

ANDREI G. FEDOROV, Ph.D.
George W. Woodruff Professor
School of Mechanical Engineering & Petit Institute for Bioengineering & Bioscience
Georgia Institute of Technology, Atlanta, GA 30332-0405, USA
Email: AGF@gatech.edu / Voice: +1-404-385-1356

<u>TABLE OF CONTENT & SECTIONS</u>		<u>Page</u>
I.	EDUCATION & EARNED DEGREES.....	2
II.	EMPLOYMENT.....	2
III.	SCHOLARLY ACCOMPLISHMENTS.....	3
	A. Published Books & Parts of Books.....	3
	B. Refereed Publications.....	3
	• Archival Journal Publications.....	3
	• Refereed Conference/Symposia Proceedings.....	13
	C. Presentations.....	19
	• Conference Presentations (reviewed based on abstract only).....	19
	• Keynote Lectures, Invited Seminars & Presentations.....	26
	D. Other Scholarly Accomplishments.....	31
	• Issued Patents & Utility (Full) Patent Applications.....	31
IV.	SERVICE.....	33
	A. Professional Contributions.....	33
V.	GRANTS & CONTRACTS.....	35
	A. As Principal and Co-Principal Investigator.....	35
	B. As Investigator.....	37
VI.	HONORS & AWARDS.....	37

I. EARNED DEGREES

- 1994-1997 **Ph.D. in Mechanical Engineering**
Purdue University, West Lafayette, Indiana
Ph. D. Thesis: “*Combined Heat and Mass Transfer and Adsorption Dynamics in a Honeycomb Adsorbent*”
Advisor: *Professor Raymond Viskanta*
- 1990-1994 **B.S./M.S. (highest honors) in Applied Mathematics**
M. V. Lomonosov Moscow State University, Moscow, Russia
M.S. Thesis: “*Numerical Simulation of Conjugate Heat and Mass Transfer and Turbulent Flow over the Wall with a Porous Insert*”
Advisor: *Professor Gennady S. Roslyakov*
- 1987-1993 **B.S./M.S. (highest honors) in Mechanical Engineering**
N. E. Bauman Moscow State Technical University, Moscow, Russia
M.S. Thesis: “*Investigation of Conjugate Heat and Mass Transfer in Systems of Transpiration Cooling*”
Advisor: *Professor Alexander I. Leontiev*

II. EMPLOYMENT

- 2000-present **Georgia Institute of Technology, Atlanta, GA, USA**
George W. Woodruff Professor (2012-Present), George W. Woodruff School of Mechanical Engineering
Woodruff Faculty Fellow (2008-2012), George W. Woodruff School of Mechanical Engineering
Professor (2008-present), George W. Woodruff School of Mechanical Engineering
Associate Professor (2005-2008), George W. Woodruff School of Mechanical Engineering
Assistant Professor (2000-2005), George W. Woodruff School of Mechanical Engineering
Initiating Member, Georgia Tech Center for Biologically Inspired Design (CBID)
Faculty Member, Parker H. Petit Institute for Bioengineering and Bioscience (IBB)
Faculty Member, MARCO/DARPA Multi-University Interconnect Focus Center (IFC)
Faculty Member, Georgia Tech Center for Drug Design, Development, and Delivery
Faculty Member, Georgia Tech Center of Fuel Cell and Battery Technology
Faculty Affiliate, Georgia Tech Integrative BioSystems Institute (IBSI)
Faculty Member, Georgia Tech Specialty Separation Center
Faculty Member, Georgia Tech Materials Council
- 1994–1999 **Purdue University, West Lafayette, IN, USA**
Postdoctoral Research Associate, School of Mechanical Engineering (1997-1999)
Graduate Research Assistant, School of Mechanical Engineering (1994-1997)
Graduate Research Assistant, Department of Physics (Summer 1998)
Researcher, Computational Finance Program (1997-1999)

- 1993-1994 **Bauman Moscow State Technical University**, Moscow, Russia
Lecturer, Department of Power Engineering
- 1992–1994 **Institute for High Temperatures**, Russian Academy of Sciences, Moscow, Russia
Research Engineer, MHD Laboratory (Head: Dr. Bituyrin)

III. SCHOLARLY ACCOMPLISHMENTS

A. PUBLISHED BOOKS AND PARTS OF BOOKS

- **Books & Parts of Books**

1. Narayanan, S., Kottke, P. A., Joshi, Y. K., and Fedorov, A.G., Gas assisted evaporation heat and mass transfer, *Annual Review of Heat Transfer*, Vol. 19, 2015 (**invited**).
2. Yazawa, K., Fedorov, A.G., Joshi, Y. K., and Shakouri, A., Energy efficient solid-state cooling for hot spot removal, In “*Cooling and Packaging Microelectronic and Nanoelectronic Equipment: Challenges, Opportunities and Emerging Technologies*” - A Festschrift for Prof. Avi Bar-Cohen, 2013.
3. Kottke, P. A., Fedorov, A.G., and Gole, J. L., Multiscale transport in porous silicon gas sensors, In *Modern Aspects of Electrochemistry*, **43/44**, M. Schlesinger (Editor), Springer, 2008 (**invited**).
4. Joshi, Y., Fedorov A., Wei, X., and Gurrum, S. P. Limits of current heat removal technologies and opportunities, In *Integrated Interconnect Technologies for 3D Nanoelectronic Systems*, M. Bakir & J. Meindl (Editors), Artech House, 2008 (**invited**).
5. Fedorov, A.G. and Viskanta, R., Heat transfer enhancement by direct contact drying of a moving porous strip, In “*Process, Enhanced, and Multiphase Heat Transfer*” - A Festschrift for A. E. Bergles, pp. 255-266, Begell House, Inc., New York, 1997.

B. REFEREED PUBLICATIONS

- **Archival Journal Papers (Submitted/Under Review)**

1. Henry, M., Kim, S. and Fedorov, A., High purity tungsten nanostructures via focused electron beam induced deposition with carrier-gas assisted supersonic jet delivery of organometallic precursors, *J. Phys. Chem. C*, in review (2016).
2. Han, X., Fedorov, A., Joshi, Y. K., Flow boiling in microgaps for thermal management of high heat flux microsystems, *ASME J. Electronic Packaging*, in review (2016).
3. Zhang, X., Han, X., Sarvey, T. E., Green, E. C., Kottke, P. A., Fedorov, A. G., Joshi, Y. K., Bakir, M., 3D ICs with embedded microfluidic cooling: technology, thermal performance and electric implications, *ASME J. Electronic Packaging*, in review (2016).

- **Archival Journal Papers (Published/In Press/Accepted)**

1. Kim, S, Russell, M., Kulkarni, D., Henry, M., Kim, S., Naik, R., Voevodin, A. A., Jang, S., Tsukruk, V. V. and Fedorov, A., Activating “invisible” glue: using electron beam for enhancement of interfacial properties of graphene-metal contact, *ACS Nano*, **10**, 1042-1049 (2016).
2. Fisher, K. Kottke, P. A., Kim, S., and Fedorov A. G., Rapid electron beam writing of topologically complex 3D nanostructures using liquid phase precursor, *Nano Lett.*, **15** (12), 8385–8391 (2015).

3. Kim, S, Henry, M., and Fedorov, A., Using energized oxygen micro-jet for improved graphene etching by focused electron beam, *Appl. Phys. Lett*, **107** (23), 233102-06 (2015).
4. Zhang, X., Han, X., Sarvey, T. E., Green, E. C., Kottke, P. A., Fedorov, A. G., Joshi, Y. K., Bakir, M., 3D ICs with embedded microfluidic cooling: technology, thermal performance and electric implications, *ASME J. Electronic Packaging*, in press (December 2015).
5. Green, C., Kottke, P. A., Han, X., Woodrum, C., Sarvey, T., Zhang, X., Asrar, P., Zhang, X., Joshi, Y. K., Fedorov, A., Sitaraman, S., and Bakir, M., A review of two-phase cooling in 3D stacked electronics: technology integration, *ASME J. Electronic Packaging*, **137** (4), 040802-9 (2015).
6. Anderson, D. A., Nasr, M., Yun, T. M., Kottke, P. A., and Fedorov, A. G., Sorption-enhanced variable volume batch-membrane steam methane reforming at low temperature: experimental demonstration and kinetic modeling, *Ind. Eng. Chem. Res.*, **54** (34), 8422–8436 (2015).
7. Kim, S, Russell, M., Henry, M., Kim, S., Naik, R., Voevodin, A. A., Jang, S., Tsukruk, V. V. and Fedorov, A., Dynamic modulation of electronic properties of graphene by localized carbon doping using Focused Electron Beam Induced Deposition, *Nanoscale*, **7**, 14946-14952 (2015).
8. Kottke, P. A., Yun, T. M., Green, C., Joshi, Y. K. and Fedorov, A. G., Two-phase convective cooling for ultra-high power dissipation in microprocessors, *ASME J. Heat Transfer*, **138** (1), 011501-011507 (2015).
9. Zhou, W., Loney, Fedorov, A., D., Degertekin, F. L., Rosen, D., Shape evolution of multiple interacting droplets in inkjet deposition, *Rapid Prototyping J.*, **21** (4), 373-385 (2015).
10. Silva, J., Geryak, R., Loney, D., Kottke, P.A., Naik, R., Tsukruk, V. V., and Fedorov, A., Stick-slip water penetration into capillaries coated with swelling hydrogel, *Soft Matter*, **11**, 5933-5939 (2015).
11. Yun, T. M., Kottke, P. A., Anderson, D. A., and Fedorov, A. G., Theoretical analysis of hydrogen production by variable volume membrane batch reactors with direct liquid fuel injection, *Int. J. Hydrogen Energy*, **40** (25), 8005-8019 (2015).
12. Kim, S, Kulkarni, D., Henry, M., Zackowski, P., Jang, S., Tsukruk, V. V. and Fedorov, A., Localized conductive patterning via focused electron beam reduction of graphene oxide, *Appl. Phys. Lett.*, **106**, 133109 (2015).
13. Yun, T. M., Kottke, P. A., Anderson, D. A., and Fedorov, A. G., Experimental investigation of hydrogen production by variable volume membrane batch reactors with modulated liquid fuel introduction, *Int. J. Hydrogen Energy*, **40** (6), 2601-2612 (2015).
14. Yun, T. M., Kottke, P. A., Anderson, D. A., and Fedorov, A. G., Power density assessment of variable volume batch reactors for hydrogen production with dynamically modulated liquid fuel introduction, *Ind. & Eng. Chem. Res.*, **53** (47), 18140–18151 (2014).
15. Sahu, V., Fedorov, A., Joshi, Y. K., Bahk, J.-H., Wang, X., and Shakouri, A., Experimental characterization of hybrid solid-state and fluidic cooling for thermal management of localized hotspots, *IEEE Comp. Pack. Manuf. Tech.*, **5**(1), 57-64 (2015).
16. Tibavinsky, I. A., Kottke, P. A., and Fedorov, A. G., Microfabricated ultrarapid desalting device for nanoelectrospray ionization mass spectrometry, *Anal. Chem.*, **87** (1), 351-356 (2015).
17. Fedorov, A., Kim, S, Henry, M., Kulkarni, D., Tsukruk, V. V., Focused electron beam induced processing (FEBIP) for emerging applications in carbon nanoelectronics, *Appl. Phys. A – Mat. Sci. & Proc.*, **117** (4), 1659-1674 (2014) **invited**.

18. Anderson, D. A., Kottke, P. A., and Fedorov, A. G., Thermodynamic analysis of hydrogen production via sorption-enhanced steam methane reforming in a new class of variable volume batch-membrane reactors, Special Issue of *Int. J. Hydrogen Energy*, **39**, 17985-17997 (2014) **invited**.
19. Zhou, W., Loney, Fedorov, A., D., Degertekin, F. L., Rosen, D., Shape evolution of multiple interacting droplets in inkjet deposition, *Rapid Prototyping J.*, in press (March 2014).
20. Anderson, D. A., Kottke, P. A., and Fedorov, A. G., Thermodynamic analysis of hydrogen production via sorption-enhanced steam methane reforming in a new class of variable volume batch-membrane reactors, Special Issue of *Int. J. Hydrogen Energy*, in press (February 2014), **invited**.
21. Sahu, V., Fedorov, A., Joshi, Y. K., Bahk, J.-H., Wang, X., and Shakouri, A., Experimental characterization of hybrid solid-state and fluidic cooling for thermal management of localized hotspots, *IEEE Comp. Pack. Manuf. Tech.*, in press (June 2014).
22. Kim, S., Kulkarni, D., Davis, M., Kim, S., Naik, R., Voevodin, A. A., Jang, S., Tsukruk, V. V. and Fedorov, A., Controlling physicochemical state of carbon on graphene using Focused Electron Beam Induced Deposition, *ACS Nano*, **8** (7), 6805–6813 (2014).
23. Plawsky, J. L., Fedorov, A. G., Garimella, S. V., Ma, H. B., Maroo, S. C., Chen, L., and Nam, Y., Nano- and microstructures for thin film evaporation – a review, *Nanoscale & Microscale Thermophys. Eng.*, **18**, 251-269 (2014), **invited**.
24. Kulkarni, D., Kim, S., Chyasnavichyus, M., Hu, K., Fedorov, A., and Tsukruk, V. V. Chemical reduction of individual graphene oxide sheets as revealed by electrostatic force microscopy, *J. Am. Chem. Soc.*, **136** (18), 6546–6549 (2014).
25. Green, C. E., Fedorov, A., and Joshi, Y. K., Time scale matching of dynamically operated devices using composite thermal capacitors, *Microelectronics J.*, **45**, 1069-1078 (2014).
26. Sahu, V., Fedorov, A., Joshi, Y. K., Transient characterization of hybrid microfluidic-thermoelectric cooling scheme for dynamic thermal management of microprocessors, *ASME/IEEE J. Electronic Packaging*, **136** (3), 31014-31019 (2014).
27. Sahu, V., Fedorov, A., Joshi, Y. K., Computational and experimental investigation of thermal coupling between superlattice coolers, *IEEE Trans. Adv. Pack.*, **4** (4), 622-631 (2014).
28. Zhou, W., Loney, Fedorov, A., D., Degertekin, F. L., Rosen, D., Lattice Boltzmann simulations of multiple droplet interaction dynamics, *Phys. Rev. E*, **89** (3), 033311 (2014).
29. Meacham, J. M., Durvasula, K., Degertekin, F. L. and Fedorov, A., Physical methods for intracellular delivery: practical aspects from laboratory to industrial scale processing, *Journal of Laboratory Automation (JALA)*, Special Issue on Advancements in Biomedical Micro/Nano Tools and Technology, **invited**, **19** (1), 1-18 (2014).
30. Zhou, W., Loney, Fedorov, A., D., Degertekin, F. L., Rosen, D., Lattice Boltzmann simulations of multiple droplet interaction dynamics, *Phys. Rev. E*, **89** (3), 033311 (2014).
31. Meacham, J. M., Durvasula, K., Degertekin, F. L. and Fedorov, A., Physical methods for intracellular delivery: practical aspects from laboratory to industrial scale processing, *Journal of Laboratory Automation (JALA)*, Special Issue on Advancements in Biomedical Micro/Nano Tools and Technology, **invited**, **19** (1), 1-18 (2014).
32. Zhou, W., Loney, D., Degertekin, F. L., Rosen, D., Fedorov, A., What controls dynamics of droplet shape evolution upon impingement on a solid surface?, *AIChE J.*, **59** (8), 3071-3082 (2013).

