Curriculum Vitae

Petar Dimitrov Minev

1 Personal Information

Professor in Applied Mathematics at the Department of Mathematical and Statistical Sciences, University of Alberta, Edmonton, AB, Canada T6G 2G1.
E-mail: minev@ualberta.ca.

2 Education

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

3 List of Publications and Presentations

3.1 Refereed Journal Articles

1. J. Keating, P. Minev, A parallel algorithm for direct simulation of fluidized beds. In print at: **Canadian J. Chem. Engng.**

2. P. Minev and R. Usubov, Splitting schemes for the stress formulation of fluid-structure interaction problems. **Applications in Engineering Science**, 9 (2022), 1–9.

3. Q. Feng, B. Han, and P. Minev, Sixth order compact finite difference schemes for Poisson interface problems with singular sources, **Computers & Mathematics with Applications**, 99 (2021), 2–25.

4. R. Frolov, P. Minev, and A. Takhirov, A direction splitting scheme for Navier-Stokes-Boussinesq system in spherical shell geometries. **Int. J. Numer. Meth. Fluids**, 93 (2021), 3507–3523.

5. R. Frolov, P. Minev, and A. Takhirov, An efficient algorithm for weakly compressible flows in spherical geometries. **Int. J. Numer. Meth. Fluids**, 93 (2021), 1359-1377.

6. A. Jarauta, V. Zingan, P. Minev, and M. Secanell, A compressible fluid flow model coupling channel and porous media flows and its application to fuel cell materials. **Transport in Porous Media**, 134 (2020), 351-386.

7. V. Calo, P. Minev, and V. Puzyrev, Splitting schemes for phase-field equations. **Appl. Numer. Math.**, 156 (2020), 192-209.

8. P. Behnoudfara, V. Calo, Q. Deng, and P. Minev, A variationaly separable splitting for the generalized-α method for parabolic equations. **Int. J. Numer. Meth. Engng.**, 121 (2019), 828-841.

9. J.L. Guermond and P. Minev, High-order adaptive time stepping for the Navier-Stokes equations. **SIAM J. Sci. Comput.**, 41 (2019), A770-A788.

10. P. Minev and P. Vabishchevich, Splitting schemes for the stress formulation of the incompressible Navier-Stokes equations, **J. Computational and Applied Mathematics**, 344 (2018), 807-818.

11. P. Minev, S. Srinivasan, and P. Vabishchevich, Flux formulation of parabolic equations with highly heterogeneous coefficients, **J. Computational and Applied Mathematics**, 340 (2018), 582-601.

12. P. Minev and P. Vabishchevich, Splitting schemes for unsteady problems involving the grad-div operator, **Applied Numerical Mathematics**, 124 (2018), 130-139.

13. J.L. Guermond and P. Minev, High-order time stepping for the Navier-Stokes equations with minimal computational complexity. **J. Computational and Applied Mathematics**, 310 (2017), 92–103.

14. S. Srinivasan, R. Lazarov, and P. Minev, Multiscale Direction-Splitting Algorithms for Parabolic Equations with Highly Heterogeneous Coefficients. **Computers & Mathematics with Applications**, 72 (2016), 1641–1654.

15. J.L. Guermond and P. Minev, High-order time stepping for the incompressible Navier-Stokes equations. **SIAM J. Sci. Comput.**, 37 (2015), A2656A2681.

16. A. Roshchenko, P. Minev and W.H. Finlay, A Time Splitting Fictitious Domain Algorithm for Fluid-Structure Interaction Problems . **J. Fluids and Structures**, 58 (2015), 109–126.

17. P. Minev, P. Vabishchevich, An operator-splitting scheme for the stream function-vorticity formulation of the unsteady Navier-Stokes equations. **J. Computational and Applied Mathematics**, 293 (2014), 147–163.

