MAREK BEHR

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Education	UNIVERSITY OF MINNESOTA	
	Ph.D. in Aerospace Engineering and Mechanics	1992
	UNIVERSITY OF MINNESOTA	
	B.S. in Aerospace Engineering and Mechanics	1988
	WARSAW UNIVERSITY	
	Physics	1983–1986

Employment	RICE UNIVERSITY, HOUSTON, TX	
	DEPARTMENT OF MECHANICAL ENGINEERING AND MATERIALS SCIENCE	
	Assistant Professor	July 1999 – present
	SANDIA NATIONAL LABORATORIES, ALBUQUERQUE, NM	
	COMPUTER SCIENCE RESEARCH INSTITUTE	
	Visiting Scientist	July – August 2002
	CHUO UNIVERSITY, TOKYO, JAPAN	
	GRADUATE SCHOOL OF SCIENCE AND ENGINEERING	
	Guest Associate Professor	May – June 2000
	UNIVERSITY OF MINNESOTA, MINNEAPOLIS, MN	
	ARMY HIGH PERFORMANCE COMPUTING RESEARCH CENTER	
	Research Assistant Professor	October 1994 – July 1999
	UNIVERSITY OF MINNESOTA, MINNEAPOLIS, MN	
	ARMY HIGH PERFORMANCE COMPUTING RESEARCH CENTER	
	Research Associate	November 1992 – September 1994

Honors and Awards

NSF Postdoctoral Research Associateship in Computational Science and Engineering, November 1992 – October 1994.

University of Minnesota Dissertation Fellowship, September 1991 – August 1992.

University of Minnesota Graduate School Fellowship, October 1988 – August 1989.

Graduated with High Distinction from University of Minnesota, June 1988.

Personal Information

Born July 13, 1965 in Warsaw, Poland.
Citizen of the U.S.

Publications   Journal Articles:

1. F. Abraham, M. Behr and M. Heinkenschloss, "The Effect of Stabilization in Finite Element Methods for the Optimal Boundary Control of the Oseen Equations", submitted to *Finite Elements in Analysis and Design* (2003).

2. M. Behr, "On the Application of Slip Boundary Condition on Curved Boundaries", submitted to *International Journal for Numerical Methods in Fluids* (2003).

3. M. Behr and D. Arora, "Shear-Slip Mesh Update Method: Implementation and Applications", *Computer Methods in Biomechanics and Biomedical Engineering* **6** (2003) 113–123.

4. M. Behr and F. Abraham, "Free-Surface Flow Simulations in the Presence of Inclined Walls", *Computer Methods in Applied Mechanics and Engineering* **191** (2002) 5467–5483.

5. M. Behr and D. Arora, "Computational Analysis of Blood Flow in Ventricular Assist Devices", *Acta of Bioengineering and Biomechanics*, **4** (2002) 546–547.

6. M. Behr, "Stabilized Space-Time Finite Element Formulations for Free-Surface Flows", *Communications in Numerical Methods in Engineering*, **11** (2001) 813–819.

7. M. Behr and T.E. Tezduyar, "Shear-slip mesh update in 3D computation of complex flow problems with rotating mechanical components", *Computer Methods in Applied Mechanics and Engineering*, **190** (2001) 3189–3200.

8. M. Behr, D.M. Pressel and W.B. Sturek, Jr., "Comments on CFD code performance on scalable architectures", *Computer Methods in Applied Mechanics and Engineering*, **190** (2000) 263–277.

9. M. Behr and T.E. Tezduyar, "Shear-slip mesh update method", *Computer Methods in Applied Mechanics and Engineering*, **174** (1999) 261-274.

10. I. Güler, M. Behr and T.E. Tezduyar, "Parallel finite-element computation of free-surface flows", *Computational Mechanics* **23** (1999) 117–123.

11. K. Kashiyama, Y. Ohba, T. Takagi, M. Behr and T.E. Tezduyar, "Parallel finite element method utilizing the mode splitting and sigma coordinate for shallow water flows", *Computational Mechanics*, **23** (1999) 144–150.

