

ANDREI G. FEDOROV, Ph.D.
Professor and Rae S. and Frank H. Neely Chair
Regents' Entrepreneur, University System of Georgia
Woodruff School of Mechanical Engineering & Petit Institute for Bioengineering & Bioscience
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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**
Regents' Entrepreneur (2022-), Board of Regents of the University System of Georgia
Rae S. and Frank H. Neely Chair (2019-), George W. Woodruff School of Mechanical Engineering
Associate Chair for Graduate Studies (2018-), George W. Woodruff School of Mechanical Engineering
Woodruff Professor (2012-2019), 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, Marcus Center for Therapeutic Cell Characterization and Manufacturing
Faculty Member, NSF ERC Center for Cell Manufacturing Technologies (CMAT)
Faculty Member, Parker H. Petit Institute for Bioengineering and Bioscience (IBB)

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 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. Gazaille, B., Chilmonczyk, M. A., and Fedorov, A.G., Process analytics for modern biopharmaceutical workflows, *BioProcess International*, Informa Connect eBooks - Sensors, February 2022 (**invited**).
2. Kim, S. and Fedorov, A.G., FEBIP for functional nanolithography of 2D nanomaterials, *IOP Handbook on Nanolithography*, J. M. De Teresa (Editor), Institute of Physics, UK, 2020 (**invited**).
3. Green, C. E., Sahu, V., Hu, Y., Joshi, Y. K., and Fedorov, A.G., Passive and active thermal technologies: modeling and evaluation, *Handbook on 3D Electronic Packaging: Design, Test, and Thermal Management*, M. Bakir (Editor), Vol. 4, pp. 375-412, Wiley-VCH Books, 2019 (**invited**).
4. Narayanan, S., Kottke, P. A., Joshi, Y. K., and Fedorov, A.G., Gas assisted evaporation heat and mass transfer, *Annual Review of Heat Transfer*, Begell House, Inc., Vol. 19, 2016 (**invited**).
5. 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, WSPC Series in Advanced Integration and Packaging, Vol. 3, pp. 195-226, World Scientific Publishing Co. Pte. Ltd., 2014.
6. 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**).
7. 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**).

8. 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. Chapman, J. D., Kottke, P. A., and Fedorov, A. G., Thermodynamic analysis of nanoelectrospray induced gas jets, *Int. J. Multiphase Flow*, in review (January 2024).

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

2. Slusher, G. A., Kottke, P. A., Culberson, A. L., Chilmonczyk, M. A., and Fedorov A. G., Microfluidics enabled multi-omics triple-shot mass spectrometry for cell-based therapies, *Biomicrofluidics*, **inited**, **18**, 011302 (2024).
3. Chapman, J. D., Kottke, P. A., and Fedorov, A. G., Droplet-gas interactions in nanoelectrospray multiphase flow, *Int. J. Multiphase Flow*, **172**, 104701-19 (2024).
4. Culberson, A. L., Bowles-Welch, A. C., Wang, B., Kottke, P. A., Jimenez, A. C., Roy, K., and Fedorov A. G., Early detection and metabolic pathway identification of T-Cell activation by in-process intracellular mass spectrometry, *Cytotherapy*, **25** (9), 1006-1015 (2023).
5. Sung, D.S., Rejimon, A., Allen, J.W., Fedorov, A.G., and Fleischer, C.C., Predicting brain temperature in humans using bioheat models: progress and outlook, *J of Cerebral Blood Flow and Metabolism*, **43**(6), 833-842 (2023).
6. Sung, D.S., Risk, B.B., Kottke, P.A., Allen, J.W., Nahab, F., Fedorov, A.G., and Fleischer, C.C., Comparisons of healthy human brain temperature predicted from biophysical modeling and measured with whole brain MR thermometry, *Sci. Reports*, **12** (1), 1-12 (2022).
7. Prabhakaran, V., Romo, J., Bhattarai, A., George, K., Norberg, Z. M., Kalb, D., Aprà, E., Kottke, P. A., Fedorov, A.G., El-Khoury, P.Z., Johnson, G. E., and Laskin, J., Integrated photoelectrochemical energy storage cells prepared by benchtop ion soft-landing, *ChemComm - Journal of the Chemical Society D: Chemical Communication*, **58**, 9060-9063 (2022). **Featured on the Journal Inside Front Cover of August 2022 Issue.**
8. Kucuktas, O., Kottke, P. A., Simeroth, D., and Fedorov, A. G., Altering apparent optical properties with array of semitransparent mesoscale structures, *J. Opt. Soc. Am. A*, **39** (9), 1-9 (2022).
9. Simeroth, D., Kottke, P. A., Kucuktas, O., and Fedorov, A. G., Modulation of apparent optical properties using arrayed mesoscale structures, *J. Quant. Spec. Rad. Transfer*, **290**, 180280 (2022).
10. Ahmed, A., Boyle, E., Kottke, P. A., Fedorov A. G., Radiolytic redox interplay defines nanomaterials synthesis in liquids, *Science Advances*, **7** (51), eabj8751, 1-7 (2021).
11. Culberson, A. L., Chilmonczyk, M. A., Kottke, P. A., Bowles, A. C., Ghosha, D., and Fedorov A. G., Sample-to-analysis platform for rapid intracellular mass spectrometry from small numbers of cells, *Lab on a Chip*, **21**, 4696 - 4706 (2021).
12. Sung, D.S., Kottke, P.A., Risk, B.B., Allen, J.W., Nahab, F., Fedorov, A.G., and Fleischer, C.C., Personalized predictions and non-invasive imaging of human brain temperature, *Comm. Physics – Nature*, **4** (68), 1-9 (2021).

13. Chilmonczyk, M. A. and Fedorov A. G., Improving cell manufacturing outcomes using inline biomarker monitoring, *BioProcess Int.*, **19** (3), 2-6 (2021), **BPI Reader's Choice Award** <https://bpi.bioprocessintl.com/2021-readers-choice-awards-analytical>.
14. Chilmonczyk, M. A., Doron, G., Kottke, P. A., Culberson, A. L., Leguineche, K., Guldborg, R. E., Horwitz, E., and Fedorov A. G., Localized sampling enables monitoring of cell state via inline electrospray ionization mass spectrometry, *Biotechnol. J.*, **16** (3), 2000277 (2021).
15. Henry, M. and Fedorov, A. G., Adaptive simulations enable computational design of electron beam processing of nanomaterials with supersonic micro-jet precursor, *Computational Materials Science*, **186**, 109993 (2021).
16. Kim, S., Jung, S., Lee, J., Kim, S., and Fedorov, A. G., High resolution three-dimensional sculpting of two-dimensional graphene oxide by e-beam direct write, *ACS Appl. Mater. Interfaces*, **12** (35), 39595-39601 (2020).
17. Lee, J., Kottke, P. A., and Fedorov A. G., Electrohydrodynamics of gas assisted electrospray ionization mass spectrometry, *J. Am. Soc. Mass Spec.*, **31** (10), 2073-2085 (2020).
18. Lee, J., Kottke, P. A., and Fedorov A. G., Hydrodynamics of vortical gas jets coupled to point-like flow suction, *Phys. Fluids*, **32** (10), 103602 (2020).
19. Chilmonczyk, M., Kottke, P.A., Horwitz, E. and Fedorov, A. G., Probing MSC and tumor cell secretome locally via Dynamic Sampling Platform (DSP), *Cytotherapy*, **22**(5), S14-S15 (2020).
20. Gunawan, A., Singh, A., Simmons, R. A., Haynes, M. W., Limia, A., Ha, J. M., Kottke, P. A., Fedorov, A. G., Lee, S. W., and Yee, S. K., A Cost performance analysis of a sodium heat engine for distributed concentrating solar power, *Adv. Sustainable Syst.*, **4**, 1900104 (2020).
21. Kim, S., Henry, M., Moon, Y. H., and Fedorov, A. G., Multimode jetting unlocks a trade-off between nanostructure morphology and composition in focused electron beam induced deposition, *Materials Today Comm.*, **21**, 100645 (2019).
22. Henry, M., Kim, S., and Fedorov A. G., Non-equilibrium adatom thermal state enables rapid additive nanomanufacturing, *Phys. Chem. Chem. Phys.*, **21**, 10449 - 10456 (2019).
23. Chapman, J. D., Kottke, P. A., and Fedorov, A. G., Enhanced thin film evaporation via impinging electrospray liquid jets with entrained air streaming, *Int. J. Heat Mass Transf.*, **131**, 85-95 (2019).
24. Chilmonczyk, M. A., Kottke, P. A., Stevens, H. Y., Guldborg, R. E., and Fedorov A. G. Dynamic mass spectrometry probe (DMSP) for ESI-MS monitoring of bioreactors for therapeutic cell manufacturing, *Biotechnology & Bioengineering*, **116**(1), 121-131 (2019).
25. Limia, A., Kottke, P.A., Fedorov, A. G., and Yee, S. K., Thermal modeling and efficiency of a dual stage sodium heat engine, *Appl. Thermal Eng.*, **145**, 603-609 (2018).
26. Fisher, J., Kottke, P. A., and Fedorov A. G., Synthesis of crystalline metal nanomonoliths by e-beam reduction of negatively-electrified jets, *Materials Today Physics*, **5**, 87-92 (2018). **Featured by Research Insights as 2018 influential contribution article.**
27. Johnson, G. E., Prabhakaran, V., Browning, N. D., Mehdi, B. L., Laskin, J., Kottke, P.A., and Fedorov, A. G., DRILL interface makes ion soft landing broadly accessible to energy science and applications, *Batteries & Supercaps*, **1** (3), 97-101 (2018).

