DIANA-ANDRA BORCA-TASCIUC
BIOGRAPHICAL SKETCH
(Updated February 2013)

I. Educational Preparation

Ph.D. 06/2005	University of California at Los Angeles, Mechanical Engineering
M.S. 06/2001	University of California at Los Angeles, Mechanical Engineering
B.S. 06/1996	University of Bucharest, Faculty of Physics, Romania

II. Professional Experience

07/11-present *Associate Professor*, Department of Mechanical, Aerospace and Nuclear Engineering, Rensselaer Polytechnic Institute, Troy, NY

01/06-06/11 *Assistant Professor*, Department of Mechanical, Aerospace and Nuclear Engineering, Rensselaer Polytechnic Institute, Troy, NY.

08/05-12/05 *Adjunct Professor*, Department of Mechanical, Aerospace and Nuclear Engineering, Rensselaer Polytechnic Institute, Troy, NY.

1/03-06/05 *Visiting Scholar*, Department of Mechanical, Aerospace and Nuclear Engineering, Rensselaer Polytechnic Institute, Troy, NY.

6/01-12/02 *Visiting Graduate Student Researcher*, Department of Mechanical Engineering, Massachusetts Institute of Technology, Cambridge, MA.

1/99 – 6/05 *Graduate Student Researcher*, Department of Mechanical & Aerospace Engineering, University of California, Los Angeles, CA.

III. Teaching

A. Courses

Semester	Number	Course name	# Students	Rating (5.0)	
				Instructor	Course
Fall 12	MANE-6640	Radiation Heat Transfer	13	3.67	3.67
Spring 12	MANE 4010-01	Thermal and Fluids Engineering II	43	4.71	4.17
Spring 12	MANE 4010-02	Thermal and Fluids Engineering II	42	4.7	4.41
Fall 11	MANE 4010	Thermal and Fluids Engineering II	46	4.47	4.38
Spring 11	MANE 6961	Microsystems: Physics, Design and Applications	13	4.3	4.0
Fall 10	MANE 4010	Thermal and Fluids Engineering II	44	4.4	3.9
Spring 10	MANE 4020	Thermal and Fluids Laboratory	23	4.4	3.4
Fall 09	MANE 4010	Thermal and Fluids Engineering II	59	4.0	3.9
Spring 09	ENGR 1100	Introduction to Engineering Analysis	77	3.7	3.4
Fall 08	MANE 4010	Thermal and Fluids Engineering II	57	4.3	4.2

Spring 08	MANE 4020	Thermal and Fluids Laboratory	12	3.0	3.0
Fall 07	MANE 4963/6962	Introduction to MEMS/MEMS Physics and Design	17	3.3	3.5
Spring 07	MANE 4010	Thermal and Fluids Engineering II	79	4.4	3.9
Fall 06	ENGR 1100	Introduction to Engineering Analysis	72	3.1	3.5
Spring 06	MANE 4020	Thermal and Fluids Laboratory	12	NA	NA
Fall 05	MANE 4020	Thermal and Fluids Laboratory	12	4.1	2.3

B. **Independent Studies and Undergraduate Research Experience**

Spring 2013
MANE 4940 13 Victor Bajenaru (junior) "Electrodeposition of Bi2Te3" -4 credits
MANE 4940 13 Melissa Mohner (junior) "Electrodeposition of Bi2Te3" -4 credits
MANE 6940 03 Adam Wilson (graduate student) "Measurement of thermoelectric" -3 credits

Fall 2012
MANE 4949 21 Yazmin Feliz (senior) "Bismuth Telluride" -3 credits
MANE 4940 17 Melissa Mohner (junior) "Properties of Nanofluids" -1 credit
Paid URP - Victor Bajenaru (junior) "Thermal conductivity measurement of nanofluids"

Summer
Paid URP - Victor Bajenaru (junior) "Thermal conductivity measurement of nanofluids"
Paid URP - Melissa Mohner (junior) "Characterization of two-phase and heat generation properties of nanofluids"

Spring 2012
MANE 4940 18 Yazmin Feliz (senior) "Bismuth Telluride" -1 credits
MANE 4940 21 Luis Salmeron (junior) "Electrodeposition of BiTe"-4 credits
MANE 6940 05 Veronica Noble (senior)"Inv. of magnetic nanoparticles" -3 credits