33. Gittens, R.A., Olivares-Navarrete, R., Cheng, A., Anderson, D., McLachlan, T., Stephan, I., Fedorov, A., Rupp, F., Geis-Gerstorfer, J., Sandhage, K.H., Boyan, B.D., and Schwartz, Z., The role of titanium surface micro/nanotopography and wettability on the differential response of human osteoblast lineage cells, *Acta Biomaterialia*, **9**, 6268-6277 (2013).
34. Hildreth, O., Rykaczewski, K., Fedorov, A., and Wong, C. P., A DLVO model for catalyst motion in Metal-assisted Chemical Etching based upon controlled out-of-plane rotational etching and force-displacement measurements, *Nanoscale*, **5**, 961-970 (2013).
35. Narayanan, S., Fedorov, A., and Joshi, Y., Heat and mass transfer during evaporation of thin liquid films confined by porous membrane subjected to air jet impingement, *Int. J. Heat Mass Trans.*, **58**, 300-311 (2013).
36. Hildreth, O., Fedorov, A., and Wong, C. P., 3D spirals with controlled chirality fabricated using metal-assisted chemical etching of silicon, *ACS Nano*, **6** (11), 10004-10012 (2012).
37. Kim, S, Kulkarni, D., Rykaczewski, K., Henry, M., Tsukruk, V. V. and Fedorov, A., Fabrication of an ultra-low-resistance Ohmic contact to MWCNT-metal interconnect using graphitic carbon by Electron Beam Induced Deposition (EBID), *IEEE Trans. Nano*, **11** (6), 1223-1230 (2012).
38. Kim, S., Kim, Y. J., Joshi, Y. K., Fedorov, A., and Kohl, P. A., Absorption heat pump/refrigeration system utilizing ionic liquid and hydrofluorocarbon refrigerants, *ASME/IEEE J. Elect. Pack.*, **134**, 031009-0130180 (2012).
39. Kim, Y. J., Kim, S., Joshi, Y. K., Fedorov, A., and Kohl, P. A., Thermodynamic analysis of an absorption refrigeration system with ionic-liquid/refrigerant mixture as a working fluid, *Energy*, **44** (1), 1005-1016 (2012).
40. Wei, W., Fedorov, A., Luo, Z., and Ni, M., Radiative properties of dense nanofluids, *Appl. Optics.*, **51** (25), 6159-6171 (2012).
41. Anderson, D., Gupta, M., Voevodin, A., Hunter, C., Putnam, S.A., Tsukruk, V.V., and Fedorov, A., Using amphiphilic nanostructures to enable long-range ensemble coalescence and surface rejuvenation in dropwise condensation, *ACS Nano*, **6** (4), 3262-3268 (2012).
42. Kottke, P.A. and Fedorov, A., Physics-based, reduced-order gas cloud with radiative transport model for rapid simulation of hyperspectral infrared sensors, *Optical Eng.*, **51** (5), 056401-11 (2012).
43. Zhou, W., Loney, D., Fedorov, A., Degertekin, F. L., Rosen, D., Droplet impact dynamics in ink-jet manufacturing, *Virtual & Physical Prototyping Journal*, **7** (1), 49-64 (2012).
44. Kulkarni, D., Kim, S-K., Fedorov, A., and Tsukruk, V. V., Fast light-induced phase transformations of carbon on metal nanoparticles, *Adv. Funct. Mat.*, **22** (10), 2129-2139 (2012).
45. Narayanan, S., Fedorov, A., and Joshi, Y., Interfacial transport of evaporating water confined in nanopores, *Langmuir*, **27** (17), 10666-10676 (2011).
46. Varady, M. J. and Fedorov, A., Fuel reformation and hydrogen generation with direct droplet impingement reactors: parametric studies and design consideration for portable methanol steam reformers, *Ind. & Eng. Chem. Res.*, **50**, 9514-9524 (2011).
47. Varady, M. J. and Fedorov, A., Fuel reformation and hydrogen generation with direct droplet impingement reactors: model formulation and validation, *Ind. & Eng. Chem. Res.*, **50**, 9502-9513 (2011).

48. Rykaczewski, K., Hildreth, O.J., Wong, C.P., Fedorov, A., and Scott, J. H. J., Guided three-dimensional catalyst folding during Metal-assisted Chemical Etching of silicon, *Nano Lett.*, **11** (6), 2369-2374 (2011).
49. Henry, M. R., Kim, S., Rykaczewski, and Fedorov, A., Inert gas jets for growth control in electron beam induced deposition, *Appl. Phys. Lett.*, **98**, 263109 (2011).
50. Kulkarni, D., Rykaczewski, K., Singamaneni, S., Kim, S-K., Fedorov, A., and Tsukruk, V. V., Thermally-induced transformations of amorphous carbon nanostructures fabricated by Electron Beam Induced Deposition, *ACS Appl. Mat. & Interfaces*, **3** (3), 710-720 (2011).
51. Rykaczewski, K., Scott, J. H. J., Fedorov, A., Electron beam heating effects during ESEM imaging of water condensation on superhydrophobic surfaces, *Appl. Phys. Lett.*, **98**, 093106 (2011).
52. Rykaczewski, K., Hildreth, O.J., Wong, C.P., Fedorov, A., and Scott, J. H. J., Directed 2D-to-3D pattern transfer method for controlled fabrication of topologically complex three-dimensional features in silicon, *Adv. Mater.*, **23**(5), 659-663 (2011).
53. Forbes, T. P., Degertekin, F.L., and Fedorov, A., Droplet charging regimes in ultrasonic atomization of a liquid electrolyte in an external electric field, *Phys. Fluids*, **23**, 012104 (2011).
54. Forbes, T. P., Degertekin, F.L., and Fedorov, A., Regime transition in electromechanical fluid atomization and implications on analyte ionization for mass spectrometric analysis, *J. Am. Soc. Mass Spec.*, **21**, 1900-1905 (2010).
55. Dietz, C., Rykaczewski, K., Fedorov, A., and Joshi, Y., ESEM imaging of condensation on a nanostructured superhydrophobic surface, *ASME J. Heat Transf.*, **132** (8), 080904 (2010).
56. Dietz, C., Rykaczewski, K., Fedorov, A., and Joshi, Y., Visualization of droplet departure on a superhydrophobic surface and implications to heat transfer enhancement during drop-wise condensation, *Appl. Phys. Lett.*, **97** (3), 033104-033106 (2010).
57. Forbes, T. P., Degertekin, F.L., and Fedorov, A., Electrochemical ionization and analyte charging in Array of Micromachined UltraSonic ElectroSpray (AMUSE) ion source, *J. Electroanal. Chem.*, **645** (2), 167-173 (2010).
58. Meacham, J.M., O'Rourke, A., Yang, Y., Fedorov, A., Degertekin, F.L., and Rosen, D.W., Micromachined ultrasonic print-head for deposition of high viscosity materials, *ASME J. Manuf. Sci. Eng.*, **132** (3), 030905-030916 (2010).
59. Narayanan, S., Fedorov, A., and Joshi, Y., On-chip thermal management of hot spots using a perspiration nanopatch, *J. Micromech. Microeng.*, **20** (7), 075010-075020 (2010).
60. Rykaczewski, K., Hildreth, O.J., Kulkarni, D., Henry, M., Kim, S-K., Wong, C.P., Tsukruk, V. V., and Fedorov, A., Maskless and resist-free rapid prototyping of three dimensional silicon structures through Electron Beam Induced Deposition (EBID) of carbon in combination with Metal assisted Chemical Etching (MaCE) of Silicon, *ACS Appl. Mat. & Interfaces*, **2**(4), 969-973 (2010).
61. Kim, Y. J., Joshi, Y., and Fedorov, A., Thermally dependent characteristics and spectral hole burning of double-lasing quantum-dot laser, *J. Appl. Phys.*, **107**, 073104-073111 (2010).
62. Forbes, T. P., Degertekin, F.L., and Fedorov, A., Electrohydrodynamics of charge separation in droplet-based ion sources with time-varying electrical and mechanical actuation, *J. Am. Soc. Mass Spec.*, **21**, 501-510 (2010).

63. Kim, Y. J., Joshi, Y., and Fedorov, A., Lee, Y. J., and Lim, S. K., Thermal characterization of interlayer microfluidic cooling of three-dimensional IC with non-uniform heat flux, *ASME J. Heat Transfer*, **132** (4), 041009-9 (2010).
64. Kottke, P.A., Degertekin, F.L., and Fedorov, A., The Scanning Mass Spectrometry Probe: a scanning probe electrospray ion source for imaging mass spectrometry of submerged interfaces and transient events in solution, *Anal. Chem.*, **82** (1), 19–22 (2010) **invited**.
65. Green, C., Fedorov, A. and Joshi, Y., Scaling analysis of performance trade-offs in electronics cooling, *IEEE Trans. Comp. Pack. Tech.*, **32** (4), 868-875 (2009).
66. Fedorov, A. and Meacham, J. M., Evaporation-enhanced, dynamically-adaptive air (gas)-cooled heat sink for thermal management of high heat dissipation devices, *IEEE Trans. Comp. Pack. Tech.*, **32** (4), 746-753 (2009).
67. Rykaczewski, K., Henry, M., Kim, S-K., Fedorov, A., Kulkarni, D., Singamaneni, S., McConney, M. E., and Tsukruk, V. V., The effect of the geometry and material properties of a carbon joint produced by electron beam induced deposited on the electrical resistance of a multiwalled carbon nanotube-to-metal contact interface, *Nanotechnology*, **21**, 035202-035214 (2010).
68. Rykaczewski, K., Henry, M., and Fedorov, A., Electron beam induced deposition of residual hydrocarbons in the presence of a multiwall carbon nanotube, *Appl. Phys. Lett*, **95** (11), 113112-113115 (2009).
69. Forbes, T. P., Dixon, R. B., Muddiman, D.C., Degertekin, F.L., and Fedorov, A., Characterization of charge separation in the Array of Micromachined UltraSonic Electrospray (AMUSE) ion source for mass spectrometry, *J. Am. Soc. Mass Spec.*, **20**, 1684-1687 (2009).
70. Sahu, V., Joshi, Y., and Fedorov, A., Hybrid solid state/fluidic cooling for hot spot removal, *Nanoscale Microscale Thermophys. Eng.*, **13** (3), 135-150 (2009).
71. Damm, D. L. and Fedorov, A., Batch reactors for hydrogen production: theoretical analysis and experimental characterization, *Ind. & Eng. Chem. Res.*, **48** (12), 5610-5623 (2009).
72. McLeod, L., Degertekin, F. L., and Fedorov, A., Determination of the rate-limiting mechanism for permeation of hydrogen through microfabricated palladium-silver alloy membranes, *J. Membrane Sci*, **341**, 225-232 (2009).
73. McLeod, L., Degertekin, F. L., and Fedorov, A., Non-ideal absorption effects on hydrogen permeation through palladium-silver alloy membranes, *J. Membrane Sci*, **339**, 109-114 (2009).
74. Fedorov, A. and Dresselhaus, M., Harnessing nano power, *Chem. Sci.*, **6**, C41-C48 (2009).
75. Baxter, J., Bian, Z., Chen, G., Danielson, D., Dresselhaus, M., Fedorov, A., Fisher, T., Jones, C., Maginn, E., Kortshagen, U., Manthiram, A., Nozik, A., Rolison, D., Sands, T., Shi, L., Sholl, D., Wu, Y., Nanoscale design to enable the revolution in renewable energy, *Energy & Env. Sci.*, **2**, 559-588 (2009).
76. Green, C., Fedorov, A., and Joshi, Y., Fluid-to-fluid spot-to-spreader (F2/S2) hybrid heat sink for integrated chip-level and hotspot-level thermal management, *ASME J. Electronic Packaging*, **131** (2), 025002-09 (2009).
77. Narayanan, S., Fedorov, A., and Joshi, Y., Gas-assisted thin-film evaporation from confined spaces for dissipation of high heat fluxes, *Nanoscale Microscale Thermophys. Eng.*, **13** (1), 30-53 (2009).

78. Ogden A., Corno, J. A., Hong, J.-I., Fedorov A., and Gole, J.L., Maintaining particle size in the transformation of anatase to rutile titania nanostructures, *J. Phys. Chem. Solids*, **69** (11), 2898-2906 (2008).
79. Hampton, C.Y., Silvestri, C. J., Forbes, T.P., Varady, M.J., Meacham, J.M., Fedorov, A., Degertekin, F.L., and Fernandez, F.M., Comparison of the internal energy deposition of Venturi-assisted electrospray ionization and a Venturi-assisted Array of Micromachined UltraSonic ElectroSprays (AMUSE), *J. Am. Soc. Mass Spec.*, **19**, 1320-1329 (2008).
80. Rykaczewski, K., Marshall, A., White, W.B., and Fedorov, A., Dynamic growth of carbon nanopillars and microrings in electron beam induced dissociation of residual hydrocarbons, *Ultramicroscopy*, **108**, 989-992 (2008).
81. Damm, D. L. and Fedorov, A., Comparative assessment of batch reactors for scalable hydrogen production, *Ind. & Eng. Chem. Res.*, **47** (14), 4665-4674 (2008).
82. Kottke, P. A., Kranz, C., Kwon Y-K, Masson, J.-F., Mizaikoff, B. M., and Fedorov, A., Theory of polymer entrapped enzyme ultramicroelectrodes: Application to glucose and adenosine triphosphate detection, *J. Electroanal. Chem.*, **618** (1/2), 74-82 (2008).
83. Damm, D. L. and Fedorov, A., Conceptual study of distributed CO₂ capture and the sustainable carbon economy, *Energy Conv. Manag.*, **49** (6), 1674-1683 (2008).
84. Kim, Y. J., Joshi, Y., Fedorov, A., Performance analysis of air-cooled microchannel absorber in absorption-based miniature electronics cooling system, *J. Mech. Sci. Tech.*, **22**, 338-349 (2008).
85. Zarnitsyn, V., Meacham, J. M., Varady, M., Hao, C., Degertekin, F. L., and Fedorov, A., Electrosonic ejector microarray for drug and gene delivery, *Biomed. Microdevices*, **10** (2), 299-308 (2008).
86. Johnson, R. W., Duty, C. E., Fedorov, A., and Lackey, W. J., Computational modeling of forced flow laser chemical vapor deposition, *J. App. Phys. A*, **90** (2), 333-345 (2008).
87. Kottke, P. A., Kranz, C., Kwon Y-K, Masson, J.-F., Mizaikoff, B. M., and Fedorov, A., Theory of polymer entrapped enzyme ultramicroelectrodes: Fundamentals, *J. Electroanal. Chem.*, **612** (2), 208-218 (2008).
88. Ogden, A., Gole, J.L., and Fedorov, A., Optical and electronic properties of semiconducting nanostructures for photocatalytic hydrogen production, *J. Nanoelectronics & Optoelectronics*, **2** (3), 269-277 (2007) **invited**.
89. Kim, Y. J., Joshi, Y., Fedorov, A., An absorption based miniature heat pump system for electronics cooling, *Int. J. Refrigeration*, **31** (1), 23-33 (2007).
90. Dixon, R. B., Muddiman, D. C., Hawkrige, A. M., and Fedorov, A., Probing the mechanism of an air amplifier using an LTQ-FT-ICR-MS and fluorescence spectroscopy, *J. Am. Soc. Mass Spec.*, **18** (11), 1909-1913 (2007).
91. Hampton, C.Y., Forbes, T.P., Varady, M.J., Meacham, J.M., Fedorov, A., Degertekin, F.L., and Fernandez, F.M., Analytical performance of Array of Micromachined UltraSonic ElectroSprays (AMUSE) coupled to ion trap mass spectrometry for the analysis of peptides and proteins, *Anal. Chem.*, **79** (21), 8154-8161 (2007).
92. Forbes, T. P., Degertekin, F. L., and Fedorov, A., Multiplexed operation of a micromachined ultrasonic droplet ejector array, *Rev. Sci. Instrum.* **78** (10), 104101-104106(2007).

93. Wadell, R., Joshi, Y., and Fedorov, A., Experimental investigation of compact evaporators for ultralow temperature refrigeration of microprocessors, *ASME/IEEE J. Electronic Packaging*, **129** (3), 291-299 (2007).
94. Varady, M., McLeod, L., Meacham, J. M., Degertekin, F. L., and Fedorov, A., Integrated MEMS infrastructure for fuel processing: hydrogen generation and separation for portable power generation, *J. Micromech. Microeng.* (**invited: Special Issue on Power MEMS**), **17** (9), S257-S264 (2007).
95. Meacham, J. M., Varady, M., Esposito, D., Degertekin, F. L., and Fedorov, A., A micromachined ultrasonic atomizer for liquid fuels, *Atomization and Sprays*, **18** (2), 163-190 (2008).
96. Fedorov, A., Rykaczewski, K., and White, W., Transport issues in focused electron beam chemical vapor deposition, *Surface & Coatings Tech.*, **201**, 8808-8812 (2007).
97. McLeod, L., Degertekin, F. L., and Fedorov, A., Effect of microstructure on hydrogen permeation through thermally stable, sputtered palladium-silver alloy membranes, *Appl. Phys. Lett.*, **90** (26), 261905-261908 (2007).
98. Zarnitsyn, V. and Fedorov, A., Mechanosensing using drag force for imaging soft biological membranes, *Langmuir*, **23** (11), 6245-6251 (2007).
99. Rykaczewski, K., White, W.B., and Fedorov, A., Analysis of electron beam induced deposition (EBID) of residual hydrocarbons in electron microscopy, *J. Appl. Phys. A*, **101** (5), 054307-054319 (2007).
100. Launay, S., Fedorov, A., Joshi, Y., Cao, A., and Ajayan P., Hybrid micro-nano structured thermal interfaces for pool boiling heat transfer enhancement, *Microelectronics J.*, **37** (11), 1158-1164 (2006).
101. White, W.B., Rykaczewski, K., and Fedorov, A., What controls deposition rate in electron beam chemical vapor deposition?, *Phys. Rev. Lett.*, **97**(8), 086101-4 (2006).
102. Fedorov, A., and Degertekin, F. L., Scanning mass spectrometry probe for biochemical imaging, *Electronics Letters*, **42**(14), 793-794 (2006).
103. Kottke, P. A., Saillard, A., and Fedorov, A., Droplet growth and transition to coalescence in confined geometries, *Langmuir*, **22**(13), 5630-5635 (2006).
104. Damm, D. L. and Fedorov, A., Local thermal non-equilibrium effects in porous electrodes of the hydrogen-fueled SOFC, *J. Power Sources*, **159**, 1153-1157 (2006).
105. Damm, D. L. and Fedorov, A., Reduced-order transient thermal modeling for SOFC heating and cooling, *J. Power Sources*, **159**, 956-967 (2006).
106. Fan, T. H., Mayle, T., Kottke, P., and Fedorov, A., Simulation of electroanalysis using boundary integral method, *TrAC Trends Anal. Chem.*, **25** (1), 52-65 (2006).
107. Damm, D. L. and Fedorov, A., Spectral radiative heat transfer analysis of the planar SOFC, *ASME J. Fuel Cell Sci. Tech.*, **2** (4), 258-262 (2005).
108. Kaisare, N. S., Lee, J. H., and Fedorov, A., Operability analysis and design of a reverse-flow microreactor for hydrogen generation via methane partial oxidation, *Ind. & Eng. Chem. Res.*, **44** (24), 8323-8333 (2005).
109. Meacham, J. M., Varady, M., Degertekin, F. L., and Fedorov, A., Droplet formation and ejection from a micromachined ultrasonic droplet generator: visualization and scaling, *Phys. Fluids*, **17** (10), 100605-100613 (2005).
110. Kottke, P. A. and Fedorov, A., Generalized principles of unchanging total concentration, *J. Phys. Chem. B*, **109**, 16811-16818 (2005).

