

Iskander S. Akhatov

CURRICULUM VITAE

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1 Education

- 1990: **Doctor of Physical & Mathematical Sciences** (The highest academic degree in Russia) in Mechanics of Liquids, Gases, and Plasma. Defended at the Research Council of the Lavrentiev Institute of Hydrodynamics, Siberian Branch of the Russian Academy of Sciences, Novosibirsk, Russia
- 1980-1983: Lomonosov Moscow State University, School of Mechanics and Mathematics, Department of Gas and Wave Dynamics. **Ph.D.** in Mechanics of Liquids, Gases, and Plasma. Defended at the Research Council of the Institute for Problems in Mechanics, Russian Academy of Sciences, Moscow, Russia
- 1974-1979: Lomonosov Moscow State University, School of Physics, Department of Applied Mathematics. **B.S./M.S.** in Physics (with Honors).

2 Professional Appointments

2011-current	Scientific Advisor, Center for Micro- and Nanoscale Dynamics of Dispersed Systems, Bashkir State University, Ufa, Russia
2008-current	Professor, Department of Mechanical Engineering, North Dakota State University, Fargo, ND, USA
2005-current	Faculty Associate, Center for Nanoscale Science & Engineering, North Dakota State University, Fargo, ND, USA
2003-2008	Associate Professor, Department of Mechanical Engineering, North Dakota State University, Fargo, ND, USA
2000-2003	Director, Institute of Mechanics, Russian Academy of Sciences, Ufa, Russia
1993-2000	Vice-President, Ufa Branch of the Russian Academy of Sciences, Ufa, Russia Head of the Laboratory of Multiphase Fluid Dynamics, Institute of Mechanics, Russian Academy of Sciences, Ufa, Russia
1992-2000	Assistant Professor/Associate Professor/Professor/Chair, Department of Mechanics, Bashkir State University, Ufa, Russia
1983-2001	

3 Research

3.1 Research Interests

- Micro- and nanometer-scale fluid dynamics; with applications to materials, energy, and bio/nanotechnology
- Dynamics and acoustics of bubbles and bubbly liquids
- Multiphase systems

3.2 Research Grants

Present Research Grants

- Grant of the Government of the Russian Federation for state support of research conducted under the guidance of leading scientists in the Russian educational institutions, "Center for Micro- and Nanoscale Dynamics of Dispersed Systems" at Bashkir State University, Ufa, Russia – PI

- NSF, CMMI, Nano and Bio Mechanics, “Collaborative Research: Tribologically Durable UHMWPE Nanocomposites for Total Joint Replacements: Nano-mechanics and Bio-tribological Modeling” – Co-PI. In collaboration with Drs. Annie Tangpong (NDSU) - PI, and Katie Zhong (Washington State University) – Co-PI
- DoE (NDSU Center for Computationally Assisted Science and Technology), “Theoretical Analysis and Computer Simulation of Plasma-Assisted Material Deposition” – Co-PI. In collaborations with Drs. Yechun Wang – PI, and Doug Schulz – Co-PI
- DoD, Defense Microelectronics Activity (DMEA), “Electronics and Materials for Flexible Sensors and Transponders (EMFST)” – Task Leader. Dr. Larry Pederson – Program Manager (NDSU Center for Nanoscale Science & Engineering)
- NSF, EPSCoR, RII, “Flexible Electronics and Materials (FlexEM) - Statewide Research Initiative” – Co-PI. In collaboration with Drs. P. Boudjouk and D. Schulz – PIs; and D. Webster, S. Rasmussen, K. Katti, D. Katti, S. Croll, X. Dai – Co-PIs

Past Research Grants (in US)