28. Meacham, J. M., Durvasula, K., Degertekin, F. L., and Fedorov, A., Enhanced intracellular delivery via coordinated acoustically-driven shear mechanoporation and electrophoretic insertion, *Scientific Reports*, **8**, 3727-3736 (2018).
29. Limia, A., Ha, J., Kottke, P.A., Gunawan, A., Fedorov, A., Lee, S. W., Yee, S. K., A dual stage sodium thermal electrochemical converter (Na-TEC), *J. Power Sources*, **371**, 217-224 (2017).
30. Kottke, P.A., Lee, J. Y., Jonke, A. P., Seneviratne, C. A., Hecht, E. S., Muddiman, D. C., Torres, M. P., and Fedorov, A., DRILL: An ESI-MS interface for improved sensitivity via inertial droplet sorting and electrohydrodynamic focusing in a swirling flow, *Anal. Chem.*, **89** (17), 8981-8987 (2017)
Featured on the Journal Front Cover of September 2017 Issue.
31. Sarvey, T. E., Hu, Y., Green, E. C., Kottke, P. A., Joshi, Y., Fedorov, A., and Bakir, M., Heterogeneous micropin-fin arrays for cooling of integrated circuits with non-uniform power maps, *IEEE Comp. Pack. Manuf. Tech.*, **7** (9), 1465-1475 (2017).
32. Anderson, D. A., Yun, T. M., Kottke, P. A., and Fedorov, A. G., Comprehensive analysis of sorption enhanced steam methane reforming in a variable volume membrane reactor, *Ind. Eng. Chem. Res.*, **56** (7), 1758-1771 (2017). **Featured on the Front Cover of February 2017 Issue.**
33. Nasr, M. N., Green, E. C., Kottke, P. A., Zhang, H., Sarvey, T. E., Joshi, Y., Bakir, M. and Fedorov, A., Hotspot thermal management with flow boiling of refrigerant in ultrasmall microgaps, *ASME J. Electronic Packaging*, **139**, 011006-011014 (2017).
34. Nasr, M. N., Green, E. C., Kottke, P. A., Zhang, H., Sarvey, T. E., Joshi, Y., Bakir, M. and Fedorov, A., Flow regimes and convective heat transfer of refrigerant flow boiling in ultra-small clearance microgaps, *Int. J. Heat Mass Transf.*, **108**, 1702-1713 (2017).
35. Lorenzini, D., Sarvey, T., Zhang, X., Hu, Y., Fedorov, A., Bakir, M., and Joshi, Y. K., Embedded single phase microfluidic thermal management for non-uniform heating and hotspots using microgaps with variable pin fin clustering, *Int. J. Heat Mass Transf.*, **103**, 1359-1370 (2016).
36. Han, X., Fedorov, A., Joshi, Y. K., Flow boiling in microgaps for thermal management of high heat flux microsystems, *ASME J. Electronic Packaging*, **138** (4), 040801-13 (2016).
37. Asrar, P., Zhang, X., Green, E. C., Kottke, P. A., Sarvey, T. E., Fedorov, A., Bakir, M., and Joshi, Y., Visualization of flow boiling of R245fa in a microgap with integrated staggered pin fins, *Electronics Cooling*, June 2016 Issue, 13-16 (2016).
38. 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*, **120** (19), 10584–10590 (2016).
39. 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).
40. Zhang, X., Han, X., Sarvey, T. E., Green, E. C., Kottke, P. A., Fedorov, A. G., Joshi, Y. K., Bakir, M., Three-dimensional integrated circuit with embedded microfluidic cooling: technology, thermal performance, and electric implications, *ASME J. Electronic Packaging*, **138**(1), 010910 (2016).
41. Fisher, J., 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).

42. 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).
43. 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).
44. 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).
45. 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).
46. 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).
47. 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).
48. 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).
49. 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).
50. 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).
51. 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).
52. 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).
53. 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).
54. 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).
55. 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**.
56. 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**.

57. 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).
58. 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**.
59. 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).
60. 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).
61. 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).
62. 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).
63. Zhou, W., Loney D., Fedorov, A. G., Degertekin, F. L., Rosen, D., Lattice Boltzmann simulations of multiple droplet interaction dynamics, *Phys. Rev. E*, **89** (3), 033311 (2014). **Selected for Phys Rev E Kaleidoscope.**
64. 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).
65. 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).
66. 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).
67. 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).
68. 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).
69. 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).
70. 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).

71. 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**, 031009-013018 (2012).
72. 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).
73. Wei, W., Fedorov, A., Luo, Z., and Ni, M., Radiative properties of dense nanofluids, *Appl. Optics.*, **51** (25), 6159-6171 (2012).
74. 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).
75. 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).
76. Zhou, W., Loney, D., Fedorov, A., Degertekin, F. L., Rosen, D., Droplet impingement dynamics in ink-jet manufacturing, *Virtual & Physical Prototyping Journal*, **7** (1), 49-64 (2012).
77. 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).
78. Narayanan, S., Fedorov, A. and Joshi, Y., Interfacial transport of evaporating water confined in nanopores, *Langmuir*, **27** (17), 10666-10676 (2011).
79. 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).
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81. 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).
82. 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).
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85. 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).
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- **Refereed Conference/Symposia Proceedings**

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22. 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.
23. 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).
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26. 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).
27. 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).
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31. 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**).
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33. 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).
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36. 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).
37. 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).
38. 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).
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40. 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).
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43. 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).
44. 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).
45. 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**).
46. 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).
47. 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).
48. 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).
49. 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).
50. 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).
51. 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).
52. 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).
53. 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).

54. 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).
55. 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).
56. 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).
57. 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. Schaplahch; Minerals, Metals & Materials Society, pp. 69-78, 2004 (Invited paper).
58. 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).
59. 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).
60. 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).
61. 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).
62. Gurram, 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.
63. 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.
64. Fedorov, A., Heat and mass transfer in glass foams, *5th ISHMT/ASME Heat and Mass Transfer Conference*, Calcutta, India, January 2002 (CD Proceedings).
65. 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).
66. 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).