111. Kottke, P. A. and Fedorov, A., Advective and transient effects in combined AFM/SECM operation, *J. Electroanal. Chem.*, **583** (2), 221-231 (2005).
112. Kaisare, N. S., Lee, J. H., and Fedorov, A., Hydrogen generation in a reverse-flow microreactor I: Mathematical formulation and scaling, *AIChE J.*, **51** (8), 2254-2264 (2005).
113. Kaisare, N. S., Lee, J. H., and Fedorov, A., Hydrogen generation in a reverse-flow microreactor II: Simulations and analysis, *AIChE J.*, **51** (8), 2265-2272 (2005).
114. Damm, D. L. and Fedorov, A., Radiation heat transfer in SOFC materials and components, *J. Power Sources*, **143**, 158-165 (2005).
115. Aderogba, S., Meacham, J. M., Degertekin, F. L., Fedorov, A., and Fernandez, F., Nanoelectrospray ion generation for high throughput mass spectrometry using a micromachined ultrasonic ejector array, *Appl. Phys. Lett.*, **86** (20), 203110-203113 (2005).
116. Kumar, S., Fedorov, A., and Gole, J. L., Photodegradation of ethylene using visible light responsive surfaces prepared from titania nanoparticle slurries, *Appl. Catal. B - Environ.*, **57** (2), 93-107 (2005).
117. Fedorov, A., Preface to Special Issue on Multiscale Transport Phenomena, *Int. J. Multiscale Comp. Eng.*, **3** (1), 1-3 (2005).
118. Gurrum, S., Suman, S., Joshi, Y., and Fedorov, A., Thermal issues in next generation integrated circuits, *IEEE Trans. Dev. Mat. Reliab.*, **4** (4), 709-715 (2004). (*invited paper*)
119. Gole, J. L., Fedorov, A., Hesketh, P., and Burda, C., From nanostructures to porous silicon: sensors and photocatalytic reactors, *Phys. Stat. Sol.*, **1** (S2), S188-S197 (2004).
120. Fan, T. H. and Fedorov, A., Transport model of chemical secretion process for tracking exocytotic event dynamics using electroanalysis, *Anal. Chem.*, **76**, 4395-4405 (2004).
121. Jiang, M., Fedorov, A., and Lackey, W. J., Liquid reagent CVD of carbon – Part II: Kinetic experiments and heat and mass transport analysis, *Carbon*, **42**(10), 1901-1906 (2004).
122. Meacham, J. M., Ejimofor, C., Kumar, S., Degertekin F. L., and Fedorov, A., A micromachined ultrasonic droplet generator based on liquid horn structure, *Rev. Sci. Instrum.*, **75** (5), 1347-1352 (2004).
123. Phillips, C. and Fedorov, A., Multicomponent mass transfer in polymer-coated chemical sensors, *Sensors & Actuators B: Chemical*, **99** (2-3), 273-280 (2004).
124. Kottke, P., Ferguson, T., and Fedorov, A., Scale analysis of combined thermal radiation and convection heat transfer, *ASME J. Heat Transfer*, **126**, 250-258 (2004).
125. Pilon, L., Fedorov, A., Ramkrishna, D., and Viskanta, R., Bubble transport in three-dimensional laminar gravity-driven flow—mathematical formulation, *J. Non-Crystalline Solids*, **336** (2), 71-83 (2004).
126. Fan, T. H. and Fedorov, A., Electrohydrodynamics and surface force analysis in AFM imaging of a charged, deformable biological membrane in a dilute electrolyte solution, *Langmuir*, **19**, 10930-10939 (2003).
127. Kikas, T., Bardenshteyn, I., Williamson, C., Ejimofor, C., Puri, P., and Fedorov, A., Hydrogen production in the reverse-flow autothermal catalytic microreactor: from evidence of performance enhancement to innovative reactor design, *Ind. & Eng. Chem. Res.*, **42** (25), 6273-6279 (2003).
128. Murthy, S. and Fedorov, A., Radiation heat transfer analysis of the monolith-type solid oxide fuel cells, *J. Power Sources*, **124** (2), 453-458 (2003).

129. Phillips, C., Jakusch, M., Steiner, H., Mizaikoff, B., and Fedorov, A., Model-based optimal design of polymer-coated chemical sensors, *Anal. Chem.*, **75** (5), 1106-1115 (2003).
130. Phillips, C., Ben-Richou, A., Ambari, A., and Fedorov, A., Catalyst surface at a fractal of cost – A quest for optimal catalyst loading, *Chem. Eng. Sci.*, **58** (11), 2403-2408 (2003).
131. Fan, T. H. and Fedorov, A., Analysis of hydrodynamic interactions during AFM imaging of biological membranes, *Langmuir*, **19**, 1347-1356 (2003).
132. Gole, J.L., Burda, C., Fedorov, A., and Prokes, S. M., Highly efficient formation of TiO_{2-x}N_x-based photocatalysts – Potential applications for active sites in microreactors, sensors, and photovoltaics, *Mat. Res. Soc. Symp. Proc.*, **789**, N12.7, 311-315 (2003).
133. Gole, J., Burda, C., Fedorov, A., and White, M., Enhanced reactivity and phase transformation at the nanoscale: efficient formation of active silica and doped and metal seeded TiO_{2-x}N_x photocatalysts, *Rev. Adv. Mat. Sci.*, **5** (4), 265-269 (2003).
134. Kim, Y. J. and Fedorov, A., Transient mixed radiative convection flow of a micropolar fluid past a moving, semi-infinite vertical porous plate, *Int. J. Heat Mass Trans.*, **46** (10), 1751-1758 (2003).
135. Duty, C., Johnson, R., Gillespie, J., Fedorov, A., and Lackey, J., Heat and mass transfer modeling of an angled Gas-Jet LCVD system, *J. App. Phys. A*, **76**, 1-9 (2002).
136. Varady, M. and Fedorov, A., Combined radiation and conduction in glass foams, *ASME J. Heat Transfer*, **124** (6), 1103-1110 (2002).
137. Fan, T. H. and Fedorov, A., Apparent radiative properties and radiation scattering by a semitransparent hemispherical shell, *ASME J. Heat Transfer*, **124** (6), 1088-1095 (2002).
138. Fedorov, A. and Pilon, L., Glass foams: formation, transport properties, heat, mass, and radiation transfer, *J. Non-Crystalline Solids*, **311**, 154-173 (2002).
139. Fan, T. H. and Fedorov, A., Radiative transfer in a semitransparent hemispherical shell, *J. Quant. Spectroscopy Rad. Transfer*, **73**, 285-296 (2002).
140. Pilon, L., Fedorov, A., and Viskanta, R., Analysis of transient thickness of pneumatic foams, *Chem. Eng. Sci.*, **57**, 977-990 (2002).
141. Fan, T. H. and Fedorov, A., Visualization of atomic force microscopy from molecular dynamics simulations, *ASME J. Heat Transfer*, **123**, 619 (2001).
142. Pilon, L., Fedorov, A., and Viskanta, R., Steady-state thickness of liquid-gas foams, *J. Colloid & Interface Sci.*, **242** (2), 425-436 (2001).
143. Malikov, G. K., Lobanov, D. L., Malikov, K. Y., Lisienko, V. G., Viskanta, R., and Fedorov, A., Direct flame impingement heating for rapid thermal materials processing, *Int. J. Heat Mass Trans.*, **44** (9), 1751-1758 (2001).
144. Pilon, L., Fedorov, A., and Viskanta, R., Gas diffusion in closed-cell foams, *J. Cellular Plastics*, **36** (6), 451-474 (2000).
145. Fedorov, A. and Viskanta, R., Radiative transfer in a semitransparent glass foam blanket, *Phys. Chem. Glasses*, **41** (3), 127-135 (2000).
146. Fedorov, A. and Viskanta, R., Radiation characteristics of glass foams, *J. Am. Ceram. Soc.*, **83** (11), 2769-2776 (2000).
147. Fedorov, A. and Viskanta, R., Three-dimensional conjugate heat transfer in the microchannel heat sink for electronic packaging, *Int. J. Heat Mass Trans.*, **43**, 399-415 (2000).

148. Fedorov, A. and Viskanta, R., Heat and mass transfer dynamics in the microchannel adsorption reactor, *Microscale Thermophys. Eng.*, **3** (2), 111-140 (1999).
149. Fedorov, A. and Viskanta, R., Analysis of transient heat/mass transfer and adsorption/desorption interactions, *Int. J. Heat Mass Trans.*, **42** (5), 803-820 (1999).
150. Fedorov, A. and Viskanta, R., Scale analysis and parametric study of transient heat/mass transfer in the presence of solid non-porous adsorption, *Chem. Eng. Comm.*, **171**, 231-257 (1999).
151. Malikov, G., Lobanov, D., Malikov, Y, Lisienko, V., Viskanta, R. and Fedorov, A., Experimental and numerical study of heat transfer in a flame jet impingement system, *J. Inst. Energy*, **72**, 2-10 (1999).
152. Fedorov, A. and Viskanta, R., Heat/mass transfer and adsorption dynamics in a honeycomb adsorbent: Application of the simplified local density model, *Therm. Sci. Eng.*, **6** (1), 1-10 (1998).
153. Fedorov, A., Lee, K. and Viskanta, R., Inverse optimal design of the radiant heating in materials processing and manufacturing, *J. Mater. Eng. Perform.*, **7** (6), 719-726 (1998).
154. Fedorov, A. and Viskanta, R., Direct contact drying of a moving porous strip, *Drying Technol. Int. J.*, **15** (5), 1327-1351 (1997).
155. Fedorov, A. and Viskanta, R., Heat and mass transfer aspects of gas separation by adsorption, *Therm. Sci. Eng.*, **5** (1), 4-11 (1997).
156. Fedorov, A. and Viskanta, R., Turbulent natural convection heat transfer in an asymmetrically heated, vertical parallel-plate channel, *Int. J. Heat Mass Trans.*, **40** (16), 3849-3860 (1997).
157. Fedorov, A., Viskanta, R., and Mohamad, A., Turbulent heat and mass transfer in an asymmetrically heated, vertical parallel-plate channel, *Int. J. Heat Fluid Flow*, **18** (3), 307-315 (1997).
158. Fedorov, A. and Viskanta, R., A numerical simulation of conjugate heat transfer in an electronic package formed by embedded discrete heat sources in contact with a porous heat sink, *ASME J. Electronic Packaging*, **119**, 8-16 (1997).
159. Fedorov, A., Comments on heat and mass transfer with a boundary layer flow past a flat plate of finite thickness, *Int. J. Heat Mass Trans.*, **37** (13), 1969 (1994).
160. Fedorov, A., Analysis of possibilities to obtain mathematically correct analytical solutions of the conjugate heat transfer problems, *MSTU Trans. Thermophys. Proc.*, **1**, 101-113 (1994).

- **Refereed Conference/Symposia Proceedings**

1. Zhang, X., Nasr, M. N., Woodrum, D. C., Green, E. C., Kottke, P. A., Sarvey, T. E., Joshi, Y., Sitaraman, Fedorov, A., and Bakir, M., Design, microfabrication and thermal characterization of hot spot cooler testbed for convective boiling experiments in extreme-microgap with integrated micropin-fins and heat loss minimization, *ITherm 2016: IEEE Intersociety Conference on Thermal and Thermomechanical Phenomena in Electronic Systems*, Las Vegas, NV, USA May 31 – June 3, 2016 (CD proceedings).
2. Abbaspour, R., Nasr, M. N., Green, E. C., Kottke, P. A., Zhang, X., Sarvey, T. E., Woodrum, D. C., Joshi, Y., Sitaraman, Fedorov, A., and Bakir, M., Combined finned microgap with dedicated extreme-microgap flow for high performance microprocessor thermal management, *ITherm 2016: IEEE Intersociety Conference on Thermal and Thermomechanical Phenomena in Electronic Systems*, Las Vegas, NV, USA May 31 – June 3, 2016 (CD proceedings).
3. Asrar, P., Green, E. C., Kottke, P. A., Sarvey, T. E., Woodrum, D. C., Fedorov, A., Sitaraman, S., Bakir, M., and Joshi, Y., Flow boiling of R245fa in a microgap with integrated staggered pin fins,

- ITherm 2016: IEEE Intersociety Conference on Thermal and Thermomechanical Phenomena in Electronic Systems*, Las Vegas, NV, USA May 31 – June 3, 2016 (CD proceedings).
4. Nasr, M. N., Green, E. C., Kottke, P. A., Zhang, H., Sarvey, T. E., Joshi, Y., Bakir, M. and Fedorov, A., Extreme-microgap ($x\text{-}\mu\text{gap}$) based hotspot thermal management with refrigerant flow boiling, *ITherm 2016: IEEE Intersociety Conference on Thermal and Thermomechanical Phenomena in Electronic Systems*, Las Vegas, NV, USA May 31 – June 3, 2016 (CD proceedings).
 5. Green, E. C., Kottke, P.A., Sarvey, T., Fedorov, A., Joshi, Y., and Bakir, M., Performance and integration implications of addressing localized hotspots through two approaches: clustering of micro pin-fins and dedicated microgap coolers, *InterPack'2015*, San Francisco, California, July 6-9, 2015 (CD proceedings).
 6. Zhang, X., Han, X., Sarvey, T., Green, E. C., Kottke, P.A., Fedorov, A., Joshi, Y., and Bakir, M., 3D IC with embedded microfluidic cooling: technology, thermal performance, and electrical implications, *InterPack'2015*, San Francisco, California, July 6-9, 2015 (CD proceedings).
 7. Han, X., Joshi, Y. K., and Fedorov, A., Flow boiling of water at reduced pressure in staggered micro-pin-fin micro heat sink, *9th International Conference on Boiling and Condensation Heat Transfer*, Boulder, Colorado, April 26-30, 2015.
 8. Green, C., Kottke, P. A., Fedorov, A., and Joshi, Y. K., Convective boiling heat transfer in short, ultra-thin microgaps, *9th International Conference on Boiling and Condensation Heat Transfer*, Boulder, Colorado, April 26-30, 2015.
 9. Green, C., Kottke, P. A., Han, X., Woodrum, C., Sarvey, T., Asrar, P., Joshi, Y. K., and Fedorov, A., Sitaraman, S., and Bakir, M., Three-dimensional stackable evaporative cooling of microelectronics, *GOMACTech – Government Microcircuit Applications and Critical Technology Conference*, St. Louis, Missouri, March 23-26, 2015.
 10. Kottke, P. A., Yun, T., Green, C., Joshi, Y. and Fedorov, A., Two-phase convective cooling for ultra-high power dissipation in microprocessors, *ITherm 2014: IEEE Intersociety Conference on Thermal and Thermomechanical Phenomena in Electronic Systems*, Orlando, FL USA May 27 - May 30, 2014 (CD proceedings). Zhang, X., Nasr, M. N., Woodrum, D. C., Green, E. C., Kottke, P. A., Sarvey, T. E., Joshi, Y., Sitaraman, Fedorov, A., and Bakir, M., Design, microfabrication and thermal characterization of hot spot cooler testbed for convective boiling experiments in extreme-microgap with integrated micropin-fins and heat loss minimization, *ITherm 2016: IEEE Intersociety Conference on Thermal and Thermomechanical Phenomena in Electronic Systems*, Las Vegas, NV, USA May 31 – June 3, 2016 (CD proceedings).
 11. Abbaspour, R., Nasr, M. N., Green, E. C., Kottke, P. A., Zhang, X., Sarvey, T. E., Woodrum, D. C., Joshi, Y., Sitaraman, Fedorov, A., and Bakir, M., Combined finned microgap with dedicated extreme-microgap flow for high performance microprocessor thermal management, *ITherm 2016: IEEE Intersociety Conference on Thermal and Thermomechanical Phenomena in Electronic Systems*, Las Vegas, NV, USA May 31 – June 3, 2016 (CD proceedings).
 12. Asrar, P., Green, E. C., Kottke, P. A., Sarvey, T. E., Woodrum, D. C., Fedorov, A., Sitaraman, S., Bakir, M., and Joshi, Y., Flow boiling of R245fa in a microgap with integrated staggered pin fins, *ITherm 2016: IEEE Intersociety Conference on Thermal and Thermomechanical Phenomena in Electronic Systems*, Las Vegas, NV, USA May 31 – June 3, 2016 (CD proceedings).

