ALI BESKOK

Batten Professor of Computational Engineering
Old Dominion University
Department of Aerospace Engineering
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EDUCATION

Ph.D. Princeton University, Princeton, New Jersey, 1996.
Major: Mechanical and Aerospace Engineering
Dissertation: Simulations and Models for Gas Flows in Micro Geometries
Advisor: Prof. George Em Karniadakis

M.S.E. Princeton University, Princeton, New Jersey, 1994,
Major: Mechanical and Aerospace Engineering,
Masters Thesis: Simulation of Heat and Momentum Transfer in Complex Micro Geometries,
Advisor: Prof. George Em Karniadakis.

M.S.M.E. Indiana University - Purdue University in Indianapolis, Indiana, 1991,
Major: Mechanical Engineering,
Masters Thesis: A Parallel Finite Element Algorithm for the Time-Averaged Solution of Rotor-Stator Interaction Problem,
Advisor: Prof. Hasan Akay.

B.S.M.E. Middle East Technical University, Ankara, Turkey, 1988,
Major: Mechanical Engineering,
Rank: 4th out of 162 Graduates.

EXPERIENCE

Professor Batten Professor of Computational Engineering, Old Dominion University, Aerospace Engineering Department (1/07-present).

Associate Professor Texas A&M University, Mechanical Engineering Dept. (9/04 to 12/06)
Affiliated with: TAMU Materials Science and Engineering Program.

Assistant Professor Texas A&M University, Mechanical Engineering Dept. (9/98-8/04).

Post-Doctoral Massachusetts Institute of Technology, Research Laboratory of Electronics (1996-1998), *Advisor:* Prof. Jacob White.

Visiting Scholar Brown University, Center for Fluid Mechanics & Division of Applied Mathematics (1994-1996), *Advisor:* Prof. George Em Karniadakis.

Professional Interests:
Research Interests: Micro- and nano-scale thermal fluidic transport; bio-particle and colloidal manipulations using microfluidics; electrokinetic transport; rarefied gas dynamics; nano technology.

Numerical Methods: Finite element and spectral element methods; direct simulation Monte Carlo method for rarefied gas flows; molecular dynamics; lattice Boltzmann method.

Awards and Nominations:
- Recognized Student Organization *Advisor of the Year Award,* May 3, 2005.
- *BP Faculty Award for Teaching Excellence*, Fall 2004.
- Sigma Delta Chapter of Pi Tau Sigma, *Honorary Faculty Member*, inducted 2004.
- Recipient of *Peggy L. and Charles L. Brittan '65 Outstanding Undergraduate Teaching Award*, 2003.
- Recipient of *National Research Council, Faculty Summer Research Fellowship*, Wright Patterson Air Force Base, June-August, 2002.
- Recipient of *Oak Ridge Associated Universities Ralph E. Powe Junior Faculty Enhancement Award*, 2000.
- Texas A&M University nominee *for David and Lucile Packard Fellowship in Engineering and Science,* 1999.

Society Memberships:
- Member of American Society of Mechanical Engineers, 1989-present.
- Member of American Institute of Aeronautics and Astronautics, 1990-present (life member).
- Member of American Society of Engineering Education, 1999-present.
- Member of American Physical Society, 1999-present.
- Member of Sigma Xi Scientific Research Society, 1993-present.

RESEARCH

Patents:
US Patent: "Method and System for Storing Information Using Nano-Pinned Dipole Magnetic Vortices in Superconducting Materials," Inventors: M.J. Andrews, J.H. Ross, Jr., J.C. Slattery, M. Yavuz, A. Beskok, K.T. Hartwig, Jr., # 6,787,798, September 7, 2004.

Publications: (Current and former student names are italicized, and indicated by *. The post-doctoral research associates are shown by ‡.)

Book:
1. Karniadakis, G.E. and Beskok, A., *Micro Flows: Fundamentals and Simulation*, Springer, New York, 2002. (365 pages. Also published by the Springer International Student Edition in 2003, with distribution in Southeast Asia. In *Chinese*, by Chemical Industry Press. This book has been adopted as a text book for microfluidics courses at various universities).
2. Karniadakis, G.E., Beskok, A., and Aluru, N., *Microflows and Nanoflows: Fundamentals and Simulation*, Springer, New York, 2005 (817 pages).

Book Chapters:

1. Qian S, Celik B, Beskok A., "Characterization of Chaotic Stirring and Mixing Using Numerical Tools," *Microfluidics and Nanofluidics Handbook*, edited by Mitra, S. and Chakraborty, S., CRC Press/Taylor & Francis Group, 2010.
2. Beskok, A., "Gas Flow in the Transition and Free Molecular Flow Regimes," NATO Advanced Study Institute on *Microfluidic Based Microsystems,* Editor. S. Kakac, Springer, New York, 2010.
3. Beskok, A., "Mixing in Microfluidic Systems," NATO Advanced Study Institute on *Microfluidic Based Microsystem,s* Editor. S. Kakac, Springer, New York, 2010.
4. Beskok, A., "AC Electrokinetic Flows," NATO Advanced Study Institute on *Microfluidic Based Microsystems,* Editor. S. Kakac, Springer, New York, 2010.
5. Beskok, A., *Hahm*[*], J., and *Dutta*[*], P., "Electrokinetic Transport Phenomena in Micro-Fluidics", *Micromechanics and Nanoscale Effects: MEMS, Multi-Scale Materials and Micro-Flows,* Editors: V.M. Harik and L-S. Luo, Kluwer Academic Publishers, the Netherlands, 2004.
6. Beskok, A. "Molecular-Based Microfluidic Simulation Models", *CRC Handbook of MEMS*, Chapter 8, Editor: Mohamed Gad-el-Hak, CRC Press, Boca Raton, FL, 2001 (Published also in the Second Edition, 2006)
7. Beskok, A. and Akay, H.U., "A Parallel Algorithm for Compressible Flows through Rotor-Stator Combinations", *Scientific and Engineering Computation Series: Parallel Computational Fluid Dynamics, Implementations and Results*. Editor: H.D. Simon. MIT Press, Cambridge, MA, 1992.

Peer Reviewed Journal Publications: (As of February 2010, ISI Citation Index has shown ***856 citations*** of Dr. Beskok's research with ***h-index***: 14.)

Published and Accepted Articles:

1. Beskok, A., and Karniadakis G.E., "Simulation of Heat and Momentum Transfer in Complex Micro-Geometries," *Journal of Thermophysics and Heat Transfer*, Volume 8, Number 4, pp. 647-655, 1994.
2. Beskok, A., Trimmer W., and Karniadakis G.E., "Rarefaction and Compressibility Effects in Gas Micro-Flows," *Journal of Fluids Engineering*, Vol. 118, pp. 448-456, 1996. (with 74 citations, designated as the **17th highly cited reference in MEMS** area out of 3906 papers published between 1994-2004, by the *ISI Essential Science Indicators* rankings http://www.esi-topics.com/mems/papers/map.html Currently this paper has 160 citations).
3. Beskok, A., and Karniadakis, G.E. "A Model for Flows in Channels, Pipes and Ducts at Micro and Nano Scales," *Microscale Thermophysical Engineering*, Vol. 3, No: 1, pp. 43-77 1999.
4. Beskok, A., and Warburton, T.C., "Arbitrary Lagrangian Eulerian Analysis of a Bi-Directional Micro-Pump Using Spectral Elements," *Int. J. of Computational Engineering Science*, Vol. 2. No 1, pp: 43-57, 2001.
5. Beskok, A., and Srinivasa, A., "Design and Analysis of a Simple Magneto-Elastic Pump," *Journal of Fluids Engineering,* Technical Note, Vol. 123, No: 2, pp. 435-438, 2001.
6. *Sert*[*], C., and Beskok, A., "Shear Layer Instability and Mixing in Micro Heat Spreaders," ASME *J. of Heat Transfer*, Photo Gallery Paper, Vol. 123, No. 4, pp: 621, August 2001.

