci.**, 65(2010), 2159–2171.

9. A. Dechaume, W. H. Finlay, P. D. Minev, A two-grid fictitious domain method for direct simulation of flows involving non-interacting particles of a very small size. **Int. J. Numer. Meth Fluids**, 63 (2010), 1241–1255.

10. S. Jin, P. Minev, K. Nandakumar, A scalable parallel algorithm for the direct numerical simulation three dimensional incompressible particulate flow. **Int. J. CFD**, 23 (2009), 427–437.

11. M.-H. Wang, C. Huang, K. Nandakumar, P. Minev, J. Luo, S. Chiovelli, CFD modeling and experimental study of erosion in slurry jet flows. **Int. J. CFD**, 23 (2009), 155–172.

12. C. Veeramani, P.D. Minev and K. Nandakumar, Collision modeling between two non-Brownian particles in multiphase flow. **Int. J. Thermal Sci.**, 48 (2009), 226-233.

13. C. Huang, S. Chiovelli, P. Minev, J. Luo, K. Nandakumar, A comprehensive phenomenological model for erosion of materials in jet flow. **Powder Technology**, 187 (2008), 273–279.

14. P.D. Minev, Remarks on the links between low order DG methods and some finite difference schemes for the Stokes problem. **Int. J. Numer. Meth Fluids**, 58 (2008). 307-317.

15. B. Bejanov, J.L. Guermond and P.D. Minev, A grid-alignment finite element technique for incompressible multicomponent flows. **J. Comp. Phys.**, 227 (2008), 6473-6489.

16. C. Veeramani, P. Minev, K. Nandakumar, A fictitious domain formulation for flows with rigid particles: a non-Lagrange multiplier version. **J. Comp. Phys.**, 224 (2007), 867–879.

17. S. Margenov and P. Minev, On a MIC(0) preconditioning of non-conforming mixed FEM elliptic problems. **Mathematics and Computers in Simulation**, 76 (2007), 149 – 154.

18. J.-L. Guermond, P. Minev, and J. Shen, An Overview of Projection methods for incompressible flows. **Comp. Meth. Appl. Mech. Engng.**, 195 (2006), 6011-6045.

19. B. Bejanov, J.L. Guermond and P.D. Minev, A locally *div*-free projection scheme for incompressible flows based on non-conforming finite elements. **Int. J. Numer. Meth. Fluids**, 49 (2005), 549-568.

20. T. Chen, P. Minev, and K. Nandakumar, A projection scheme for incompressible multiphase flow using adaptive Eulerian grids: 3D validation. **Int. J. Numer. Meth. Fluids**, 48 (2005), 455-466.

21. J.-L. Guermond, P. Minev, and J. Shen, Error analysis of pressure-correction schemes for the Navier-Stokes equations with open boundary conditions. **SIAM J. Numer. Anal.**, 43 (2005), 239-258.

22. T. Chen, P. Minev, and K. Nandakumar, A projection scheme for incompressible multiphase flow using adaptive Eulerian grids. **Int. J. Numer. Meth. Fluids**, 45 (2004), 1-19.

23. C. Caia and P. Minev, A finite element method for an averaged multiphase flow model. **Int. J. CFD** 18 (2004), 111-123.

24. C. Diaz-Goano, P. Minev, and K. Nandakumar, A fictitious domain/finite element method for particulate flows. **J. Comp. Phys** 192 (2003), 105-123.

25. J.-L. Guermond and P. Minev, Mixed finite element approximation of an MHD problem involving conducting and insulating regions: the 3D case. **Numer. Meth. PDE's** 19 (2003), 706-731.

26. P. Minev, T. Chen and K. Nandakumar, A finite element technique for multifluid incompressible flow using Eulerian grids. **J. Comp. Phys** 187 (2003), 255-273.

27. J.-L. Guermond and P. Minev, Analysis of a projection/characteristic scheme for incompressible flow. **Comm. Numer. Meth. Engng.** 19 (2003), 535-550.