13. Nasr, M. N., Green, E. C., Kottke, P. A., Zhang, H., Sarvey, T. E., Joshi, Y., Bakir, M. and Fedorov, A., Extreme-microgap (x- μ gap) based hotspot thermal management with refrigerant flow boiling, *ITherm 2016: IEEE Intersociety Conference on Thermal and Thermomechanical Phenomena in Electronic Systems*, Las Vegas, NV, USA May 31 – June 3, 2016 (CD proceedings).
14. Green, E. C., Kottke, P.A., Survey, T., Fedorov, A., Joshi, Y., and Bakir, M., Performance and integration implications of addressing localized hotspots through two approaches: clustering of micro pin-fins and dedicated microgap coolers, *InterPack'2015*, San Francisco, California, July 6-9, 2015 (CD proceedings).
15. Zhang, X., Han, X., Survey, T., Green, E. C., Kottke, P.A., Fedorov, A., Joshi, Y., and Bakir, M., 3D IC with embedded microfluidic cooling: technology, thermal performance, and electrical implications, *InterPack'2015*, San Francisco, California, July 6-9, 2015 (CD proceedings).
16. Han, X., Joshi, Y. K., and Fedorov, A., Flow boiling of water at reduced pressure in staggered micro-pin-fin micro heat sink, *9th International Conference on Boiling and Condensation Heat Transfer*, Boulder, Colorado, April 26-30, 2015.
17. Green, C., Kottke, P. A., Fedorov, A., and Joshi, Y. K., Convective boiling heat transfer in short, ultra-thin microgaps, *9th International Conference on Boiling and Condensation Heat Transfer*, Boulder, Colorado, April 26-30, 2015.
18. Green, C., Kottke, P. A., Han, X., Woodrum, C., Sarvey, T., Asrar, P., Joshi, Y. K., and Fedorov, A., Sitaraman, S., and Bakir, M., Three-dimensional stackable evaporative cooling of microelectronics, *GOMACTech – Government Microcircuit Applications and Critical Technology Conference*, St. Louis, Missouri, March 23-26, 2015.
19. Kottke, P. A., Yun, T., Green, C., Joshi, Y. and Fedorov, A., Two-phase convective cooling for ultra-high power dissipation in microprocessors, *ITherm 2014: IEEE Intersociety Conference on Thermal and Thermomechanical Phenomena in Electronic Systems*, Orlando, FL USA May 27 - May 30, 2014 (CD proceedings).
20. Zhou, W., Loney, D., Fedorov, A., Degertekin, F. L., Rosen, D., On a three-dimensional Lattice Boltzmann model of droplet impingement for inkjet deposition, *VRAP 2013: International Conference on Advanced Research in Virtual and Rapid Prototyping*, Leiria, Portugal, October 1-5, 2013 (CD proceedings).
21. Zhou, W., Loney, D., Fedorov, A., Degertekin, F. L., Rosen, D., Lattice Boltzmann Simulations of multiple droplet interactions during impingement on the substrate, *24nd International Solid Freeform Fabrication Symposium – An Additive Manufacturing Conference*, Austin, Texas, USA, August 12-14, 2013 (CD proceedings, **Best Presentation Award**).
22. Zhou, W., Loney, D., Fedorov, A., Degertekin, F. L., Rosen, D., Shape characterization for droplet impingement dynamics in ink-jet manufacturing, *ASME 2012 International Design Engineering Technical Conference & Computers and Information in Engineering Conference IDETC/CIE-2012*, Chicago, Illinois, August 12-15, 2012 (CD proceedings).
23. Kim, Y. J., Kim, S., Joshi, Y., Fedorov, A., Kohl, P.A., Exergy analysis of an absorption refrigeration system using an ionic liquid as a working fluid in the chemical compressor, *14th International Refrigeration and Air Conditioning Conference*, Purdue, IN, July 16-19, 2012 (CD proceedings).

24. Yazawa, K., Ziabari, A., Koh, R.Y., Shakouri, A., Sahu, V., Fedorov, A., and Joshi, Y., Cooling power optimization for hybrid solid-state and liquid cooling in integrated circuit chips with hotspots, *ITherm 2012: IEEE Intersociety Conference on Thermal and Thermomechanical Phenomena in Electronic Systems*, San Diego, California, USA, May 30 – June 1, 2012 (CD proceedings).
25. Green, C., Fedorov, A., and Joshi, Y., Dynamic thermal management of high heat flux devices using embedded solid-liquid phase change materials and solid state coolers, *ITherm 2012: IEEE Intersociety Conference on Thermal and Thermomechanical Phenomena in Electronic Systems*, San Diego, California, USA, May 30 – June 1, 2012 (CD proceedings).
26. Zhou, W., Loney, D., Fedorov, A., Degertekin, F. L., Rosen, D., Shape evolution of droplet impingement dynamics in ink-jet manufacturing, *22nd International Solid Freeform Fabrication Symposium – An Additive Manufacturing Conference*, Austin, Texas, USA, August 8-10, 2011 (CD proceedings).
27. Zhou, W., Loney, D., Fedorov, A., Degertekin, F. L., Rosen, D., Droplet impact dynamics in ink-jet manufacturing, *5th International Conference on Advanced Research in Virtual and Rapid Prototyping*, Leiria, Portugal, September 28-October 1, 2011 (CD proceedings, **Best Paper Award**).
28. Kim, Y. J., Kim, S., Joshi, Y., Fedorov, A., Kohl, P.A., Waste-heat driven miniature refrigeration system using ionic liquid as a working fluid, *5th ASME International Energy Sustainability Conference*, Washington, DC, August 7-10, 2011 (CD proceedings).
29. Green, S., Fedorov, A., and Joshi, Y., Thermal capacitance matching in 3D many core architectures, *SEMI-THERM'2011*, San Jose, California, March 20-24, 2011 (CD proceedings).
30. Sahu, V., Joshi, Y., Fedorov, A., Hybrid solid-state/fluidic cooling for microprocessors, *TECHCON 2010*, Austin, Texas, USA, September 13-14, 2010 (CD proceedings).
31. Loney, D., Zhou, W., Degertekin, F. L., Rosen, D., Fedorov, A., Acoustic analysis of viscous fluid ejection using ultrasonic atomizer, *21st International Solid Freeform Fabrication Symposium – An Additive Manufacturing Conference*, Austin, Texas, USA, August 9-11, 2010 (CD proceedings).
32. Zhou, W., Loney, D., Fedorov, A., Degertekin, F. L., Rosen, D., Impact of polyurethane droplets on a rigid surface for ink-jet printing, *21st International Solid Freeform Fabrication Symposium – An Additive Manufacturing Conference*, Austin, Texas, USA, August 9-11, 2010 (CD proceedings).
33. Narayanan, S., Fedorov, A., and Joshi, Y., Experimental characterization of a micro-scale thin-film evaporative cooling device, *ITherm 2010: IEEE Intersociety Conference on Thermal and Thermomechanical Phenomena in Electronic Systems*, Las Vegas, Nevada, USA, June 2-5, 2010 (CD proceedings).
34. Sahu, V., Joshi, Y., Fedorov, A., Experimental investigation of hotspot removal using superlattice cooler, *ITherm 2010: IEEE Intersociety Conference on Thermal and Thermomechanical Phenomena in Electronic Systems*, Las Vegas, Nevada, USA, June 2-5, 2010 (CD proceedings).
35. Kim, Y. J., Joshi, Y., and Fedorov, A., Lee, Y. J., and Lim, S. K., Thermal characterization of interlayer microfluidic cooling of three-dimensional IC with non-uniform heat flux, *International Conference on Nanochannels, Minichannels and Microchannels*, Pohang, South Korea, June 22-24, 2009 (**invited keynote**, CD Proceedings).
36. Green, S., Fedorov, A., and Joshi, Y., Scaling analysis of performance trade-offs in electronics cooling, *InterPack'2009*, San Francisco, California, July 19-23, 2009 (CD proceedings).

37. Lee, Y. J., Kim, Y. J., Huang, G., Bakir, M., Joshi, Y. K., Fedorov, A. and Lim, S. K., Co-design of signal, power, and thermal distribution networks for 3D ICs, *DATE 2008 (Design, Automation & Test in Europe)*, Nice, France, April 20-24, 2009 (CD proceedings).
38. Meacham, J.M., Rourke, A.O., Yang, Y., Fedorov, A. G., Degertekin, F. L., and Rosen, D. W., Experimental characterization of high viscosity droplet ejection, *20th International Solid Freeform Fabrication Symposium – An Additive Manufacturing Conference*, Austin, Texas, USA, August 3-5, 2009 (CD proceedings).
39. Fedorov, A. and Meacham, J. M., Evaporation-enhanced, dynamically-adaptive air (gas)-cooled heat sink for thermal management of high heat dissipation devices, *ITherm 2008: IEEE Intersociety Conference on Thermal and Thermomechanical Phenomena in Electronic Systems*, Orlando, Florida, USA May 28-31, 2008 (CD proceedings).
40. Sahu, V., Fedorov, A., and Joshi, Y., Hybrid solid-state/fluidic cooling for hot spot removal, *ITherm 2008: IEEE Intersociety Conference on Thermal and Thermomechanical Phenomena in Electronic Systems*, Orlando, Florida, USA May 28-31, 2008 (CD proceedings).
41. Green, C., Fedorov, A., and Joshi, Y., Fluid-to-fluid spot-to-spreader (F^2/S^2) hybrid heat sink for integrated chip-level and hotspot-level thermal management, *ITherm 2008: IEEE Intersociety Conference on Thermal and Thermomechanical Phenomena in Electronic Systems*, Orlando, Florida, USA May 28-31, 2008 (CD proceedings, **Outstanding Paper Award in Thermal Management**).
42. Fedorov, A., Rykaczewski, K., and White, W., Transport issues in focused electron beam chemical vapor deposition, *EuroCVD16*, Hague, The Netherlands, September 16-21, 2007 (CD Proceedings).
43. Narayanan, S., Fedorov, A., and Joshi, Y., Perspiration nanopatch for hot spot thermal management, *InterPack'2007*, Vancouver, BC, Canada, July 8-12, 2007 (CD Proceedings).
44. Kim, Y. J., Joshi, Y., Fedorov, A., Design of absorption-based miniature heat pump system for cooling high power microprocessors, *InterPack 07*, Vancouver, BC, Canada, July 8-12, 2007 (CD Proceedings).
45. Suman, S., Fedorov, A., and Joshi, Y., Regenerative fluid loop concept for performance enhancement of adsorption refrigeration system, *ITherm 2006: IEEE Intersociety Conference on Thermal and Thermomechanical Phenomena in Electronic Systems*, San Diego, California, May 30 - June 2, 2006 (CD Proceedings).
46. Gole, J.L., Lewis, S. E., Fedorov, A., and Prokes, S., Nanostructures and porous silicon: activity and phase transformation in sensors and photocatalytic reactors, *SPIE Symposium on Optics & Photonics: Conference on "Physical Chemistry of Interfaces and Nanomaterials IV"*, SPIE-International Society for Optical Engineering, San Diego, CA, July 31-August 4, 2005 (Invited paper, CD Proceedings).
47. McLeod, L., Degertekin, F. L., and Fedorov, A., Analysis of hydrogen permeation through sub-micron-thick palladium alloy membranes, *ASME Summer Heat Transfer Conference*, San Francisco, CA, July 17-22, 2005 (CD Proceedings).
48. Damm, D. L. and Fedorov, A., Simplified thermal analysis of the SOFC transients during start-up/shut-down, *ASME Summer Heat Transfer Conference*, San Francisco, CA, July 17-22, 2005 (CD Proceedings).

49. Naeemi, A., Joshi, Y., Fedorov, A., Kohl, P., and Meindl, J.D., The urgency of deep sub-ambient cooling for gigascale integration, *International Conference on Integrated Circuit Design and Technology ICICDT05*, Austin, Texas, May 9-11, 2005 (CD Proceedings).
50. Suman, S., Fedorov, A., and Joshi, Y., Thermodynamic design of thermal compressor for sorption assisted cryogenic cooling of electronics, *InterPack 05*, San Francisco, CA, July 17-22, 2005 (CD Proceedings).
51. Damm, D. L. and Fedorov, A., Spectral radiative heat transfer analysis of the planar SOFC, *International Mechanical Engineering Congress & Exposition IMECE'04*, Anaheim, CA, November 13-19, 2004 (CD Proceedings).
52. Fan, T. H. and Fedorov, A., An integrated transport model for tracking of individual exocytotic events using a microelectrode, *Seventh Nanotechnology Conference and Trade Show NANOTECH 2004*, Boston, Massachusetts, March 7-11, 2004 (CD Proceedings).
53. Gole, J.L., White, M., Fedorov, A., and Burda, C., Efficient formation of active silica and doped and metal seeded titania for visible light tunable photocatalysis: application to microreactors, solar cells, and sensors, *TMS-Advanced Materials for Energy Conversion*, Editors: D. Chandra, P. Baulista, L. Schaplach; Minerals, Metals & Materials Society, pp. 69-78, 2004 (Invited paper).
54. Suman, S., Joshi, Y., and Fedorov, A., Cryogenic/sub-ambient cooling of electronics: Revisited, *ITherm 2004: IEEE Intersociety Conference on Thermal and Thermomechanical Phenomena in Electronic Systems*, Las Vegas, Nevada, June 1-14, 2004 (CD Proceedings).
55. Phillips, C. and Fedorov, A., Multicomponent mass transfer in polymer-coated chemical sensors, *6th ISHMT-ASME Heat and Mass Transfer Conference*, Kalpakkam, Tamil Nadu, India, January 2004 (CD Proceedings).
56. Murthy, S. and Fedorov, A., Radiation heat transfer analysis of the monolith-type solid oxide fuel cells, *International Mechanical Engineering Congress & Exposition IMECE'03*, Washington, DC, November 16-21, 2003 (CD Proceedings).
57. Fan, T. H. and Fedorov, A., Electrohydrodynamics and surface force analysis in AFM imaging of a charged, deformable biological membrane in a dilute electrolyte solution, *4th ASME FED & JSME Joint Fluid Conference*, Honolulu, Hawaii, July 6-10, 2003 (CD Proceedings).
58. Gurrum, S., Suman, S., Joshi, Y., and Fedorov, A., Thermal issues in next generation integrated circuits, *International Electronic Packaging Technical Conference and Exhibition*, Maui, Hawaii, July 6-11, 2003 (CD Proceedings). This paper was nominated for the InterPack03 Best Paper Award.
59. Fan, T. H. and Fedorov, A., Electrohydrodynamic interactions of an AFM tip and a biological membrane, *Sixth Nanotechnology Conference and Trade Show NANOTECH 2003*, Vol. 1, pp. 1-5 & Vol. 3, pp. 376-380, San Francisco, California, February 23-27, 2003.
60. Fedorov, A., Heat and mass transfer in glass foams, *5th ISHMT/ASME Heat and Mass Transfer Conference*, Calcutta, India, January 2002 (CD Proceedings).
61. Fan, T. H. and Fedorov, A., Apparent radiative properties and radiation scattering by a semitransparent hemispherical shell, *International Mechanical Engineering Congress & Exposition IMECE'01*, New York City, New York, November 2001 (CD Proceedings).

62. Varady, M. and Fedorov, A., Combined conduction and radiation in glass foams, *International Mechanical Engineering Congress & Exposition IMECE'01*, New York City, New York, November 2001 (CD Proceedings).
63. Fan, T.-H. and Fedorov, A., Radiative transfer in a semitransparent hemispherical shell, *3rd International Symposium on Radiative Transfer*, International Centre for Heat and Mass Transfer, Antalya, Turkey, June 17-22, 2001 (CD Proceedings).
64. Fedorov, A. and Viskanta, R., Analysis of conjugate heat transfer in a three-dimensional microchannel heat sink for cooling of electronic components, *ASME Heat Transfer Division - 1999*, HTD-364-3, pp. 89-98, ASME, New York, 1999.
65. Rabovitser, J., Chudnovsky, Ya., Matsui, K., Viskanta, R., and Fedorov, A., Development of a compact high efficiency and low emission surface combustor-boiler, *International Gas Research Conference*, pp. 58-65, GRI, San Diego, CA, 1998.
66. Fedorov, A. and Viskanta, R., Heat/mass transfer and adsorption dynamics in a honeycomb adsorbent: application of the simplified local density model, *45th Oji International Seminar "New Approach Towards Low-Temperature Thermal Engineering Without Fluorocarbon Refrigerants"*, pp. 1-10, Sapporo, Japan, 1997.
67. Fedorov, A., Bityurin, V., and Bocharov, A., Theoretical investigation of conjugate heat and mass transfer in systems of transpiration cooling, *1st All-Russian Heat and Mass Transfer Conference*, 7, pp. 194-199, MEI Publisher, Moscow, Russia, 1994.