12. T.E. Tezduyar, S Aliabadi and M. Behr, "Enhanced-Discretization Interface-Capturing Technique (EDICT) for computation of unsteady flows with interfaces", *Computer Methods in Applied Mechanics and Engineering*, **155** (1998) 235–248.

13. K. Kashiyama, K. Saitoh, M. Behr and T.E. Tezduyar, "Parallel finite element methods for large-scale computation of storm surges and tidal flows", *International Journal for Numerical Methods in Fluids*, **24** (1997) 1371–1389.

14. T. Tezduyar, S. Aliabadi, M. Behr, A. Johnson, V. Kalro and M. Litke, "Flow simulation and high performance computing", *Computational Mechanics*, **18** (1996) 397–412.

15. K. Kashiyama, H. Ito, M. Behr and T.E. Tezduyar, "Three-step explicit finite element computation of shallow water flows on a massively parallel computer", *International Journal for Numerical Methods in Fluids*, **21** (1995) 885–900.

16. M. Behr, D. Hastreiter, S. Mittal and T.E. Tezduyar, "Incompressible flow past a circular cylinder: Dependence of the computed flow field on the location of the lateral boundaries", *Computer Methods in Applied Mechanics and Engineering*, **123** (1995) 309–316.

17. J.G. Kennedy, M. Behr, V. Kalro, and T.E. Tezduyar, "Implementation of implicit finite element methods for incompressible flows on the CM-5", *Computer Methods in Applied Mechanics and Engineering*, **119** (1994) 95–111.

18. T.E. Tezduyar, S.K. Aliabadi, M. Behr and S. Mittal, "Massively parallel finite element computation of compressible and incompressible flows", *Computer Methods in Applied Mechanics and Engineering*, **119** (1994) 157–177.

19. M. Behr and T.E. Tezduyar, "Finite element solution strategies for large-scale flow simulations", *Computer Methods in Applied Mechanics and Engineering*, **112** (1994) 3–24.

20. T. Tezduyar, S. Aliabadi, M. Behr, A. Johnson, and S. Mittal, "Parallel finite-element computation of 3D flows", *IEEE Computer*, **26** October (1993) 27–36.

21. M. Behr, A. Johnson, J. Kennedy, S. Mittal, and T.E. Tezduyar, "Computation of incompressible flows with implicit finite element implementations on the Connection Machine", *Computer Methods in Applied Mechanics and Engineering*, **108** (1993) 99–118.

22. M. Behr, L.P. Franca, and T.E. Tezduyar, "Stabilized finite element methods for the velocity-pressure-stress formulation of incompressible flows", *Computer Methods in Applied Mechanics and Engineering*, **104** (1993) 31–48.

23. T.E. Tezduyar, M. Behr, S.K. Aliabadi, S. Mittal, and S.E. Ray, "A new mixed preconditioning method for finite element computations", *Computer Methods in Applied Mechanics and Engineering*, **99** (1992) 27–42.

24. T.E. Tezduyar, M. Behr, S. Mittal, and J. Liou, "A new strategy for finite element computations involving moving boundaries and interfaces – the deforming-spatial-domain/space-time procedure: II. Computation of free-surface flows, two-liquid flows, and flows with drifting cylinders", *Computer Methods in Applied Mechanics and Engineering*, **94** (1992) 353–371.

25. T.E. Tezduyar, M. Behr, and J. Liou, "A new strategy for finite element computations involving moving boundaries and interfaces – the deforming-spatial-domain/space-time procedure: I. The concept and the preliminary tests", *Computer Methods in Applied Mechanics and Engineering*, **94** (1992) 339–351.

26. M. Behr, T.E. Tezduyar, and H. Higuchi, "Wake interference behind two flat plates normal to the flow: A finite-element study", *Theoretical and Computational Fluid Mechanics*, **2** (1991) 223–250.

27. M. Behr, J. Liou, R. Shih, and T.E. Tezduyar, "Vorticity-stream function formulation of unsteady incompressible flow past a cylinder: Sensitivity of the computed flow field to the location of the outflow boundary", *International Journal for Numerical Methods in Fluids*, **12** (1991) 323–342.