28. M.R. Kaazempur-Mofrad, P. Minev and C.R. Ethier, A Characteristic/finite element algorithm for time-dependent 3-D advection-dominated transport using unstructured grids. **Comp. Methods in Applied Mech. and Eng.** 192 (2003), 1281-1298.

29. J.-L. Guermond and P. Minev, Mixed finite element approximation of an MHD problem involving conducting and insulating regions: the 2D case. **Math. Model. and Numer. Anal. ($M^2AN$)** 36 (2002), 517-536.

30. P. Minev, A stabilized incremental projection scheme for the incompressible Navier-Stokes equations. **Int. J. Numer. Meth. Fluids** 36 (2001), 441-464.

31. P. Minev, U. Lange and K. Nandakumar, A comparative study of two-fluid models relevant to bubble column dynamics. **J. Fluid Mech.** 394 (1999), 73-96.

32. P. Minev and C.R. Ethier, A characteristic/finite element algorithm for the 3-D Navier-Stokes equations using unstructured grids. **Comp. Methods in Applied Mech. and Eng.** 178 (1999), 39-50.

33. P. Minev and P.M. Gresho, A remark on pressure correction schemes for transient viscous incompressible flow. **Comm. Numer. Meth. Engng** 14 (1998), 335-346.

34. L.J.P. Timmermans, P. Minev and F.N. van de Vosse, An approximate projection scheme for incompressible flow using spectral elements. **Int. J. Num. Meth. Fluids** 22 (1996), 673-688.

35. P. Minev, F.N. van de Vosse, L.J.P. Timmermans and A.A. van Steenhoven, A splitting algorithm for thermally-driven flow problems. **Int. J. Num. Meth. Heat and Fluid Flow**, 6 (1996), 51-60.

36. P. Minev, F.N. van de Vosse and A.A. van Steenhoven, Transient natural convection in a 2-D enclosure with a bottom heat source. **J. Theor. Applied Mech.** 25 (1995), 94-108.

37. L.J.P. Timmermans, F.N. van de Vosse and P. Minev, Taylor-Galerkin based spectral element methods for convection-diffusion problems. **Int. J. Num. Meth. Fluids** 18 (1994), 853-870.

38. B. Tchavdarov, P. Minev and St. Radev, Numerical analysis of a compound jet disintegration. **Comp. Methods in Applied Mech. and Eng.** 118 (1994), 121-132.

39. P. Shopov and P. Minev, The unsteady motion of a bubble or drop towards a liquid-liquid interface. **J. Fluid Mech.** 1992 (235), 123-141.

40. P. Shopov, P. Minev and I. Bazhlekov, Numerical method for unsteady viscous hydrodynamical problems with free boundaries. **Int. J. Num. Meth. Fluids** 14 (1992), 681-706.

41. P. Shopov and P. Minev, Unsteady interaction of two deformable drops. **Mech. Research Comm.** 18 (1991), 311-317.

42. P. Shopov, P. Minev, I. Bazhlekov and Z. Zapryanov, Interaction of a deformable bubble with a rigid wall at moderate Reynolds number. **J. Fluid Mech.** 219 (1990), 241-271.

43. P. Minev, Numerical modelling of the motion of a gas bubble toward a fluid-fluid interface. **Comptes Rend. de l'Acad. Bulg. Sci.** 43 (1990), 17-20.

44. P. Minev, P. Shopov and Z. Zapryanov, Non-stationary motion of a deformable gas bubble in viscous liquid in the presence of wall. **Comptes Rend. de l'Acad. Bulg. Sci.** 42 (1989), 43-46.

## 4.3 Refereed Proceedings

1. C. Veeramani, P. Minev, and K. Nandakumar, A fictitious domain method for particle sedimentation. **Lecture Notes in Computer Science**, Springer, 3743 (2005), 544-551.

2. C. Diaz-Goano, P. Minev, and K. Nandakumar, Direct simulation of multiphase flow systems: A Lagrange multiplier/fictitious domain method and its parallel implementation. **Proceedings of the Second MIT Conference on Computational Fluid and Solid Mechanics**, Elsevier, (2003), 1312-1316.