- NSF, “Collaborative Research: Direct In-plane Formation of Large Organic Crystals for Active Nanostructured Devices” – Co-PI. In collaboration with Drs. Debra Mascaro (University of Utah) – PI, and Vladimir Bulovic (MIT) – Co-PI
- DoD, Defense Microelectronics Activity (DMEA), “Center of Excellence for Microsensors and their Fabrication with NanoBlock and Fluidic Self Assembly Technology” – Task Leader. Dr. Bill Davis - Project Engineer (DMEA), Dr. Greg McCarthy – Program Manager (CNSE)
- NSF, EPSCoR, “Spintronics” - Co-PI. In collaboration with Drs. Philip Bourdjouk and Doug Schulz (NDSU) - PIs, and Drs. Dean Webster (NDSU) and Seth Rasmussen (NDSU) - Co-PIs
- NSF, “NER: Vibrating Nanotube-based Nano Powder Production System” – PI. In collaboration with Dr. Bor Jang (NDSU) – Co-PI
- NSF, “STTR Phase I: Local Vapor Fuel Cell” (DMI-0419578) – Co-PI. In collaboration with Dr. Wayne Huang (Nanotek Instruments, Inc.) – PI
- Rensselaer Polytechnic Institute, R&D Fund, “Drug Delivery Enhancement by Ultrasound: Physical Mechanisms and Mathematical Modeling” (2001)
- NYSRDA - New York State Energy Research & Development Authorities, “Bubble Fusion Research” (2002)
- DOE NEER “Multidimensional Analysis of Forced Bubble Dynamics” (2001-2002)
- ORNL UT-Battelle LLC “Analysis of Bubble Fusion Scale up” (2001-2002)
- NSF/COBASE “Acoustic and rheological processes in aqueous foams” (1999)

Past Research Grants (in Germany)

- DLR, Int. Dept., Contract RUS-133-97 “Dynamics of sonoluminescing bubbles” (1997-2000)
- DLR, Int. Dept., Contract X222.31 “Nonlinear structure formation in acoustic cavitation” (1994-1996)
- DFG (SFB-185) “Mathematical modeling of nonlinear phenomena and chaos in hydrodynamics of non-Newtonian fluids” (1993)
- DAAD “Nonlinear waves in multiphase fluids” (1992)

3.3 Publications

Book Chapters and Reviews

1. Lauterborn, W., Kurz, T., Akhatov, I. Nonlinear Acoustics in Fluids. In: Springer Handbook of Acoustics, Ed. T.D. Rossing, Springer, 2007, pp.257-297.
2. Yang, L., Akhatov, I.S., Jang, B. Z. Nano-fabrication: A Review. Journal of the Chinese Institute of Engineers, 2007, 30, 3, pp.441- 446.
3. Lahey, R.T., Jr., Taleyarkhan, R.P., Nigmatulin, R.I., Akhatov, I.S. Sonoluminescence and Search for Sonofusion. In: Advances in Heat Transfer, Vol. 39, Elsevier Inc, 2006, pp.1-168.

- Akhatov I., Gazizov R., Ibragimov N. Nonlocal symmetries. Heuristic Approach. Journal of Soviet Mathematics. 1991, 55, 1, pp.1401-1450.

Patents

- Hoey, J.M., Akhatov, I.S., Swenson, O.F., Schulz, D.L. Focusing of Aerosol Particles. U.S. Patent Application # 60/956,493 (2007).