Fall 2011
ENGR 4940-04 Victor Bajenaru (sophomore), "Research in nanofluids"; 4 credits.
MANE 4940-11 Yazmin Feliz (junior) "Large pore size alumina"; 4 credits
MANE 4049-16 Adriana Rojas (senior) "Pulsed electrodeposition of bismuth telluride"; 4 credits
MANE 4049-21 Luis Salmeron (junior) "RF testing system"; 4 credits
MANE 4049-26 Luis Salmeron (junior) "Advanced thermal management: mLHP technology"; 2 credits
MANE 4049-29 Yazmin Feliz (junior) "Composite material properties"- 4 credits

Summer 2011
Luis Salmeron (junior) "Development of a temperature control unit for RF induction heating"; paid URP-supported by Summer Research Program for Underrepresented Minority and Women Undergraduates.

Spring 2011
MANE 4940-04 Yazmin Feliz (junior), "Fabrication of alumina templates"; 4 credits
ENGR 4940-01 Adriana Rojas (junior), "Electrodeposition of bismuth telluride"; 4 credits

ENGR 4940-02 Michelle Decepida (sophomore), “Investigation of nanocrystalline bismuth telluride”; 4 credits
MANE 4940-03 Christopher Crivello (junior), “Thermal conductivity measurement”; 4 credits
MANE 4940-05 Alexander Pollock (junior), “Conductivity measurement”; 4 credits

Fall 2010
MANE 4940-14 Andrea Agra (senior), “Thermal research methods I”; 3 credits
MANE 4940-12 Andrea Agra (senior), “Thermal research methods II”; 3 credits
ENGR 4940-06 Joo Hyuk Kang (junior), “Microfluidics”; 4 credits
MANE 4940-19 Paul G. Sori (junior),”Liquid dynamics”; 4 credits
Yazmin Feliz (junior), “Fabrication of anodic alumina templates”; paid URP

Summer 2010
Rafael Alvarez (senior), “Development of the experimental setup for liquid squeeze film damping measurement in microsystems”; paid URP
Andrea Agra (senior), “Thermal conductivity measurement of nanofluids”; URP
Joo Hyuk Kang (junior), “Dielectrophoretic actuation of liquids in microchannels”; URP

Spring 2010
John Cannarella (senior), “Development of measurement setup for thermal conductivity characterization of nanofluids”; paid URP
Chris Quinto (senior), “Nanoparticle heating for cancer treatment”; paid URP

Fall 2009
Chris Quinto (senior), ”Nanoparticle heating for cancer treatment”; paid URP
John Cannarella (senior), “Investigation of electromechanical coupling factor in MEMS vibration based energy harvesting”; paid URP

Spring 2009
MANE 4940-03 James Cardillo (senior), “Nano-particle heat transfer”; 4 credits
Elizabeth Martin (junior), “Characterization of fluorescent properties of carbon nanotubes”; paid URP
John Cannarella (sophomore), “Magnetic property characterization of ferrofluids); URP

Fall 2008
MANE 4940-12 James Cardillo (senior), “Nano-heat transfer research”; 3 credits
MANE 4940-01 Nicholas Hogberg (senior), “Experimental setup for magnetic measurements”; 3 credits
MANE 6940-11 Mohamed Elbibary (graduate student), “Process flow for power MEMS”; 3 credits

Spring 2008
WRIT 2940-02 Megan Sirag (freshmen),“Temperature assisted nanowire fabrication”; 4 credits
MANE 6940-17 Heather Denver (graduate student), “Fluorescence thermometry via quantum dots”; 3 credits
MANE 6940-02 Mohamed Elbibary (graduate student),“Capillary switchable media”; 3 credits
ECSE 6940-22 Asantha Kempitiya (graduate student), “Modeling of continuous vibration driven MEMS”; 3 credits
Sadia Choudhury (junior),“Experimental set-up for cross-plane thermal conductivity measurement ”; work study
Timothy Heimat (sophomore), “Mechanical testing of PDMS Composite”; paid URP
Elizabeth Martin (sophomore), “PDMS Composite Fabrication,” paid URP

Fall 2007
MANE 6940-09 Prashant Garg (graduate student), "Temperature measurement in RF Testing," 3 credits
Timothy Heimat (sophomore), "Mechanical testing of PDMS Composite"; paid URP
Elizabeth Martin (sophomore), "PDMS Composite Fabrication"; paid URP

Spring 2007
MANE 4940-06 Daniel Farrow (senior), "Power harvesting nanofluids"; 3 credits
MANE 4940-11 Timothy Heimat (freshmen), "Ni nanowire electrodeposition"; 2 credits
Elizabeth Martin (sophomore), " PDMS Composite Fabrication"; paid URP