67. 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).
68. 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.
69. 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.
70. 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.
71. Fedorov, A., Bituryn, 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. OTHER PUBLICATIONS

- **News Releases**

1. Featured in the news release "New Startup Makes Developing Gene Therapies Faster and Easier" by Georgia Tech (<https://research.gatech.edu/new-startup-makes-developing-gene-therapies-faster-and-easier>); also described by Georgia Bio, EurekAlert, Genetic Engineering & Biotechnology News, Analytical Scientist (March 2022).
2. Featured in the Wall Street Journal story "The Nanotechnology Revolution Is Here—We Just Haven't Noticed Yet" (<https://www.wsj.com/articles/the-nanotechnology-revolution-is-here-we-just-havent-noticed-yet-11642827640?redirect=amp>) and the WSJ print edition story "The Next Miniature Marvels" (January 2022).
3. Featured in the news release "Building Better Tools for Biomanufacturing" by Georgia Tech (<https://research.gatech.edu/building-better-tools-biomanufacturing>); also described by Georgia Bio, EurekAlert, Genetic Engineering & Biotechnology News, Analytical Scientist (December 2021).
4. Featured in the news release "New Model Can Predict Personalized Brain Temperature Maps" by Academic Times (<https://academictimes.com/new-model-can-predict-personalized-brain-temperature-maps/>); also described by Emory Lab Blog, Nature Blog, IOP's *Physics World* (April 2021).
5. Featured in the news release "New Instrument Will Uncover Structure and Chemical Composition on Sub-Cell Scale" by Georgia Tech (<https://rh.gatech.edu/news/642825/new-instrument-will-uncover-structure-and-chemical-composition-sub-cell-scale>); also described by AAAS EurekAlert, PhysOrg, Reddit, Nanowerk, (January 2021).
6. Featured in the news release "Tiny Supersonic Jet Ejector Accelerates Nanoscale Additive Manufacturing" by Georgia Tech (<https://www.news.gatech.edu/2019/07/02/tiny-supersonic-jet-injector-accelerates-nanoscale-additive-manufacturing>); also described by DOE Basic Energy Science, EurekaAlert, PhysOrg, Reddit, Nanowerk, 3D Printing Media Network, Flipboard (July 2019).

7. Featured in the news release “Microfluidic Molecular Exchanger Helps Control Therapeutic Cell Manufacturing” by Georgia Tech (<http://www.rh.gatech.edu/news/612597/microfluidic-molecular-exchanger-helps-control-therapeutic-cell-manufacturing>); also described by AAAS EurekAlert, PhysOrg, Reddit, Nanowerk, Flipboard (October 2018).
8. Featured in the news story “Carbon conundrum: cooling the planet will entail recapturing plenty of CO₂” by Sustainability News (<https://www.sustainability-times.com/environmental-protection/carbon-conundrum-cooling-the-planet-will-entail-recapturing-plenty-of-co2/>) (September 2018).
9. Featured in the news release “Tiny “Tornado Boosts Performance of Electrospray Ionization Mass Spectrometry” by Georgia Tech (<http://www.rh.gatech.edu/news/593106/tiny-tornado-boosts-performance-electrospray-ionization-mass-spectrometry>); also described by GenomeWeb, PhysOrg, Quantum Times, Molecular Medicine/Futurist Transhuman News, Measurement Media Network, HiTech Days (June 2017).
10. Featured in the news release “Four Stroke Engine Cycle Produces Hydrogen from Methane and Capture CO₂” by Georgia Tech (<http://www.rh.gatech.edu/news/587525/four-stroke-engine-cycle-produces-hydrogen-methane-and-captures-co2>); also described by National Science Foundation (NSF) News, Atlanta Business Chronicles, Engadget, Newswise, PhysOrg, Eureka Alert, Reddit, Latest Technology, World Oil Gas News, California Hydrogen Business Council, Hydrogen Fuel News (February 2017).
11. Featured in the news release “3D “Nanobridges” Formed Using Electron Beam Writing with Tiny Jets of Liquid Precursor” by Georgia Tech (<http://www.news.gatech.edu/2015/12/18/3d-“nanobridges”-formed-using-electron-beam-writing-tiny-jets-liquid-precursor>); also described by DOE Basic Energy Science, IEEE Spectrum Magazine, Newswise, PhysOrg, Eureka Alert (December 2015).
12. Featured in the news release “Liquid Cooling Moves onto the Chip for Denser Electronics” by Georgia Tech (<http://www.news.gatech.edu/2015/10/05/liquid-cooling-moves-chip-denser-electronics>) (October 2015).
13. Featured in the news release “Disappearing Carbon Circuits on Graphene Could Have Security, Biomedical Uses” by Georgia Tech (<http://www.news.gatech.edu/2015/09/29/disappearing-carbon-circuits-graphene-could-have-security-biomedical-uses>); also described by DOE Basic Energy Science, IEEE Spectrum Magazine, R&D Magazine, Kurzweil Accelerating Intelligence, PhysOrg, Eureka Alert (September 2015).
14. Featured in the news release “Smart Hydrogel Coating Creates “Stick-Slip” Control of Capillary Action” by Georgia Tech (<http://www.news.gatech.edu/2015/07/25/smart-hydrogel-coating-creates-“stick-slip”-control-capillary-action>); also described by PhysOrg, Eureka Alert (July 2015).
15. Featured in the news release “Nine Georgia Tech-Emory Biomedical Projects Received Coulter Foundation Funding: Teams Chosen to Receive Funding to Accelerate Commercialization of Medical Technologies Invented in their Labs” by Georgia Tech (<http://www.news.gatech.edu/2015/07/21/nine-georgia-tech-emory-biomedical-projects-receive-coulter-foundation-funding>) (July 2015).
16. Featured in the news release “Grant Funds Development of Improved Nanoscale Additive Manufacturing” by Georgia Tech (<http://www.news.gatech.edu/2013/10/21/grant-funds-development-improved-nanoscale-additive-manufacturing>); also described by Product Design & Development, Nanowerk, AZoNano, Green Car Congress, DOE Basic Energy Science (October 2013).

17. Featured in the news release “3-D Cooling: DARPA Funds Research to Improve Heat Dissipation in 3-D Microelectronic Systems” by Georgia Tech (<http://www.gtresearchnews.gatech.edu/research-into-3-d-cooling-funded/>); also described by Defense Innovation Marketplace, PhysOrg, Silicon Semiconductor, DARPA (April 2013).
18. Featured in the ATDC Spotlight (<http://www.atdc.org/blogpost/997110/168426/Startup-Chronicles-OpenCell-Technologies>) on OpenCell Technologies, Inc., a GT spin-off company co-founded by J. M. Meacham, F. L. Degertekin, and A. G. Fedorov to commercialize MEMS gene delivery technology invented in Fedorov and Degertekin laboratories (August 2013).
19. Featured in the news release “Hybrid Electronics: Low-Resistance Connections Could Facilitate Use of Multi-walled Carbon Nanotubes for Electronic Interconnects” by Georgia Tech; also described by Sciencedaily, Electronics News, Materials Today, Solid State Technology (November 2012).
20. Featured in the news release “Carbon Capture Strategy Could Lead to Emission-Free Cars” by *Georgia Tech*; also described by Sciencedaily, PollutionOnline, AutoFocusAsia (February 2008). The story has been selected for inclusion in the European Commission's Science for Environment Policy news for policy makers http://ec.europa.eu/environment/integration/research/research_alert_en.htm.
21. Featured in a documentary by the Bavarian educational TV network “Global Engineering Education - U.S. Perspective” (April 2007). Georgia Tech was one of eight participating international universities conducting the study and showcased as an American institution on the forefront of globalization in terms of educating its engineers. Georgia Tech's approach to engineering education is compared to the Swiss Federal Institute of Technology (ETH) Zurich, and also Technische Universitat Darmstadt (TUD) in Germany.
22. Featured in the news release “Nano Probe May Open New Window Into Cell Behavior” by *Georgia Tech*; also described by the National Cancer Institute (NCI) on the Nano.Cancer.Gov website, Small Times Magazine, Foresight Nanotech Institute Digest, NanoBioTech News, and Chemical & Engineering News (July 2006).
23. Featured in the news release “New Device Could Shorten Drug Development” by *Georgia Tech*; also described by R&PG News, Pharma-Lexicon, News-Medical.Net, Lab Technologist, Journal of Emerging Medical Technologies, Drug Design and Development Magazine (June 2005).
24. Featured on the Fact Sheet of Georgia Tech faculty involved in nanotechnology research at the Georgia Tech NANOTECH web site: http://www.georgianano.org/intro_nano.htm
25. Featured in the article “Powering an Energy Revolution: Fuel Cells Promise Improvements in Transportation, Electronics and Power Generation” by the *Georgia Tech Research Horizons Magazine* (Spring/Summer 2002 issue).
26. Featured in the article “Entrepreneurs' Club” by the Purdue Engineering Alumni Magazine *Extrapolations* (Summer 1998 issue).