3. [1] T. Chen, P. Minev and K. Nandakumar, A 3D projection scheme for incompressible multiphase flows using dynamic front refinement and reconnection. **Lecture Notes in Computer Science**, Springer, 2907 (2003), 17-24

4. [1] J.-L. Guermond and P. Minev, Approximation of an MHD problem using Lagrange finite elements. **Contemporary Mathematics**, American Mathematical Society, 329 (2003), 131-137.

5. C. Diaz-Goano, P. Minev and K. Nandakumar, Direct simulation of particulate flow: A Lagrange multiplier/fictitious domain approach. **Lecture Notes in Computer Science**, Springer, 2179 (2001), 409-416

6. P. Minev and C.R. Ethier, A semi-implicit projection algorithm for the Navier-Stokes equations with application to flows in complex geometries. **Notes on Numerical Fluid Mechanics**, Vieweg, 73 (1999), 223-231.

[1] Invited presentation

7. P. Minev and C.R. Ethier, Method of characteristics for the Navier-Stokes equations using unstructured finite element grids. Proceedings of the **Sixth Annual Conference of the CFD Society of Canada**, Quebec City (1998), VIII57-VIII64.

8. F.N. van de Vosse, P. Minev and L.J.P. Timmermans, A spectral element projection scheme for incompressible flow with application to shear-layer stability studies. In Proceedings of the Third International Conference on Spectral and High Order Methods (ICOSAHOM), eds. A.V. Ilin and L.R. Scott, **Houston Journal of Mathematics**, University of Houston (1995), 295-304.

9. P. Minev and F.N. van de Vosse, A finite element preconditioned spectral element algorithm for 3D incompressible flows. Proceedings of the **Sixth Int. Symposium on CFD**, Lake Tahoe, Nevada (1995), 833-838.

10. P. Minev, F.N. van de Vosse, L.J.P. Timmermans, A.A. van Steenhoven and C.C.M Rindt, Numerical simulation of buoyant plumes using a spectral element technique. Proceedings of **Heat Transfer 94, Advanced Computational Methods in Heat Transfer**, (ed. Wrobel, Brebbia and Nowak), Computational Mechanics publications, Southampton, Boston (1994), 147-154.

11. P. Minev, B. Tchavdarov and St. Radev, Numerical simulation of the disintegration of a compound jet. Proceedings of the **First Greek National Congress on Computational Mechanics**, Athens (1992), 683-693.

12. P. Minev, P. Shopov and Z. Zapryanov, The rise of a gas bubble to a deformable interface. Proceedings of the **Sixth Bulgarian Congress on Theoretical and Applied Mechanics**, Varna (1989), 310-315.

13. P. Shopov, P. Minev, I. Bazhlekov and Z. Zapryanov, Numerical modelling of the deformation of fluid-fluid interfaces in viscous flows. Proceedings of the **Third International Symposium of CFD**, Nagoya (1989), 1180-1185.

14. P. Shopov and P. Minev, Numerical method for non-stationary hydrodynamical problems with many free surfaces. Proceedings of the **Second International Conference on Numerical Methods and Applications**, Sofia (1988), 454-459.

## 4.4 Books

1. Scientific computing and applications, Eds. P. Minev, Y. Lin and Y. Wong, **Advances in computation: theory and practice**, Nova Science Publishers, 7 (2001).

## 4.5 Conference Presentations

1. [1]**Workshop on Mathematical Modeling and Scientific Computation**, University of the Antilles and Guyane, Guadeloupe, French West Indies (2011).

2. [1] **BIRS Workshop on Modelling and Simulation**, Banff International Research Station and the University of Calgary (2011).

3. **Sixteenth International Conference on Finite Elements in Flow Problems**, Munich (2011).

4. [2] **Workshop on Fictitious Domain and Immersed Interface Methods**, Luminy (2010).

5. [1] **Complex Fluid Dynamics**. KAUST, Saudi Arabia (2010).