Journal Papers

- Lutfurakhmanov, A., Loken, G., Schulz, D.L., Akhatov, I.S., Capillary-based liquid microdroplet deposition, Applied Physics Letters, 2010, 97, 124107.
- Wu, X.-F., Bedarkar, A., Akhatov, I.S. Hydroelastic analysis of an axially loaded compliant fiber wetted with a droplet, Journal of Applied Physics, 2010, 108, 083518.
- Schulz, D.L., Hoey, J., Smith, J., Elangovan, A., X. Wu, Akhatov, I.S., Payne, S., Moore, J., Boudjouk, P., Pederson, L., Xiao, J., Zhang, J. Si₆H₁₂/Polymer Inks for Electrospinning a-Si Nanowire Lithium Ion Battery Anodes, Electrochemical and Solid-State Letters, 2010, 13, 10, A143-A145.
- Schulz, D., Hoey, J., Thompson, D., Swenson, O., Han, S., Lovaasen, J., Dai, X., Braun, C., Keller, K., Akhatov, I., Collimated aerosol beam deposition: sub-5- μ m resolution of printed actives and passives, IEEE Transactions on Advanced Packaging, 2010, 33, 2, 421-427.
- Hoey, J.M., Halvorsen, A., Vaselaar, D., Braaten, K., Maassel, M., Reich, M.T., Akhatov, I.S., Ghandour, O., Drzaic, P., Schulz, D.L., Rapid Prototyping of RFID Antennas using Direct-Write, IEEE Transactions on Advanced Packaging, 2009, 32, 4, 809-815.
- Shafranska, O., Voronov, A., Kohut, A., Wu, X.-F., Akhatov, I.S. Polymer-metal complexes as a catalyst for the growth of carbon nanostructures. Carbon, 2009, 47, 3137-3142.
- Syunyaev, R.Z., Balabin, R.M., Akhatov, I.S., Safieva, J.O. Adsorption of petroleum asphaltenes onto reservoir rock sands studied by near-infrared (NIR) spectroscopy. Energy & Fuels, 2009, 23, 1230-1236.
- Mekic, S., Akhatov, I.S., Ulven, C.A. Analysis of a radial infusion model for in-plane permeability measurements of fiber reinforcement in composite materials, Polymer Composites, 2009. DOI 10.1002/pc.20750.
- Mekic, S., Ulven, C.A., Akhatov, I.S. Evaluation of in-plane and transverse permeability of flax fiber performs for biocomposite materials, Journal of Biobased Materials and Bioenergy, 2009, 3, 1-9.
- Akhatov, I.S., Hoey, J.M., Swenson, O.F., Schulz, D.L. Aerosol focusing in micro-capillaries: Theory and Experiment. Journal of Aerosol Science, 2008, 39, 691-709.
- Akhatov, I.S., Hoey, J.M., Swenson, O.F., Schulz, D.L. Aerosol flow through a long micro-capillary: collimated aerosol beam. Microfluidics and Nanofluidics, 2008, 5, 215-224.
- Han, S., Dai, X., Loy, P., Lovaasen, J., Huether, J., Hoey, J.M., Wagner, A., Sandstrom, J., Bunzow, D., Swenson, O.F., Akhatov, I.S., Schulz, D.L. Printed Silicon as Diode and FET Materials – Preliminary Results. Journal of Non-Crystalline Solids, 2008, 354, 2623-2626.
- Mekic, S., Akhatov, I.S., Ulven, C.A. A radial infusion model for transverse permeability measurements of fiber reinforcement in composite materials, Polymer Composites, 2008. DOI 10.1002/pc.20632.
- Ziejewski, M., Karami, G., Akhatov, I. Selected biomechanical issues of brain injury caused by blasts. Brain Injury Professional, 2007, Vol. 4, Issue 1, 10-14 (pub. of the North American Brain Injury Society).
- Nasibullaeva, E.S., Akhatov, I.S. Diffusion stability of bubbles in a cluster. Journal of Applied Mechanics and Technical Physics, 2007, 48, 4, 501-507.
- Gavrilyuk, S., Akhatov, I. Model of a liquid nanofilm on a solid substrate based on the van der Waals concept of capillarity. Phys. Rev. E, 2006, 73, 021604.
- Nagrath, S., Jansen, K., Lahey, R.T., Jr., Akhatov, I. Hydrodynamic simulation of air bubble implosion using a Level Set approach. Journal of Computational Physics, 2006, 215, 1, 98-132.