28. T.E. Tezduyar, J. Liou, D.K. Ganjoo, and M. Behr, "Solution techniques for the vorticity-stream function formulation of two-dimensional incompressible flows", *International Journal for Numerical Methods in Fluids*, **11** (1990) 515–539.

Conference Papers:

29. D. Arora, M. Behr and M. Pasquali, "Blood Damage Measures for Ventricular Assist Device Modeling", to appear in *Proceedings of 7th International Conference on Computational Modelling of Free and Moving Boundary Problems*, Santa Fe, New Mexico, (2003).

30. M. Behr, D. Arora and M. Pasquali, "Tracking Strain in Ventricular Assist Devices", *Proceedings of the 2nd Joint Meeting of IEEE Engineering in Medicine and Biology Society and Biomedical Engineering Society*, Houston, Texas, (2002).

31. M. Behr and P. Briggs, "Parallel Implementation of Computational Fluid Dynamics Codes on Emerging Architectures", *SCI 2002 Proceedings*, Orlando, Florida, (2002).

32. M. Behr and F. Abraham, "On Delaying the Breakdown of Continuum Models in Flow Simulations in Deforming Domains", in H.A. Mang, F.G. Rammensdorfer and J. Eberhardsteiner, editors, *Proceedings of the 5th World Congress on Computational Mechanics*, Vienna University of Technology, Vienna, Austria, (2002).

33. M. Behr, D. Arora and S. Schulte-Eistrup, "Prediction of Flow Features in Centrifugal Blood Pumps", *Proceedings of the 2nd European Conference on Computational Mechanics*, Cracow University of Technology, Cracow, Poland, (2001).

34. H.L. Edge, J. Sahu, W. Sturek, J. Clarke, D. Pressel, M. Behr, K.R. Heavey, P. Weinacht, C. Zoltani and C. Nietubicz, "ZNSFlow CFD CHSSI Software", AIAA Paper 2001-0595, *Proceedings of the AIAA 39th Aerospace Sciences Meeting*, Reno, Nevada, (2001).

35. M. Behr, "Stabilized space-time FEM and its applications to free-surface flows", *Proceedings of the Conference on Computational Engineering and Science*, Vol.5, JSCES, Tokyo, Japan, (2000).

36. M. Behr and T.E. Tezduyar, "Shear-slip mesh update method in 3D computation of complex flow problems with rotating mechanical components", in J.L. Tassoulas, editor, *Engineering Mechanics 2000*, CD-ROM, University of Texas, Austin, Texas, (2000).

37. D.M. Pressel, M. Behr and S. Thompson, "The True Limitations of Shared Memory Programming", *Proceedings of 1999 International Conference on Parallel and Distributed Processing Techniques and Applications*, Las Vegas, Nevada (1999).

38. H. Edge, J. Sahu, W. Sturek, J. Clarke, D. Pressel, M. Behr, K. Heavey, P. Weinacht and C. Zoltani, "CFD Computations with ZNSFlow CHSSI Software", *Proceedings of 1999 DoD HPCMO User's Group Conference*, Monterey, California (1999).

39. K. Kashiyama, S. Sugano, M. Behr and T.E. Tezduyar, "Space-time finite element method for shallow water flows considering moving boundaries", *Proceedings of the 3rd ASME/JSME Joint Fluids Engineering Conference*, ASME, San Francisco, California, (1999).

40. M. Behr and T.E. Tezduyar, "Shear-Slip Mesh Update Method for Computation of Flow Problems with Spinning Geometries", in S. Idelsohn, E. Oñate and E. Dvorkin, editors, *Computational Mechanics – New Trends and Applications*, CD-ROM, (1998).

41. W. Sturek, D.M. Pressel and M. Behr, "Comments on CFD Code Performance on Scaleable Architectures", in *Proceedings of the 4th Japan-US Symposium on Finite Element Methods in Large-Scale Computational Fluid Dynamics*, Tokyo, Japan, (1998).

42. T.E. Tezduyar, S. Aliabadi, M. Behr and I. Güler, "Finite element formulations for unsteady flows with interfaces", in M. Hafez and J.C. Heinrich, editors, *Proceedings of the Tenth International Conference on Finite Elements in Fluids*, Tucson, Arizona, (1998).