6. [2] **Second Conference of the Euro-American Consortium for Promoting the Application of Mathematics in Technical and Natural Sciences**, Sozopol (2010).

7. [3] **Fifth Conference on Finite Difference Methods:Theory and Applications(FDM'10)**, Lozenetz (2010).

8. [2] **First Conference of the Euro-American Consortium for Promoting the Application of Mathematics in Technical and Natural Sciences**, Sozopol (2009).

9. Parallel fictitious domain algorithm for direct simulation of particulate flows. **Academy Colloquium "Immersed Boundary Methods: current status and future research directions"**, Amsterdam (2009).

10. **7th International Conference on "Large-Scale Scientific Computations"**, Sozopol (2009).

11. [3] **International Conference on Thermal Engineering: Theory and Applications**, Abu Dhabi (2009).

12. **8th World Congress on Computational Mechanics**, Venice (2008).

13. [1] **Workshop on Theoretical and Numerical Aspects of Fluid-Structure Interaction**, Oberwolfach (2007).

14. [2] **Third International Conference on Theoretical and Numerical Fluid Mechanics**, Vancouver (2007).

15. [2] **33rd International Conference of Applications of Mathematics in Engineering and Economics** (2007), Sozopol.

16. **Seventh International Conference on Large Scale Scientific Computing**, Sozopol (2007).

17. **7th World Congress on Computational Mechanics**, LA (2006).

18. **International Conference: Pioneers of Bulgarian Mathematics**, Sofia (2006).

19. **First South-East European Conference on Computational Mechanics**, Kragujevac (2006).

20. [1] **BIRS Workshop on Interfacial Dynamics of Complex Fluids**, Banff International Research Station (2006).

21. [2] **Workshop on numerical, mathematical and modelling analysis related to fluid dynamics in hydrogen fuel cells**, Fields Institute, Ottawa (2006).

22. **The Third MIT Conference in Computational Fluid and Solid Mechanics**, Cambridge (2005).

23. [1] **Pacific Northwest Numerical Analysis Seminar**, Banff (2004).

24. [1] **Sixth World Congress on Computational Mechanics**, Bejing (2004).

25. **Iterative Methods, Preconditioning and Numerical PDE's (IMET 2004)**, Prague (2004).

26. [3] **Twelfth International Conference on Finite Elements in Flow Problems (FEF'2003)**, Nagoya (2003).

27. [1] **Winter Meeting of the Canadian Mathematical Society**, Ottawa (2002).

28. [1] **Annual Meeting of the Canadian Applied and Industrial Mathematics Society**, Calgary (2002).

29. [1] **Workshop on Numerical Analysis**, Nijmegen (2001).

30. **Eleventh International Conference on Finite elements in flow problems (FEF'2001)**, Austin (2000).

31. [1] **International Workshop on Scientific Computing and Application**, Hong Kong (1998).

[2] Plenary talk
[3] A keynote lecture

32. **Workshop on Interaction of Scales in Turbulence: Application to Convection, Diffusion and Chemistry**, Utrecht (1995).

33. **First ERCOFTAC Workshop on Direct and Large-Eddy Simulation**, Guildford (1994).

34. **First European Fluid Mechanics Conference**, Cambridge (1991).