C. PRESENTATIONS

- **Conference Presentations (reviewed based on abstract only)**

1. Kim, S., Henry, M., M., Kim, S., Naik, R., Voevodin, A. A., Jang, S., Tsukruk, V. V., and Fedorov, A., Direct-write patterning and dynamic doping of monolayer graphene using focused electron beam induced processing, *Materials Research Society (MRS) Spring 2016 Meeting*, Phoenix, Arizona, March 28-April 1, 2016.
2. Henry, M., Fisher, J., Kim, S., Kottke, P. A. and Fedorov, A., Using energetic jets to enable new modes of focused electron beam induced processing of nanomaterials, *20th Biennial European Conference on Chemical Vapor Deposition - EuroCVD 20*, Sempach, Switzerland, July 13-17, 2015.
1. Chilmonczyk, M., Tibavinsky, I., Kottke, P.A. , and Fedorov, A., Fast response microfabricated dialysis-ESI device enabled by monolithic integration, *63rd ASMS Conference on Mass Spectrometry & Allied Topics*, St. Louis, MO, USA, May 31 - June 4, 2015.
2. Henry, M., Fisher, J., Kim, S., Kottke, P. A. and Fedorov, A., Focused electron beam induced processing via multi-mode energized micro/nano-jets to enable advances in graphene nanoelectronics, *59th Conference on Electron, Ion, and Photon Beam Technology and Nanofabrication (EIPBN)*, San Diego, California, May 26-29, 2015.
3. Kim, S., Russell, M., Kulkarni, D., Chyasnaychuyus, M., Henry, M., Kim, S., Naik, R., Voevodin, A. A., Jang, S., Tsukruk, V. V., and Fedorov, A., Enhanced interfacial properties of graphene-metal junctions with Focused Electron Beam Induced Deposition (FEBID) of graphitic interlayer, *Materials Research Society (MRS) Spring 2015 Meeting*, San Francisco, California, April 6-10, 2015.

4. Anderson, D., Nasr, M., Yun, T., Kottke, P.A., and Fedorov, A., Sorption-enhanced CHAMP reactor for distributed steam methane reforming, *3rd International Forum on Environment and Energy Science*, ACEEES, Perth, Australia, December 12-16, 2014 (**best presentation award**).
5. Anderson, D. A., Kottke, P. A., Yun, T., and Fedorov, A. G., Sorption-enhanced variable volume membrane reactor for hydrogen production from methane: modeling and experimental characterization, *2014 AIChE Annual Meeting*, Atlanta, Georgia, November 16-21, 2014.
6. Fedorov, A., Kim, S., Henry, M., Kulkarni, D., Tsukruk, V. V., Multifunctional FEBIP environment for emerging applications in carbon nanoelectronics and opto-electro-mechanical nanodevice fabrication, *5th FEBIP (Focused Electron Beam Induced Processing) International Workshop*, Frankfurt, Germany, July 22-24, 2014.
7. Henry, M., Kim, S., and Fedorov, A., Energetic gas jet enhancement of Focused Electron Beam Induced Deposition (FEBID), *Materials Research Society (MRS) Spring 2014 Meeting*, San Francisco, California, April 21-25, 2014.
8. Kim, S., Kulkarni, D., David, R., Henry, M., Voevodin, A. A., Kim, S., Pacley, S., Jang, S., Tsukruk, V. V., and Fedorov, A., Engineering graphene-metal interface with Focused Electron Beam Induced Deposition (FEBID) of graphitic nanojoints, *Materials Research Society (MRS) Spring 2014 Meeting*, San Francisco, California, April 21-25, 2014.
9. Anderson, D., Kottke, P.A., and Fedorov, A., Sorption-enhanced CHAMP class reactor for low temperature, distributed hydrogen production from natural gas, *2nd International Education Forum on Environment and Energy Science*, ACEEES, Los Angeles, CA, USA, December 13-17, 2013.
10. Yun, T., Kottke, P. A., and Fedorov, A., Liquid fuel reformation in variable-volume membrane reactor, *2nd International Education Forum on Environment and Energy Science*, ACEEES, Los Angeles, CA, USA, December 13-17, 2013.
11. Kottke, P.A., Fedorov, A.G., Thin film evaporative cooling of hot spots, *2013 Power MEMS workshop*, London, UK, December 3-6, 2013.
12. Anderson, D. A., Kottke, P. A., and Fedorov, A. G., Hydrogen production from natural gas via sorption-enhanced variable volume batch-membrane reactors, *2013 AIChE Annual Meeting*, San Francisco, California, November 3-8, 2013.
13. Silva, J., Geryak, R., Kottke, P.A., Anderson, D.M., Tsukruk, V. V., Naik, R. and Fedorov, A., Thermomechanical behavior of a constrained gel interface for heat and moisture management, *International Mechanical Engineering Congress & Exposition IMECE'13*, San Diego, CA, November 15-21, 2013.
14. Kottke, P.A., Tibavinsky, I., Fedorov, A., Scanning Mass Spectrometry (SMS) Probe: towards an *in vivo* imaging mass spectrometry system for discovery of disease signatures, *Materials Research Society (MRS) Spring 2013 Meeting*, San Francisco, California, April 1-5, 2013.
15. Kim, S., Kulkarni, D., Tsukruk, V.V., Fedorov, A., Graphitic EBID carbon interfaces between MWCNT/graphene and metal electrodes, *Materials Research Society (MRS) Spring 2013 Meeting*, San Francisco, California, April 1-5, 2013.
16. Anderson, D. and Fedorov, A., Improved CHAMP-class reactors enabling a sustainable route to hydrocarbon processing for mobile and distributed power generation, *1st International Education Forum on Environment and Energy Science*, ACEEES, Hawaii, December 14-18, 2012.

17. Yun, T., Kottke, P. A., and Fedorov, A., CHAMP-DDIR: high power density fuel reforming reactor for hydrogen generation, *1st International Education Forum on Environment and Energy Science*, Hawaii, ACEEES, December 14-18, 2012.
18. Kottke, P.A., Anderson, D.M., and Fedorov, A., Condensation enhancement with micro- and nano-structured amphiphilic surfaces, *2012 Power MEMS workshop*, Atlanta, GA, December 2-5, 2012.
19. Narayanan, S., Fedorov, A., and Joshi, Y., Managing hot spots on chips via gas assisted thin film evaporation from confined spaces, *International Mechanical Engineering Congress & Exposition IMECE'12*, Houston, TX, November 9-15, 2012.
20. Yun, T. M., Kottke, P. A., and Fedorov, A. G., DDIR-CHAMP: high power density fuel reforming reactor for hydrogen generation, 2012 AIChE Annual Meeting, Pittsburg, Pennsylvania, October 28-November 2, 2012.
21. Kim, S., Kulkarni, D., Rykaczewski, K., Henry, M. R., Tsukruk, V.V. and Fedorov, A., Application of FEBID to carbon nanotube-based interconnect fabrication, *4th FEBIP (Focused Electron Beam Induced Processing) International Workshop*, Zaragoza, Spain, June 20-21, 2012.
22. Henry, M. R., Kim, S., Rykaczewski, K., and Fedorov, A., Using energetic inert gas jets to enable new modes of focused electron beam induced deposition (FEBID), *4th FEBIP (Focused Electron Beam Induced Processing) International Workshop*, Zaragoza, Spain, June 20-21, 2012.
23. Ogden, A. D., Gole, J. L., and Fedorov, A., Hybrid nanostructured TiO₂ electrodes for photocatalytic hydrogen production, *4rd International Forum on Multidisciplinary Research and Education in Energy Sciences*, Honolulu, Hawaii, December 17-22, 2011.
24. Anderson, D., Gupta, M., Voevodin, A., Hunter, C., S. A. Putnam, Tsukruk, V.V., and Fedorov, A., Control water condensation in energy systems using nanostructured surfaces, *4rd International Forum on Multidisciplinary Research and Education in Energy Sciences*, Honolulu, Hawaii, December 17-22, 2011.
25. Kulkarni, D., Kim, S.K., Fedorov, A., and Tsukruk, V., On the contact resistance of the carbon nanotube-metal interfaces, *Materials Research Society (MRS) Fall 2011 Meeting*, Boston, Massachusetts, November 28-December 2, 2011.
26. Rykaczewski, K., Hildreth, O.J., Wong, C.P., Fedorov, A., and Scott, J. H. J., Guided self-assembly of 3D catalyst structures during metal assisted chemical etching of silicon, *Materials Research Society (MRS) Fall 2011 Meeting*, Boston, Massachusetts, November 28-December 2, 2011.
27. Rykaczewski, K., Scott, J. H. J., Fedorov, A., Electron beam heating effects during in-situ ESEM imaging of water condensation on superhydrophobic surfaces, *Microscopy & Microanalysis 2011*, Nashville, Tennessee, August 7-11, 2011.
28. Rykaczewski, K., Fedorov, A., Scott, J. H. J., Nano-to-micro scale water droplet growth dynamics during condensation on superhydrophobic surfaces, *Materials Research Society (MRS) Spring 2011 Meeting*, San Francisco, California, April 25-29, 2011.
29. Rykaczewski, K., Hildreth, O.J., Wong, C.P., Fedorov, A., and Scott, J. H. J., 3D silicon nanostructures fabrication via thin film focused ion beam milling in combination with metal assisted chemical etching, *Materials Research Society (MRS) Spring 2011 Meeting*, San Francisco, California, April 25-29, 2011.

30. Rosen, D., Degertekin, F. L., Fedorov, A., Loney, D., Zhou, W., Drop-on-demand deposition of complex fluids for 3D manufacturing, *NSF CMMI Research & Innovation Conference "Engineering for Sustainability and Prosperity"*, Atlanta, GA, USA, January 4-7, 2011.
31. Ogden, A. D., Gole, J. L., and Fedorov, A., Hybrid nanostructured TiO₂ electrodes for photocatalytic hydrogen production, *3rd International Forum on Multidisciplinary Research and Education in Energy Sciences*, Ishigaki-jima, Okinawa, Japan, December 9-14, 2010.
32. Siegel, K. A., Varady, M., and Fedorov, A., Transient catalytic reactors for on-board hydrogen production, *3rd International Forum on Multidisciplinary Research and Education in Energy Sciences*, Ishigaki-jima, Okinawa, Japan, December 9-14, 2010.
33. Sahu, V., Joshi, Y. K., and Fedorov, A., Superlattice coolers for dynamic thermal management of microprocessor hotspots, *IMAPS Advanced Technology Workshop on Thermal Management*, Palo Alto, California, September 28-30, 2010.
34. Rykaczewski, K., Hildreth, O.J., Wang, C. P., Fedorov, A., Scott, J. H. J., and Maslar, J. E., Maskless and Resist-Free Rapid Prototyping of Integrated Insulator, Semiconductor, and Conductor Three Dimensional Structures with Rotational Geometry through Electron Beam Induced Deposition (EBID) of Carbon and Focused Ion Beam (FIB) Induced Deposition of Platinum in Combination with Metal-Assisted Chemical Etching (MACE) of Silicon, *Materials Research Society (MRS) Fall 2010 Meeting*, Boston, Massachusetts, November 29-December 3, 2010.
35. Rykaczewski, K., Kulkarni, D., Henry, M., Kim, S.-K., Tsukruk, V.V., and Fedorov, A., Theoretical and experimental investigation of formation and resulting properties of Electron Beam Induced Deposited (EBID) of a carbon MWNT-to-metal interface, *Materials Research Society (MRS) Spring 2010 Meeting*, San Francisco, California, April 5-9, 2010.
36. Kulkarni, D., Singamaneni, S., Tsukruk, V.V., Rykaczewski, K., and Fedorov, A., Physical properties of Electron beam induced deposited (EBID) carbon - Multiwalled carbon nanotube (MWNT) - metal interface, *Materials Research Society (MRS) Spring 2010 Meeting*, San Francisco, California, April 5-9, 2010.
37. Rykaczewski, K. and Fedorov, A., Focused electron beam deposition (EBID) of nanomaterials: multiscale simulations, surprising behavior trends, and promising applications, *International Mechanical Engineering Congress and Exposition (IMECE-2009), Symposium on Multiphysics Simulations of Solids*, Lake Buena Vista, Florida, November 13-19, 2009 (**invited**).
38. Dietz, C., Rykaczewski, K., Fedorov, A., and Joshi, Y., ESEM imaging of condensation on a nanostructured, superhydrophobic surface, *International Mechanical Engineering Congress and Exposition (IMECE-2009)*, Lake Buena Vista, Florida, November 13-19, 2009.
39. McLeod, L., Degertekin, F. L., and Fedorov, A., Hydrogen permeation across Nanostructured Pd/Ag alloy membranes: Ward-and-Dao model revisited, *5th International Conference on Diffusion in Solids and Liquids – Mass Transfer, Heat Transfer and Microstructure and Properties, DSL-2009*, Rome, Italy, June 24-26, 2009.
40. Rykaczewski, K., and Fedorov, A., Electron beam induced deposition (EBID) of carbon interface between a carbon nanotube interconnect and metal electrode, *Materials Research Society (MRS) Spring 2009 Meeting*, San Francisco, California, April 13-17, 2009.

41. Mehrabadi, M., Kottke, P.A., and Fedorov, A., A Model for the dynamics of membrane deformation in exocytosis, *82nd ACS Colloid and Surface Science Symposium*, Raleigh, North Carolina, USA, June 15-18, 2008.
42. Damm, D. L., and Fedorov, A., Forced unsteady-state, variable volume membrane reactor: new scalable technology for distributed hydrogen production, *3rd ASME Energy Nano Conference*, Jacksonville, Florida, August 10-14, 2008.
43. McLeod, L., Degertekin, F. L., and Fedorov, A., Grain boundary diffusion of hydrogen in nano-structured Pd/Ag alloy membranes, *3rd ASME Energy Nano Conference*, Jacksonville, Florida, August 10-14, 2008.
44. Hampton, C. Y., Forbes, T. P., Varady, M. J., Meacham, J. M., Silvestri, C. J., Degertekin, F. L., Fedorov, A., and Fernandez, F. M., Internal energy deposition in ionization by the Venturi-assisted array of micromachined ultrasonic electrospays (AMUSE) for mass spectrometry, *59th Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy (Pittcon 2008)*, New Orleans, Louisiana, USA, March 1-7, 2008.
45. Fedorov, A. and Jain, A., DRILL: Atmospheric pressure confining/focusing vortex flow structure and method of generating/transmitting dry ions from ion source to mass analyzer, *56th ASMS Conference on Mass Spectrometry*, Denver, Colorado, USA, June 1-5, 2008.
46. Kottke P.A., Degertekin, F.L., and Fedorov, A., Reverse-Taylor-Cone electrospray ionization for transient imaging in solution, *56th ASMS Conference on Mass Spectrometry*, Denver, Colorado, USA, June 1-5, 2008.
47. Forbes, T.P., Dixon, R. B., Muddiman, D. C., Degertekin, F.L., and Fedorov, A., Exploring mechanisms of analyte ionization in AMUSE (Array of Micromachined UltraSonic ElectroSpray) ion source combined with an FT-ICR mass spectrometer, *56th ASMS Conference on Mass Spectrometry*, Denver, Colorado, USA, June 1-5, 2008.
48. Hampton, C. Y., Silvestri, C. J., Forbes, T. P., Varady, M. J., Meacham, J. M., Degertekin, F. L., Fedorov, A., and Fernandez, F. M., Internal energy deposition of a Venturi-assisted micromachined array of ultrasonic electrospays, *56th ASMS Conference on Mass Spectrometry*, Denver, Colorado, USA, June 1-5, 2008.
49. Dixon, R. B., Edwards, J.R., Fedorov, A., Hawkrigde, A. M., and Muddiman, D. C., Improved ion abundance in LTQ and LTQ-FT-ICR mass spectrometry by implementing an air amplifier, *ACS Southeastern Regional Meeting*, Greenville, South Carolina, USA, October 24-27, 2007.
50. Meacham, J. M., Zarnitsyn, V., Varady, M., Atencia, J., Locascio, L., Degertekin, F. L., and Fedorov, A., Fabrication of a disposable electrosonic microarray in thiolene and performance characterization for biomolecule delivery, *μ TAS 2007 Conference*, Paris, France, October 7-11, 2007.
51. Hampton, C. Y., Forbes, T. P., Varady, M. J., Meacham, J. M., Silvestri, C. J., Degertekin, F. L., Fedorov, A., and Fernandez, F. M., Stability and internal energy deposition of a Venturi-assisted micromachined array of ultrasonic electrospays for mass spectrometry, *FACSS (Federation of Analytical Chemistry and Spectroscopy Societies) Annual Conference*, Memphis, Tennessee, USA, October 14-18, 2007.