23. Nigmatulin, R.I., Akhatov I.S., Topolnikov, A.S., Bolotnova, R.K., Vakhitova, N.K., Lahey, R.T., Jr., Taleyarkhan, R.P. The Theory of Supercompression of Vapor Bubbles and Nanoscale Thermonuclear Fusion. *Physics of Fluids*, 2005, 17, 107106, 1-31.
24. Konovalova, S.I., Akhatov, I.S. Structure formation in acoustic cavitation. *Multiphase Science and Technology*, 2005, 17, 4, 343-371.
25. Akhatov, I.S., Nigmatulin, R.I. Lahey, R.T., Jr. The analysis of linear and nonlinear bubble cluster dynamics. *Multiphase Science and Technology*, 2005, 17, 3, 225-256.
26. Nasibullaeva, E.S., Akhatov, I.S. Dynamics of a bubble cluster in an acoustic field. *Acoustical Physics*, 2005, 51, 6, 705-712.
27. Akhatov, I., Vakhitova, N., Topolnikov, A., Zakirov, K., Wolfrum, B., Kurz, T., Lindau, O., Mettin, R., Lauterborn, W. Dynamics of laser-induced cavitation bubbles. *Experimental Thermal and Fluid Sciences*, 2002, 26, 731-737.
28. McDaniel, J.G., Akhatov, I., Holt, R.G. Inviscid dynamics of a wet foam drop with monodisperse bubble size distribution. *Physics of Fluids*, 2002, 14, 6, 1886-1894.
29. Akhatov, I., Lindau, O., Topolnikov, A., Mettin, R., Vakhitova, N., Lauterborn, W. Collapse and rebound of a laser-induced cavitation bubble. *Physics of Fluids*, 2001, 13, 10, 2805-2819.
30. Nigmatulin, R., Akhatov, I., Vakhitova, N., Lahey, R.T., Jr. On the forced oscillations of a small gas bubble in a spherical liquid-filled flask. *J. Fluid Mechanics*, 2000, 414, 47-73.
31. Parlitz, U., Mettin, R., Luther, S., Akhatov, I., Voss, M, Lauterborn, W. Spatiotemporal dynamics of acoustic cavitation bubble clouds. *Phil. Trans. R. Soc. Lond. A*, 1999, 357, 313-334.
32. Nigmatulin, R., Akhatov, I., Vakhitova, N. Forced oscillations of a gas bubble in a spherical volume of a compressible liquid. *J. Applied Mechanics and Technical Physics*, 1999, 40, 285-291.
33. Nigmatulin, R., Akhatov, I., Vakhitova, N., Lahey, R.T., Jr. The resonant supercompression and sonoluminescence of a gas bubble in a liquid-filled flask. *Chem. Eng. Comm.*, 1998, 168, 145-169.
34. Mettin, R., Akhatov, I., Parlitz, U., Ohl, C.D., Lauterborn, W. Bjerknes force between small cavitation bubbles in a strong acoustic field. *Phys. Rev. E*, 1997, 56, 2924-2931.
35. Akhatov, I., Vakhitova, N., Galeeva, G., Nigmatulin, R, Khismatullin, D. Weak oscillations of a gas bubble in a spherical volume of compressible liquid. *J. Appl. Maths Mechs*, 1997, 61, 921-930 (translated from *Prikladnaya Matematika i Mekhanika*, 1997, 61, 6, 952-962).
36. Akhatov, I., Mettin, R., Ohl, C.D., Parlitz, U., Lauterborn, W. Bjerknes force threshold for stable single bubble sonoluminescence. *Phys. Rev. E*, 1997, 55, 3747-3750.
37. Akhatov, I., Gumerov, N., Ohl, C.D., Parlitz, U., Lauterborn, W. The role of surface tension in stable single bubble sonoluminescence. *Phys. Rev. Lett.*, 1997, 78, 227-230.
38. Nigmatulin, R., Akhatov, I., Vakhitova, N. The effect of fluid compressibility on the dynamics of the gas bubble. *Physics/Doklady*, 1996, 41, 276-279 (translated from *Doklady Akademii Nauk*, 1996, 348, 768-771).
39. Akhatov, I., Parlitz, U., Lauterborn, W. Towards a theory of self-organization phenomena in bubble-liquid mixtures. *Phys. Rev. E*, 1996, 54, 4990-5003.
40. Parlitz, U., Scheffczyk, C., Akhatov, I., Lauterborn, W. Structure formation in cavitation bubble fields. *Chaos, Solitons and Fractals*, 1995, 5, 10, 1881-1891.
41. Akhatov, I., Parlitz, U., Lauterborn, W. Pattern formation in acoustic cavitation. *J. Acoust. Soc. America*, 1994, 96, 6, 3627-3635.
42. Khismatullin, D., Akhatov, I. Sound-ultrasound interaction in bubbly fluids: Theory and possible applications. *Physics of Fluids*, 2001, 13, 12, 3582-3598.
43. Akhatov, I., Khismatullin, D. Mechanisms of interaction between ultrasound and sound in liquid with bubbles: Singular focusing. *Acoustical Physics*, 2001, 47, 140-144 (translated from *Akusticheskii Zhurnal*, 2001, 47, 178-182).
44. Akhatov, I., Khismatullin, D. Two-dimensional mechanisms of interaction between ultrasound and sound in bubbly liquids: Interaction equations. *Acoustical Physics*, 2001, 47, 10-15 (translated from *Akusticheskii Zhurnal*, 2001, 47, 15-21).
45. Akhatov, I., Khismatullin, D. Effect of dissipation on the interaction between long and short waves in bubbly liquids. *Fluid Dynamics*, 2000, 35, 573-583 (translated from *Izvestiya Rossiiskoi Akademii Nauk, Mekhanika Zhidkosti i Gaza*, 2000, 4, 126-138).