Fall 2006
MANE 4940-07 Daniel Farrow (senior), "Power harvesting nanofluids"; 3 credits
MANE 6940-16 Heather Denver (graduate student), "PDMS composite: fabrication and characterization"; 3 credits

Spring 2006
MANE 6940-31 Jeongmin Hong (graduate student), "Cu nanowire fabrication"; 3 credits

C. **Visiting students project supervision**

Summer 2011 Nichole Baldwin (visiting from College of St. Rose) "Influence of coating on magnetization of iron oxide nanoparticles" co-advised with Dr. Rahmi Ozisik from Materials Science Department; paid URP, supported by Nanocenter

Summer 2010 Jasmine Hargrove (visiting from Spelman College a Historically Black College), "Development of measurement technique for AC susceptibility of nanofluids"; paid URP, supported by Nanocenter

Fall 2006&Spring 2007
Mona Sayed Salem and Marwa Sayed Salem (visiting graduate students from Egypt), "Electrostatic MEMS Converter Fabrication and Characterization"; co-advised with Professor Mona Hella from Electrical and Computer Science Engineering Department at RPI

Summer 2006
Siaritzia Millian-Caban (visiting undergraduate student from Mayaguez University), "Electroosmotic pumping through alumina templates"; co-advised with Prof. Julie Stenken from Department of Chemistry and Chemical Biology at RPI

D. **Student Thesis Supervision**

1. **Thesis in progress**

a) Master

1. Weijie Zhang "Boiling heat transfer on nanostructured surfaces"
   Expected graduation date: August 2013

b) Doctoral

1. Samuel Moran, “Modified Harman technique for thermoelectric properties characterization of thin films on substrates,”

2. Yuan Yuan, “The effect of functionalization on specific absorption rate of magnetic nanoparticles for cancer hyperthermia applications”
   Candidacy exam passed: 20 December 2010
   Expected graduation date: May 2013

3. Shu-Yi Wang, “Coupling plasmonic solar cells with fluorescent solar concentrators”
   Candidacy exam passed: 21 December 2010
   Expected graduation date: August 2013 (co-advised with Dr. Deborah Kaminski, MANE Department)

4. Mohamed Elbibary; “Solar concentrators for efficient solar power”
   Expected graduation date: May 2013 (co-advised with Dr. Deborah Kaminski, MANE Department)

5. Shujuan Huangs; “Liquid squeeze film damping in microsystems ”
   Expected graduation date: August 2013 (co-advised with Dr. John Tichy, MANE Department)

6. John Oxaal, “Microscale kinetic to electric energy converters: fabrication and characterization”
   Expected graduation date: December 2013

2. **Thesis Completed**

a) Masters

1. Shujuan Huang (now PhD student), ”On the experimental method for specific absorption rate measurement of RF heated magnetic nanoparticles,” May 2010

2. Michael J. Fornasiero (went to General Electric, Niskayuna NY, USA), “The effect of nanoparticle coating and chaining on thermal conductivity of nanofluids,” May 2010

3. Morgan P. Baker (went to Dropper Laboratory, Saint Petersburg, FL, USA), “Liquid dynamics in dielectrophoretic actuation,” May 2010

4. Asantha Kempitiya (co-advised with Mona Hella from EECS Department; now a PhD student), “Kinetic to electric energy converters via microscale variable capacitors,” May 2009

5. Mohamed Elbibary (now a PhD student), “Experimental investigation of dielectrophoretic effect,” May 2009

6. Heather Denver (won NSF fellowship and went to University of Pennsylvania for PhD), “Synthesis and Mechanical Characterization of Magnetic Elastomers,” May 2008

7. Amit Gupta (graduated with ME; see doctoral below); ME project title: “Localized, low-voltage DC electroosmotic pumping across nanoporous membranes,” May 2007

b) Doctoral

1. Amit Gupta (joined Jindal Steel and Power India as an Technical Assistant to the Manager), "Nanoscale and Bulk Temperature Measurement in the Vicinity of RF Heated Nanoparticles," December 2009
   Committee members: Ravindra Kane, Joel Plawsky and Mona Hella

2. Asantha Kempitiya (co-advised with Mona Hella; joined International Rectifier) "Low Power Harvesting Interface IC's for Electrostatic Energy Harvesting Applications" : December 2011 (May 2012 graduation)
   Committee members: Mona Hella (co-adviser), Gary J. Saulnier, Leila Parsa