## 4.6 Invited Seminar Presentations

1. Seminar of the Fraunhofer Institute for Industrial and Applied Mathematics, Kaiserslautern, Germany, October 2011.

2. Numerical Analysis Seminar, University of Houston, April 2010.

3. Department of Mathematics Colloquium, University of Texas at Arlington, March 2010.

4. Department of Mathematics Colloquium, University of Texas at Dallas, November 2009.

5. Institute of Mechanics and Biomechanics, Bulgarian Academy of Sciences, May 2009.

6. Numerical Analysis Seminar at Texas A&M University, April 2008, March 2010.

7. Seminar of the R&D on Scientific Computing at the Narvik University College, Norway, December 2007.

8. Computational and Applied Mathematics Colloquium Series, Penn State University, USA, April 2005.

9. Chinese Academy of Sciences, Beijing, September 2004

10. Purdue University, USA, September 2001.

11. Université de Toulon et de Var, France, May 2001.

12. Seminar on Applied Mathematics, University of Alberta, Canada, October 1996.

13. Seminar on Applied Mathematics, The University of Nijmegen, Holland, February 1996.

14. Seminar on Fluid Dynamics "Panta Rhei", Delft University of Technology, Holland, May 1994.

15. Seminar of the Institute of Statistical Mechanics of Turbulence, Marseille, France, May 1993.

16. Seminar on Rheology, University of Twente, Holland, November 1992.

## 4.7 Reports

1. F.N. van de Vosse and P. Minev, Spectral element methods: theory and applications. **Eindhoven University of Technology report, ISBN 90-236** (1996).

2. A Study of the available CFD codes with respect to turbulent combustion. Internal report WOC-WET 96.026, TU Eindhoven.

3. Stability and transition to turbulence in some isothermal and non-isothermal flows. Internal report WOC-WET 93.004, TU Eindhoven.

# 5 Teaching

## 5.1 Summary of achievements

- At the undergraduate level, I enjoy teaching engineering classes in mathematics. Since most of my research activities have been directed towards applications of Mathematics in Engineering, I can provide the engineering students with examples from engineering applications, build a mathematical model for them, and obtain a solution. This approach was particularly useful in the PDE classes that I have taught in the past. In such cases I always encourage the students to participate in the modelling process and this helps them to link their previous experience with the mathematical tools that I teach. In my opinion, the development of this approach was the main reason for the significant improvement of my teaching evaluations in Math 201.

- I also played an important role in teaching and curriculum development for the graduate and undergraduate classes in Numerical Analysis. In these classes, I always combine the serious theoretical approach with practical programming of the underlying algorithms. This not only gives the students a deep understanding of the material, but also to prepares them for real life applications. I re-shaped the curriculum and taught for several years the core graduate course in Numerical Analysis (Math 536) and also developed and taught a topics course in Computational Fluid Dynamics. In this course, the students gradually build a finite element solver for different incompressible flow applications.

- In the summer of 2000, I was asked to deliver several lectures to high school students at the Esso Summer camp in Edmonton. These were very talented young mathematicians who were quite enthusiastic during the lectures. As a result, we formed a small Math club during the following year.

## 5.2 Courses taught

- Numerical Methods for PDE's (MATH536, graduate course).
- Computational Fluid Dynamics (MATH655, graduate topics course).
- Intermediate Differential Equations (MATH438, undergraduate course).
- Numerical Analysis (MATH381, undergraduate course).
- Differential Equations for Engineers (MATH201, undergraduate course).
- Calculus for engineers (MATH100, undergraduate course).
- Calculus for engineers (MATH101, undergraduate course).
- University of Alberta Summer School on Fluid Dynamics, Lectures on Computational Fluid Dynamics, 1999, 2000 and 2002.
- Esso Summer camp for high school students, 2000, Lectures in Geometry.

# 6 Committees and Services

## 6.1 Summary

- As an Associate Chair for Graduate Studies I initiated a Graduate Colloquium where all thesis based students are required to present their research at least once during their study. I also suggested several important changes in the Regulations for Graduate Studies in the department which were approved by the Departmental Council.
- As a member of the Graduate Committee, I actively participated in the students ranking for various scholarships and awards. I also participated in the screening process of applications for graduate studies in the department.
- As a liaison to Engineering, I coordinated the common examination for the students in the pre-Engineering program in Keyano College, Ft. Mc. Murray.
- I participated in the restructuring of the curriculum for the undergraduate courses on Numerical Analysis MATH 381, 481, 486 and the graduate courses Math 535, 536.
- I organized one international conference and was a member of the organizing committee of two others. I was also asked by the Canadian Mathematical Society to organize a special session at the 2003 Summer meeting of the Society.

## 6.2 University Committees

- President Review Committee, 2011-present.
- Faculty Evaluation Committee, Faculty of Engineering, 2011-present.
- General Faculty Council, 2005-2008.