46. Akhatov, I., Khismatullin, D. Long-wave--short-wave interaction in bubbly liquids. *J.Appl.Maths Mechs*, 1999, 63, 917-926 (translated from *Prikladnaya Matematika i Mekhanika*, 1999, 63, 980-990).
47. Akhatov, I., Baikov, V., Khusnutdinova, K. Non-linear dynamics of coupled chains of particles. *J. Appl. Maths Mechs*, 1995, 59, 353-361 (translated from *Prikladnaya Matematika Mekhanika*, 1995, 59, 3, 376-384).
48. Akhatov, I., Khasanov, M., Khusainov, I. Movement stability analysis of a pipe string in a thixotropic fluid. *Journal of Engineering Physics and Thermophysics*, 1994, 66, 353-359 (translated from *Inzhenerno-Fizicheskii Zhurnal*, 1994, 66, 405-411).
49. Akhatov, I., Khasanov, M., Khusainov, I. Self- excited and stochastic oscillations in the hydrodynamics of non-Newtonian fluids. *J.Appl. Maths Mechs*, 1993, 57, 1, 81-86 (translated from *Prikladnaya Matematika i Mekhanika*, 1993, 57, 1, 71-76).
50. Akhatov, I., Khasanov, M., Khusainov, I. Auto- and chaotic oscillations in hydrodynamics of non-Newtonian liquids. *Int. J. Bifurcations and Chaos*, 1993, 3, 4, 1039-1044.
51. Ametov, I., Akhatov, I., Baikov, V. Stability of the displacement of immisible visco-elastic liquids in a porous medium. *J.Appl. Maths Mechs*, 1991, 55, 673-678 (translated from *Prikladnaya Matematika i Mekhanika*, 1991, 55, 5, 803-807).
52. Akhatov, I. Shear instability in stratified viscoelastic and gas-liquid media. *J.Appl. Maths Mechs*, 1989, 53, 491-595 (translated from *Prikladnaya Matematika i Mekhanika*, 1989, 53, 4, 630-635).
53. Akhatov, I., Baikov, V., Baikov, R. Propagation of nonlinear waves in gas-liquid media with a gas content variable in space. *Fluid Dynamics*, 1986, July, 161-164 (translated from *Izvestiya Akademii Nauk SSSR, Mekhanika Zhidkosti i Gaza*, 1986, 21, 1, 180-183).
54. Akhatov, I., Baikov, V. Propagation of sound perturbations in heterogeneous gas-liquid systems. *Journal of Engineering Physics*, 1986, September, 276-280 (translated from *Inzhenerno-Fizicheskii Zhurnal*, 1986, 50, 3, 385-390).
55. Akhatov, I., Gazizov, R., Ibragimov, N. Bäcklund transformations and nonlocal symmetries. *Soviet Math. Dokl.*, 1988, 36, 393-395 (translated from *Doklady Akademii Nauk SSSR*, 1987, 297, 11-13).
56. Akhatov, I., Gazizov, R., Ibragimov, N. Quasi-local symmetry of equations of the nonlinear heat-conduction type. *Sov. Phys. Dokl.*, 1987, 32, 554-556 (translated from *Doklady Akademii Nauk SSSR*, 1987, 295, 75-78).
57. Akhatov, I., Gazizov, R., Ibragimov, N. Group classification of the equations of nonlinear filtration. *Soviet Math. Dokl.*, 1987, 35, 384-386 (translated from *Doklady Akademii Nauk SSSR*, 1987, 293, 1033-1035).
58. Akhatov, I., Vainshtein, P. Transition of porous explosive combustion into detonation. *Combustion, Explosion, and Shock Waves*, 1984, July, 63-69 (translated from *Fizika Goreniya i Vzryva*, 1984, 20, 1, 70-77).
59. Nigmatulin, R., Vainshtein, P, Akhatov, I. Transition of powdered explosive convective combustion into detonation. *Combustion, Explosion, and Shock Waves*, 1984, March, 618-621 (translated from *Fizika Goreniya i Vzryva*, 1983, 19, 5, 93-97).
60. Akhatov, I., Vainshtein, P., Nigmatulin, R. Nonstationary regimes of convective combustion of a porous powdered fuel. *Sov. Phys. Dokl.*, 1983, 28, 618-620 (translated from *Doklady Akademii Nauk SSSR*, 271, 1096-1100).
61. Akhatov, I., Vainshtein, P. Nonstationary combustion regimes in porous powders. *Combustion, Explosion, and Shock Waves*, 1983, November, 297-304 (translated from *Fizika Goreniya i Vzryva*, 1983, 19, 3, 53-61).
62. Akhatov, I., Vainshtein, P., Nigmatulin, R. Structure of detonation waves in gas suspensions of fuel containing the oxidant. *Fluid Dynamics*. 1982, March, 675-681 (translated from *Izvestiya Akademii Nauk SSSR, Mekhanika Zhidkosti i Gaza*, 1981, 16, 5, 47-53).
63. Akhatov, I., Vainshtein, P. On the theory of steady-state combustion of a spherical particle of propellant. *Moscow University Mechanics Bulletin*, 1981, 36, 1-2, 19-23 (translated from *Vestnik Moskovskogo Universiteta. Mekhanika*, 1981, 36, 1, 91-94).