E. Thesis Committee Member

1. PhD Defense committee member:

1. Eduardo Castillo "Contacts and Thermoelectric Transport Characterization by Harman Method" August, 2012

2. Rohan Dayal "Vibration based Electromagnetic Energy Harvesting-Microgenerator, Power Consumption and Control", April 2012

3. Daren Elcock "Flow Mechanism around Micropillar with Gas Jet" December 2011

4. Han Peng "High Frequency, High Efficiency Fully Integrated DC-DC Converters," Aug. 09 2011

5. Lin Hu, "Nanoscale Interfacial Materials for Thermal Transport Applications," April 2011

6. Mohammad Ali Rafiee, "Graphene-based Composite Materials," April 2011

7. Sebastian Roar Prada, "Modeling Design and Characterization of an Ultrasonic Through-Wall Communication System," May 2010

8. Burak Catli, "Multi-Band / Wide-Band Frequency Generators for Spectrum-Agile Radio and Future Millimeter-Wave Applications," December 2009.

9. Monaliza Mazumder, "Thermal Transport from Nanoscale Heat-Sources and in Nano-structured Materials," December 2009.

10. Hyun Woo Shim, " Design and Fabrication of Silicon Carbide Nanowires," June 2008

11. Seoungyul Kim, "Fundamental Study of Field-Induced Gas and Water Dissociation Near Nanostructured Electrodes," August 2008.

12. Sunil K. Pal, "Growth of carbon nanotubes on metallic substrates and study of their interfacial transport properties," October 2007

13. Wootaek Hwang, "Micro-Scale Electrochemically Actuated Capillary Lens," October 2006

2. PhD candidacy committee member:

2006: Wootaek Hwang

2007: Hyun Woo Shim, Sunil K. Pal
2008: Monalisa Mazumder, Burak Catli, Seoungyul Kim,
2009: Lin Hu
2010: Eduardo Castillo, Keyan Rafiee, Han Peng, Rohan Dayal
2011: Daren Elcock, Kiran Sasikumar
2012: Christopher Rivet

F. Course and Curriculum Development

1. MANE-6640 **"**Radiation Heat Transfer" (Fall 2012)
   Course description: This course investigates the principles of thermal radiation and their application to engineering heat and photon transfer problems. The course starts with a review of basic radiation concepts covered in undergraduate heat transfer curricula and then introduces several advanced topics inlcuding quantum and classical models of radiative properties of materials, electromagnetic wave theory for thermal radiation, radiative transfer in participating and particulate media, nanoparticle heating in alternating electromagnetic field. These topics are discussed in the context of relevant applications of radiative transfer such as laser-material interactions, imaging, infrared instrumentation, global warming, semiconductor manufacturing, combustion, furnaces, high temperature processing, cancer hyperthermia."

2. MANE 4963/6962, "Introduction to MEMS/MEMS Physics and Design"(Fall 2007)
   Course description: This course covers the fundamental basis of MEMS with emphasis on electro-mechanical transducers. The students learn about microfabrication techniques and microscale physics phenomena important to device fabrication such as capillarity and adhesion. One of the common tools for modeling electro-mechanical transducers, lumped element circuit is introduced. Mechanical properties and mechanical behavior of typical MEMS structures is discussed. A number of sensing and actuation mechanisms are presented and several case studies are carried out including electrostatic and magnetic actuators, accelerometer, digital micromirror device, grating light valve, RF MEMS, piezoresistive and piezoelectric sensors.

3. Implemented an experimental module (the heat exchanger) for Thermal and Fluids Engineering Laboratory in Spring 2008 to replace the out of commission gas turbine module. Since then this module is continued to be offered. The module was originally designed for use in a former lab class (Energy Systems).

4. The incorporation of nanoscale science and engineering into the undergraduate curriculum is becoming timely as nanotechnology applications are now reaching a wide range of industries. Thermal and fluids engineering topics play a major part in the preparation of mechanical and chemical engineers, and nanotechnology training in TF areas is critical. In this context, Dr. D.-A. Borca-Tasciuc is leading an effort to develop four new experimental laboratory modules to be included in two existing engineering courses: "Thermal and Fluids Engineering Laboratory" taught in the Mechanical, Aerospace and Nuclear Engineering Department and "Chemical Engineering Laboratory" taught in the Chemical and Biological Engineering Department. The experimental modules are focused on visual demonstrations and hands-on activities for studying heat transfer, fluid flow, and capillary properties of nanofluids. The project is supported by an NSF-NUE grant and the 4 modules were implemented as part of the Thermal and Fluids Engineering laboratory in Fall 2012.