D. PRESENTATIONS

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

1. Ahmed, A., Kottke, P. A., Fedorov A. G., High resolution metal deposition using focused electron beam with redox chemistry control, *67th International Conference on Electron, Ion and Photon Beam Technology and Nanofabrication*, La Jolla, CA, USA, May 28-31, 2024.

2. Sentmanat, J., Taghioskoui, M., Kottke, P.A., and Fedorov, A. G., BeamMap: A multi-modal mass spectrometry and electron microscopy imaging instrument on the single-cell scale, *72nd ASMS Conference on Mass Spectrometry & Allied Topics*, San Diego, CA, USA, May 31 – June 4, 2024.
3. Sentmanat, J., Kottke, P.A., and Fedorov, A. G., Sub-Micron Multimodal Chemical Imaging Technique for Electrochemical Interfaces of Energy Systems, *3rd Energy & Informatics International Forum*, ACEEES, Bali, Indonesia, December 11-15, 2023.
4. Slusher, G., Culberson, A. L., Chilmoczyk, M., Kottke, P.A., and Fedorov, A. G., Microfluidic Sample-to-Analysis Platform Enables Dynamic Monitoring of Enzyme Production by Microbial Cells to Enable the Next Generation of Synthetic Biofuels, *3rd Energy & Informatics International Forum*, ACEEES, Bali, Indonesia, December 11-15, 2023.
5. Sentmanat, J., M., Kottke, P.A., and Fedorov, A. G., Sub-Cellular Resolution Biochemical Imaging Technique Combining Electron Microscopy and Mass Spectrometry, *AAMSDG 2023 Symposium*, Emory School of Medicine, October 20, 2023.
6. Sentmanat, J., Taghioskoui, M., Kottke, P.A., and Fedorov, A. G., Subcellular Resolution Biochemical Imaging Method Combining Scanning Electron Microscopy with Vacuum Electrospray-Enabled Mass Spectrometry, *Frontiers in Native Mass Spectrometry and Single Particle Microscopy*, Wisconsin Institute for Discovery, October 2-5, 2023.
7. Culberson, A. L., Bowles-Welch, A. C., Wang, B., Kottke, P. A., Jimenez, A. C., Roy, K., and Fedorov A. G., Early detection and metabolic pathway identification of T-Cell activation by in-process intracellular mass spectrometry, *ISCT 2023 - Annual Meeting of the International Society for Cellular Therapy*, Paris, France, May 31-June 3, 2023.
8. Culberson, A. L., Slusher, G. A., Bowles-Welch, A. C., Wang, B., Kottke, P. A., Jimenez, A. C., Roy, K., and Fedorov A. G., Microfluidic Sample-to-Analysis Platform Enables Dynamic Monitoring of Metabolic Pathways of T-Cell Activation by ESI-MS, *71th ASMS Conference on Mass Spectrometry & Allied Topics*, Houston, TX, USA, June 5-9, 2023.
9. Sentmanat, J., Kottke, P.A., and Fedorov, A. G., Subcellular Resolution Biochemical Imaging Method Combining Electron Microscopy with Vacuum Electrospray Beams, *71th ASMS Conference on Mass Spectrometry & Allied Topics*, Houston, TX, USA, June 5-9, 2023.
10. Ahmed, A., Boyle, E., Kottke, P. A., Fedorov A. G., Solvent Dependent Metal Nanostructure Synthesis Using Focused Electron Beam, *NNCI (National Nanotechnology Coordinated Infrastructure) Nano+Additive Manufacturing Summit*, Louisville, KY, USA, August 9-10, 2022.
11. Fedorov, A. G., Culberson, A., Chilmoczyk, M., Kottke, P.A., Enabling Technologies for Biochemical State Monitoring in Therapeutic Cell Manufacturing, *Keynote Lecture at 6th International Conference on Bioinspired and Bio-based Chemistry and Materials - NICE 2022*, Nice, France, June 21-23, 2022.
12. Lee, J., Sentmanat, J., Kottke, P.A., and Fedorov, A. G., Electron Beam Microscopy Combined with Focused Electrospray Beam for Biochemical imaging with Subcellular Resolutions, *70th ASMS Conference on Mass Spectrometry & Allied Topics*, Minneapolis, MN, USA, June 5-9, 2022.
13. Sentmanat, J., Lee, J., Kottke, P.A., and Fedorov, A. G., Gas-assisted transport of electrospray droplets in high-resolution vacuum IMS, *70th ASMS Conference on Mass Spectrometry & Allied Topics*, Minneapolis, MN, USA, June 5-9, 2022.

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111. 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.

112. 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.
113. 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.
114. 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 electro spray array, *17th International Mass Spectrometry Conference (IMSC 2006)*, Prague, Czech Republic, August 27-30, 2006.
115. 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.
116. 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.
117. 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.
118. Hampton, C., Meacham, M., Degertekin, F. L., Fedorov, A. and Fernandez, F. M., AMUSE (Array of Micromachined UltraSonic Electro spray) ion source for mass spectrometry, *2005 AIChE Annual Meeting & American Electrophoresis Society Annual Meeting*, Cincinnati, Ohio, USA, October 30-November 4, 2005.
119. Hampton, C., Meacham, M., Degertekin, F. L., Fedorov, A. and Fernandez, F. M., Micromachined ultrasonic electro spray ion source, *53rd ASMS Conference on Mass Spectrometry*, Orlando, Florida, USA, June 5-9, 2005.
120. 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.
121. Aderogba, S., Meacham, M., Fernandez, F. M., Degertekin, F. L., and Fedorov, A., Micromachined ultrasonic electro spray 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.
122. 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.
123. 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.