43. M. Behr and T.E. Tezduyar, "A note on Shear-Slip Mesh Update Method", *Lecture Notes of the Workshop on Parallel Computing in Applied Fluid Mechanics*, Associazione Amici Scuola Normale Superiore, Pisa, Italy, (1997).

44. T.E. Tezduyar, S. Aliabadi, M. Behr, I. Güler, A. Howard and M. Ellis, "Parallel computing methods for free-surface flows", *Proceedings of the 7th International Conference on Computing in Civil and Building Engineering*, Seoul, Korea, (1997).

45. T.E. Tezduyar, S. Aliabadi and M. Behr, "Enhanced-Discretization Interface-Capturing Technique", in Y. Matsumoto and A. Prosperetti, editors, *Proceedings of the ISAC '97 High Performance Computing on Multiphase Flows*, Japan Society of Mechanical Engineers, Tokyo, Japan, (1997).

46. T.E. Tezduyar, S. Aliabadi, M. Behr, A. Johnson, V. Kalro and M. Litke, "High performance computing in flow simulation", in L. Dekker, W. Smit and J.C. Zuidervaart, editors, *Eurosim '96 HPCN Challenges in Telecomp and Telecom: Parallel Simulation of Complex Systems and Large-Scale Applications*, North Holland, (1996) 27–34.

47. K. Kashiyama, S. Yoshikawa, M. Behr and T.E. Tezduyar, "Massively parallel finite element computation of storm surge", *Lecture Notes on Finite Element Simulation of Flow Problems*, Japan Society of Computational Fluid Dynamics, Tokyo, Japan, (1995).

48. T.E. Tezduyar, S. Aliabadi, M. Behr, A. Johnson, V. Kalro and C. Waters, "3D simulation of flow problems with parallel finite element computations on the Cray T3D", *Computational Mechanics '95, Proceedings of International Conference on Computational Engineering Science*, Mauna Lani, Hawaii, (1995).

49. T. Tezduyar, S. Aliabadi, M. Behr, A. Johnson, and S. Mittal, "Massively parallel finite element computation of 3D flows – mesh update strategies in computation of moving boundaries and interfaces", in A. Ecer, J. Hauser, P. Leca and J. Periaux, editors, *Parallel Computational Fluid Dynamics – New Trends and Advances*, Elsevier, (1995).

50. K. Kashiyama, H. Ito, M. Behr and T. Tezduyar, "Massively parallel finite element strategies for large-scale computation of shallow water flows and contaminant transport", *Extended Abstracts of the Second Japan-US Symposium on Finite Element Methods in Large-Scale Computational Fluid Dynamics*, Tokyo, Japan, (1994).

51. K. Kashiyama, H. Ito, M. Behr and T. Tezduyar, "Massively parallel finite element method for large-scale computation of shallow water flows", *Extended Abstracts of the Third World Congress on Computational Mechanics*, IACM, Chiba, Japan, (1994).

52. K. Kashiyama, M. Behr and T.E. Tezduyar, "Massively parallel finite element computation of shallow water flows and contaminant transport", in A. Peters *et al*, editors, *Computational Methods in Water Resources X*, Kluwer Academic Publishers, Paris, France, (1994).

53. J.G. Kennedy, V. Kalro, M. Behr, and T.E. Tezduyar, "A strategy for implementing implicit finite element methods for incompressible fluids on the CM-5", *Extended Abstracts of the Second Japan-US Symposium on Finite Element Methods in Large-Scale Computational Fluid Dynamics*, Tokyo, Japan, (1994).

54. T. Tezduyar, S. Aliabadi, M. Behr, A. Johnson, and S. Mittal, "Massively parallel finite element computation of three-dimensional flow problems", in *Proceedings of the 6th Japan Numerical Fluid Dynamics Symposium*, Tokyo, Japan, (1992).

55. M. Behr and T. Tezduyar, "Galerkin/least-squares space-time finite element method for deforming domains – recent developments", in J.J.H. Miller, editor, *BAIL VI Proceedings of the Sixth International Conference on Boundary and Interiors Layers – Computational and Asymptotic Methods*, Front Range Press, Copper Mountain, Colorado, (1992).