Conference Papers

64. Lutfurakhmanov, A., Sailer, R., Loken, G., Kohut, A., Wang, Y., Voronov, A., Schulz, D.L., Akhatov, I.S., Liquid deposition at micro and Nanoscale, Proceedings of ASME 2010 3rd Joint US-European Fluids Engineering Summer Meeting and 8th International Conference on Nanochannels, Microchannels, and Minichannels FEDSM2010-ICNMM2010 August 2-4, 2010, Montreal, Canada.
65. Mahmud, Z., Hoey, J.M., Lutfurakhmanov, A., Daus, J., Swenson, O.F., Schulz, D.L., Akhatov, I.S., Experimental characterization of aerosol flow through a micro-capillary, Proceedings of ASME 2010 3rd Joint US-European Fluids Engineering Summer Meeting and 8th International Conference on Nanochannels, Microchannels, and Minichannels FEDSM2010-ICNMM2010 August 2-4, 2010, Montreal, Canada.
66. Lutfurakhmanov, A., Sailer, R., Loken, G., Kohut, A., Wang, Y., Voronov, A., Schulz, D., Akhatov, I., Capillary-based liquid micro/nano deposition, Proceedings of USNCTAM2010, 16th US National Congress of Theoretical and Applied Mechanics, June 27 - July 2, 2010, State College, Pennsylvania, USA.
67. Hoey, J., Lutfurakhmanov, A., Daus, J., Mahmud, Z., Swenson, O., Schulz, D., Akhatov, I., Aerosol flow in Microscale: theory, experiment, and application to direct-write micro fabrication, Proceedings of USNCTAM2010, 16th US National Congress of Theoretical and Applied Mechanics, June 27 - July 2, 2010, State College, Pennsylvania, USA.
68. Akhatov, I.S., Hoey, J.M., Thompson, D., Lutfurakhmanov, A., Mahmud, Z., Swenson, O.F., Schulz, D.L., Osiptsov, A.N. Aerosol Flow through Micro-capillary. ASME 2nd Micro/Nanoscale Heat & Mass Transfer International Conference, Shanghai, December 18-21, 2009.
69. Akhatov, I.S., Hoey, J.M., Thompson, D., Lutfurakhmanov, A., Mahmud, Z., Swenson, O.F., Schulz, D.L., Osiptsov, A.N. Aerosol Flow in Microscale: Theory, Experiment, and Application to Direct-Write Fabrication. American Association for Aerosol Research 28th Annual Conference, Minneapolis, MN, October 26-30, 2009.
70. Hoey, J.M., Thompson, D., Robinson, M., Mahmud, Z., Swenson, O.F., Pokhodnya, K., Akhatov, I.S., Schulz, D.L. CAB-DWTM for 5 μm Trace-Width Deposition of Solar Cell Metallization Top-Contacts, Proceedings of the 34th IEEE Photovoltaic Specialists Conference, Philadelphia, PA, June 7-12, 2009.
71. Akhatov, I.S., Hoey, J.M., Thompson, D., Swenson, O.F., Schulz, D.L., Osiptsov, A.N. Aerosol flow in microscale: theory, experiment, and application to direct-write micro fabrication. ECI International Conference on Heat Transfer and Fluid Flow in Microscale, Whistler, September 21-26, 2008.
72. Schulz, D.L., Hoey, J.M., Thompson, D., Swenson, O.F., Han, S., Lovaasen, J., Dai, X., Braun, C., Keller, K., Akhatov, I.S. Collimated aerosol beam deposition: sub 5- μm resolution of printed actives and passives. Special edition of IEEE Journal for selected papers of the Annual US Display Consortium Flexible Electronics and Displays Conference, January 21-24, 2008, Phoenix, AZ; Academic & Fundamental Research Track; Session: Printed Electronics, submitted (2007).
73. Mekic, S., Ulven, C.A., Akhatov, I.S. Nanoclay/epoxy solution flow through reinforcing fabric during liquid molding, International SAMPE Symposium and Exhibition (ISSI), Baltimore 2007.
74. Sailer, R., Lutfurakhmanov, A., Akhatov, I., Schulz, D. Non-contact nanolithography. Proceedings of the 2007 NSTI Nanotechnology Conference and Trade Show, Santa Clara, CA, May 18-20, 2007.
75. Lutfurakhmanov, A., Sailer, R., Akhatov, I., Schulz, D. Quick "easy?!" determination of the diameter of nanocapillaries. Proceedings of the 2007 NSTI Nanotechnology Conference and Trade Show, Santa Clara, CA, May 18-20, 2007.
76. Akhatov, I., Gavriluk, S., Chugunov, S., Lutfurakhmanov, A. Statics and Dynamics of Liquid Nanofilm on a Solid Substrate Based on the van der Waals Concept of Capillarity. Proceedings of the US National Congress on Theoretical and Applied Mechanics, Boulder, CO, June 25-30, 2006.
77. Akhatov, I., Gavriluk, S. Model of a liquid nanofilm on a solid substrate. Proceedings of the 2006 NSTI Nanotechnology Conference and Trade Show, Boston, MA, May 8-12, 2006.
78. Shimpi, A., Akhatov, I., Jang, B., Huang, W., Guo, J. Transport Phenomena in Local Vapor Fuel Cell. Proceedings of the International Hydrogen Energy Congress & Exhibition IHEC 2005, Istanbul, Turkey, July 13-15, 2005.