7. *Dutta*[*], P., and Beskok, A., "Analytic Solution of Combined Electroosmotic/Pressure Driven Flows in Two- Dimensional Straight Channels: Finite Debye Layer Effects," *Analytical Chemistry*, 73(9); 1979-1986, 2001.
8. *Dutta*[*], P. and Beskok, A., "Time Periodic Electroosmotic Flows: Analogies to Stokes' Second Problem," *Analytical Chemistry,* 73(21); 5097-5102, 2001.
9. Beskok, A., "Validation of a New Slip Model for Separated Gas Micro-Flows," *Numerical Heat Transfer: Fundamentals*, 40 (6): 451-471, December 2001.
10. Beskok, A. and Warburton, T.C., "An Unstructured H/P Finite Element Scheme for Fluid Flow and Heat Transfer in Moving Domains," *Journal of Computational Physics*, 174, 492-509, 2001.
11. *Dutta*[*], P., Beskok, A., and Warburton T.C., "Electroosmotic Flow Control in Complex Micro-Geometries," *Journal of MEMS*, Vol 11, no 1, 36-44, February 2002.
12. *Dutta*[*], P., Beskok, A., and Warburton T.C., "Numerical Simulation of Mixed Electroosmotic/ Pressure Driven Flows in Complex Micro-Geometries," *Numerical Heat Transfer: Part A,* 41, 131-148, 2002.
13. *Ahmed*[*], I. and Beskok, A., "Rarefaction Compressibility and Viscous Heating in Gas Micro Filters," *AIAA Journal of Thermophysics and Heat Transfer*, Vol 16, no 2, 161-170, 2002.
14. *Sert*[*], C. and Beskok, A., "Time-Periodic Forced Convection in Micro Heat Spreaders," *Numerical Heat Transfer: A,* Vol. 42, No 7, 685 - 705, 2002.
15. Kim, M.J., Kihm, K.D., and Beskok, A., "Electro-Osmosis-Driven Micro-Channel Flows: A Comparative Study of Microscopic Particle Image Velocimetry Measurements and Numerical Simulations," *Experiments in Fluids,* 33, 170-180, 2002.
16. Holden, M.A., *Kumar*[*], S., Beskok A., Cremer P.S., "Microfluidic Diffusion Diluter: Bulging of PDMS Microchannels Under Pressure Driven Flow," *Journal of Micro Mechanics and Micro Engineering,* Vol 13, 412 - 418, 2003.
17. Holden, M.A., *Kumar*[*], S., Castellana, E, Beskok A., Cremer P.S., "Generating Fixed Concentration Arrays in a Microfluidic Device," *Sensors and Actuators B,* Vol 92, 1999-207, 2003.
18. *Sert*[*], C. and Beskok, A., "Numerical Simulation of Reciprocating Flow Forced Convection in Two Dimensional Channels," *ASME Journal of Heat Transfer* Vol 125(3), 403-412, 2003.
19. *Kumar*[*], S., Beskok A., "Heat and Mass Transfer in a Peristaltic Micro Mixer," *ASME Journal of Heat Transfer,* Photo Gallery Paper, Vol 125(4), 548, 2003.
20. *Bahukudumbi*[*], P., *Park*[‡], J.H., and Beskok, A., "A Unified Engineering Model for Shear Driven Gas Micro Flows," *Microscale Thermophysical Engineering*, Vol 7(4), 291-315. 2003.
21. *Bahukudumbi*[*], P., and Beskok, A., "A Phenomenological Lubrication Model for the Entire Knudsen Regime," *Journal of Micromechanics and Microengineering,* Vol 13 No 6, 873-884, 2003.
22. *Park*[‡], J.H., *Bahukudumbi*[*], P., and Beskok, A., "Rarefaction Effects on Shear Driven Oscillatory Flows: A DSMC Study in the Entire Knudsen Regime," *Physics of Fluids*, Vol 16 No 2, pp. 317-330, 2004.
23. *Hahm*[*], J and Beskok, A., "On-Chip Multi-Species Detection Using Hydrodynamic/ Electrokinetic Focusing," *Bulletin of the Polish Academy of Sciences: Technical Sciences*, Vol 53, No 4, pp 325-334, 2005.

24. *Sert*[*], C. and Beskok, A., "Spectral Element Formulations on Nonconforming Grids: A Comparative Study of Pointwise Matching and Integral Projection Methods," *Journal of Computational Physics,* 211 (1): 300-325 January 1 2006.
25. Pillai, S.D., Beskok, A., *Balasubrahmanian*[*]*, A.,* and Soni, K., "A Microfluidic Device for Capture and Concentration of Microorganisms in Recycled Water," *Habitation*, Vol 10, No 3/4, pp 224, 2006.
26. *Hahm*[*], J., *Balasubramanian*[*], A., and Beskok, A., "Flow and Species Transport Control in Grooved Micro-Channels Using Local Electrokinetic Forces," *Physics of Fluids,* 19, 013601 2007.
27. *Bahukudumbi*[*]*,* P., and Everett, W.N., and Beskok, A., Huff, G.H., and Lagoudas, D., and Ounaies, Z., and Bevan, M. "Colloidal Microstructures, transport, and Impedance Properties within Interfacial Microelectrodes," *Applied Physics Letters,* 90 224102, 2007. (Reprinted in June 11, 2007 issue of *Virtual Journal of Nanoscale Science & Technology*).
28. *Balasubramanian*[*], A. and Pillai, S.D. and Beskok, A., "In-situ analysis of bacterial capture in a microfluidic channel," *Journal of Micromechanics and Microengineering*, 1467-1478, (17) 2007.
29. *Balasubramanian*[*], A. and Soni, K. and Pillai, S.D. and Beskok, A., "A Microfluidic Device for Continuous Capture of Pathogens from Water," *Lab on a Chip*, Vol 7, 1315-1321, 2007.
30. *Kim*[*], H.J., and Beskok, A., "Quantification of Chaotic Strength and Mixing in a Microfluidic System," *Journal of Micromechanics and Microengineering* (17) 2197-2210, 2007. (Featured in *IoP Select*, a special collection of journal articles published by the Institute of Physics).
31. *Kumar*[*], S., *Kim*[*], H.J., and Beskok, A., "Numerical Simulations of Peristaltic Mixing," *Journal of Fluids Engineering*, Vol 129 1361-1371, 2007.
32. Soni, K. and *Balasubramanian*[*], A. and Pillai, S.D. and Beskok, A., "Zeta Potential of Selected Bacteria in Drinking Water When Dead, Starved, or Exposed to Minimal and Rich Culture Media," *Current Microbiology*, 56(1): 93-97 2008.
33. *Bahukudumbi*[*]*,* P., and Beskok, A. "Quantification of Energy Dissipation for Laterally Oscillating Microstructures," *Physics of Fluids*, Vol 20(3), 033603, 2008 (Also featured in April 7, 2008 issue of *Virtual Journal of Nanoscale Science & Technology*).
34. *Park*[*], S., Beskok, A., "Alternating current electrokinetic motion of colloidal particles on interdigitated microelectrodes," *Analytical Chemistry,* Vol 80(8): 2832-2841, 2008.
35. *Kim*[*]*, B.,* Beskok, A., Cagin, T. "Thermal Interactions in Nanoscale Fluid Flow—Molecular Dynamics Simulations with Solid-Liquid Interfaces," *Microfluidics and Nanofluidics,* Volume: 5(4): 551-559, 2008.
36. *Celik*[‡], B., *Akdag*[‡]*,* U., *Gunes*[*]*,* S., and Beskok, A., "Flow Past an Oscillating Circular Cylinder in a Channel with an Upstream Splitter Plate," *Physics of Fluids*, Vol 20(10), 103603, 2008.
37. *Kim*[*]*,* B., Beskok, A., Cagin, T. "Molecular Dynamics Simulations of Thermal Resistance at the Liquid-Solid Interface," *Journal of Chemical Physics,* 129, 174701, 2008 (Also featured in November 17, 2008 issue of *Virtual Journal of Nanoscale Science & Technology*).
38. *Kim*[*]*,* H.J.*,* and Beskok, A., "Numerical Modeling of Chaotic Mixing in Electroosmotically Stirred Continuous Flow Mixers," ASME *Journal of Heat Transfer,* 131(9), 092403, 2009.
39. *Park*[‡], S., *Koklu*[‡], M., Beskok, A., "Particle trapping in high conductivity media with electrothermally enhanced negative dielectrophoresis," *Analytical Chemistry,* 81(6), pp 2303-2310, 2009.