Book Chapters:

56. M. Behr, "Biofluid Simulations on Linux Clusters", in K. Matsuno, A. Ecer, J. Periaux, N. Satofuka and P. Fox, editors, *Parallel Computational Fluid Dynamics—New Frontiers and Multi-Disciplinary Applications*, Elsevier, (2003) 451–458.

57. T.E. Tezduyar, S. Aliabadi and M. Behr, "Parallel finite element computing methods for unsteady flows with interfaces", in M. Hafez and K. Oshima, editors, *Computational Fluid Dynamics Review 1998*, World Scientific, (1998) 643–667.

58. T.E. Tezduyar, S. Aliabadi, M. Behr, A. Johnson and M. Litke, "Parallel 3D finite element cmputation of contaminant dispersion", in S.N. Atluri and G. Yagawa, editors, *Advances in Computational Engineering Science*, Tech Science Press, (1997) 1002–1008.

59. T.E. Tezduyar, S. Aliabadi, M. Behr, A. Johnson, V. Kalro and M. Litke, "High performance computing techniques for flow simulations", in M. Papadrakakis, editor, *Parallel Solution Methods in Computational Mechanics*, Wiley, (1996) 363–398.

60. T.E. Tezduyar, M. Behr and T.J.R. Hughes, "Finite element metods", Section 19.3 in J.A Schetz and A.E. Fuhs, editors, *Handbook of Fluid Dynamics and Fluid Machinery*, Wiley, (1996) 1272-1282.

61. T.E. Tezduyar, M. Behr and T.J.R. Hughes, "High-performance finite element computation of fluid dynamics problems", in M. Hafez and K. Oshima, editors, *Computational Fluid Dynamics Review 1995*, Wiley, (1995) 300–321.

62. T.E. Tezduyar, M. Behr, S.K. Aliabadi, S. Mittal, and S.E. Ray, "A new mixed preconditioning method based on the clustered element-by-element preconditioners", in *Domain Decomposition Methods in Science and Engineering*, *Contemporary Mathematics* Vol.157, American Mathematical Society, (1994) 215–222.

63. T.E. Tezduyar, M. Behr, S. Mittal, and A.A. Johnson, "Computation of unsteady incompressible flows with the finite element methods – space-time formulations, iterative strategies and massively parallel implementations", in P. Smolinski, W.K. Liu, G. Hulbert, and K. Tamma, editors, *New Methods in Transient Analysis*, AMD Vol.143, ASME, (1992) 7–24.

64. T.E. Tezduyar, J. Liou, D.K. Ganjoo, M. Behr, and R. Glowinski, "Unsteady incompressible flow computations with the finite element method", in T.J. Chung, editor, *Finite Elements in Fluids*, Vol.8, Hemisphere Publishing, (1992) 177–209.

65. H. Higuchi, J. Liou, M. Behr, and T.E. Tezduyar, "Finite element computations and experimental studies of flow past an array of plates", in W.K. Liu et al., editor, *Computational Experiments*, PVP Vol.176, ASME, New York, (1989) 45–54.

Presentations Invited Presentations:

1. 11th Annual Meeting of the International Society for Rotary Blood Pumps, Bad Oeynhausen, Germany, September 2003.

2. 7th U.S. Natl Congress on Computational Mechanics Keynote, Albuquerque, New Mexico, July 2003.

3. RWTH Colloquium, Aachen, Germany, May 2003.

4. University of Stuttgart Colloquium, Stuttgart, Germany, May 2003.

5. University of Hawaii at Manoa Seminar, Honolulu, Hawaii, April 2003.

6. University of Vermont Seminar, Burlington, Vermont, April 2003.

7. Finite Elements in Fluids 2003 Keynote, Nagoya, Japan, April 2003.

8. Chuo University Seminar, Tokyo, Japan, March 2003.

9. SIAM Computational Science & Engrg CSE03, San Diego, California, February 2003 (2).

11. Rice University CITI Seminar, Houston, Texas, October 2002.

12. Max-Planck Institute Seminar, Greifswald, Germany, September 2002.

13. Systemics, Cybernetics and Informatics 2002, Orlando, Florida, July 2002.

14. 5th World Congress on Computational Mechanics, Vienna, Austria, July 2002.