52. Ogden, A., Gole, J. L., and Fedorov, A., Synthesis and characterization of TiO₂-xNx nanostructures for visible light photocatalytic hydrogen production, *2nd ASME Energy Nano Conference*, Santa Clara, California, September 5-7, 2007.
53. Damm, D. L., and Fedorov, A., CHAMP: Scalable technology for distributed hydrogen production and CO₂ capture, *2nd ASME Energy Nano Conference*, Santa Clara, California, September 5-7, 2007.
54. Damm, D. L., and Fedorov, A., CO₂ capture and sustainable carbon economy, *2nd ASME Energy Nano Conference*, Santa Clara, California, September 5-7, 2007.
55. Fernandez, F. M., Hampton, C. Y., Forbes, T. P., Meacham, J. M., Dixon, R. B., Muddiman, D. C., Degertekin, F. L., and Fedorov, A., Characterization of ion generation by a Venturi-assisted array of micromachined ultrasonic electrosprays, *55th ASMS Conference on Mass Spectrometry*, Indianapolis, Indiana, USA, June 3-7, 2007.
56. Forbes, T. P., Hampton, C. Y., Meacham, J. M., Fernandez, F. M., Degertekin, F. L., Dixon, R. B., Muddiman, D. C., and Fedorov, A., AMUSE (Array of Micromachined UltraSonic ElectroSpray) ion source for high throughput, multiplexed bioanalytical mass spectrometry, *Third US-HUPO Symposium: Mapping the Humane Proteome – From Tools to Functionality*, Seattle, Washington, USA, March 5-8, 2007.
57. Fedorov, A., Degertekin, F. L., and Kottke, P. A., Combined Scanning Mass Spectrometry–Atomic Force Microscopy (SMS-AFM) probe: A new tool for biochemical and topographical imaging, *18th Sanibel Conference on Mass Spectrometry*, Sanibel Island, Florida, January 19-22, 2007 (poster).
58. Papania, M., Mair, R., Meacham, J.M., Fedorov, A., Degertekin L., Rota P., Methods to assess potency of aerosolized live attenuated viral vaccines, *16th Congress of International Society for Aerosols in Medicine*, Tours, France, June 16-20 (2007) (**best oral presentation award**).
59. Sun, L., White, W. B., Rykaczewski, Wingkono, G. A., Fedorov, A., and T. M. Orlando, Focused electron beam chemical vapor deposition of a periodic silicon carbide nano-pattern, *Materials Research Society (MRS) Fall 2006 Meeting*, Boston, Massachusetts, November 28-30, 2006.
60. Varady, M., McLeod, L., Meacham, J. M., Degertekin, F. L., and Fedorov, A., Integrated MEMS infrastructure for fuel processing, hydrogen generation and separation for portable power generation, *PowerMEMS 2006 Workshop*, Berkeley, CA, November 29-December 1, 2006.
61. Zarnitsyn, V.G. and Fedorov, A., Hydrodynamic interactions during AFM imaging of biological cells: can AFM truly resolve a lipid membrane position?, *AICHE Fall Annual Meeting*, San Francisco, CA, November 12-17, 2006.
62. Zarnitsyn, V.G., Degertekin, F. L. and Fedorov, A., Electrosonic MEMS gun for efficient cellular transfection and drug delivery, *AICHE Fall Annual Meeting*, San Francisco, CA, November 12-17, 2006.
63. McLeod, L., Degertekin, F. L. and Fedorov, A., Transient behavior of hydrogen permeation through Pd/Ag alloy micro/nano membranes, *International Mechanical Engineering Congress & Exposition IMECE'06*, Chicago, IL, November 5-10, 2006.
64. Meacham, J. M., Varady, M., Degertekin, F. L., and Fedorov, A., Fuel atomization from a micromachined ultrasonic droplet generator: visualization and scaling, *International Mechanical Engineering Congress & Exposition IMECE'06*, Chicago, IL, November 5-10, 2006.

65. Damm, D. and Fedorov, A., A novel approach to zero CO₂ emissions in the transportation sector, *International Mechanical Engineering Congress & Exposition IMECE'06*, Chicago, IL, November 5-10, 2006.
66. Rykaczewski, K., White, B., Browning, J., Marshall, A. D. and Fedorov, A., Dynamic model of electron beam induced deposition (EBID) of residual hydrocarbons in electron microscopy, *International Mechanical Engineering Congress & Exposition IMECE'06*, Chicago, IL, November 5-10, 2006.
67. Varady, M., McLeod, L., Meacham, J. M., Degertekin, F. L., and Fedorov, A., MEMS-enabled processing of liquid fuels for fuel cell applications, *9th International Conference on Microreaction Technology (IMRET 9)*, Postdam/Berlin, Germany, September 6-8, 2006.
68. Fedorov, A., Reverse-ESI-MS-on-a-Scanning-Tip: Scanning Mass Spectrometry (SMS) nanoprobe for spatially and temporally resolved bioanalytical imaging, *17th International Mass Spectrometry Conference (IMSC 2006)*, Prague, Czech Republic, August 27-30, 2006.
69. Fernandez, F. M., Hampton C. Y., Meacham, J. M., Degertekin, F. L., and Fedorov, A., Venturi-assisted nanospray protein ion generation by a micromachined ultrasonic electrospray array, *17th International Mass Spectrometry Conference (IMSC 2006)*, Prague, Czech Republic, August 27-30, 2006.
70. Coggins, C. L., Gerlach, D., Joshi, Y., and Fedorov, A., Compact, low temperature refrigeration of microprocessors, *2006 International Refrigeration and Air Conditioning Conference*, Purdue University, West Lafayette, Indiana, USA, July 15-20, 2006.
71. Kottke, P.A., Saillard, A., and Fedorov, A., Coalescence of heterogeneously nucleated charged droplets, *231st ACS National Meeting, Symposium on "Fundamental Research in Colloid and Surface Chemistry"*, Atlanta, Georgia, USA, March 26-30, 2006.
72. Lackey, W. J., Fedorov, A., Orlando, T., and Wang, Z. L., Electron Beam CVD: A new tool for manufacturing of nanomaterials and devices, *2005 NSF Nanoscale Science and Technology Grantees Conference, National Science Foundation*, Arlington, Virginia, USA, December 12-15, 2005.
73. Hampton, C., Meacham, M., Degertekin, F. L., Fedorov, A. and Fernandez, F. M., AMUSE (Array of Micromachined UltraSonic Electrospray) ion source for mass spectrometry, *2005 AIChE Annual Meeting & American Electrophoresis Society Annual Meeting*, Cincinnati, Ohio, USA, October 30-November 4, 2005.
74. Hampton, C., Meacham, M., Degertekin, F. L., Fedorov, A. and Fernandez, F. M., Micromachined ultrasonic electrospray ion source, *53rd ASMS Conference on Mass Spectrometry*, Orlando, Florida, USA, June 5-9, 2005.
75. Aderogba, S., Meacham, M., Fernandez, F. M., Degertekin, F. L., and Fedorov, A., MEMS ultrasonic ejector array for mass spectrometry of biomolecules, *3rd Annual IEEE EMBS Special Topic Conference on Microtechnologies in Medicine and Biology*, Oahu, Hawaii, USA, May 12-15, 2005.
76. Aderogba, S., Meacham, M., Fernandez, F. M., Degertekin, F. L., and Fedorov, A., Micromachined ultrasonic electrospray microarray for high throughput/multiplexed mass spectrometry of proteins, *First US-HUPO Symposium: Mapping the Humane Proteome – From Tools to Functionality*, Washington, DC, USA, March 13-16, 2005.

77. Meacham, J. M., H. Noh, Degertekin, F. L., Fedorov, A., Rota, P., and Papania, M., MEMS ultrasonic atomizer for measles vaccine delivery, *Respiratory Care Open Forum*, 50th AARC's International Respiratory Congress, New Orleans, Louisiana, USA, December 4-7, 2004.
78. Kaisare, N., Fedorov, A., and Lee, J. H., Hydrogen generation in a microchannel reactor with periodic flow reversal: simulation and analysis, *2004 AIChE Annual Meeting*, Austin, Texas, USA, November 7-12, 2004.
79. Meacham, J. M., Varady, M., Degertekin, F. L., and Fedorov, A., Droplet formation and ejection from a micromachined ultrasonic droplet generator: visualization and scaling, *Transport Phenomena in Micro and Nano Devices*, Engineering Conferences Foundation, Hawaii, USA, October 17-21, 2004.
80. Damm, D. and Fedorov, A., Radiation heat transfer in SOFC materials and components, *ASM Symposium on Fuel Cells Materials, Processing, and Manufacturing Technologies*, ASM International, Columbus, Ohio, USA, October 18-21, 2004.
81. Meacham, J. M., Varady, M., Esposito, D., Degertekin, F. L., and Fedorov, A., A Micromachined ultrasonic atomizer for liquid fuels, *ASM Symposium on Fuel Cells Materials, Processing, and Manufacturing Technologies*, ASM International, Columbus, Ohio, USA, October 18-21, 2004.
82. Launay, S., Fedorov, A., Joshi, Y., Cao, A., and Ajayan P., Hybrid micro-nano structured thermal interface for pool boiling heat transfer enhancement, *THERMINICS – International Workshop on Thermal Investigations of ICs and Systems*, Sophia Antipolis, Côte d'Azur, France, September 29-October 1, 2004.
83. Aderogba, S., Meacham, M., Degertekin, F. L., and Fedorov, A., A Micromachined ultrasonic electro-spray source array for high throughput mass spectrometry, *3rd Integrated Nanosystems Conference*, ASME Nanotechnology Institute, Pasadena, California, USA, September 22-24, 2004.
84. Kikas, T., Bardenshteyn, I., Williamson, C., Ejimofor, C. Puri, P., and Fedorov, A., Hydrogen production in the reverse-flow autothermal catalytic microreactor, In *Proceedings of the Seventh International Conference on Microreaction Technology (IMRET)*, Lausanne, Switzerland, September 7-10, 2003.
85. Gole, J. L., Lewis, S., Hesketh, P., and Fedorov, A., Sensing and photocatalysis for a combined nano/microporous array enhanced with nanocrystalline semiconductor coatings, *Materials Research Society (MRS) Fall 2002 Meeting*, Boston, Massachusetts, December 2-6, 2002. The results reported in this paper were featured on the MRS website among key highlights of the meeting.
86. Fan, T. H. and Fedorov, A., Visualization of fluid-fluid Interfaces and their Interactions in a slowly rising, viscous multicomponent droplet, *Photogallery of Transport Phenomena, 2002 International Mechanical Engineering Congress & Exposition IMECE'00*, New Orleans, Louisiana (November 17-22, 2002).
87. Kikas, T., Zhang, H., Bardenshteyn, I. M., Ejimofor, C. Puri, P., Phillips, C., and Fedorov, A., Feedstock for micro fuel cells: efficient hydrogen production in the reverse-flow autothermal catalytic microreactors with fractal structuring of catalytically active surface, *International Symposium on Micro/Nanoscale Energy Conversion MECT-02*, International Centre for Heat and Mass Transfer, Antalya, Turkey, April 14-19, 2002.
88. Fan, T. H. and Fedorov, A., Visualization of atomic force microscopy from Molecular Dynamics simulations, *Photogallery of Heat Transfer Phenomena (Extreme Scale Visualizations)*, 2000

International Mechanical Engineering Congress & Exposition IMECE'00, Orlando, Florida (November 5-10, 2000).

89. Fedorov, A., Radiative transfer in closed cell foams, *Open Forum on Radiative Heat Transfer*, 34th National Heat Transfer Conference, Pittsburgh, PA (August 21, 2000).

• **Keynote Lectures, Invited Seminars & Presentations**

1. "Walking the Feynman's Talk" – Using Focused Electron Beam for Direct-Write Nanofabrication of CNT, Graphene and Graphene Oxide Electronic Devices. Birck Nanotechnology Center, Purdue University, West Lafayette, Indiana, USA (November 25, 2015).
2. Using Multi-Phase Energetic Jets to Achieve Understanding of Precursor-Surface Interactions and Enable New Modes of Focused Electron Beam Processing (FEBIP) of 2D & 3D Nanomaterials and Heterogeneous Interfaces, Invited presentation at Department of Energy (DOE) Basic Energy Sciences (BES) Synthesis & Processing Science Program, Gaithersburg, MD (November 2-4, 2015).
3. Exploiting Nanoscale Confinement for Design of Optimal Evaporation/Condensation Interface, IX Keynote lecture at the IX International Conference on "Heat Pipes, Heat Pumps, Refrigerators, Power Sources", Minsk, Belarus (September 7–10, 2015).
4. New Ideas in Fuel Reforming and Hydrogen Generation for Distributed, Mobile and Portable Applications. Academy for Co-creative Education of Environment and Energy Science (ACEEES), Tokyo Institute of Technology, Tokyo, Japan (June 16, 2015).
5. Emerging Micro/Nanotechnologies using Focused Electromechanical Fields for Drop-on-Demand Bioanalytics. Mechanical Engineering Department, Stanford University, Palo Alto, California, USA (April 8, 2015).
6. Electron Beam Induced Deposition (EBID) of Graphitic NanoJoints for Graphene Interconnects, Global Research Collaboration (GRC) Invited e-Workshop, Semiconductor Research Corporation (SRC) (November 6, 2014).
7. Matching Demand & Supply in Cooling of High Performance Microprocessors: From Scaling Laws to Device Applications, Porous Media Laboratory, Luikov Institute for Heat and Mass Transfer, Minsk, Belarus (January 23, 2014).
8. Microdevices for Phase-Charge Cooling of High Performance Electronics, Power Engineering Department, Bauman Moscow State Technical University, Moscow, Russia (January 17, 2014).
9. Micro/Nano-Fluidic Devices Based on Focused Electromechanical Fields for Large Biomolecule Delivery, Sensing, and Imaging, IBB Breakfast Club Seminar Series, Petit Institute for Bioengineering and Bioscience, Georgia Institute of Technology, Atlanta, Georgia, USA (January 14, 2014).
10. Exploiting Nanoscale Confinement for Design of Optimal Evaporation/Condensation Interface, Department of Mechanical Engineering, University of Nevada, Las Vegas, USA (September 23, 2013).
11. Focused Electron Beam Induced Processing (FEBIP) for Emerging Carbon-Based Electronic Nanomaterials. Intel/SRC Symposium and Executive Review, Hillsboro, Oregon, USA (September 5, 2013).
12. Thin Film Evaporation – Overview: Focusing on Micro/Nano Structures for Phase-Change Heat Transfer. NSF/DARPA/ONR/ARPA-E International Workshop on "Micro and Nano Structures for Phase Change Heat Transfer", MIT, Boston, Massachusetts, USA (April 22-23, 2013).

13. *New Ideas in Fuel Reforming and Hydrogen Generation for Distributed, Mobile and Portable Applications*. American Chemical Society (ACS) Symposium on "Hydrogen Production, Storage, and Utilization", 245th ACS National Meeting, New Orleans, LA (April 7-11, 2013).
14. *Evaporation and Condensation within Nanoscale Confined Domains: Old Problems, New Ideas, and Critical Applications*. Department of Mechanical Engineering and Materials Science, Duke University, Durham, North Carolina, USA (January 23, 2013).
15. *Drop-on-Demand Bioanalytics using Focused Electromechanical Fields*, Keynote lecture at 2012 IEEE NANOMED (IEEE International Conference on Nano/Molecular Medicine & Engineering), Bangkok, Thailand (November 4-7, 2012).
16. *Focused Electron Beam Induced Deposition (FEBID): Unresolved Problems, New Ideas, and Emerging Applications*. Invited Lecture and Master Workshop, Nanotools/Scanning Probes GmbH, Munich, Germany (October 13-16, 2012).
17. *Matching Demand & Supply in Cooling of High Performance Microprocessors: From Scaling Laws to Device Applications*. Air Force Research Labs (AFRL), Dayton, Ohio, USA (September 18, 2012).
18. *Bridging the Gap between Energy & Sustainability – Unlocking a Potential for Smooth Transition to Sustainable Energy Management in Transportation & Removing Critical Bottlenecks in Renewable Energy Technologies*. Keynote lecture at the 5th International Forum on Multidisciplinary Education and Research for Energy, Tokyo Institute of Technology, Tokyo, Japan (September 7, 2012).
19. *“Walking the Feynman’s Talk” – Using Focused Electrons for 3D Nanomanufacturing to Enable Critical Applications*. Mechanical, Aerospace & Biomedical Engineering Department, University of Tennessee Knoxville, Tennessee, USA (April 19, 2012).
20. *Technological Challenges and Opportunities for Carbon Capture and Sequestration*, National Power Plant Management Summit (by invitation only forum for Plant Managers, Plant Superintendents, VPs and Directors of Power Generation), Wheeling, Illinois, USA (October 17-19, 2011).
21. *Surely You’re NOT Joking Mr. Feynman: “Walking the Talk” from Quazi-2D Microfabrication to Fully-3D Nanomanufacturing to Enable Critical Applications*. Opening Keynote lecture at International Symposium on Nano/Micro Fabrication for Energy Science and Technology, Organized by a Consortium of Tokyo Institute of Technology/University of Tokyo/Keio University/Waseda University, Kawasaki City, Japan (March 4, 2011).
22. *Opportunities CO₂ Capture from Transportation and Distributed Sources and Enabling Technologies with “Sustainability” Potential*, Keynote lecture at the Saudi Aramco Technology Symposium “Technologies for Reducing CO₂ Emissions from Transportation Sectors and CO₂ Utilization”, Houston, Texas, USA (October 11, 2010).
23. *Electron Beam Induced Deposition (EBID): Role of Mass/Heat Transfer, Deposition Scaling Laws, and Applications to 3D Nanomanufacturing*, Keynote lecture at FEBIP 2010 (International Workshop on Focused Electron Beam Induced Processing), Albany, NY, USA (July 15-16, 2010).
24. *Towards Sustainable “Carbon Economy” for Transportation - Enabling Technologies for Distributed H₂/Power Generation with CO₂ Capture*, Mechanical & Aerospace Engineering Department, University of Notre Dame, Indiana, USA (March 16, 2010).
25. *Technology Options for CO₂ Capture from Transportation and Distributed Sources*, Technology & Policy Briefing to British American Parliamentary Group, Atlanta, Georgia, USA (February 18, 2010).