124. 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.
125. 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.
126. 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.
127. 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.
128. 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.
129. 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.
130. 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.
131. 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).
132. 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.
133. 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).
134. 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. *Multiphase Cooling at Extremes and its Enabling Microsystems*. Invited presentation at the "Knowledge Sharing Forum", Organized by GE Research Center, NY, USA (May 24, 2023).
2. *Enabling Technologies for Biochemical State Monitoring in Therapeutic Cell Manufacturing*, Keynote Lecture (Main Speaker) at 6th International Conference on Bioinspired and Bio-based Chemistry and Materials - NICE 2022, Nice, France (June 21-23, 2022).
3. *The Magic Mix for Sustainable Energy - Hydrogen, Carbon Dioxide, Synthetic and Natural Hydrocarbons: Reaction and Separation Technologies to Make it Work!* Keynote lecture at the 1st Energy & Informatics International Forum, Tokyo Tech InfoSyEnergy (ISE) Consortium, Tokyo, Japan (December 15-19, 2021).
4. *Direct-Write Electron Beam Processing of Topologically Complex Functional Nanomaterials Using Thermo-Electrically Energized Multiphase Precursor Jets*, Invited Lecture at 67th Annual American Vacuum Society International Symposium and Exhibition (AVS 67), Symposium on "Novel Development and Approaches of Interfacial Analysis", Charlotte, North Carolina (October 24-29, 2021).
5. *Electromechanical Ion Sources and Imaging MS Technologies*. Invited presentation at Thermo Fisher Instrumentation Global R&D Group, Online (June 2, 2021).
6. *Cooling of High Power Generation Systems: Matching Demands with Supplies across the Length and Time Scales*, Keynote Lecture at 8th International Conference of Fluid Flow, Heat and Mass Transfer (FFHMT'21), Niagara Falls, Canada (May 21-23, 2021).
7. *Monitoring of Cell Secretome and Metabolome using Dynamic Sampling Platform coupled to ESI-MS*. Invited Lecture at PITTCON 2021 (premier international conference on latest advances in scientific instrumentation), Symposium on "Recent Advances in Mass Spectrometry for Process Monitoring", New Orleans, Louisiana, USA (March 7-10, 2021).
8. *Multiphase Cooling at Extremes: Using Confined Evaporating Liquid Films with Streaming Gas/Vapor Flows*, Invited Lecture at Auburn University, Mechanical Engineering Department, Auburn, AL, USA (October 23, 2020).
9. *Enabling Technologies for Biochemical State Monitoring in Therapeutic Cell Manufacturing*, Keynote Lecture (Main Speaker) at 5th International Conference on Bioinspired and Bio-based Chemistry and Materials - NICE 2020, Nice, France (October 12-14, 2020).
10. *Direct Write Processing of 3D Composite Nanostructures and 2D Electronic Materials using Focused Beams of Molecules and Electrons*. Invited Lecture at Nano@Tech, Georgia Tech's Institute of Electronics and Nanotechnology (IEN) Seminar Series, Atlanta, GA, USA (January 14, 2020).
11. *Thermal Dissipation at Extremes Using Confined Evaporating Liquid Films with Streaming Gas/Vapor Flows*, Plenary Lecture at JSME/KSME/ASTFE Pacific Rim Thermal Engineering Conference, Maui, Hawaii, USA (December 13-17, 2019).
12. "Walking the Feynman's Talk" with Focused Electron and Molecular Beams for Writing 3D Nanostructures and 2D Electronic and Quantum Materials. Mechanical and Aerospace Engineering (MAE) Department, Princeton University, NJ (November 18, 2019).
13. *Convective Phase Change Heat and Mass Transfer at Extremes*, Plenary Lecture at the International Symposium on Thermal-Fluid Dynamics (ISTFD2019), Xi'an, China (July 26-29, 2019).

14. *Exploiting Localized Thermal and Electric Field Gradients to Control of Nanomaterial Phase and Composition in Far-From-Equilibrium Gas/Liquid Jet-Assisted E-Beam Deposition*, Invited Presentation at Department of Energy (DOE) Basic Energy Sciences (BES), Synthesis & Processing Science Program, Gaithersburg, MD (July 17-18, 2019).
15. *Amphiphilic Surfaces for Condensed Phase Wetting Control in Nanomaterial Synthesis*, Invited Lecture at the Russian Academy of Sciences, Frumkin Institute of Physical Chemistry and Electrochemistry, Moscow, Russia (June 17, 2019).
16. *The Dynamic Mass Spectrometry Probe (DMSP) – Advanced Process Analytics for Therapeutic Cell Manufacturing, Health Monitoring and Biomarker Discovery*, Invited Lecture at 6th Engineering Conference International (ECI) Advancing Manufacture of Cell and Gene Therapies VI, Sun Diego, CA, USA (January 27-31, 2019).
17. *“Walking the Feynman’s Talk” – Focused Electron Beam Writing of 3D Nanostructures and 2D Electronic Materials*, Invited Colloquium at the Department of Mechanical Engineering and Materials Science, Washington University, St. Louis, MO (September 27, 2018).
18. *Crossing 5 kW/cm² Barrier via Convective Phase Change at Extreme Pressures, Dimensions and Mass Fluxes*, Keynote Lecture at the X International Conference on “Heat Pipes, Heat Pumps, Refrigerators, Power Sources”, Minsk, Belarus (September 10-14, 2018).
19. *Focused Electron Beam Processing of 3D Composite Nanostructures and 2D Electronic Materials*. Invited Lecture at the DOE Center for Nanophase Materials Science (CNMS) Annual User Meeting, Session “Creating the Next Generation of Materials”, Oak Ridge National Laboratory, Oak Ridge, Tennessee, USA (August 14, 2018).
20. *Electrified Microdroplets and Nanojets for Bioanalytical, Nanomanufacturing, and Cooling Applications*, Invited Lecture at the Frumkin Institute of Physical Chemistry and Electrochemistry, Russian Academy of Sciences, Moscow, Russia (July 5, 2018).
21. *“Direct-Write” Growth and Modification of Topologically-Complex Functional Nanostructures Using Focused Electron Beam in Combination with Multi-Phase Energized Micro/Nano-Jets*. Invited Lecture at the Material Research Society (MRS) Spring 2018 Annual Meeting, Symposium on Additive Manufacturing, Phoenix, Arizona, USA (April 2-6, 2018).
22. *Bridging the Gap between Energy & Sustainability – Unlocking a Potential for Smooth Transition to Sustainable Energy Management & Removing Critical Bottlenecks in Renewable Energy Technologies*. Plenary Lecture at the 2017 IULEE Workshop on Energy and Environment, Qingdao, China (August 17-19, 2017).
23. *Heat and Mass Transfer Dynamics at the Evaporation/Condensation Interface under Nanoscale Confinement*. Plenary Lecture at the International Conference on “Interfacial Phenomena and Heat Transfer”, Xi’an, China (July 7-10, 2017).
24. *Exploiting Nanoscale Confinement for Design of Optimal Evaporation/Condensation Interface*. Viskanta Fellowship Lecture at the Mechanical Engineering Department, Purdue University, West Lafayette, IN, USA (April 5, 2017).
25. *Evaporative Cooling at Extremes – Ultra-High Pressures, Ultra-Small Gaps and Ultra-Large Mass Fluxes – Above and Beyond 1 kW/cm²*. Invited Lecture at the Gordon Research Conference (GRC) on “Micro and Nanoscale Phase Change Heat Transfer”, Galveston, TX, USA (January 8-13, 2017).