15. Chuo University Seminar, Tokyo, Japan, May 2002.

16. Parallel CFD 2002, Nara, Japan, May 2002.

17. Sandia National Laboratories Seminar, Albuquerque, New Mexico, March 2002.

18. 6th U.S. Natl Congress on Computational Mechanics, Dearborn, Michigan, August 2001 (2).

20. Rice University Mechanics of Materials Group Meeting, Houston, Texas, June 2001.

21. Waterways Experiment Station Seminar, Vicksburg, Mississippi, August 2000.

22. Kyushu University Seminar, Fukuoka, Japan, June 2000.

23. University of Tokyo Seminar, Tokyo, Japan, June 2000.

24. 5th Japan National Congress on Computational Mechanics, Tokyo, Japan, May 2000.

25. Chuo University Seminars, Tokyo, Japan, May 2000 (3 seminars).

28. Stanford University Lecture, Stanford, California, April 2000.

29. 5th U.S.-Japan Symposium on Flow Simulation and Modeling, Houston, Texas, March 2000.

30. NASA Ames Research Center Seminar, Moffett Field, California, November 1999.

31. Rice University Seminar, Houston, Texas, April 1999.

32. Worcester Polytechnic Institute Seminar, Worcester, Massachussetts, February 1999.

33. University of Florida GERC Seminar, Shalimar, Florida, January 1999.

34. First HPC, Application and Training Workshop, Atlanta, Georgia, March 1998.

35. Workshop on Parallel Computing in Applied Fluid Mechanics, Pisa, Italy, September 1997.

36. AHPCRC 1997 Infrastructure Support Workshop, Vicksburg, Mississippi, February 1997.

37. Army Research Lab CFD6 CHSSI Meeting, Aberdeen, Maryland, August 1996.

38. AHPCRC Infrastructure Support Workshop, Aberdeen, Maryland, February 1996.

39. AHPCRC-ARL Joint Conference on CFD and CSM, Aberdeen, Maryland, December 1994.

40. Symposium on Parallel FE Computations, Minneapolis, Minnesota, October 1993.

41. 2nd U.S. National Congress on Computational Mechanics, Washington, D.C., August 1993.

42. U.S.-Japan Symposium on FEM in Large-Scale CFD, Minneapolis, Minnesota, October 1992.

43. 6th Intl Conference on Boundary and Interior Layers, Copper Mtn, Colorado, August 1992.

Contributed Presentations:

44. 13th Conf. of the European Society of Biomechancis, Wrocław, Poland, September 2002.

45. 5th European Conference on Computational Mechanics, Krakow, Poland, June 2001.

46. Finite Element in Fluids 2000, Austin, Texas, May 2000.

Teaching Experience	Undergraduate/Graduate	Graduate
	Kinematics and Dynamics of Fluid Flow	Finite Element Analysis
	Computational Fluid Mechanics	Parallel Computing Methods in Comput. Mech. `http://manila.mems.rice.edu/mech525`
	Engrg Mechanics: Statics and Dynamics `http://manila.mems.rice.edu/mech211`	Engrg Mathematical and Numerical Methods `http://manila.mems.rice.edu/mech524`

Service   Journal Referee:

- Advances in Water Resources
- ASCE Journal of Engineering Mechanics
- Communications in Numerical Methods in Engineering
- Computational Mechanics
- Computer Methods in Applied Mechanics and Engineering
- Computers & Fluids
- IEEE Computational Science & Engineering
- International Journal for Numerical Methods in Fluids
- International Journal of Applied Science and Computations
- International Journal of Computational Fluid Dynamics
- Journal of Visualization
- Parallel Computing

Proposal Referee:

- NSF
- Petroleum Research Fund

Professional Affiliations:

1995–present International Association of Computational Mechanics

1995–present U.S. Association of Computational Mechanics

2000–present American Institute of Aeronautics and Astronautics

2001–present American Society of Engineering Education