40. *Celik*[‡]*,* B., and Beskok, A., "Mixing induced by a transversely oscillating circular cylinder in a straight channel," *Physics of Fluids,* (21), 073601*,* 2009.
41. Hu, Q, Joshi, R.P., and Beskok, A. "Model study of electroporation effects on the dielectrophoretic response of spheroidal cells," *Journal of Applied Physics,* Vol 106, 024701, 2009.
42. *Kim*[*]*,* B., Beskok, A., Cagin, T. "Viscous Heating in Nanoscale Shear Driven Liquid Flows," *Microfluidics and Nanofluidics*, DOI 10.1007/s10404-009-0515-5, 2009.
43. Ai Y., Beskok A., Gauthier D., Joo S.W., and Qian S., "DC electrokinetic transport of cylindrical cells in straight microchannels," *Biomicrofluidics*, 3, 044110, 2009 (Also featured in the December 1, 2009 issue of *Virtual Journal of Biological Physics Research*).
44. *Celik*[‡], B., Raisee M., Beskok, A., **"**Heat transfer enhancement in a slot channel via a transversely oscillating adiabatic circular cylinder," *International Journal of Heat and Mass Transfer*, 53: 626-634, 2010.
45. Ai, Y., *Park*[*]*,* S., Zhu, J., Xuan, X., Beskok, A., and Qian, S., "DC Electrokinetic Particle Transport in an L-shaped Microchannel," *Langmuir,* 26(4), 2937-2944, 2010.
46. *Barisik*[*]*,* M., *Kim*[*]*,* B., Beskok, A., "Smart Wall Model for Molecular Dynamics Simulations of Nanoscale Gas Flows," *Communications in Computational Physics*, 7(5): pp 977-993, 2010.
47. Luo, X., Beskok, A., and Karniadakis, G.E., "Modeling Electrokinetic Flows by Smoothed Profile Techniques," *J. Comp. Physics*, in Press, 2010.
48. *Sabuncu*[*], A.C., Kalluri, B.S., Qian, S., Stacey, M., Beskok, A., "Dispersion state and toxicity of mwCNTs in cell culture medium with different T80 concentrations," *Colloids and Surfaces* B, In Press, 2010.

Peer Reviewed Journal Articles, Under Review:

- *Kim*[*]*, H.J.*, Beskok, A., "An Algebraic Factorization Scheme for Spectral Element Solution of Incompressible Fluid Flow and Scalar Transport," Submitted.
- *Barisik*[*]*,* M., *Kim*[*]*,* B., Beskok, A., *"*Molecular Dynamics Investigation of Nano-Scale Gas Flows: A Case Study of Couette Flow at *Kn*=10," Submitted.
- *Koklu*[*]*,* M, *Park*[*]*,* S., Beskok, A., "Effects of electrothermal fluid motion on dielectrophoretic traps in shallow and deep microfluidic chambers," Submitted.
- *Sabuncu*, A.C.*, Liu, J.A., Beebe, S.J., and Beskok, A., "Dielectrophoretic assessment of mouse melanoma clones," Submitted.

Conference Proceedings:

1. Gu, D., Yalcin, S.E., Baumgart, H., Qian, S., Beskok, A., Baysal, O., "Zeta Potentials of ALD Metal Oxide Films for Microfluidic Applications," 9th International Conference on Atomic Layer Deposition, July 19-22, Monterey, California, USA, 2009.
2. Celik B., Beskok A., Raisee M., Heat transfer enhancement in a straight channel via transversely oscillating adiabatic circular cylinder, *First International Conference on Computational Methods for Thermal Problems*, September 8-10, Naples, Italy, 2009.
3. Ai Y., Park S., Zhu J., Xuan X., Beskok A., and Qian S., Transient electrophoretic motion of charged particles through an L-shaped microchannel, Proceedings of IMECE 2009, November 13-19, Lake Buena Vista, Florida, USA, 2009.
4. Sabuncu A.C., Kalluri B.S., Cao W., Stacey M.W., Qian S., Beskok A. and Abdel-Fattah T.M., Electrokinetic Properties of Colloidal Carbon Nanotubes, The 13th International

Conference on Surface & Colloid Science and the 83rd ACS Colloid & Surface Science Symposium, June 14-19, 2009, New York, USA, 2009.

5. Ai Y., Joo S.W., Beskok A., and Qian S., Dielectrophoretic choking phenomenon in a converging-diverging channel, the 13th International Conference on Surface & Colloid Science and the 83rd ACS Colloid & Surface Science Symposium, June 14-19, New York, USA, 2009.
6. *Kim*[*]*, B.,* Beskok, A., Cagin, T. "Molecular Dynamics Simulations of Thermal Interactions in Nanoscale Liquid Channels," ASME IMECE 2008, Boston, MA, IMECE2008-67448, October 31-November 6, 2008.
7. Beşkök, A., and *Çelik*[‡], B., "Mikro Akışlı Sistemlerde Elektrokinetik Taşıma," 2. Ulusal Havacılık ve Uzay Konferansi, İTU, İstanbul, Turkey, 15-17 October, UHUK-2008-002, 2008.
8. Beskok, A., "An Electrokinetically Stirred Continuous Flow Micromixer," 6th International Conference on Nanochannels, Microchannels and Minichannels (ASME), June 23-25, Darmstadt, Germany, ICNMM2008-62022, 2008.
9. *Kim*[*], H.J., and Beskok, A., "Numerical Studies of Mixing in an Electroosmotically Stirred Continuous Micro Mixer," ASME IMECE 2007, Seattle, WA, IMECE2007-42730, November 11-15, 2007.
10. *Akdag*[‡], U., and Beskok, A. "A Review of Electrokinetic Transport in Microfluidics,"16th Ulusal Isı Bilimi ve Tekniği Kongresi, Kayseri, Turkey, 30 May-2 June 2007.
11. *Akdag*[‡], U., *Gunes, S*[*]., and Beskok, A. "The Vorticity Dynamics of Flow Past an Oscillating Cylinder in Microscale," 4th Ankara International Aerospace Conference, Ankara, Turkey, 10-12 September, AIAC-2007-015, 2007.
12. Beskok, A., Bevan, M.A., Ounaieas, Z., and Lagoudas, D., "Reversible control on anisotropic electrical conductivity," SPIE Smart Structures and materials & Nondestructive Evaluation and Health Monitoring, 14th International Symposium 18-22 March, San Diego, CA. 2007.
13. Huff, G.H., *Bahukudumbi*[*]*, P.,* Everett, W.N., Beskok, A., Bevan, M.A., Lagoudas, D., and Ounaieas, Z., "Electromagnetically Functional Hybrid Composites for Structurally Embedded Load Breaing Aerosurface Antennas," URSI697, CNC/USNC North American Radio Science Meeting, July 22nd – 26th, Ottawa, ON, Canada, 2007.
14. Huff, G.H., *Bahukudumbi*[*]*, P.*, Everett, W.N., Beskok, A., Bevan, M.A., Lagoudas, D., and Ounaieas, Z., "Electromagnetically Tunable Fluids for Microfluidic Reconfiguration of Antennas," URSI699, CNC/USNC North American Radio Science Meeting, July 22nd – 26th, Ottawa, ON, Canada, 2007.
15. Kim, K., and Kerr, M.L., and Beskok, A., and Jayasuriya, S., "Frequency-domain based Feedback Control of Flow Separation using Synthetic Jets," *Proceedings of American Control Conference* (ACC 2006), Minneapolis, Minnesota, June 14-16, 2006.
16. *Bahukudumbi*[*], P., Everett, W.N., Bevan, MA, and Beskok, A., "Engineering Colloidal Microfluidic Networks with Directed Assembly", The 43rd Annual Technical Meeting of the Society of Engineering Science, August 13-16, University Park, PA, 2006.
17. *Hahm*[*], J and Beskok, A., "Flow and Species Transport Control in Grooved Micro-Channels," *Proceedings of ASME IMECE Meeting,* IMECE2005-82111, 2005.
18. *Bahukudumbi*[*], P., Bevan, MA, and Beskok, A., "Self and Directed Colloidal Assembly On Patterned Electrodes", *Proceedings of ASME IMECE Meeting,* IMECE2005-80628, 2005.