26. *Emerging Micro/Nanotechnologies using Focused Electromechanical Fields for Drop-on-Demand Bioanalytics*. Invited seminar at the Mechanical Engineering Department, Columbia University, New York City, New York, USA (October 7, 2016).
27. *Exploiting Nanoscale Confinement for Design of Optimal Evaporation/Condensation Interface*. Invited presentation at the Mechanical Engineering Department, University of Minnesota, Twin Cities, USA (October 5, 2016).
28. *Extreme Capabilities for Biomedical Diagnostics Enabled by Integration of Micro/Nanotechnologies*. Invited presentation at the CDC/Emory/Emory/Morehouse School of Medicine(MSM) Nanotechnology Day, Georgia Tech's Institute of Electronics & Nanotechnology, USA (July 14, 2016).
29. *"Walking the Feynman's Talk" – Focused Electron Beam "Direct-Write" Processing of CNT, Graphene and Graphene Oxide Electronic Devices*. Invited presentation at the Mechanical Engineering Department, University of California at Berkeley, USA (March 18, 2016).
30. *"Walking the Feynman's Talk" – Using Focused Electron Beam for Direct-Write Nanofabrication of CNT, Graphene and Graphene Oxide Electronic Devices*. Invited presentation at Birck Nanotechnology Center, Purdue University, West Lafayette, Indiana, USA (November 25, 2015).
31. *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).
32. *Exploiting Nanoscale Confinement for Design of Optimal Evaporation/Condensation Interface*, Keynote lecture at the IX International Conference on "Heat Pipes, Heat Pumps, Refrigerators, Power Sources", Minsk, Belarus (September 7–10, 2015).
33. *New Ideas in Fuel Reforming and Hydrogen Generation for Distributed, Mobile and Portable Applications*. Invited lecture at the Academy for Co-creative Education of Environment and Energy Science (ACEEES), Tokyo Institute of Technology, Tokyo, Japan (June 16, 2015).
34. *Emerging Micro/Nanotechnologies using Focused Electromechanical Fields for Drop-on-Demand Bioanalytics*. Invited seminar at the Mechanical Engineering Department, Stanford University, Palo Alto, California, USA (April 8, 2015).
35. *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).
36. *Matching Demand & Supply in Cooling of High Performance Microprocessors: From Scaling Laws to Device Applications*, Invited seminar at the Porous Media Laboratory, Luikov Institute for Heat and Mass Transfer, Minsk, Belarus (January 23, 2014).
37. *Microdevices for Phase-Charge Cooling of High Performance Electronics*, Invited seminar at the Power Engineering Department, Bauman Moscow State Technical University, Moscow, Russia (January 17, 2014).
38. *Micro/Nano-Fluidic Devices Based on Focused Electromechanical Fields for Large Biomolecule Delivery, Sensing, and Imaging*, Invited presentation at the IBB Breakfast Club Seminar Series, Petit Institute for Bioengineering and Bioscience, Georgia Institute of Technology, Atlanta, Georgia, USA (January 14, 2014).

39. *Exploiting Nanoscale Confinement for Design of Optimal Evaporation/Condensation Interface*, Invited seminar at the Department of Mechanical Engineering, University of Nevada, Las Vegas, USA (September 23, 2013).
40. *Focused Electron Beam Induced Processing (FEBIP) for Emerging Carbon-Based Electronic Nanomaterials*. Invited presentation at the Intel/SRC Symposium and Executive Review, Hillsboro, Oregon, USA (September 5, 2013).
41. *Thin Film Evaporation – Overview: Focusing on Micro/Nano Structures for Phase-Change Heat Transfer*. Invited lecture at the 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).
42. *New Ideas in Fuel Reforming and Hydrogen Generation for Distributed, Mobile and Portable Applications*. Invited talk at the American Chemical Society (ACS) Symposium on "Hydrogen Production, Storage, and Utilization", 245th ACS National Meeting, New Orleans, LA (April 7-11, 2013).
43. *Evaporation and Condensation within Nanoscale Confined Domains: Old Problems, New Ideas, and Critical Applications*. Invited seminar at the Department of Mechanical Engineering and Materials Science, Duke University, Durham, North Carolina, USA (January 23, 2013).
44. *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).
45. *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).
46. *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).
47. *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).
48. *“Walking the Feynman’s Talk” – Using Focused Electrons for 3D Nanomanufacturing to Enable Critical Applications*. Invited seminar at the Mechanical, Aerospace & Biomedical Engineering Department, University of Tennessee Knoxville, Tennessee, USA (April 19, 2012).
49. *Technological Challenges and Opportunities for Carbon Capture and Sequestration*, Invited Presentation at the 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).
50. *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).

51. *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).
52. *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).
53. *Towards Sustainable "Carbon Economy" for Transportation - Enabling Technologies for Distributed H₂/Power Generation with CO₂ Capture*, Invited Seminar at the Mechanical & Aerospace Engineering Department, University of Notre Dame, Indiana, USA (March 16, 2010).
54. *Technology Options for CO₂ Capture from Transportation and Distributed Sources*, Technology & Policy Briefing to British American Parliamentary Group, Atlanta, Georgia, USA (February 18, 2010).
55. *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).
56. *Electron Beam CVD-A New Tool for 3-D Nanomanufacturing: Underlying Fundamentals, Unexpected Behavior Trends, and Promising Applications*, Invited Seminar at the Mechanical Engineering Department, University of Connecticut, Storrs, Connecticut, USA (October 8, 2009).
57. *Thermal characterization of interlayer microfluidic cooling of three-dimensional IC with non-uniform heat flux*, Keynote lecture at International Conference on Nanochannels, Minichannels and Microchannels, Pohang, South Korea (June 24, 2009).
58. *(Electro)Chemical Imaging of Biochemical Interfaces – Enabling Tools for Systems Biology Research: Physical Methods and Mathematical Challenges*, IBSI (Integrated BioSystems Institute) Chalk Talk, Georgia Institute of Technology, Atlanta, Georgia, USA (March 4, 2009).
59. *Carbon Capture and Sequestration*, National Conference of State Legislatures, Agriculture and Energy Committee, Atlanta, Georgia, December 12, 2008.
60. *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).
61. *Electron Beam CVD for 3-D Manufacturing of Complex Nanostructures for Energy Applications*, Joint India-US Workshop on Scalable Nanomaterials for Enhanced Energy Transport, Conversion, and Efficiency, General Electric's John F. Welch Technology Centre, Bangalore, India, August 19-21, 2008. (cannot attend due to visa problem).
62. *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.
63. *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).

64. *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).
65. *CO₂ Capture and Sustainable Carbon Economy*, 2nd ASME International Energy Nanotechnology Conference, Santa Clara, California, September 5-7, 2007.
66. *Electrosonic DNA Gun Microarray for Drug and Gene Delivery*, Integrative BioSystems Institute (IBSI) Conference, Georgia Institute of Technology, Atlanta, Georgia, USA (March 14, 2007).
67. *Small Scale Fuel Processing for Portable Power Generation*, Mechanical Engineering Seminar Series, University of Minnesota, Twin Cities Campus, Minneapolis, Minnesota, USA (October 18, 2006).
68. *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).
69. *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).
70. *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).
71. *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).
72. *Transport and Chemical Processing on Small Scales*, Milliken and Company, Spartanburg, South Carolina, USA (June 27, 2005)
73. *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).
74. *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).
75. *Exciting Vistas at Intersection of Materials and Nanotechnology*, Materials Council Nanomaterials Forum, Georgia Institute of Technology, Atlanta, Georgia, USA (December 16, 2004).
76. *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).
77. *A Micromachined Ultrasonic Atomizer for Liquid Fuels*, Invited Poster Presentation at Workshop on Solid Oxide Fuel Cells, DOE Solid Energy Conversion Alliance (SECA), Boston, Massachusetts, USA (May 12, 2004).
78. *Micromachined Acoustic μ -Atomizer for Mist Impingement Cooling of High Performance Electronics*, Sandia National Laboratories, Albuquerque, New Mexico, USA (April 8, 2004).
79. *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).

80. *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).
81. *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).
82. *Thermal Management Strategies for Next Generation Electronics*, Interconnect Focus Center, Georgia Institute of Technology, Atlanta, Georgia, USA (April 9, 2002).
83. *Thermal/Fluid Aspects of Materials Processing and Manufacturing*, School of Material Science and Engineering, Georgia Institute of Technology, Atlanta, Georgia, USA (March 26, 2002).
84. *Radiative Transfer in a Semitransparent Hemispherical Shell*, International Centre for Heat and Mass Transfer, Antalya, Turkey (June, 2001).
85. *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).
86. *Transport Phenomena in Glass Manufacturing*, Schott Glas, Inc., Mainz, Germany (February 7, 2001).
87. *Transient Catalytic Microreactors, Surface Combustors, and Multifunctional Materials for High Density Power Generation*, DARPA PALM POWER Workshop, Ft. Lauderdale, Florida, USA (November 14, 2000).
88. *Thermal/Fluid Aspects of Materials Processing and Manufacturing*, MicroCoating Technologies, Inc., Chamblee, Georgia, USA (October 12, 2000).
89. *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).
90. *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).
91. *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).
92. *Transport Phenomena in Chemical Microsystems*, MEMS Research Group Seminar, G. W. Woodruff School of Mechanical Engineering, Georgia Institute of Technology, Atlanta, Georgia, USA (February 21, 2000).
93. *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).
94. *Radiative Transfer in Glass Foams*, Argonne National Laboratory, Chicago, Illinois, USA (October 12, 1999).