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80. Akhatov, I.S., Konovalova, S.I. Structure Formation in Acoustic Cavitation. Proceedings of the Japan/US Seminar on Two-Phase Flow Dynamics, Nagahama, Japan, December 6-11, 2004.
81. Akhatov, I.S., Nigmatulin, R.I., Lahey, R.T. The Analysis of Linear and Nonlinear Bubble Cluster Dynamics. Proceedings of the Japan/US Seminar on Two-Phase Flow Dynamics, Nagahama, Japan, December 6-11, 2004.
82. Konovalova, S.I., Zakirov, K., Akhatov, I.S. Dynamics of Bubbles and Bubble Clouds: Structure Formation in Acoustic Cavitation. Proceedings of the 3rd International Symposium for Two-Phase Modeling and Experimentation, Pisa, Italy, September 22-24, 2004.
83. Akhatov, I., Topolnikov, A., Vakhitova, N., Lindau, O., Mettin, R., Lauterborn, W. Collapse and rebound of laser-induced cavitation bubbles. C.Brennen (ed.), Proceedings of the 4th International Symposium on Cavitation, June 21-23, 2001, California Institute of Technology, Pasadena, CA, USA.
84. Khismatullin, D., Akhatov, I. Sound-ultrasound interaction in bubbly liquid. E. Michaelides (ed.), Proceedings of the 4th International Conference on Multiphase Flow. May 27-June 1, 2001, New Orleans LA, USA.
85. Akhatov, I., Vakhitova, N., Topolnikov, A., Zakirov, K., Wolfrum, B., Kurtz, T., Lindau, O., Mettin, R., Lauterborn, W. Dynamics of laser-induced cavitation bubbles. E.Michaelides (ed.), Proceedings of the 4th International Conference on Multiphase Flow. May 27-June 1, 2001, New Orleans LA, USA.
86. Akhatov, I., Holt, R.G., McDaniel, J.G. Dynamics of aqueous foam drops. E.Michaelides (ed.), Proceedings of the 4th International Conference on Multiphase Flow. May 27-June 1, 2001, New Orleans LA, USA.
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3.4 Research Group

Postdocs

- Dr. *Olena Shafrańska*, Research Associate, Micro/Nano Fluidics Laboratory, NDSU ME Department. (2008-2009)
- Dr. *Cheng Wang*, Research Associate, Impact Biomechanics Laboratory, NDSU ME Department. (2006-2007)