19. Kim, K. and Beskok, A., and Jayasuriya, S., "Nonlinear System Identification for the Interaction of Synthetic Jets with a Boundary Layer," *Proceedings of American Control Conference* (ACC 2005), Portland, Oregon, June 8-10, 2005.
20. Ford, D.M. and Bevan, M.A. and Beskok, A, and Schielack, J.F., "High School Science Teachers Use Scientific Inquiry in Nanotechnology to Build Instructional Frameworks" AIChe Annual Meeting, Cincinnati, OH, Oct 30-Nov 4, 2005.
21. *Park*‡, J-H, and Beskok, A., "DSMC Analysis of Fluid Film Damping in Laterally Oscillating Microstaructures," *Proceedings of ASME IMECE Meeting*, IMECE 2003-41610, 2003.
22. *Bahukudumbi**, P., *Park*‡, J-H, and Beskok, A., "Direct Simulation Monte Carlo Analysis of Oscillatory Couette Flow," AIAA 2003-3771, *36th AIAA Thermophysics Conference*, Orlando, FL, June 23 – 26, 2003.
23. *Bahukudumbi**, P., *Park*‡, J-H, and Beskok, A., "Unified Engineering Models for Prototype Applications of Shear and Pressure Driven Gas Micro Flows," AIAA, 2003-0438, *41st AIAA Aerospace Sciences Meeting and Exhibit*, January 6-9, Reno, NV 2003.
24. *Bahukudumbi**, P., and Beskok, A., "A Unified Engineering Model for Shear Driven Gas Micro Flows," *Proceedings of ASME IMECE Meeting*, IMECE/MEMS 2002-33699, 2002
25. Beskok, A., "Physical Challenges and Simulation of Microfluidic Transport," *Proceedings of AIAA Aerospace Sciences Meeting and Exhibit,* AIAA-2001-0718, 2001.
26. *Dutta**, P., and Beskok, A. "Analysis of Time Periodic Electroosmotic Flows," *Proceedings of ASME IMECE Meeting*, IMECE/MEMS-23867, 2001.
27. *Dutta**, P., Kim, M.J., Kihm, K.D., and Beskok, A. "Electroosmotic Flow in a Grooved Micro-Channel Configuration: A Comparative Study of μ-PIV Measurements and Numerical Simulations," *Proceedings of ASME IMECE Meeting*, IMECE2001/MEMS-23895, 2001.
28. *Ahmed**, I. and Beskok, A. "Numerical Simulation of Gas Flows in Micro-filters," *Proceedings of ASME IMECE Meeting*, IMECE/MEMS-23873, 2001.
29. *Sert**, C., and Beskok, A., "Time Periodic Forced Convection Cooling in Micro Heat Spreaders," *Proceedings of ASME IMECE Meeting*, MEMS Vol. 2, pp: 571-580 2000
30. *Dutta**, P, and Beskok, A., "Electroosmotic Flow Control in Complex Micro-Geometries," *Proceedings of ASME IMECE Meeting*, MEMS Vol: 2 pp: 375-384 2000.
31. *Dutta**, P, and Warburton, T.C., and Beskok, A., "Numerical Modeling of Electrokinetically Driven Micro Flows," *Proceedings of ASME IMECE Meeting*, MEMS Vol. 1, pp: 467-474, 1999.
32. Kirby, R.M., and Warburton, T.C., and Sherwin, S.J., and Beskok, A. and Karniadakis, G.E., "The Nektar Code: Dynamics Simulations without Remeshing," ASME 2nd International Conference on Computational Technologies for Fluid/ Thermal/ Chemical Systems with Industrial Applications, San Francisco, CA July 18-22, 1999.
33. Du, Y. and Beskok, A. and Karniadakis, G.E. "Simulations of a Lorentz Force Actuator," *Proceedings of the 3rd ASME/JSME Joint Fluids Engineering Conference* San Francisco, CA July 18-22, 1999.
34. Liu, F. and Gatsonis, N.A. and Beskok, A. and Karniadakis, G. E., "Simulation Models for Rarefied Flow Past Sphere in a Pipe," *Rarefied Gas Dynamics*, Vol. I, p. 679-686, Cepadues-Editions, Toulouse, France, 1999.
35. Beskok, A. and Warburton, T.C., "Micro-Fluidic Design and Fluid Structure Interaction Analysis of a Micro-Pump," *Proceedings of ASME IMECE Meeting*, November 15-20, CA, November 15-20, CA, DSC-Vol. 66, pp. 77-84, 1998.

36. Liu, H.F. and Beskok, A. and Gatsonis, N. and Karniadakis, G.E. "Rarefied Gas Flow Passed a Micro-Sphere: Effects of Rarefaction," *Proceedings of ASME IMECE Meeting*, November 15-20, CA, DSC-Vol. 66, pp. 445-452, 1998.
37. Du, Y. and Beskok, A. and Warburton, T. and Karniadakis, G.E., "Lorentz Force Modeling in EMHD Turbulence Control: DNS Studies," *Proceedings of the International Symposium on Seawater Drag Reduction*, Newport, RI, 22-23 July 1998.
38. Beskok, A. and Karniadakis, G.E., "Modeling Separation in Rarefied Gas Flows," *28th AIAA Fluid Dynamics Conference,* AIAA 97-1883, June 29-July 2, 1997.
39. Beskok, A. and Trimmer, W. and Karniadakis, G.E., "Rarefaction, Compressibility and Thermal Creep Effects in Micro-Flows," *Proceedings of the ASME IMECE Meeting* Dynamic Systems and Control Division DSC-Vol. 57-2, pp. 877-892, 1995.
40. Beskok, A. and Karniadakis, G.E., "Simulation of Heat and Momentum Transfer in Complex Micro-Geometries," *AIAA Shear Flow Conference*, July 6-9, Florida, AIAA 93-3269, 1993.
41. Beskok, A. and Karniadakis, G.E., "Simulation of Slip-Flows in Complex Micro-Geometries," *Proceedings of the ASME IMECE Meeting,* DSC-Vol. 40, Micromechanical Systems. Book No. G00783-1992, pp. 355-370, 1992.

Bulletin of American Physical Society, Division of Fluid Dynamics Abstracts:

1. *Kim**, B.H., and Beskok, A., "Viscous Heating in Nanoscale Shear Driven Flows," *Bulletin of American Physical Society, Division of Fluid Dynamics*, Vol. 54, no 19, pp 235, 2009.
2. *Barisik**, M., *Kim** B.H., and Beskok, A., "Molecular Dynamics Simulations of Nanoscale Gas Flows," *Bulletin of American Physical Society, Division of Fluid Dynamics*, Vol. 54, no 19, pp 190, 2009.
3. Lui, X., Beskok, A., Karniadakis, G.E., "Modeling Electrophoresis of Microtubles in Microchannels," *Bulletin of American Physical Society, Division of Fluid Dynamics*, Vol. 54, no 19, pp 150, 2009.
4. Ai, Y., Joo, S.W., Beskok, A., Qian, S., "DC Electrokinetic Transport of a Cylindrical Particle in a Rectangular Microchannel," *Bulletin of American Physical Society, Division of Fluid Dynamics*, Vol. 54, no 19, pp 150, 2009.
5. Beskok A., *Kim**, *B.H.*, and Cagin, T., "Thermal Resistance at the Liquid-Solid Interface", *Bulletin of American Physical Society, Division of Fluid Dynamics*, Vol. 53, pp 165, 2008.
6. *Celik*‡, *B., Akdag*‡, *U.,* and Beskok, A., "Mixing Potential of an Oscillating Cylinder in a Microchannel," *Bulletin of American Physical Society, Division of Fluid Dynamics*, Vol. 52, no 17, pp 200., 2007.
7. *Bahukudumbi**, P., and Bevan, M., and Beskok, A. "Reversible Control of Anisotropic Electrical Conductivity Using Colloidal Microfluidic Networks," *Bulletin of American Physical Society, Division of Fluid Dynamics*, Vol. 51, 2006.
8. *Bahukudumbi**, P., and Bevan, M., and Beskok, A. "Mapping potential energy landscapes of templated substrates using diffusing colloidal particles," *Bulletin of American Physical Society, Division of Fluid Dynamics*, Vol. 50, pp 91, 2005.
9. *Kim**, H-J., and Beskok, A., "Characterization of mixing in an electroosmotically stirred continuous micro mixer," *Bulletin of American Physical Society, Division of Fluid Dynamics*, Vol. 50, pp 160, 2005.
10. *Sert**, C. and Warburton, T.C. and Beskok, A. "Conceptual Design and Simulation of Forced Convection Micro Heat Spreaders," *Bulletin of American Physical Society, Division of Fluid Dynamics*, Vol. 44, No 8, p 23, 1999.