95. *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).
96. *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).
97. *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).
98. *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).

E. 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. and Damm, D. L., "*Hydrogen-Generating Reactors and Methods*", U.S. Patent No. 9,403,143, Issued 08/2016.
30. Meacham, J. M., Durvasula, K., Mehta, A., Fedorov, A. G., and Degertekin, F.L. "*Intracellular Delivery and Transfection Methods and Devices*", U.S. Patent 9,725,709, Issued 08/2017.
31. Fedorov, A. G., "*Thermal Ground Planes, Thermal Ground Plane Structures, and Methods of Heat Management*", U.S. Patent 9,945,617, Issued 04/2018.
32. Meacham, J. M., Fedorov, A. G., and Degertekin, F.L. "*Self-Pumping Structures and Methods of Use Self-Pumping Structures*", U.S. Patent 9,970,422, Issued 05/2018.
33. Yee, S., Fedorov, A. G., Lee, S., Limia, A., "*Thermo-Electro-Chemical Converters and Methods of Use Thereof*", U.S. Patent 10,249,884, Issued 04/2019.

34. Fedorov, A., "Evaporation Cooling Devices and Systems and Methods of Removing Heat from Hot Spots", U.S. Patent 10,337,802, Issued 07/2019.
35. 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 15/629,162 (divisional filing), Filed 07/2017.
36. 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, Continuation Filed 05/2018.
37. 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.
38. 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.
39. Fedorov, A. G., "Systems and Methods for Electron Beam Induced Processing", U.S. Patent App. 62/167,596, Filed 05/2016.
40. Meacham, J. M., Binkley, M., Fedorov, A. G., and Degertekin, F.L., Swadley, C., "High Throughput Acoustic Particle Separation Methods and Devices", U.S. Patent App. 16/085,314, Filed 09/2018.
41. Fedorov, A. G., Chilmonczyk, M., and Kottke, P.A. "Analysis System and Method of Use Thereof" U.S. Patent App. 62/764,712, Filed 09/2019.
42. Meacham, J. M., Fedorov, A. G., and Degertekin, F.L. "Systems and Methods of Mitigating Particle Aggregation Caused by Standing Wave and Transient Acoustophoretic Effects", U.S. Patent App. 62/783,771, Filed 12/2019.
43. Meacham, J. M., Fedorov, A. G., and Degertekin, F.L. "Ejector Structures with Reduced Standing Wave Fields for Mechanoporation of Cells", U.S. Patent App. 63/036,213 (June 2020).
44. Fedorov, A.G. and Kottke P.A., "Specimen Imaging Systems and Methods", U.S. Patent App. 62/910,691 (October 2020).
45. Fedorov, A.G., "Systems and Devices for Delivering Cargo Material and Methods of Delivering Cargo Materials", U.S. Patent App. 62/940,553 (November 2020).
46. Fedorov, A. G. and Anderson, D. "Reactors for Fuel Forming and Methods of Use Thereof", U.S. Patent App. 17/196,404, (March 2021, Divisional Filing).
47. Fedorov, A. G., "Systems and Methods for Electron Beam Induced Processing", U.S. Patent App. 17/223,620 (April 2021, Divisional Filing), Notice of Allowance 10/28/2022.
48. Fedorov, A.G. and Kottke P.A., "Specimen Imaging Systems and Methods", U.S. Patent App. 17/763,294 (March 2022).
49. Culberson, A., Chilmonczyk, M., Fedorov, A.G., Kottke, P.A., "Analysis Systems and Methods of Analysis", U.S. Patent App. PCT/US22/77220, Assigned to Andson Biotech (October 2022).
50. Fedorov, A. G., "Systems and Methods for Electron Beam Induced Processing", U.S. Patent App. 18/158,666 (Divisional Filing 01/2023).
51. Fedorov, A. G., Boyle, E. C., Ahmed, A., Kottke, P.A., "Electron Shower Induced Deposition Systems, Methods of Use Thereof, and Methods of Making Nanostructures", U.S. Patent App. 63/518,119 (August 2023).

IV. SERVICE

A. PROFESSIONAL CONTRIBUTIONS

- *Guest Editor*, Special Issue of the ASME Journal of Heat Transfer in 2022 in honor of the memory of Dr. Raymond Viskanta (2022).
- *General Co-Chair*, 2nd Energy & Informatics International Forum, InfoSyEnergy (ISE) Consortium, Oahu Island, Hawaii, USA (December 12-17, 2022).
- *Special Issue Co-Editor*, Frontiers in Neuroscience, Focus Area - "Brain Temperature in Mammals and Humans - Measurement, Modeling, and Applications," (2021-Present).
- *Member of International Advisory Board*, InfoSyEnergy Consortium, focused on research in elemental technologies, systems, and scenarios of energy using big data science (AI + data science) and education of doctoral students to design a new sustainable energy society, Tokyo Institute of Technology, Japan (2020-Present).
- *Senior Faculty Mentor*, NSF supported Thermal Transport Café – a virtual mentoring initiative of 30+ junior heat transfer faculty at the assistant professor level at the US and global research universities.
- *International Scientific Committee*, 8th International Conference of Fluid Flow, Heat and Mass Transfer (FFHMT'21), Niagara Falls, Canada (May 21-23, 2021).
- *Panelist and GT ERC Mentor*, NSF sponsored GRFP-ERC (Graduate Research Fellowship Program) Workshop, focusing on formative issues for GRFP applicants who are underrepresented in engineering and including formal and informal training in scientific writing and communication, professional development training, and access to mentors and role models engaged in innovative research
- *Editorial Board*, Nanoscale and Microscale Thermophysical Engineering (2018-Present).
- *International Scientific Committee*, X International Conference on "Heat Pipes, Heat Pumps, Refrigerators, Power Sources", Minsk, Belarus (September 10-13, 2018).
- *Invited Expert Contributor*, Harvard Research Project on Knowledge Production and Laboratory Management in Sciences, PI – Prof. Karim R. Lakhani, Harvard Business School (2018).
- *International Scientific Committee*, International Conference on "Interfacial Phenomena and Heat Transfer", Xi'an, China (July 7-10, 2017).
- *Invited Expert Contributor*, Stanford Patent Peer Review Project , PI – Prof. Lisa Larrimore Ouellette, Stanford Law School (2016).
- *External Advisor*, Faculty Promotion to Full Professor Rank, University of Technology Sydney, Australia (2016).
- *External Examiner of PhD Dissertations*, Indian Institute of Technology IIT Bombay, India (January 2016), University of Technology Sydney, Australia (August 2016).
- *General Co-Chair*, 5th International Forum on Environment and Energy Science, San Diego, California, USA (December 15-19, 2016).
- *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).
- *Visiting Professor*, Tokyo Institute of Technology (June 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 (2013-2017).
- *General Co-Chair*, 2nd International Forum on Environment and Energy Science, Huntington Beach, 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 (2007-2017).
- *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).
- *Reviewer of technical papers*, Nature Nanotechnology (since 2015), IEEE Electron Device Letters (since 2015), Applied Physics Letters (since 2012), 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*, DOE BES Young Investigator Program (2020), Czech Science Foundation (2019), DOE Energy Frontiers Research Centers (EFRC) Program (2018), National Aeronautics and Space Administration (since 2017), 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 (since 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. *AMUSE (Array of Micromachined UltraSonic ElectroSpray) for Bioanalytical Mass Spectrometry.* **Agency:** National Institute of Health (NIH); **Period:** September 1, 2006 – June 31, 2010.
19. *SBIR: Electrosonic Ejection Microarray for Development of Cancer Therapies.* **Agency:** National Institute of Health (NIH); **Period:** January 1, 2009 – January 1, 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. *Thermal Management of Next Generation Integrated Circuits*. **Agency:** MARCO/DARPA through Interconnect Focus Center; **Period:** September 1, 2009 – October 31, 2012.
25. *MTIF/GTRI Collaboration: Modeling and Simulation of Bio/chemical Sensors*. **Agency:** Defense Threat Reduction Agency (DTRA)/Air Force via sub-contract from GTRI; **Period:** December 1, 2009 – November 31, 2011.
26. *Drop-on-Demand Deposition of Complex Fluids for 3-D Manufacturing*. **Agency:** National Science Foundation (NSF); **Period:** August 1, 2009 – June 1, 2013.
27. *Liquid Fuel Reformation in Direct Droplet Impingement Reactor*. **Agency:** National Science Foundation (NSF); **Period:** August 1, 2009 – August 1, 2013.
28. *GRA.VL13.B34-InvisiCool*. **Agency:** Georgia Research Alliance; **Period:** January 1, 2013 – August 31, 2013.
29. *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.
30. *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.
31. *Mass Spectrometry Probe (MSP) for In-Situ, Untargeted Transient Biochemical Imaging of Submerged Biological Interfaces*. **Agency:** National Institute of Health (NIH); **Period:** September 1, 2011 – August 31, 2015.
32. *GRA.Phase1B-InvisiCool*. **Agency:** Georgia Research Alliance; **Period:** March 14, 2014 – March 31, 2015.
33. *Three-Dimensional Stackable Evaporative Cooling of Microelectronics*. **Agency:** Defense Advanced Research Project Agency (DARPA); **Period:** January 1, 2013 – July 31, 2016.
34. *SUPERCool 3D ICs – Superior Performance Electronics using Recirculating Coolant for 3D ICs*. **Agency:** Defense Advanced Research Project Agency (DARPA); **Period:** August 1, 2013 – July 31, 2016.
35. *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.
36. *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 – April 30, 2017.
37. *InvisiCool Gel: Passive “Invisible” Pain Reduction of Thermal/Laser-Based Medical Procedures Using Phase Change Materials*. **Agency:** Coulter Foundation; **Period:** July 1, 2015 – May 30, 2017.
38. *Using Multiphase Energetic Precursor Jets to Enable New Modes of Focused Electron Beam Induced Processing*. **Agency:** Department of Energy (DOE BES); **Period:** August 15, 2016 – August 14, 2019.
39. *DRILL: Droplet Transmission and Ion Desolvation Interface for Mass Spectrometry (R01)*. **Agency:** National Institute of Health (NIH); **Period:** September 15, 2014 – September 14, 2020.