Ph.D. Theses Supervised

- *Sait Mekic*, "Porous media characterization applied to fiber reinforcements and membranes." September 2008. (NDSU)

M.S. Theses Supervised

- *Svyatoslav Chugunov*, "Analysis of liquid structures: statics and dynamics." August 2009. (NDSU)
- *Artur Lutfurakhmanov*, "Capillary-based nanolithography: modeling and experiment." May 2009. (NDSU)
- *Robert A. Sailer*, "STM-controlled capillary based non-contact material deposition nanolithography." June 2007. (NDSU)
- *Justin M. Hoey*, "Aerodynamic focusing of aerosol particles through a micro-nozzle: modeling and experiment." May 2007. (NDSU)
- *Benjamin A. Rime*, "Experimental investigation of speak-based proton exchange membranes for use in direct methanol fuel cells." April 2007. (NDSU)
- *Mohammad Rastgaar Aagaah*, "Vibrating micro-droplet production system." June 2005. (NDSU)

Ph.D. Theses Supervised in Russia

- *Svetlana Konovalova*, "Translational effects and structure formation in acoustic cavitation." (2006)
- *Kamil Zakirov*, "Numerical modeling of bubble growth and collapse in compressible liquid." (2005)
- *El'vira Nasibullaeva*, "Nonlinear dynamics of resonances and synchronization in bubble clusters." (2001). Awarded a stipend of the Acoustical Society of America.
- *Andrey Topolnikov*, "Numerical modeling of nonlinear oscillations and collapse of gas bubble in a liquid." (2000)
- *Konstantin Mikhailenko*, "Numerical simulation of two-dimensional two-phase flow with chemical reactions." (1999)
- *Damir Khismatullin*, "Mathematical modeling of resonant phenomena in dynamics of bubbly liquids." (1998). Awarded a NATO postdoctoral fellowship at the Department of Aerospace and Mechanical Engineering of Boston University (2000). Currently Associate Professor at the Department of Biomedical Engineering, Tulane University, New Orleans, LA.
- *Andrey Korobchinski*, "Unsteady motion of multiphase systems in periodic pressure fields." (1996)
- *Ismagil'yan Khusainov*, "Chaotic oscillations in dynamics of non-Newtonian fluids." (1993)
- *Rosa Chemborisova*, "Thermoconvective instability of relaxational liquids in porous media." (1991)

4 Honors, Awards, and Visiting Positions

2010	Paper "Aerosol focusing in micro-capillaries: Theory and experiment" <i>Journal of Aerosol Science</i> , Volume 39, Issue 8 (2008), pages 691-709, is recognized by Elsevier as one of the "Top-50 most cited articles" as published in <i>Journal of Aerosol Science</i> 2007-2010.
2009	Invited Lecture, New Jersey Institute of Technology, Newark, NJ
2008/June	Visiting Professor, University of Provence, Marseille, France
2007	Invited Lecture, Institute of Henri Poincare, Paris, France
2005/2006	Researcher of the Year Award, College of Engineering and Architecture, North Dakota State University
2001-2003	Visiting Researcher, Department of Mechanical, Aerospace & Nuclear Engineering, Rensselaer Polytechnic Institute, Troy, NY
2003	Invited Lecture, University of Lausanne, Institute of Theoretical Physics, Switzerland
2002	Invited "Michael A. Sadowsky Lecture in Applied Mechanics", Rensselaer Polytechnic Institute
2001	Invited Lecture, UC Santa Barbara, Center for Risk Studies and Safety
2000	Invited Lecture, Department of Applied Sciences, Universite' Libre de Bruxelles, Belgium
1999	Visiting Professor, Department of Aerospace and Mechanical Engineering, Boston University, Boston, MA
1993-2000	Visiting Researcher, The Third Physical Institute, University of Göttingen, Germany

2002 Corresponding Member of Academy of Sciences of Republic Bashkortostan, Russia
2001 Honored person in Science and Technology of Republic Bashkortostan, Russia
2001 Member of the National Committee for Theoretical and Applied Mechanics of Russia
1984 Ph.D. dissertation awarded the Prize of Komsomol for the best research work of a young scientist, Ufa, Russia
1978/1979 Lenin scholarship, School of Physics, Lomonosov Moscow State University