11. *Dutta*[*], P, and Warburton, T.C., and Beskok, A., "Electroosmotically Driven Liquid Flows in Complex Micro-Geometries," *Bulletin of American Physical Society, Division of Fluid Dynamics*, Vol. 44, No 8, p 23, 1999.
12. Beskok, A. and Karniadakis, G.E, "Modeling Separation in Rarefied Gas Flows," *Bulletin of American Physical Society, Division of Fluid Dynamics*, Vol. 41, No 9, p 1812, 1996.
13. Beskok, A. and Karniadakis, G.E, "Models and Limits of Slip/Transitional Flow Theory in Micro-Channel Flows," *Bulletin of American Physical Society, Division of Fluid Dynamics*, Vol. 40, No 12, p 1934, 1995.
14. Beskok, A. and Trimmer, W. and Karniadakis, G.E, "Models and Simulations of Micro-Flows," *Bulletin of American Physical Society, Division of Fluid Dynamics*, Vol. 39, No 9, p 1924, 1994.

Research Projects (Total Value: $3,449,174; Prorated Value: $1,748,787)

ODU Years

1. "A Learning Community for Engineers and Biologists at the Bio-Micro/Nano Interface," NSF, CCLI program, 6/2010-5/2013, S/ Qian (PI); Ali Beskok (co-PI) with 2 others. Total: $175,000 (Prorated: $43,750).
2. "Integrating Microbial Target Capture with Flow Field Fractionation for Lab on a Chip Device for Food Matrices," National Center for Food Protection and Defense (A Homeland Security Center of Excellence) October 2009 - September 2010, Suresh Pillai (TAMU, PI) Ali Beskok (co-PI). Total: $154,541, (Prorated: $108,468).
3. "Interface Resistance and Thermal Transport in Nano-Scale Confined Liquids," CBET, NSF, 1/2010-12/2012, Ali Beskok (PI). Total: $255,624.
4. "MRI: Acquisition of Four-Probe MultiView 4000 AFM, NSOM, and SPM System," Shizhi Qian (PI), A Beskok, J. Hao, D. Gauthier, and R Cooper, co-PIs. NSF, CBET, 8/2009-7/2012, Total: $310,401. (Prorated: $62,080).
5. "Novel nano-porous electroosmotic micropump: Basic technology development and its lab-on-a-chip applications," ODU Office of Research, Shizhi Qian (PI), Helmut Baumgart and Ali Beskok (Co-PIs). Total: $70,000. (Prorated: $17,500).
6. "A Microfluidic Approach for Separation and Concentration of Bacterial Spores from Milk and Juices," National Center for Food Protection and Defense (A Homeland Security Center of Excellence) May 2008 - May 2009, Total: $73,236.
7. **"**A Unified Modeling Approach for Micro- and Nano-Scale Gas Flows," Li-Shi Luo (PI), Ali Beskok (Co-PI); Division of Mathematical Sciences, NSF; 7/2008-6/2011. Total: $265,000. (Prorated: $ 132,500).
8. "A Microfluidic Approach for Separation and Concentration of Bacterial Spores from Milk and Juices," S. Pillai (PI) TAMU, and A. Beskok (co-PI) ODU. National Center for Food Protection and Defense (A Homeland Security Center of Excellence) October 2007 - May 2008, Total: $95,558. (Prorated: $61,822).
9. "Disease-Specific Trapping of Human Cancer Cells," A. Beskok, J. Kolb, S. Beebe, R. Joshi, Multidisciplinary Seed Funding Award — ODU Office of Research, January-June 2008, Total: $70,700. (Prorated: $36,500).

- "Reversible Control of Anisotropic Electrical Conductivity Using Colloidal Microfluidic Networks," DARPA, *transferred from TAMU* $28,707.

- "Concentrating Bacterial Spores from Milk and Juices using Dielectrophoresis based Microfluidic Capture Systems," National Center for Food Protection and Defense, *transferred from TAMU* $55,086.
- "A Nonconforming Spectral Element Method for Electroosmotically Induced Microfluidic Mixing." NSF, *transferred from TAMU* $21,947.

TAMU Years
External Grants/Contracts:

10. "Microfluidic Systems for Reconfigurable RF Surfaces and Systems," DARPA, Toyon Research Corp. (TAMU sub-contract) A. Beskok (PI), co-PIs: D. Lagoudas, M. Bevan and Z. Ounaies. October 2006- July 2007, Total Dollar Value: $300,000 (TAMU $200,000 (prorated 75,000)).
11. "Reversible Control of Anisotropic Electrical Conductivity Using Colloidal Microfluidic Networks," DARPA, PI: A. Beskok, CO-PIs: D. Lagoudas, M. Bevan and Z. Ounaies. Dollar Value: $100,000.
12. "Concentrating Bacterial Spores from Milk and Juices using Dielectrophoresis based Microfluidic Capture Systems," S. Pillai (PI) and A. Beskok (co-PI). National Center for Food Protection and Defense (A Homeland Security Center of Excellence) October 2006 - September 2007, Total: $127,021. (Prorated: $55,086).
13. "A microfluidic device based capture and concentration of microbial contaminants from recycled water," NASA, PI: S. Pillai, Co. PI: A. Beskok. One graduate student is supported. Dollar Value: $89,000 (Prorated: $60,000).
14. "Microfluidic System for Capture and Concentration of Microbial Contaminants in Drinking Water." Texas ATP, S. Pillai and A. Beskok co-investigators, one graduate and one undergraduate student per year is supported. January 2004 - December 2005, Total: $126,550. (Prorated: $66,691).
15. "A Nonconforming Spectral Element Method for Electroosmotically Induced Microfluidic Mixing." NSF Applied Mathematics, PI: A. Beskok, One graduate student per year is supported. September 2003-2005, Total: $157,755.
16. "Institute for Intelligent Bio-Nano Materials and Structures for Aerospace Vehicles," NASA URETI proposal. PI. Dimitris Lagoudas, with 30 co-PI's, including M. Andrews from the ME Department. A. Beskok is a Faculty Associate. 1 Graduate Student per year is supported, Total for Institute $15M over 5 years, 8/02-8/07, (ME's total support: $433,798, Prorated to A. Beskok $216,894).
17. "Development of Forced Convection Micro Heat Spreaders," State of Texas Advanced Research Program, PI. A. Beskok, Co-PI: R. Lucht. Three graduate students are supported (2 Ph.D. Students for A. Beskok and 1 Ph.D. Student for R. Lucht), January 2000 to July 2002, Total Dollar value $127,980 (Prorated: *$64,000*).
18. "Scientific Simulations for Micro Electro Mechanical Systems (MEMS) On PC-Based Linux Clusters," DELL Computer Corporation STAR Program, PI: A. Beskok, Support for 1 Graduate Student, Date 10/11. 1999. Dollar value: $25,000.
19. "Numerical Simulation of Gas Transport in Micron and Sub-Micron Scales," Oak Ridge Associated Laboratories, Ralph E. Powe, Junior Faculty Enhancement Award, 2000. PI: A. Beskok, Support for 1/2 Graduate Student, Dollar value $10,000.

20. "PUF-01: Purchase of a CLSM system," State of Texas, 9/01, PI: K. Kihm, Co-PI's: A. Beskok and 5 others. Competitive. Dollar value: $110,000 (*Prorated* $18,571).