26. *Feasibility and Technology Options for CO₂ Capture from Transportation and Distributed Sources*, Open Forum on Energy and Environment “The Impact of CO₂ on Global Climate Change”, Georgia Institute of Technology, Atlanta, Georgia, USA (November 5, 2009).
27. *Electron Beam CVD-A New Tool for 3-D Nanomanufacturing: Underlying Fundamentals, Unexpected Behavior Trends, and Promising Applications*, Mechanical Engineering Department, University of Connecticut, Storrs, Connecticut, USA (October 8, 2009).
28. *(Electro)Chemical Imaging of Biochemical Interfaces – Enabling Tools for Systems Biology Research: Physical Methods and Mathematical Challenges*, IBSI (Integrated BioSystems Institute), Georgia Institute of Technology, Atlanta, Georgia, USA (March 4, 2009).
29. *Carbon Capture and Sequestration*, National Conference of State Legislatures, Agriculture and Energy Committee, Atlanta, Georgia, December 12, 2008.
30. *Transient (Electro)Chemical Imaging of Reacting Interfaces: Physical Concepts and Mathematical Challenges*, Mathematical Biology and Ecology Seminar, Georgia Institute of Technology, Atlanta, Georgia, USA (December 3, 2008).
31. *Thermodynamic and Thermal Transport Challenges in Energy Technologies Enabling Sustainable Transportation*, Panel “Future Directions on Renewable and Sustainable Energy Research”, ASME Summer Heat Transfer Conference, Jacksonville, Florida, August 10-14, 2008.
32. *Electron Beam CVD-A New Tool for 3-D Nanomanufacturing: Underlying Fundamentals, Unexpected Behavior Trends, and Promising Applications*, Nanoparticle Science and Engineering Seminar Series, University of Minnesota, Twin Cities Campus, Minneapolis, Minnesota, USA (February 1, 2008).
33. *Towards Sustainable “Carbon Economy” - Enabling Technologies for H₂/Power Generation with CO₂ Capture*, Mechanical Engineering Seminar Series, University of Illinois at Urbana-Champaign, Illinois, USA (October 16, 2007).
34. *CO₂ Capture and Sustainable Carbon Economy*, 2nd ASME International Energy Nanotechnology Conference, Santa Clara, California, September 5-7, 2007.
35. *Electrosonic DNA Gun Microarray for Drug and Gene Delivery*, Integrative BioSystems Institute (IBSI) Conference, Georgia Institute of Technology, Atlanta, Georgia, USA (March 14, 2007).
36. *Small Scale Fuel Processing for Portable Power Generation*, Mechanical Engineering Seminar Series, University of Minnesota, Twin Cities Campus, Minneapolis, Minnesota, USA (October 18, 2006).
37. *Miniaturized Refrigeration Systems for Sub-Ambient Cooling of Electronics*, IFC Workshop on Thermal Management & Power Delivery, MARCO/DARPA Interconnect Focus Center, Georgia Tech, Atlanta, Georgia, USA (May 1, 2006).
38. *AMUSE (Array of Micromachined UltraSonic ElectroSprays) for Bioanalytical Mass Spectrometry*, Mass Spectrometry Seminar Series, Department of Chemistry, University of Georgia, Athens, Georgia, USA (March 3, 2006).
39. *AMUSE (Array of Micromachined UltraSonic ElectroSprays) for Bioanalytical Mass Spectrometry*, Department of Mechanical and Aerospace Engineering, University of California at Los Angeles (UCLA), Los Angeles, California, USA (January 27, 2006).

40. *AMUSE (Array of Micromachined UltraSonic ElectroSprays) for Bioanalytical Mass Spectrometry*, Department of Mechanical Engineering, Massachusetts Institute of Technology (MIT), Boston, Massachusetts, USA (December 7, 2005).
41. *Transport and Chemical Processing on Small Scales*, Milliken and Company, Spartanburg, South Carolina, USA (June 27, 2005)
42. *Radiative Heat Transfer in SOFC Materials and Components*, Academician Leontiev's School-Seminar "Heat Transfer and Hydrodynamics in Power Generation", Russian Academy of Sciences, Kaluga, Russia (May 24, 2005).
43. *Small Scale Fuel Processing for Portable Power Applications*, Center for Fuel Cells and Battery Technologies, Georgia Institute of Technology, Atlanta, Georgia, USA (February 16, 2005).
44. *Exciting Vistas at Intersection of Materials and Nanotechnology*, Materials Council Nanomaterials Forum, Georgia Institute of Technology, Atlanta, Georgia, USA (December 16, 2004).
45. *Glass Foams: Formation, Transport Properties, and Mechanisms of Heat and Mass Transfer*, Johns Manville Inc. R&D Technical Center, Littleton, Colorado, USA (June 28, 2004).
46. *Micromachined Acoustic μ -Atomizer for Mist Impingement Cooling of High Performance Electronics*, Sandia National Laboratories, Albuquerque, New Mexico, USA (April 8, 2004).
47. *From Nanostructures to Porous Silicon: Sensors and Photocatalytic Reactors*, NanoSemiMat-03, Cooperative Network for Research on Semiconductor Nanodevices and Nanostructured Materials, Universidade Federal de Pernambuco, Salvador, Brasil (March 25-26, 2004).
48. *AFM Imaging of Biological Membranes: Optimal Operation and Data Interpretation Through Understanding of Transport Phenomena*, Purdue Heat Transfer Celebration, Purdue University, West Lafayette, Indiana (April 4-6, 2003).
49. *From Energy to Environment: Unique Opportunities in Nanoscale Catalysis*, US-Japan Nanotherm Seminar: Nanoscale Thermal Science and Engineering, Berkeley-Stanford, California (June 24-26, 2002).
50. *Thermal Management Strategies for Next Generation Electronics*, Interconnect Focus Center, Georgia Institute of Technology, Atlanta, Georgia, USA (April 9, 2002).
51. *Thermal/Fluid Aspects of Materials Processing and Manufacturing*, School of Material Science and Engineering, Georgia Institute of Technology, Atlanta, Georgia, USA (March 26, 2002).
52. *Radiative Transfer in a Semitransparent Hemispherical Shell*, International Centre for Heat and Mass Transfer, Antalya, Turkey (June, 2001).
53. *Transport Phenomena in Chemical Microreactors*, Integrated Sensing, System Identification, and Control Laboratory, School of Chemical Engineering, Georgia Institute of Technology, Atlanta, Georgia, USA (March 12, 2001).
54. *Transport Phenomena in Glass Manufacturing*, Schott Glas, Inc., Mainz, Germany (February 7, 2001).
55. *Thermal/Fluid Aspects of Materials Processing and Manufacturing*, MicroCoating Technologies, Inc., Chamblee, Georgia, USA (October 12, 2000).
56. *Thermal/Fluid Aspects of Materials Processing and Manufacturing*, Mechanics of Materials Research Group Seminar, G. W. Woodruff School of Mechanical Engineering, Georgia Institute of Technology, Atlanta, Georgia, USA (October 6, 2000).

57. *Thermal/Fluid Aspects of Materials Processing and Manufacturing*, Manufacturing Research Group Seminar, G. W. Woodruff School of Mechanical Engineering, Georgia Institute of Technology, Atlanta, Georgia, USA (June 9, 2000).
58. *Transport Phenomena in Chemical Processing and Reaction Systems*, Specialty Separation Center (SSC) Seminar, School of Chemical Engineering, Georgia Institute of Technology, Atlanta, Georgia, USA (February 23, 2000).
59. *Thermal System Design: Integration of Fundamental Thermal/Fluid Analysis with Process Optimization and Control*, Mechanical Engineering Seminar, Georgia Institute of Technology, Atlanta, Georgia, USA (May 25, 1999).
60. *Radiative Transfer in Glass Foams*, Argonne National Laboratory, Chicago, Illinois, USA (October 12, 1999).
61. *Heat and Mass Transfer Dynamics in the Microchannel Adsorption Reactor*, Heat Transfer Seminar, School of Mechanical Engineering, Purdue University, West Lafayette, Indiana, USA (February 25, 1999).
62. *Heat and Mass Transfer and Adsorption Dynamics in a Honeycomb Adsorbent: Application of the Simplified Local Density Model*, 45th Oji International Seminar, Hokkaido University, Sapporo, Japan (September 16, 1997).
63. *Heat and Mass Transfer and Adsorption/Desorption Dynamics*, Mathematical Modeling and Control Seminar Series, Department of Power Engineering and Control, Urals State Technical University, Ekaterinburg, Russia (July 5, 1997).
64. *Combined Heat and Mass Transfer and Adsorption Dynamics in the Honeycomb Adsorbent*, Heat Transfer Seminar, School of Mechanical Engineering, Purdue University, West Lafayette, Indiana, USA (November 12, 1996).

D. OTHER SCHOLARLY ACCOMPLISHMENTS

- **Utility (Full) Patents and Applications**

1. Fedorov, A. G. and Degertekin, F. L., "*Electrospray Systems and Methods*", U.S. Patent No. 7,208,727, Issued 04/2007.
2. Degertekin, F.L. and Fedorov, A. G., "*Integrated Micro Fuel Processor and Flow Delivery Infrastructure*," U.S. Patent No. 7,312,440, Issued 12/2007.
3. Fedorov, A. G. and Degertekin, F. L., "*Reverse-Taylor-Cone Ionization Systems and Methods of Use Thereof*", U.S. Patent No. 7,411,182, Issued 08/2008.
4. Fedorov, A. G., "*Scanning Ion Probe Systems and Method of Use Thereof* ", U.S. Patent No. 7,442,927, Issued 10/28/2008.
5. Launay, S., Fedorov, A. G., and Joshi, Y., "*Thermal Management Devices, Systems, and Methods*", U.S. Patent No. 7,532,467, Issued 06/2009.
6. Fedorov, A. G., "*Nano-Patch Thermal Management Devices, Methods, and Systems*", U.S. Patent No. 7,545,644, Issued 06/2009.
7. Fedorov, A. G. and Degertekin, F. L., "*Electrospray Systems and Methods*", U.S. Patent No. 7,557,342, Issued 07/2009.

8. Fedorov, A. G., "Confining/Focusing Vortex Flow Transmission Structure, Mass Spectrometry Systems, and Methods of Transmitting Particles, Droplets, and Ions", U.S. Patent No. 7,595,487, Issued 09/2009.
9. Fedorov, A. G., Wadell, R., and Launay, S., "Vortex Tube Refrigeration Systems and Methods", U.S. Patent No. 7,669,428, Issued 03/2010.
10. Fedorov, A. G., "Scanning Ion Probe Systems and Method of Use Thereof ", U.S. Patent No. 7,705,299, Issued 04/2010.
11. Fedorov, A. G. and Degertekin, F. L., "Electrosonic Cell Manipulation Device and Methods of Use Thereof", U.S. Patent No. 7,704,743, Issued 04/2010.
12. Degertekin, F.L. and Fedorov, A. G., "Integrated Micro Fuel Processor and Flow Delivery Infrastructure," U.S. Patent No. 7,714,274, Issued 05/2010.
13. Fedorov, A. G. and Degertekin, F. L., "Reverse-Taylor-Cone Ionization Systems and Methods of Use Thereof", U.S. Patent No. 7,880,148, Issued 02/2011.
14. Fedorov, A.G., Varady, M., and Degertekin, F. L., "Droplet Impingement Chemical Reactors and Methods of Processing Fuel", U.S. Patent No. 7,909,897, Issued 03/2011.
15. Fedorov, A. G. and Damm, D. L., "Hydrogen-Generating Reactors and Methods", U.S. Patent No. 7,981,171, Issued 07/2011
16. Fedorov, A. G. and Degertekin, F. L., "Electrospray Systems and Methods", U.S. Patent No. 7,989,763, Issued 08/2011.
17. Fedorov, A. G., "Fluid-to-Fluid Spot-to-Spreader Heat Management Devices and Systems and Methods of Managing Heat ", U.S. Patent No. 8,082,978, Issued 12/2011.
18. Fedorov, A. G. and Rykaczewski, K., "Electron Beam Induced Deposition of Interface to Carbon Nanotube", U.S. Patent No. 8,207,058, Issued 06/2012.
19. Fedorov, A. G. and Degertekin, F. L., "Electrosonic Cell Manipulation Device", U.S. Patent No. 8,334,133, Issued 12/2012.
20. Fedorov, A. G., "Foldable Hydrogen Storage Media and Methods", U.S. Patent No. 8,372,947, Issued 02/2013.
21. Fedorov, A. G., Green, C., Joshi, Y. K., "Devices Including Composite Thermal Capacitors ", U.S. Patent No. 8,378,453, Issued 02/2013.
22. Fedorov, A. G. and Rykaczewski, K., "Electron Beam Induced Deposition of Interface to Carbon Nanotube", U.S. Patent No. 8,531, 029, Issued 09/2013.
23. Fedorov, A.G., Varady, M., and Degertekin, F. L., "Droplet Impingement Chemical Reactors and Methods of Processing Fuel", U.S. Patent No. 8,603,205, Issued 12/2013.
24. Fedorov, A. G., Green, C., Joshi, Y. K., "Devices Including Composite Thermal Capacitors ", U.S. Patent No. 8,710,625, Issued 04/2014.
25. Fedorov, A. G., "Evaporation-Enhanced Thermal Management Devices, Systems, and Methods of Heat Management ", U.S. Patent No. 8,710,625, Issued 06/2014.
26. Fedorov, A. G., Green, C., Joshi, Y. K., "Devices Including Composite Thermal Capacitors ", U.S. Patent No. 8,878,340, Issued 11/2014.
27. Fedorov, A. G., "Passive Heat Sink for Dynamic Thermal Management of Multiple Hot Spots", U.S. Patent No. 8,953,314, Issued 02/2015.

28. Fedorov, A. and Kottke, P. A., “SMS Probe and SEM Imaging System and Methods of Use”, U.S. Patent No. 9,245,722, Issued 01/2016.
29. Fedorov, A. G., “Thermal Ground Planes, Thermal Ground Plane Structures, and Methods of Heat Management”, U.S. Patent App. 12/331,579, Filed 12/2008.
30. Meacham, J. M., Fedorov, A. G., and Degertekin, F.L. “Self-Pumping Structures and Methods of Use Self-Pumping Structures”, U.S. Patent App. 13/065,649, Filed 03/2011.
31. Fedorov, A. G. and Damm, D. L., “Hydrogen-Generating Reactors and Methods”, U.S. Patent App. 13/158,648, (divisional filing), Filed 06/2011.
32. Fedorov, A. and Green, C. E., “Thermal Capacitors for Minimizing Complications and Side Effects of Thermal Medicine”, U.S. Patent App. 13/833,455, Filed 03/2013.
33. Meacham, J. M., Durvasula, K., Mehta, A., Fedorov, A. G., and Degertekin, F.L. “Intracellular Delivery and Transfection Methods and Devices”, U.S. Patent App. 61/777,980, Filed 08/2014.
34. Fedorov, A. and Kottke, P. A., “Evaporation Cooling Devices and Systems and Methods of Removing Heat from Hot Spots”, U.S. Patent App 61/772,614, Filed 09/2014.
35. Fedorov, A. G. and Anderson, D. “Reactors for Fuel Reforming and Methods of Use Thereof”, U.S. Patent App. 61/971,066, Filed 03/2015.

IV. SERVICE

A. PROFESSIONAL CONTRIBUTIONS

- *International Scientific Committee*, International Symposium on “Interfacial Phenomena and Heat Transfer”, Novosibirsk, Russia (March 2-4, 2016).
- *General Co-Chair*, 4th International Forum on Environment and Energy Science, Maui, Hawaii, USA (December 6-10, 2015).
- *International Scientific Committee*, IX International Conference on “Heat Pipes, Heat Pumps, Refrigerators, Power Sources”, Minsk, Belarus (September 7–10, 2015).
- *Discussion Leader*, Gordon Research Conference on “Micro & Nanoscale Phase Change Heat Transfer”, Galveston, Texas, USA (January 11-16, 2015).
- *International Advisory Board*, Bulletin of Japanese Society of Mechanical Engineering (JSME), including Mechanical Engineering Reviews, Transactions of the JSME (in Japanese), Mechanical Engineering Journal, and Mechanical Engineering Letters (2013-2015).
- *Member of International Advisory Board*, Academy for Co-Creative Education in Environment and Energy Science (ACEEES), Tokyo Institute of Technology, Japan (2013-Present).
- *General Co-Chair*, 2nd International Forum on Environment and Energy Science, Hyatt Regency Huntington Beach Resort and Spa, California, USA (December 13-17, 2013).
- *General Co-Chair*, 1st International Forum on Environment and Energy Science, Waikoloa, Hawaii, USA (December 14-18, 2012).
- *Editorial Board*, International Journal of Interfacial Phenomena and Heat Transfer (2012-Present).
- *International Advisory Board*, Tokyo Institute of Technology's Global Center of Excellence for Energy Science (2008-2012).
- *International Editorial Board*, Journal of Nanoelectronics and Optoelectronics (2007-Present).
- *Editorial Advisory Board*, International Journal of Multiscale Computational Engineering (2004-Present).