## 6.3 Faculty of Science Committees

- Advisory Selection Committee, 2010-present
- Faculty Evaluation Committee, 2005-2007.

## 6.4 Departmental Committees

- Associate Chair for Graduate Studies, 2006-2009.
- Elected Member of the Chair Selection Committee, 2005-2006.
- Chair, Alberta High School Mathematics Competition (AHSMC) Committee, 2003-2006.
- Executive Committee, 2003-2004, 2006-present.
- Member, AHSMC Committee, 2002-2003.
- Computing Committee (instructional), 2000-2001.
- Outreach & Recruitment, 2000-2001.
- Graduate Committee (Administration and Programs), 1999-2000, 2002-2003, 2004-2006.
- Liaison (Engineering), 1998-2002.

## 6.5 Boards membership

- Member of the Advisory Board of International Journal for Numerical Methods in Fluids.
- Member of the Editorial Board of International Journal for Numerical Analysis and Modelling.

## 6.6 Conference organization

- Co-organizer of the ICIAM Satellite Workshop on Numerical Methods for Incompressible Flow, Vancouver, Canada, July 2011.
- Member of the International Program Committee of the International Workshop on Computer Aspects of Numerical Algorithms, CANA 2011, September 2011, Szczecin, Poland.
- Member of the International Organizing Committee of the 8th International Conference on Large-Scale Scientific Computing, Sozopol, Bulgaria, June, 2011.
- Member of the International Organizing Committee of the 16th International Conference on Finite Elements in Flow Problems (FEF11), Munich, Germany, March, 2011.
- Co-organizer, Banff International Research Station Workshop, November 2010.
- Member of the International Program Committee of the 7th Conference on Numerical Methods and Applications - NM&A'10, August, 2010, Borovets, Bulgaria.
- Member of the International Organizing Committee of the 35rd International Conference on Applications of Mathematics in Engineering and Economics, Sozopol, Bulgaria, June, 2009.
- Member of the International Organizing Committee of the 7th International Conference on Large-Scale Scientific Computing, Sozopol, Bulgaria, June, 2009.
- Member of the International Organizing Committee of the 33rd International Conference on Applications of Mathematics in Engineering and Economics, Sozopol, Bulgaria, June, 2007.
- Member of the International Organizing Committee of the 6th International Conference on Large-Scale Scientific Computing, Sozopol, Bulgaria, June , 2007.
- Member of the International Organizing Committee of the 14th International Conference on Finite Elements in Flow Problems (FEF07), Santa Fe, USA, March, 2007.
- Member of the International Organizing Committee of the 6th Conference on Numerical Methods and Applications - NM&A'06, August, 2006, Borovets, Bulgaria.
- Organizer of the Fifth International Conference on Scientific Computing and Applications, Banff, Alberta, Canada, May, 2006.
- Member of the Scientific Committee of the First South-East European Conference in Computational Mechanics, June, 2006, Kragujevac, Serbia.

- Member of the International Organizing Committee of the Fifth International Conference on Large-Scale Scientific Computing, Sozopol, Bulgaria, June, 2005.
- A special session organizer at the Summer Meeting of the Canadian Mathematical Society, June, 2003.
- Member of the International Organizing Committee of the Fourth International Conference on Large-Scale Scientific Computing, Sozopol, Bulgaria,, 2003.
- Member of the International Organizing Committee of the Third International Conference on Large-Scale Scientific Computing, Sozopol, Bulgaria, June, 2001.
- Organizer of the Second International Workshop on Scientific Computing and Applications, Kananaskis, Alberta, Canada, May, 2000.