18. S. Madhavan, Y. Y. Al-Jahmany, P. D. Minev, and K. Nandakumar, On the transition to 3D modes for channel flow past a square cylinder. **Canadian J. Chem. Eng.**, 92 (2014), 2122–2137.

19. T. Gornak, O. Iliev, P. Minev, A. Zemitis, A fast algorithm for 3D simulation of thermal stratification in containment pools of nuclear power plants. **Computers&Mathematics with Applications**, 67 (2014), 2228–2239.

20. T. Gornak, J.L. Guermond, O. Iliev, and P. Minev, A direction splitting approach for incompressible Brinkman flow. **Int. J. Numer. Analysis Modeling**, 4 (2013), 1–13.

21. J. Keating, P. Minev, A Fast Algorithm for Direct Simulation of Particulate Flows Using Conforming Grids. **J. Comp. Phys.** 255 (2013), 486–501.

22. 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 Med. Pulm. Drug Del.** 26 (2013), 31–40.

23. 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. **Math. Comp.** 81 (2012), 1951–1977.

24. 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. **Int. J. Numer. Meth. Fluids**, 68 (2012), 856871.

25. Ph. Angot, J. Keating, P. Minev, A Direction Splitting Algorithm for Incompressible Flow in Complex Geometries. **Comp. Meth. Appl. Mech. Engng.** 217 (2012), 111–120.

26. 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.

27. 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.

28. R Reddy, S Jin, K Nandakumar, PD Minev and J Joshi, Direct numerical simulation simulation of free falling sphere in creeping flow. **Int. J. CFD** , 24 (2010) , 109 – 120.

29. 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.

30. 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.

31. 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.

32. 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.

33. 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.

34. 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.

35. 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.

36. 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.

37. 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.

38. 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.

39. 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.

40. 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.

41. 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.

42. 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.

43. 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.

44. 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.

45. 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.

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

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

48. 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.

49. 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.

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

51. 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.

52. 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.

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

54. 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.

55. 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.

56. 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.

57. 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.

58. 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.

59. 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.

60. 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.

61. 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.

62. 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.

63. 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.

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

65. 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.

66. 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.

67. 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.

3.2 Refereed Proceedings

1. T. Gornak, O. Iliev, P. Minev, A Note on Local Refinement for Direction Splitting Methods. **Lecture Notes in Computer Science**, Springer, 8962 (2015), 3–12.

2. J.L. Guermond and P.D. Minev, Efficient parallel algorithms for unsteady incompressible flows. In: O. Iliev, S. Margenov, P. Minev, P. Vassilevski, and L. Zikatanov (Eds.) Numerical solution of PDEs: theory, algorithms, and their applications, **Springer Proceedings in Mathematics & Statistics**, 45 (2013), 185-202.

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

4. 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.

5. [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

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

7. 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

8. 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.

9. 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.

10. 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.

11. 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.

12. 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.

13. 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.

14. 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.

15. 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.

16. 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.

3.3 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).

2. Numerical solution of PDEs: theory, algorithms, and their applications, Eds. O. Iliev, S. Margenov, P. Minev, P. Vassilevski, and L. Zikatanov, **Springer Proceedings in Mathematics & Statistics**, 45 (2013).

3.4 Conference Presentations

[1] Invited talk, [2] Plenary talk, [3] Keynote talk.