Internal Grants/Contracts:

21. "Modeling of protein composite bio-fluids for encapsulation process design," PI: Allison Ficht, co-PIs: A. Beskok and M.J. Andrews and seven other TAMU faculty. TAMU Life Sciences Task Force, 1 Graduate Student is supported, September, 2003-2004. Dollar Value: $250,000. (Prorated: $56,760).
22. "Demonstration of Nano-Pinning for Terascale Information Storage," PI: M.J. Andrews, co-PIs: A. Beskok, J. Chen, J. Ross, J. Slattery, and M. Yavuz. TAMU Telecommunications and Informatics Task Force (TITF), 1 Graduate Student is supported, September, 2001-2003. Dollar Value: $200,000. (Prorated: $33,300).
23. "Designing New Experimental and Computational Methods in Microfluidics," TAMU Center for Integrated Micro-Chemical Systems (CIMS) Graduate Student Support (Half support for one Graduate Student per year). Co-PIs: A. Beskok and P. Cremer. Date 5/2001-12/2002. Dollar Value: $35,000, (Prorated: $17,500).
24. "Development of Microfluidic Nozzle Concepts for Biomedical Applications," TAMU Interdisciplinary Research Initiatives Program, PI: K. Kihm, Co-PIs: A. Beskok and P. McIntyre, (Half support for 1 M.S. Student) Date 4/2000 - 5/2003, Dollar value: $25,000 (Prorated: $7,500).
25. "Faculty Workstation Program," Texas A&M University. PI: A. Beskok. 2003, Dollar Value $1,500.
26. "Faculty Workstation Program," Texas A&M University. PI: A. Beskok. 1999, Dollar Value $1,500.
27. "Request for Software Support for Microfluidic and MEMS Design," TAMU Faculty Mini Grant, PI: A. Beskok, Dollar Value: $1500**.**
28. "Hardware Support for the New Computational Microfluidics Laboratory," Texas A&M, Faculty Mini-Grant Program. PI: A. Beskok. 5/99, Dollar Value: $750.
29. "TAMU Faculty Startup Grant," Texas A&M University Mechanical Engineering Department and Texas Engineering Experiment Station. PI: A. Beskok, 8/98. Total Dollar Value: $50,000.

TEACHING

Student Advising:

Visiting Scholars & Post Doctoral Associates:

- Jea Hyun Park, "Direct Simulation Monte Carlo Calculations for Unsteady Gas Micro Flows." Dr. Park was a Korea Science and Engineering Foundation, Postdoctoral Fellow. Currently he is a postdoctoral research associate at *University of Illinois Urbana Champaign*.
- Unal Akdag, "Experimental microfluidics." March-September 2006. Visiting scholar, supported by the Scientific and Technological Research Council of Turkey, TUBITAK.
- Bayram Celik, "Computational Microfluidics." January-July 2007. Visiting scholar, supported by the Scientific and Technological Research Council of Turkey, TUBITAK. Postdoc (July 2007-present).
- Mehti Koklu, "AC Electrokinetics and Experimental Microfluidics"

Doctoral Students:

Current Ph.D. Students

- Ahmet Can Sabuncu, "Impedance Measurements of Colloidal Microfluidic Circuits"
- Murat Barisik, "Molecular Dynamics Simulations of Nano-Scale Confined Gas Flows"
- Ziyuan Shi, "Molecular Dynamics Simulations of Thermal Resistance at the Solid/Liquid Interface"
- Lei Shi, "Immersed Boundary Lattice Boltzmann Method for Particulate Flows"
- Diganta Dutta, TBD

Former Ph.D. Students

- Prashanta Dutta, "Numerical Modeling of Electroosmotically Driven Flows in Complex Micro-Geometries," 8/2001. Dr. Dutta is an ***Associate Professor*** at *Washington State University*.
- Cuneyt Sert, "Nonconforming Formulations with Spectral Element Methods," 8/2003. Dr. Sert is an ***Assistant Professor*** at *Middle East Technical University,* Ankara, Turkey.
- Jungyoon Hahm, "Numerical Modeling of Electrophoretic Transport in Micro-Scales," 8/2005. Dr. Hahm is a research engineer at Samsung, South Korea.
- Ashwin Balasubrahmanian, "Design of a microfluidic system for capture and concentration of microbial contaminants from recycled water," 5/2007. Currently, Applied Sciences Group Leader and Product Development Engineer-IV at Lynntech Inc in TX.
- Pradipkumar Bahukudumbi, "Energy landscape and electric field mediated interfacial colloidal assembly," 5/2007. Currently, chief engineer at Milliken and Co in SC.
- Ho Jun Kim, "Theoretical and Numerical Studies of Chaotic Mixing," 5/2008. Currently, chief engineer at Samsung, S. Korea.
- Seungkyung Park, "Electrokinetic and Acoustic Manipulations of Colloidal and Biological Particles", 12/2008. Currently a post-doc at Johns Hopkins University.
- BoHung Kim, "Molecular Dynamics Simulations of Heat Transfer in Nanoscale Confined Liquid Films," 5/2009. Currently a ***Research Assistant Professor*** at George Mason University.

Masters Students:

Former MS Students

- Imtiaz Ahmed, "Simulation of Gas Flows Through Micro-Constrictions," 5/2001.
- Saurabh Kumar, "Numerical Simulation of Micro-Fluidic Passive and Active Mixers," 8/2002.
- Pradipkumar Bahukudumbi, "A Phenomenological Model for Rarefied Gas Flows in Thin-Film Slider Bearings," 12/2002.
- Ho Jun Kim, "Numerical Simulation of Chaotic Advection and Mixing in Microfluidic Systems," 8/2004.

- Tejas Jagdish Shah, "Online Parameter Estimation Applied to Mixed Conduction/Radiation Heat Transfer," 5/2005.
- Srinivas Cherla, "Design Testing and Optimization of a Microfluidic Device for Capture and Concentration of Bacteria," 8/2005.
- Bo Hung Kim, "A Graphical Preprocessing Interface for Nonconforming Spectral Element Solvers," 8/2006.
- Hae June Kim, "Microfluidic Emulsification in Electric Field," 5/2007.

Undergraduate Students:

- Michelle Nunnally, "Directed Studies on MEMS, CFD Simulations and Mesh Generation," Spring and Summer, 1999.
- Melinda Aban, "Numerical Study of Fluid/Structure Interaction for Tensible and Distensible Aneurysms," TAMU Undergraduate Summer Research Program, 6/99-8/99.
- Silas Barta, "Artificial Intelligence based CFD Algorithms," Spring 2002.
- Ozgur Bozkurt, "Design of a Microfluidic System for Capture and Concentration of Microbial Contaminants from Drinking/Recycled Water," Summer 2003.
- Wesley Mock "Design of a microfluidic system for capture and concentration of microbial contaminants from recycled water," Fall 2004- Spring 2005.
- John Harris, "Design of a microfluidic system for capture and concentration of microbial contaminants from recycled water," Summer 2005.

High School Teacher Research & Training:

- Information Technology in Science (ITS), Center for Teaching and Learning, Summer Program for High School Teachers (July 3-July 21, 2006). Teaching 13 High School teachers "Science and Technology at the Nanoscale" with Profs. David Ford and Mike Bevan of Chemical Engineering as CHEN 685-298, Directed Studies.
- Tami Dudo, "Design of a microfluidic system for capture and concentration of microbial contaminants from recycled water," Summer 2005.
- Information Technology in Science (ITS), Center for Teaching and Learning, Summer Program for High School Teachers (July 5-July 22, 2005). Teaching 13 High School teachers "Science and Technology at the Nanoscale" with Profs. David Ford and Mike Bevan of Chemical Engineering.

High School Student Training:

- Jesse Ault, senior at La Porte High School, La Porte, IN.
- Nick Eidson, senior at Western Branch High School, Chesapeake, VA.

Undergraduate Teaching:

- **ENGN 110 & 111**, (Fall 2008, Spring 2009, Fall 2009).
- **Gas Dynamics,** MEEN 472 (Fall 2005).
- **Numerical Methods for Mechanical Engineers,** MEEN 357 (Fall 2004).
- **Fluid Mechanics**, MEEN 344 (Fall 1998, Fall 1999, Fall 2001, Spring 2003, Fall 2003, Spring 2004, Fall 2004)
  Averaged Teaching Score: 4.12/5.00.

Select Student Comments: "Organization, clarity and enthusiasm", "Very open to input. Very responsive to class needs. Very patient and took the time in lecture to ensure we covered the important topics", "He is a very good lecturer and teacher. He is very patient and understanding and genuinely concerned that we learn the material well. He is always open for questions".

- **Engineering Thermodynamics**, ENGR 212 (Spring 2001, Fall 2001, Fall 2002, Spring 2005, Spring 2006)
  Averaged Teaching Score: 4.12/5.00.
  Select Student Comments: "Gives good examples and thoroughly explains the concepts", "Cares about our learning the material".