40. *Sodium Ion Expansion Power Block for Distributed CSP.* **Agency:** US Department of Energy EERE; **Period:** September 15, 2015 – January 14, 2020.
 41. *Electrified Liquid Jets from Nanostructured Surfaces for Phase Change Heat Transfer Enhancement.* **Agency:** National Aeronautics & Space Administration (NASA); **Period:** August 1, 2016 – July 31, 2020.
 42. *Dynamic Mass Spectrometry Probe for Therapeutic Cell Bioreactor Quality Control Indicator Discovery.* **Agency:** Marcus Foundation; **Period:** January 15, 2017 – January 14, 2021.
 43. *Dynamic Sampling Platform (DSP) for Process Monitoring in Cell Manufacturing* **Agency:** Biolocity (Translation Grant); **Period:** July 1, 2020 – March 30, 2022.
 44. *Deep Learning and Natural Language Processing for Accelerated Inverse Design of Optical Metamaterials.* **Agency:** Advanced Research Project Agency - Energy (ARPA-e); **Period:** January 1, 2020 – June 24, 2022.
 45. *Dynamic Sampling Platform (DSP) – Phase I.* **Agency:** Georgia Research Alliance (GRA); **Period:** July 1, 2020 – June 30, 2022.
 46. *Precise Area INtroduction and Targeted Delivery (PAINT Delivery): A Novel Tool to Facilitate Targeted Intracellular Delivery of Therapeutic Agents.* **Agency:** Georgia Tech Regenerative Engineering and Medicine (REM) Seed Grant; **Period:** September 1, 2021 – August 31, 2022.
 47. *Using Multi-Phase Energetic Precursor Jets to Enable New Modes of Focused Electron Beam Induced Processing (FEBIP).* **Agency:** Department of Energy Basic Energy Sciences (DOE BES); **Period:** September 1, 2019 – August 31, 2022.
 48. *Dynamic Sampling Platform (DSP) – Phase I.* **Agency:** Georgia Research Alliance (GRA); **Period:** July 1, 2020 – June 30, 2022.
 49. *Precise Area INtroduction and Targeted Delivery (PAINT Delivery): A Novel Tool to Facilitate Targeted Intracellular Delivery of Therapeutic Agents.* **Agency:** Georgia Tech Regenerative Engineering and Medicine (REM) Seed Grant; **Period:** September 1, 2021 – August 31, 2022.
 50. *Using Multi-Phase Energetic Precursor Jets to Enable New Modes of Focused Electron Beam Induced Processing (FEBIP).* **Agency:** Department of Energy Basic Energy Sciences (DOE BES); **Period:** September 1, 2019 – August 31, 2022.
- **Current Projects**
 1. *BeamMap: Ultra-High Resolution Topological and Chemical Imaging with Synergistic Liquid and Electron Beams (R01).* **Agency:** National Institute of Health (NIH); **Period:** September 15, 2020 – September 14, 2023.
 2. *NSF Engineering Research Center for Cell Manufacturing Technologies (CMaT).* **Agency:** National Science Foundation; **Period:** September 1, 2017 – August 31, 2027.
 3. *Andson Biotech - Dynamic Sampling Platform (DSP) – Phase II.* **Agency:** Georgia Research Alliance (GRA); **Period:** July 1, 2022 – June 30, 2023.
 4. *Equipment Supplemental to BeamMap: Ultra-High Resolution Topological and Chemical Imaging with Synergistic Liquid and Electron Beams (R01).* **Agency:** National Institute of Health (NIH); **Period:** August 12, 2022 – September 14, 2023.

5. *Focused Electron Beam Induced Deposition (FEBID) in Far-from Equilibrium Dispersed Liquid Precursors*. **Agency:** Department of Energy Basic Energy Sciences (DOE BES); **Period:** September 1, 2022 – August 31, 2025.

VI. HONORS AND AWARDS

- Regents' Entrepreneur, Board of Regents of the University System of Georgia (2022).
- BioProcess International 2021 Readers' Choice Awards in Analytical category, Publication "Improving Cell Manufacturing Outcomes Using In-Line Biomarker Monitoring" (2021).
- World Top 2% Scientist, Stanford World Ranking of Scientists in All Fields (2019, 2020, 2021).
- ITerm'18 Best Paper Award in Thermal Management, IEEE Intersociety Conference on Thermal and Thermomechanical Phenomena in Electronic Systems (2018).
- Raymond Viskanta Fellowship and Lectureship, Purdue University (2017).
- [15 Solar and Renewable Energy Instructors to Know](http://www.hvacclasses.org/), HVAC (<http://www.hvacclasses.org/>) (2016).
- Top University Invited Visiting Researcher, 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).
- ITerm'08 Outstanding Paper Award in Thermal Management, IEEE Intersociety Conference on Thermal and Thermomechanical Phenomena in Electronic Systems (2008).
- Class of 1934 Outstanding Interdisciplinary Activity Award, Georgia Institute of Technology (2008).
- 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).