1. **Contemporary Problems in Computational Mathematics and Mathematical Physics, Memorial Conference for 100 Years of A.A. Samarskii**, Moscow (2019).
2. **Supercomputer Technologies in Mathematical Modelling**, Moscow (2019).
3. [1] **Minisymposium on Numerical Methods for Interfacial Dynamics, ICIAM 2019**, Valencia (2019).
4. [3] **PIMS-Germany Workshop on Numerical Analysis**, Heidelberg (2019).
5. [3] **Workshop on Time Filters and Predictive Accuracy**, Pittsburgh (2019).
6. [1] **The 5th International Workshop on Modeling, Analysis, Simulations, and Applications of Interfacial Dynamics and FSI Problems**, Beijing (2018).
7. [1] **The International Workshop on Computational Mathematics and Scientific Computing (IWCMSC 2017)**, Qingdao (2017).
8. [2] **Nineth Conference of the Euro-American Consortium for Promoting the Application of Mathematics in Technical and Natural Sciences**, Albena (2017).
9. [1] **BIRS Workshop on Enabling Process Innovation through Computation**, Banff International Research Station, Banff (2016).
10. **Tenth International Conference on Scientific Computing and Applications**, Fields Institute, Toronto (2016).
11. [1] **Workshop on Advances in discontinuous Galerkin methods and related topics**, Heidelberg (2015).
12. [1] **Minisymposium on: Recent advances in modeling, analysis, and methodology for interface and free boundary problems and applications, at ICIAM 2015**, Beijing (2015)
13. [1] **Third International Conferences on High Performance Computing and Applications**, Shanghai (2015).

14. [1] **Recent Developments in Computational Mathematics and Applications, A Satellite Meeting of the 8th International Congress in Industrial and Applied Mathematics**, Jing Gang Shan (2015).

15. **Tenth International Conference on Large-Scale Scientific Computations**, Sozopol (2015).

16. [2] **Seventh Conference of the Euro-American Consortium for Promoting the Application of Mathematics in Technical and Natural Sciences**, Varna (2015).

17. [1] **Minisymposium on free boundary problems, PANACM 2015**, Buenos Aires (2015).

18. [1] **Recent Advances in Computational Mathematics & Applications**, Tsinghua Sanya International Mathematics Forum, Sanya (2014).

19. [2] **Eighth International Conference on Numerical Methods and Applications (NMA'14)**, Borovetz (2014)

20. [2] **Numerical Methods for Scientific Computations and Advanced Applications (NMSCAA'14)**, Bansko (2014).

21. [2] **XII Conference in Computational Mechanics**, Santiago de Chile (2013).

22. [2] **Fields Institute Workshop on Numerical Methods for Fluid Dynamics**, Ottawa (2013).

23. [1] **Second International Conference on Supercomputing Technologies in Mathematical Modelling**, Yakutsk, Russia (2013).

24. [1] **Minisymposium on Flows with Coupled Transport; Advances in Computational Mechanics: A Conference Celebrating the 70th Birthday of Thomas J.R. Hughes**, San Diego (2013).

25. [1] **Workshop on Numerical Methods for PDEs: In occasion of Raytcho Lazarov's 70th birthday**, Texas A&M University (2013).

26. [3] **Minisymposium on Free Surface, Moving Boundaries and Multi-Phase Flows, World Congress in Computational Mechanics WCCM 2012**, Sao Paulo (2012).

27. [1] **20th Canadian Symposium on Fluid Dynamics**, Toronto (2012).

28. [2] **Fifth Conference on Numerical Analysis and Applications**, Lozenetz (2012)

29. [1] **Fourth Conference of the Euro-American Consortium for Promoting the Application of Mathematics in Technical and Natural Sciences**, Varna (2012).

30. [1] **Second International Conference on Scientific Computing**, Nanjing (2012).

31. [1] **NJIT Ninth Annual Conference on Frontiers in Applied and Computational Mathematics**, Newark (2012).

32. [1] **Eight International Conference on Scientific Computing and Applications**, Las Vegas (2012).

33. [1]**Workshop on Mathematical Modeling and Scientific Computation**, University of the Antilles and Guyane, Guadeloupe, French West Indies (2011).

34. [1] **BIRS Workshop on Modelling and Simulation**, Banff International Research Station and the University of Calgary (2011).

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

36. [2] **Workshop on Fictitious Domain and Immersed Interface Methods**, Luminy (2010).

37. [1] **Complex Fluid Dynamics**. KAUST, Saudi Arabia (2010).