Graduate Teaching:

- **Fluid Mechanics**, MEEN 621 (Spring 2000, Spring 2001, Fall 2002, Fall 2006)
  Averaged Teaching Score: 4.31/5.00.
  Select Student Comments: "We got a good understanding on the fundamentals of fluid mechanics", "Good preparation shown by the instructor", "Did an excellent job with the mathematical theory", "The instructor is concerned that his teaching is effective; explains the material slowly and thoroughly, allows class to ask questions".
- **Spectral Methods in Heat Transfer and Fluid Flow**, MEEN 689 (Spring 1999, Fall 2000, Spring 2002, Fall 2003, Fall 2005).
  Averaged Teaching Score: 4.63/5.00.
  Select Student Comments: "His methodical approach to introducing difficult topics, ability to explain difficult mathematical concepts in an easily understandable way, and ability to convey the big picture."
  Note: This is a *special topics numerical methods course, developed by Dr. Beskok*. This course has been approved as a permanent course, and it is being taught as MEEN 679.
- **CFD I,** AE 620, Fall 2007.
- **Microfluidics,** AE 896, Spring 2008.
- **Spectral Methods,** AE895, Spring 2009.

SERVICE

Professional Service

1. *ASME Journal Fluids Engineering*, *Associate Editor* (July, 2006 - June 30, 2008).
2. *International Journal of Nanomechanics Science and Technology* (Begell House, USA), Editorial Board
3. NSF Workshop on Control and System Integration of Micro- and Nano-Scale Systems, theme panelist on modeling, measurement and model validation, 3/04.
4. Executive Committee of the ASME Subdivision of MEMS, *Representative* to the ASME Division of Aerospace, appointed (12/98-11/01).
5. Texas Higher Education Coordinating Board, Texas ARP/ATP-Program Review Panel, *Panelist*, appointed, November 28, 2000,
6. ASME K-22 Heat Transfer Visualization Committee, *Member*, volunteer, (2001 - present),
7. ASME Division of Fluids Engineering, Subcommittee on Microfluidics, *Member* (2002-2004) ,
8. ASME, IMECE Meeting, Co-organizer of Symposium on Microfluidics (1999 - 2004).
9. AIAA, Co-organizer of "Microfluidics Workshop," AIAA meeting, Reno NV, January 2001.

University and Community Service

1. ODU BCET Tenure and Promotion Committee Chair (2009)
2. ODU BCET Tenure and Promotion Committee (2008, 2009)
3. Director of ODU Computational Engineering Research Cluster (September 2007-present)
4. ODU Aerospace Engineering Department IT Committee (September 2007-present)
5. Faculty Senator (elected, September 2005-December 2006).
    a. TAMU Faculty Senate Diversity Subcommittee
    b. TAMU Faculty Senate International Programs Committee
6. Texas A&M University Representative on MEMS technology for Texas Technology Initiative (2/05-12/07)
7. Graduate Studies and Research Committee (2004-2006)
8. Laboratory Committee (2002-2006)
9. Departmental Representative to the Library (Fall 2004 – Fall 2006)
10. Fluid Mechanics Ph.D. Qualifying Exam Committee (Sp. 99, Fall 99, Fall 00, Sp. 01, Fall 04, Spring 05).
11. Thermodynamics Ph.D. Qualifying Exam Committee (Sp. 03).
12. Heat Transfer Ph.D. Qualifying Exam Committee (Fall 03).
13. Thermal/Fluidics Division Faculty Search Committee (2000, 2002, 2004, 2006).
14. Mechanics Division Faculty Search Committee (2006).
15. Dynamical Systems and Controls Division Faculty Search Committee (2004, 2005)
16. Course coordinator for MEEN 357 and MEEN 472 (Spring 2005-Fall 2006).
17. Served on numerous Masters and Ph.D. Thesis Committees.
18. Departmental Graduate Research Committee (2005)
19. Faculty Advisor to TAMU Turkish Student Association (2003 - 2006)

PROFESSIONAL OUTREACH

Continuing Education/Professional Development

TEX-MEMS Meetings: In August 1999, Dr. Beskok of TAMU Mechanical Engineering and Dr. Igor Carron of Nuclear Engineering organized and conducted the first "Texas Area Micro-Electro-Mechanical Systems Meeting: TEX-MEMS". The purpose of TEX-MEMS was to identify individuals in academia and industry with ongoing work and/or interest in MEMS, and to foster possible collaborations between these researchers. Texas is the center for many cutting edge medical, technological, scientific, and industrial developments in the nation, and many of these fields can significantly benefit from implementation of MEMS based technologies into their research and development programs. The TEX-MEMS meeting is a means to promote the scholarly exchange of information on issues related to MEMS in Texas. This meeting was followed by consecutive meetings at Southern Methodist University, UT Dallas, Texas Tech, UT Arlington, TAMU, UT El Paso (with sponsorship and participation from Mexico), U.T. Dallas and Texas Tech. I expect TEX-MEMS meetings to continue, as the interest in this emerging technology (and its sub-fields, such as microfluidics) grows. I believe, founding TEX-MEMS has been an important service to the State of Texas, and it has brought further recognition to Texas A&M University.

Workshops, Tutorials, and Short Courses*:*

1. Beskok, A., "Fundamentals and Simulations of Micro- and Nano-Flows," (*3-Hour Tutorial*) ASME Integrated Nanosystems 2002: Design, Synthesis, and Applications, 9/18/02. Number of attendees: 18, Taught for the first time.
2. Beskok, A., "A Lecture Series on Micro Flows," Middle East Technical University, Turkey. Invited by Prof. Melik Dolen, December 18-20, 2002. Number of attendees: 27, based on the ASME Integrated Nanosystems tutorial.
3. Beskok, A., "Fundamentals and Simulations of Micro- and Nano-Flows," (*3-Hour Tutorial*) ASME MEMS IV Conference 2004, 4/25/04. Number of attendees: 13.
4. Beskok, A., "Electrokinetically Driven Liquid Micro Flows," (*1.5-Hour Tutorial*) International Conference on Mesoscopic Methods in Engineering and Science (ICMMES), Meeting 2004, 7/30/04. Number of attendees: 25.
5. Beskok, A., "Fundamentals and Simulations of Micro- and Nano-Flows," (*3-Hour Tutorial*) ASME MEMS V Conference 2005, 4/27/05. Number of attendees: 9.
6. Beskok, A., "Gas Micro Flows," (5 Day Summer Course) ICTP Summer School on Microfluidics, Trieste Italy 8/8/05-8/12/05.
7. Beskok, A., "Electrokinetic Micro Flows," (*1.5-Hour Tutorial*) International Conference on Mesoscopic Methods in Engineering and Science (ICMMES) Meeting, Hong Kong 7/24/05.

Invited Significant Seminars or Lectures

Invited Talks at International and National Conferences:

8. Beskok, A., "Gas Flow in the Transition and Free Molecular Flow Regimes," NATO Advanced Study Institute on *Microfluidic Based Microsystems* – August 23 – September 3, 2009, Cesme-Izmir, Turkey.
9. Beskok, A., "Mixing in Microfluidic Systems," NATO Advanced Study Institute on *Microfluidic Based Microsystems* – August 23 – September 3, 2009, Cesme-Izmir, Turkey.
10. Beskok, A., "AC Electrokinetic Flows," NATO Advanced Study Institute on *Microfluidic Based Microsystems* – August 23 – September 3, 2009, Cesme-Izmir, Turkey.
11. Beskok, A., "An Electrokinetically Stirred Continuous Flow Micromixer," Keynote Address of the Mixing Session, 6th International Conference on Nanochannels, Microchannels and Minichannels (ASME), June 23-25, Darmstadt, Germany, ICNMM2008-62022, 2008.
12. Beskok, A., "Shear Driven Oscillatory Gas Flows in the Entire Knudsen Regime", DSMC07, Direct Simulation Monte Carlo, Theory, Methods and Applications, Santa Fe, NM, invited by Dr. Mike Gallis, 10/01/07.
13. Beskok, A., "An Electroosmotically Stirred Continuous Micro-Mixer" International Conference on Mesoscopic Methods in Engineering and Science (ICMMES), Old Dominion University, Hampton VA, invited by Prof. Li-Shi Luo, 7/25/06.
14. Beskok, A., "Microfluidic Capture and Concentration of Bacteria from Drinking Water," In Enterprise Forum of Micro-technologies with Applications in Food Industry, Mexico City, 11/05/05.
15. Beskok, A., "Chaotically Stirred Electrokinetic Micro Mixers," International Conference on Mesoscopic Methods in Engineering and Science (ICMMES), Hong Kong, invited by Prof. Manfred Krafczyk and Prof. Li-Shi Luo, 7/26/05.