- *General Co-Chair*, 4th International Forum on Multidisciplinary Education and Research for Energy Science, Honolulu, Hawaii, USA (December 17-21, 2011).
- *Co-Chair*, National Science Foundation Workshop on “Nanotechnologies for Solar and Thermal Energy Conversion and Storage”, Jacksonville, Florida (August 10-11, 2008).
- *General Chair*, 3rd Energy Nanotechnology International Conference, ASME Nanotechnology Institute, Jacksonville, Florida (August 2008).
- *Technical Program Chair*, 2nd Energy Nanotechnology International Conference, ASME Nanotechnology Institute, Santa Clara, California (September 2007).
- *Co-Chair*, 4rd IASME/WSEAS International Conference on Fluid Mechanics (Fluids-2006), Miami, Florida, USA (January 2006), 3rd IASME/WSEAS International Conference on Fluid Mechanics and Aerodynamics, Corfu Island, Greece (August 2005).
- *International Scientific Committee*, 2nd ThETA Conference “Thermal Issues in Emerging Technologies”, Cairo, Egypt (December 2008), 16th School-Seminar “Problems of Heat and Mass Transfer & Gas Dynamics in Power Plants”, Saint-Petersburg, Russia (May 2007), 2005 International Conference on Heat and Mass Transfer, Udine, Italy (January 2005); 2nd International Conference on Fluid Mechanics, Corfu Island, Greece (August 2004).
- *Guest Editor*, Special Issue on Multiscale Transport Phenomena, International Journal of Multiscale Computational Engineering (2004).
- *Chair/Co-Chair*, Technical Sessions “Heat Transfer in Fuel Cells” at 2005 & 2007 ASME Summer Heat Transfer Conferences; “Radiative Heat Transfer in Participating Media” at 2004 ASME Heat Transfer/Fluids Engineering Summer Conference; “Heat Transfer in Fuel Cells”, at 2003 ASME International Mechanical Engineering Congress and Exposition IMECE-03; “Open Forum on Radiative Heat Transfer” at 2002 AIAA/ASME Joint Thermophysics and Heat Transfer Conference; “Multiscale Transport Phenomena in Energy Systems” at 2001 ASME International Mechanical Engineering Congress and Exposition IMECE-01; “Open Forum on Radiative Heat Transfer” at 2000 ASME National Heat Transfer Conference.
- *Member*, ASME Heat Transfer Division K-6 Committee on Heat Transfer in Energy Systems (1999-Present), ASME Heat Transfer Division K-22 Committee on Heat Transfer Visualization (2002-Present).
- *Member*, American Society of Mechanical Engineers (1994-Present), American Society of Mass Spectrometry (2006-Present).
- *Reviewer of technical papers*, Nanoscale (since 2012), Biomacromolecules (since 2009), ASME Journal of Biomechanical Engineering (since 2008), Nanotechnology (since 2007), Lab-on-a-Chip (since 2007), Journal of Membrane Science (since 2007), IEEE Transactions on Components and Packaging Technologies (since 2007), IEEE/ASME Journal of Electronic Packaging (since 2005), Langmuir (since 2004), Analytical Chemistry (since 2004), Journal of Computational Mechanics (since 2004), Multiscale Computational Engineering (since 2004), Physics of Fluids (since 2003), European Physical Journal-Applied Physics (since 2003), Experiments in Fluids (since 2003), Industrial & Engineering Chemistry Research (since 2003), ASME Journal of Energy Resources Technology (since 2003), Heat Transfer Engineering (since 2003), Journal of Enhanced Heat Transfer (since 2003), IEEE/ASME Journal of MEMS (since 2002), Numerical Heat Transfer (since 2002), International Journal of Heat and Mass Transfer

(since 2002), Acta Mechanica (since 2002), ASME Journal of Manufacturing Science and Engineering (since 2002), Journal of Quantitative Spectroscopy and Radiative Transfer (since 2001), Journal of Transport in Porous Media (since 2001), ENERGY-The International Journal (since 2000), Sensors & Actuators (since 2000), Applied Energy Journal (since 1998), ASME Journal of Heat Transfer (since 1997), United States Nuclear Regulatory Commission (1996), Proceedings of the Russian Academy of Sciences (1992-1994).

- *Reviewer of research proposals*, Office of Naval Research (since 2001), Army Research Office (since 2001), US Civilian Research and Development Foundation (since 2002), Kentucky Science Foundation (since 2002), US Department of Energy (since 2003), American Institute of Biological Sciences (since 2003), California Energy Commission (since 2003), National Science Foundation (since 2003), ACS Petroleum Research Fund (since 2005), National Institutes of Health (2010).
- *Fellowship Selection Committee*, Pi Tau Sigma Student Scholarship (2010-2011).
- *Academic Advisory Board*, School of Power Engineering, Bauman MSTU, Russia (1990-1994).

V. GRANTS AND CONTRACTS

A. AS PRINCIPAL AND CO-PRINCIPAL INVESTIGATOR

- **Completed Projects**

1. *Fuel Microprocessors for Liquid Fuels: Integration of Piezo-Electrically Driven Atomizer with the MEMS Catalytic Microreactor.* **Agency:** Air Products & Chemicals, Inc.; **Period:** January 2, 2002 – July 31, 2003.
2. *Novel Reverse-Flow Microreactor for Hydrogen Production for Fuel Cells.* **Agency:** Air Products & Chemicals, Inc.; **Period:** March 1, 2001 – February 28, 2002.
3. *Scalable, Low-Cost, Solid-State Photocatalytic Reactor for Low Temperature, Energy Efficient Disinfection of Water/Air Streams for Personal, Hospital, and Residential Use.* **Agency:** Emory/GT Biomedical Technology Center; **Period:** July 1, 2002 – June 30, 2003.
4. *Phase I: An Integrated Approach at Modeling and Mitigating SOFC (Solid Oxide Fuel Cell) Failure.* **Agency:** US Department of Energy (DOE); **Period:** October 1, 2002 – September 30, 2003.
5. *Development of the Micromachined Acoustic Atomizer for Vaccine Aerosolization.* **Agency:** Creare, Inc./Center for Disease Control and Prevention (CDC); **Period:** October 1, 2003 – August 31, 2004.
6. *Thermal Management of Next Generation Integrated Circuits.* **Agency:** MARCO/DARPA through Interconnect Focus Center; **Period:** September 1, 2002 – August 31, 2006.
7. *Micromachined Ultrasonic Atomizer for Aerosolized Vaccine/Drug Delivery.* **Agency:** CDC/GT Seed Grant Program; **Period:** September 30, 2004 – October 1, 2006.
8. *Phase II: An Integrated Approach at Modeling and Mitigating SOFC (Solid Oxide Fuel Cell) Failure.* **Agency:** US Department of Energy (DOE); **Period:** October 1, 2003 – January 30, 2006.
9. *Advanced Cryogenic Cooling and Evaluation of its Physical Limits.* **Agency:** MARCO/DARPA through Interconnect Focus Center; **Period:** January 1, 2005 – August 31, 2006.
10. *Electrohydrodynamics of AFM Imaging of Biological Membranes.* **Agency:** National Science Foundation (NSF); **Period:** January 1, 2005 – January 1, 2007.

11. *BIOCOMPLEXITY: Multifunctional Scanning Nanoprobes for In-Situ Analysis of Chemical Processes at Microbe/Mineral Interfaces.* **Agency:** National Science Foundation (NSF); **Period:** September 1, 2002 – August 30, 2007.
12. *MEMS-Enabled Processing of Liquid Fuels for Distributed Power Generation Using Fuel Cells.* **Agency:** National Aeronautics and Space Administration (NASA); **Period:** September 1, 2003 – December 31, 2007.
13. *CHAMP: Scalable Technology for Distributed Hydrogen Production and CO₂ Capture.* **Agency:** Georgia Tech (Creating Energy Option CEO Program); **Period:** April 30, 2007 – April 30, 2008.
14. *Energy Nanotechnology International Conference.* **Agency:** National Science Foundation (NSF); **Period:** March 1, 2008 – January 31, 2008.
15. *Multifunctional Scanning Probes for Imaging Cellular Signaling Processes.* **Agency:** National Institute of Health (NIH); **Period:** September 15, 2003 – September 14, 2009.
16. *Thermal Management of Next Generation Integrated Circuits.* **Agency:** MARCO/DARPA through Interconnect Focus Center; **Period:** September 1, 2006 – August 31, 2009.
17. *Scanning Mass Spectrometry (SMS) Probe for Biochemical Imaging on the Nanoscale.* **Agency:** National Science Foundation (NSF); **Period:** February 15, 2008 – January 31, 2010.
18. *Scanning Mass Spectrometry Probe for Bioanalytical Applications.* **Agency:** National Institute of Health (NIH) "Pathway to Independence" Program; **Period:** September 1, 2007 – January 31, 2010.
19. *AMUSE (Array of Micromachined UltraSonic ElectroSpray) for Bioanalytical Mass Spectrometry.* **Agency:** National Institute of Health (NIH); **Period:** September 1, 2006 – June 31, 2010.
20. *NIRT: Electron Beam CVD – A New Tool for Synthesis of Nanomaterials and Devices.* **Agency:** National Science Foundation (NSF); **Period:** September 1, 2004 – August 31, 2011.
21. *NIRT: Active Nanoparticles in Nanostructured Materials Enabling Advances in Renewable Energy and Environmental Remediation.* **Agency:** National Science Foundation (NSF); **Period:** August 15, 2006 – August 15, 2011.
22. *Acquisition of the Bruker MicroTOF Mass Spectrometer towards Development of the Scanning Mass Spectrometry (SMS) Nanoprobe for In-Situ Biochemical Imaging on Nanoscale.* **Agency:** National Science Foundation (NSF) Major Research Instrumentation (MRI) Program; **Period:** August 1, 2007 – August 1, 2010.
23. *Development and Characterization of Low-Temperature Ohmic Contact between CNT and Metal Interconnects Using Focused Electron Beam Chemical Vapor Deposition.* **Agency:** Semiconductor Research Corporation (SRC); **Period:** January 1, 2009 – January 1, 2012.
24. *GRA-Phase I & II OpenCell Technologies.* **Agency:** GT Office of Provost; **Period:** September 1, 2009 – May 31, 2011.
25. *Thermal Management of Next Generation Integrated Circuits.* **Agency:** MARCO/DARPA through Interconnect Focus Center; **Period:** September 1, 2009 – October 31, 2012.
26. *MTIF/GTRI Collaboration: Modeling and Simulation of Bio/chemical Sensors.* **Agency:** Defense Threat Reduction Agency (DTRA)/Air Force; **Period:** December 1, 2009 – November 31, 2011.
27. *Drop-on-Demand Deposition of Complex Fluids for 3-D Manufacturing.* **Agency:** National Science Foundation (NSF); **Period:** August 1, 2009 – June 1, 2013.

28. *Liquid Fuel Reformation in Direct Droplet Impingement Reactor*. **Agency:** National Science Foundation (NSF); **Period:** August 1, 2009 – August 1, 2013.
 29. *GRA.VL13.B34-InvisiCool*. **Agency:** Georgia Research Alliance; **Period:** January 1, 2013 – August 31, 2013.
 30. *Dynamically-Adaptive, Hybrid Micro/Nano-Structured Superhydrophobic Surfaces for Critical Thermal and Moisture Management Applications*. **Agency:** Air Force Research Lab/BIONIC Center; **Period:** September 1, 2010 – September 30, 2014.
 31. *Electron Beam Induced Deposition (EBID) of Low-Temperature, Ohmic Contact to Graphene Interconnects Using Graphitic Nano-Joints: Process Development, Property Characterization, and Fundamental Understanding*. **Agency:** Semiconductor Research Corporation (SRC); **Period:** November 1, 2011 – November 1, 2014.
 32. *Mass Spectrometry Probe (MSP) for In-Situ, Untargeted, Transient Biochemical Imaging of Submerged Biological Interfaces*. **Agency:** National Institute of Health (NSF); **Period:** September 1, 2011 – September 1, 2015.
- **Current Projects**
 1. *Three-Dimensional Stackable Evaporative Cooling of Microelectronics*. **Agency:** Defense Advanced Research Project Agency (DARPA); **Period:** January 1, 2013 – May 31, 2016.
 2. *Using Energetic Jets to Enable New Modes for Focused Electron Beam Induced Deposition of 3D Nanostructures*. **Agency:** Department of Energy (DOE BES); **Period:** August 15, 2013 – August 14, 2016.
 3. *GRA.VL13.B34-InvisiCool*. **Agency:** Georgia Research Alliance; **Period:** January 1, 2013 – December 31, 2015.
 4. *SUPERCool 3D ICs – Superior Performance Electronics using Recirculating Coolant for 3D ICs*. **Agency:** Defense Advanced Research Project Agency (DARPA); **Period:** December 1, 2013 – May 31, 2016.
 5. *DRILL: Droplet Transmission and Ion Desolvation Interface for Mass Spectrometry (R01)*. **Agency:** National Institute of Health (NIH); **Period:** September 15, 2014 – September 14, 2018.
 6. *Hydrogen Production from Natural Gas Using Sorption-Enhanced Membrane Reactors and Structured Catalysts*. **Agency:** US Civilian Research and Development Foundation (CRDF); **Period:** December 1, 2014 – November 30, 2016.
 7. *Invisicool Gel*. **Agency:** Coulter Foundation; **Period:** July 1, 2015 – June 30, 2016.
 8. *Sodium Ion Expansion Power Block for Distributed CSP*. **Agency:** US Department of Energy EERE; **Period:** September 15, 2015 – September 14, 2018.

B. AS INVESTIGATOR

1. *Focused Research Program in Micro/Nano Thermal Engineering*. **Agency:** Georgia Tech; **Period:** August 1, 2003 – July 31, 2004.
2. *Focused Research Program in Laser CVD*. **Agency:** Georgia Tech; **Period:** August 1, 2002 – July 31, 2003.
3. *Focused Research Program in Efficient Nano/Micro Molding*. **Agency:** Georgia Tech; **Period:** August 1, 2000 – July 31, 2003.

4. qHUB: Cyberinfrastructure for Community-Driven Research and Learning in Heat Transfer. **Agency:** National Science Foundation; **Period:** August 1, 2007– July 31, 2009.

VI. HONORS AND AWARDS

- Invited Visiting Professor, Tokyo Institute of Technology, Japan (Summer 2015).
- Grand Challenge Ambassador/Featured Guest, “Carbon Use Grand Challenge” Summit, Climate Change and Emission Management Corporation (CCEMC), Alberta, Canada (2014).
- Best paper award “Droplet impact dynamics in ink-jet manufacturing” at the 5th International Conference on Advanced Research in Virtual and Rapid Prototyping, Leiria, Portugal (2011).
- ASME Pi Tau Sigma Gustus L. Larson Memorial Award for Outstanding Achievements in Mechanical Engineering within Ten to Twenty Years Following Graduation (2010).
- NASA Invention & Contribution Board (ICB) Award, National Aeronautics and Space Administration, for “technical contributions to NASA, which have significant value in the conduct of aeronautical and space activities” (2010).
- SRC Inventor Recognition Award, Semiconductor Research Corporation (2009).
- ITherm’08 (IEEE Intersociety Conference on Thermal and Thermomechanical Phenomena in Electronic Systems) Outstanding Paper Award in Thermal Management (2008).
- Class of 1934 Outstanding Interdisciplinary Activity Award, Georgia Institute of Technology (2008).
- Georgia Tech’s CETL “Thanks a Teacher” Certificate (2008, 2010, 2011, 2012).
- Woodruff Endowed Faculty Fellow, Georgia Institute of Technology (2007-2012).
- ASME Bergles-Rohsenow Young Investigator Award for Sustained Contribution to Heat, Mass, and Radiation Transfer (2007).
- MARCO Inventor Recognition Award, Microelectronics Advanced Research Corporation (2006, 2007).
- Invited Participant, National Academy of Engineering (NAE) Frontiers of Engineering Symposium (2006).
- SME Branimir F. von Turkovich Outstanding Young Manufacturing Engineer Award (2006).
- World Technology Network (WTN) Elected Associate, as recognition of “the most innovative people and organizations in the science and technology world”, and Nominee for the WTN World Technology Award in Health and Medicine (2005).
- Sigma Xi (Georgia Tech Chapter) Young Faculty Award (2004).
- Emerging Scientist Travel Support Award to attend and present a talk at the 3rd International Symposium on Radiative Transfer, National Science Foundation (2001).
- Meritor Excellence Teaching Award Nominee, Georgia Tech Women in Engineering Program (2000).
- Certificate of Appreciation, Purdue Mechanical Engineering Heat Transfer Faculty (1998).

- President of the Russian Federation Outstanding Young Investigator Award (1994).
- Best paper award, 2nd Int. Conference "Current Problems of Fundamental Sciences", Moscow (1994).
- Bauman MSTU Scientific Advisory Board Research Fellowship (1993).
- Ministry of Energy of the Russian Federation Fellowship (1992).
- V. I. Lenin Honorary Fellowship for Outstanding Academic Achievements (1989-1992).