38. [2] **Second Conference of the Euro-American Consortium for Promoting the Application of Mathematics in Technical and Natural Sciences**, Sozopol (2010).

39. [3] **Fifth Conference on Finite Difference Methods:Theory and Applications(FDM'10)**, Lozenetz (2010).

40. [2] **First Conference of the Euro-American Consortium for Promoting the Application of Mathematics in Technical and Natural Sciences**, Sozopol (2009).

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

42. **7th International Conference on Large-Scale Scientific Computations**, Sozopol (2009).

43. [2] **International Conference on Thermal Engineering: Theory and Applications**, Abu Dhabi (2009).

44. **8th World Congress on Computational Mechanics**, Venice (2008).

45. [1] **Workshop on Theoretical and Numerical Aspects of Fluid-Structure Interaction**, Oberwolfach (2007).

46. [2] **Third International Conference on Theoretical and Numerical Fluid Mechanics**, Vancouver (2007).

47. [2] **33rd International Conference of Applications of Mathematics in Engineering and Economics** (2007), Sozopol.

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

49. **7th World Congress on Computational Mechanics**, LA (2006).

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

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

52. [1] **BIRS Workshop on Interfacial Dynamics of Complex Fluids**, Banff International Research Station (2006).

53. [2] **Workshop on Numerical, Mathematical and Modelling Analysis Related to Fluid Dynamics in Hydrogen Fuel Cells**, Fields Institute, Ottawa (2006).

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

55. [1] **Pacific Northwest Numerical Analysis Seminar**, Banff (2004).

56. [1] **Sixth World Congress on Computational Mechanics**, Bejing (2004).

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

58. [3]**Twelfth International Conference on Finite Elements in Flow Problems (FEF'2003)**, Nagoya (2003).

59. [1] **Winter Meeting of the Canadian Mathematical Society**, Ottawa (2002).

60. [1] **Annual Meeting of the Canadian Applied and Industrial Mathematics Society**, Calgary (2002).

61. [1] **Workshop on Numerical Analysis**, Nijmegen (2001).

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

63. [1] **International Workshop on Scientific Computing and Application**, Hong Kong (1998).

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

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

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

3.5 Invited Seminar Presentations

1. Curtin Institute for Computation, Curtin University, Perth, Australia, February 2018.

2. CFD seminar, Ecole des Minnes, ParisTech, Sophia Antipolis, December 2017.

3. Seminar at INRIA, Paris, October 2017,

4. ICES seminar, University of Texas at Austin, March 2017.

5. Computational and Applied Mathematics Colloquium Series, Penn State University, November 2016.

6. Seminar of the Fraunhofer Institute for Industrial and Applied Mathematics, Kaiserslautern, Germany, December 2015.

7. University of Santiago, Santiago, Chile, April 2015.

8. University of the Antilles, Guadeloupe, December 2014.

9. Seminar in Applied and Computational Mathematics, Simon Fraser University, Vancouver, October 2012.

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

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

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

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

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

15. Numerical Analysis Seminar at Texas A&M University, April 2008, March 2010, November 2013, March 2017.

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

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

18. Chinese Academy of Sciences, Beijing, September 2004

19. Purdue University, USA, September 2001.

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

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

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

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

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

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

3.6 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.

4 Teaching

- Numerical Methods Part I (MATH535, graduate course).
- 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).
- Multivariate calculus for engineers (MATH209, 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.

5 Committees and Services

5.1 University Committees

- President Review Committee, 2011-2015.
- Faculty Evaluation Committee, Faculty of Engineering, 2011-2015.
- General Faculty Council, 2005-2008.

5.2 Faculty of Science Committees

- Awards Adjudication Committee, 2019-2020.
- Advisory Selection Committee, 2010-2013
- Faculty Evaluation Committee, 2005-2007.

5.3 Departmental Committees

- Hiring Committee, 2013-2015.
- 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.