# 7 Grants

- NSERC CRD grant (co-investigator): A Novel Open SOurce COmputer Analysis Framework for Fuel Cell Membrane Electrode Assemblies Operating at High Current Densities, 2011-2013, $84,500 in total.
- NSERC Strategic Research Opportunities Grant (co-investigator): Smart high aspect ratio particles for targeted aerosol delivery, 2006-2009, about $315,000 in total.
- NSERC Discovery grant (principal investigator): Development of Computational Methods and Simulation of Complex Flows, 2004-2007, $20,850 per year.
- NSERC CRD grant (principal investigator): Investigation of Erosion-Corrosion Mechanisms in Slurry Flow Pipelines, 2001-2004, $22,750 per year.
- COURSE grant (principal investigator): Investigation of Erosion-Corrosion Mechanisms in Slurry Flow Pipelines, 2001-2004, appr. $63,000 per year, supported with $15,000 (cash) and $15,000 (in-kind) per year by Syncrude Canada Ltd.
- PIMS and University of Alberta Conference Grant: Second International Workshop on Scientific Computing and Applications, 2000, $17,500.
- NSERC equipment grant: Computer Server and Terminals for Mathematical Sciences, 2000, $115,500.
- NSERC Research grant (principal investigator): A Finite Element Solver for Simulation of Multiphase Flow, 1999-2003, $15,750 per year.
- Start up grant at the University of Alberta (Principal Investigator), 1998-2000, $60,000.

# 8 Graduate Students and Postdoctoral Fellows

## 8.1 List of past and current students and postdoctoral fellows

- Students: S. Alami, B. Bejanov, C. Caia, C. Diaz-Goano, J. Keeting, S. Madhavan, S. Sankaran, V. Pastoor, A. Roshchenko, M. Speetjens, C. Veeramani, L. Zhang.
- Postdoctoral fellows: S. Jin, A. Dechaume, T. Chen, M. Wang, T. Marinov.

## 8.2 Summary

I am a co-supervisor of

- Li Zhang, A. Roshchenko and J. Keeting, PhD students, and Soheila Alami, an MSc student in the Department of Mathematical and Statistical Sciences, University of Alberta.

I supervised

- Boyan Bejanov (Department of Mathematical and Statistical Sciences, University of Alberta); title of the PhD thesis: Numerical Solution of Free Surface Incompressible Flows. Presently Dr. Bejanov works for the Bank of Canada.
- C. Caia (Department of Mathematical and Statistical Sciences, University of Alberta); PhD thesis title: Numerical Simulation of Bubbly Flows. At present, C. Caia is a senior analyst at the Bank of Montreal.

I co-supervised:

- S. Madhavan, a PhD student in the Department of Chemical Engineering, University of Alberta; title of the PhD thesis: Investigation of vortical and interfacial particulate flows.
- C. Veeramani (Department of Chemical Engineering, University of Alberta); title of the PhD thesis: 3D simulation of Particulate Flows. He is currently a postdoctoral fellow at the University of Saskatchewan.
- C. Diaz-Goano (Department of Chemical Engineering, University of Alberta); title of the PhD thesis: Direct Numerical Simulation of Particulate Flows Using a Finite Element/Fictitious Domain Approach. Presently Dr. Diaz-Goano works for EnCana, Calgary.
- S. Sankaran, MSc student in the Department of Chemical and Materials Engineering at the University of Alberta. Title of MSc thesis: Erosion-corrosion in oil sand transportation. Presently he works as an engineer in the industry.

I co-supervised the post-doctoral fellows: S. Jin (Department of Chemical and Materials Engineering, University of Alberta) and A. Dechaume (Department of Mathematical and Statistical Sciences,University of Alberta). T. Chen, M. Wang (Department of Chemical and Materials Engineering, University of Alberta) and supervised T. Marinov (Department of Mathematical and Statistical Sciences,University of Alberta). T. Chen is an engineer in CMG Ltd., Calgary, M. Wang is a research associate at the Department of Mechanical Engineering at the University of Alberta, and T. Marinov is a professor at the Southern University at New Orleans, A. Dechaume is research associate at CERFACS (Toulouse).
At the Eindhoven University of Technology, I supervised two MSc theses:

- V. Pastoor, 1994-1995, Numerical and Experimental Study of Unsteady Buoyant Plumes.
- M. Speetjens, 1995-1996, Application of LES and SEM to Transitional and Turbulent Flows.

# 9 Memberships

- International Association for Computational Mechanics
- Canadian Applied and Industrial Mathematics Society.