16. Beskok, A., "Microfluidic Capture and Concentration of Bacteria from Drinking Water," First National Conference on Environmental Sampling for Bio Threat Agents, Baltimore, MA, 1/28/05.
17. Beskok, A., "Oscillatory Couette Flows: Bounded Stokes and Rarefaction Layers," International Conference on Mesoscopic Methods in Engineering and Science (ICMMES), Technical University of Braunschweig, Braunschweig, Germany, invited by Prof. Manfred Krafczyk and Prof. Li-Shi Luo, 7/28/04.
18. Beskok, A., "Numerical Modeling of Electroosmotic Transport," 1st Gordon Research Conference on Physics and Chemistry of Microflows, Queen's College Oxford, United Kingdom, invited by Dr. Yolanda Fintschenko, Sandia National Laboratories, 7/31/01.
19. Beskok, A., "Physical Challenges and Simulation of Microfluidic Transport," AIAA 39th Aerospace Sciences Meeting and Exhibit, Reno, Nevada, invited by Prof. Karman Ghia, 01/15/01.
20. Beskok, A., "Numerical Modeling of Micro-Scale Gas Flows: Applications to MEMS," 22nd International Rarefied Gas Dynamics Symposium, Sydney, Australia, invited by Dr. Tim Bartel, Sandia National Laboratories, 07/13/00.
21. Beskok, A., "Microscale Flow Modeling," Microfluidics Symposium, Center for Scientific Computing, Espoo, Finland, invited by Dr. Jari Koponen, 02/17/00.

Departmental Seminars*:*

1. Beskok, A., "Electrokinetically Driven Micro Flows," Yeungnam University, South Korea, Mechanical Engineering Department, invited by Prof. Han, 10/16/2009.
2. Beskok, A., "An Electrokinetically Stirred Continuous Flow Micromixer," Middle East Technical University, Mechanical Engineering Department, invited by Prof. Almira Yazicioglu, 5/6/2009.
3. Beskok, A., "AC Electrokinetic Manipulation of Colloidal Particles in Microfluidic Systems", Middle East Technical University, Mechanical Engineering Department, invited by Prof. Almira Yazicioglu, 5/6/2009.
4. Beskok, A., "AC Electrokinetic Manipulation of Colloidal Particles in Microfluidic Systems", City College of New York, Mechanical Engineering Department, invited by Prof. Taehun Lee, 12/3/2009.
5. Beskok, A., "AC Electrokinetic Manipulation of Colloidal Particles in Microfluidic Systems", Old Dominion University, Physics Department, invited by Prof. Gale Dodge, 11/11/08.
6. Beskok, A., "AC Electrokinetic Manipulation of Colloidal Particles in Microfluidic Systems", Brown University, Fluid Mechanics Seminars, invited by Prof. George Karniadakis, 10/28/08.
7. Beskok, A., "AC Electrokinetic Manipulation of Colloids and Biological Particles in Microfluidic Systems", Drexel University, Mechanical Engineering, invited by Prof. Min Jun Kim, 10/19/07.
8. Beskok, A., "Capture and Concentration of Colloidal Particles in Microfluidic Systems," ODU, ECE Department, Norfolk, VA, invited by Prof. Sacharia Albin, 11/02/07.
9. Beskok, A., "Microfluidics a Research Overview," Aksaray University, Aksaray, Turkey, invited by TUBITAK, Scientific and Technological Research Council of Turkey, 08/15/07.
10. Beskok, A., "Microfluidics a Research Overview," ODU, AE Department, Norfolk, VA, invited by Prof. Jim Cross, 04/21/07.

11. Beskok, A., "Design and Optimization of Chaotically Stirred Microfluidic Mixers", Washington State University, Mechanical Engineering, Departmental Seminar Series. Invited by Prof. Prashanta Dutta, 4/7/06.
12. Beskok, A., "An Electroosmotically Stirred Continuous Micro Mixer: From Theory and Computations to Design and Experimentation", University of Waterloo, Mechanical Engineering Department. Invited by Prof. Gerry Schneider, 3/16/06.
13. Beskok, A., "Characterization of Chaotically Stirred Microfluidic Mixers", Texas A&M University, Biomedical Engineering, Departmental Seminar Series. Invited by Prof. Gerry Cote, 4/3/06.
14. Beskok, A., "Micro Scale Transport Modeling Using Spectral Element Methods," University of California, Riverside, invited by Prof. Tom Stahovich 11/4/05.
15. Beskok, A., "Micro and Nano Flows: Fundamentals and Simulation", University of Arkansas Little Rock Fall Colloquium Series, 8/17/04.
16. Beskok, A., "Micro Flows: Fundamentals and Simulations," Sabanci University, Turkey, invited by Prof. Atif Sabanovic, 12/11/02.
17. Beskok, A., "Micro Flows: Fundamentals and Simulations," Koc University, Turkey, invited by Prof. Cagatay Basdogan, 12/12/02.
18. Beskok, A., "Micro Flows: Fundamentals and Simulations," Texas Tech, Lubbock, Texas, *Inaugural Talk of Mechanical Engineering Academy, Seminar Series*. Invited by Prof. Jordan Berg, 05/30/02.
19. Beskok, A., "Micro Flows: Fundamentals and Simulations," Carnegie Mellon University, Pittsburgh, PA, invited by Prof. Adnan Akay, 05/22/02.
20. Beskok, A., "Physical Challenges and Numerical Simulation of Microfluidic Transport," Purdue University, West Lafayette, Indiana, invited by Prof. Steve Werely, 05/04/01.
21. Beskok, A., "Electroosmotic Transport in Liquid Micro-Flows," University of Texas, Austin, Mechanical Engineering Department, invited by Prof. Ronald Panton, 03/30/01.
22. Beskok, A., "Numerical Simulation of Electroosmotic Transport in Liquid Micro-Flows," Indiana University - Purdue University in Indianapolis, Mechanical Engineering Department, invited by Prof. Hasan Akay, 12/22/00.
23. Beskok, A., "Challenges and Applications of Microscale Thermal Fluidic Modeling," Southern Methodist University, Mathematics Department, invited by Prof. Johannes Tausch, 11/16/00.
24. Beskok, A., "Numerical Modeling of Micro-Scale Flows: Applications to MEMS," University of Texas, Austin, Aerospace Engineering Department, invited by Prof. David Goldstein, 03/30/00.

Lectures at Laboratories, Institutes and Industrial Seminars:

25. Beskok, A., "Capture and Concentration of Colloidal Particles in Microfluidic Systems," Los Alamos National Laboratory, Los Alamos, NM, Invited by Dr. Malcolm Andrews, 10/03/07.
26. Beskok, A., "Microfluidics a Research Overview," 3M, St. Paul, MN, 09/21/07.
27. Beskok, A., "Spectral Element Algorithms for Micro Fluidic Simulations," Wright Patterson Air Force Base, Fairborn, OH, Faculty Summer Research Program, 08/09/02.
28. Beskok, A., "A Summary of Microfluidics Research at Texas A&M University," Oak Ridge National Laboratories, Oak Ridge, TN, invited by Dr. Mike Ramsey, 06/28/02.

29. Beskok, A., "An Overview of Microfluidics for Food Science and Engineering," Texas Science Partnership Program, TAMU Institute for Food Science and Engineering, College Station, TX, invited by Dr. Mark McLellan, 03/26/02.
30. Beskok, A., "Physical Challenges and Numerical Simulation of Microfluidic Transport," Institute for Computer Applications in Science and Engineering (ICASE), NASA Langley Research Center, VA, invited by Dr. Li-Shi Luo, 08/22/01.
31. Beskok, A., "Numerical Modeling of Gas Transport in Micro-Scales," ANSYS Pittsburgh, PA, invited by Dr. Deepak Ganju, 10/11/99.