5.4 Boards membership

- Member of the Editorial Board of Applications in Engineering Science.
- Member of the Editorial Board of Fluids, An Open Access Journal.
- 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.

5.5 Conference organization

- Chair of the Organizing Committee of the Annual Meeting of the Canadian Applied and Industrial Mathematics Society, Edmonton, 2016.
- 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.

6 Grants

- Petroleum Research Fund, American Chemical Society, Efficient numerical techniques for modelling of surfactant-laden interfacial phenomena, 2015-2017, $110,000 in total.
- NSERC CRD grant (principal investigator): Multiscale Analysis and Large-scale Parallelization of Heterogeneous Reservoir Models, 2014-2017, $170,000 in total.
- NSERC Discovery grant (principal investigator): Massively Parallel Direction Splitting Algorithms for Complex Flows, 2012-2017, $26,000 per year.
- 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 Discovery grant (principal investigator): Numerical Simulation of Complex Flows Involving Elastic Membranes, Fluid-Fluid, and Fluid-Solid Interfaces, 2007-2012, $19,500 per year.
- 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.

7 Graduate Students and Postdoctoral Fellows

7.1 List of past and current students and postdoctoral fellows

- Students: M. Alijani, S. Alami, B. Bejanov, C. Caia, C. Diaz-Goano, Q. Feng, R. Frolov, J. Keeting, A. Kosakian, S. Madhavan, S. Sankaran, V. Pastoor, A. Roshchenko, M. Speetjens, R. Usubov, C. Veeramani, Z. Zhang, .

- Postdoctoral fellows: T. Chen, A. Dechaume, S. Jin, P. Hessari, T. Marinov, S. Srinivasan, A. Takhirov, M. Wang, V. Zingan.

7.2 Summary

Present students: Q. Feng.
Past students:

- M. Alijani (Department of Mathematical and Statistical Sciences, University of Alberta); title of the MSc thesis: Operator splitting for two-phase flow in porous media.

- B. 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.

- 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 an engineering consulting company, Calgary.

- R. Frolov (Department of Mathematical and Statistical Sciences, University of Alberta); title of the PhD thesis: Splitting schemes for compressible Navier-Stokes equations. Presently a postdoctoral fellow at the University of Calgary.
- J. Keating, (Department of Mathematical and Statistical Sciences, University of Alberta); title of the PhD thesis: Direction-Splitting Schemes For Particulate Flows. Dr. Keating is currently a software developer at CaseWare International Inc.
- A. Kosakian (Department of Mechanical Engineering, University of Alberta); title of PhD thesis: Numerical modeling of transient phenomena in PEM fuel cells.
- S. Madhavan, (Department of Chemical Engineering, University of Alberta); title of the PhD thesis: Investigation of vortical and interfacial particulate flows. Dr. Madhavan is currently a research engineer at Good Year, Akron, USA.
- A. Roshchenko, (Department of Mathematical and Statistical Sciences, University of Alberta); title of the PhD thesis: Direct numerical simulations of fluid-structure interaction in the respiratory airways. D. Roshchenko is currently a reservoir simulation scientist at CMG Group LTD., Calgary, AB.
- S. Sankaran, (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.
- R. Usubov (Department of Mathematical and Statistical Sciences, University of Alberta); title of the MSc thesis: A novel numerical approach to Fluid-Structure interaction problem.
- C. Veeramani (Department of Chemical Engineering, University of Alberta); title of the PhD thesis: 3D simulation of Particulate Flows. He is currently an assistant professor at IIT, Roorkee, India.
- Z. Zhang, (Department of Mathematical and Statistical Sciences, University of Alberta); title of the MSc thesis: Directional splitting on grids with local refinement for parabolic problems. He is presently a PhD student at Texas A&M University.

Past postdoctoral fellows: I co-supervised the post-doctoral fellows: A. Takhirov V. Zingan, S. Jin, A. Dechaume, T. Chen, M. Wang , T. Marinov.
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.