IV. Publications

A. **Books, Monographs, Recordings, Large Scale Musical or Video Works, Commissions**

1. Chen, G., **Borca-Tasciuc, D.-A**., and Yang, R., "Nanoscale Heat Transfer" in Encyclopedia of Nanoscience and Nanotechnology, H.S. Nalwa, Ed., American Scientific Publishers, Vol. 7 pp. 429-459 (2004).

B. **Journal Articles**

1. In Refereed Journals
Students from D. Borca-Tasciuc's group are denoted with * (graduate) and † (undergraduate).

1. Rivet, C. J., *Yuan, Y., **Borca-Tasciuc, D.-A**., and Gilbert, R, J., "Alternating magnetic field stimulation of iron oxide nanoparticles generates substantial heat without influencing cortical neuron viability," under review
2. Manzano, C. V., †Rojas, A. A., †Decepida, M., Mayor, B., A., †Feliz, Y., Caballero-Calero, O., **Borca-Tasciuc, D.-A.,** and Martin-Gonzalez, M., "Thermoelectric properties of Bi2Te3 films by constant and pulsed electrodeposition," under review
3. Hsu, L., Fang, J., **Borca-Tasciuc, D.-A.,** Worobo, R., and Moraru, C. I., "The Effect of Micro- and Nanoscale Topography on the Adhesion of Bacterial Cells to Solid Surfaces, " in press, Applied and Environmental Microbiology; Featured in journal's "Spotlight" highlighting research articles of significant interest.
4. Choi, J., Sung, B., Kim, C., and **Borca-Tasciuc, D.-A.**, "Interface Engineering to Enhance Thermal Contact Conductance of Evaporators in Miniature Loop Heat Pipe Systems" under review;;
5. *Kempitiya, A., **Borca-Tasciuc,** D.-A., Hella M., "Low Power Interface IC for MicroWatt Electrostatic Energy Harvesters," IEEE Transactions on Industrial Electronics, Vol. 28, p.609, 2013.
6. *Wang, S., *Huang, S. and **Borca-Tasciuc, D.-A.,** "Potential Sources of Errors in Measuring and Evaluating the Specific Loss Power of Magnetic Nanoparticles in an Alternating Magnetic Field," IEEE Transaction on Magnetics, Vol.49, p. 255 (2013);
7. *Hughes, M. D., Maher, C., **Borca-Tasciuc**, **D.-A.,** Polanco, D., and Kaminski, D. "Performance comparison of wedge-shaped and planar luminescent solar concentrators," Renewable Energy, Vol.52, p.266 (2013);
8. *Kempitya, A., **Borca-Tasciuc, D.-A.,** and Hella, M. "Low Power Interface IC for Tri-plate Electrostatic Energy Converters," IEEE Transactions on Power Electronics, Vol. 28, p. 609 (2013);
9. *Yuan, Y. and **Borca-Tasciuc, D.-A**. "Anomalously high specific absorption rate in bioaffine ligand coated iron oxide nanoparticle suspensions, "IEEE Transactions on Magnetics, Vol. 49, p. 263 (2013);
10. *Yuan, Y., Rende, D., Altan, C. L., Bucak, S., Ozisik, R., and **Borca-Tasciuc, D.-A.,** "The effect of surface modification on magnetization of iron oxide nanoparticle colloids," Langmuir, Vol. 11, p. 13051-9 (2012);
11. Sano, W. Szabo, Z., **Borca-Tasciuc-D.A.**, Borca-Tasciuc, T. "Introducing Nanotechnology into the Thermal and Fluids Curricula: Pool Boiling Heat Transfer in Nanofluids," accepted, International Journal of Mechanical Engineering Education;
12. *Wang, S., **Borca-Tasciuc, D.-A.,** and Kaminski, D., "The Effect of Particle Vertical Positioning on the Absorption Enhancement in Plasmonic Organic Solar Cells," Journal of Applied Physics, Vol. 111, p. 124301 (2012); Selected for July, 2 2012 issue of Virtual Journal of Nanoscale Science & Technology;

13. Choi, J. H., Sung, B. H., Yoo, J. H., Kim, C. J., and **Borca-Tasciuc, D.-A.,** "Enhanced Miniature Loop Heat Pipe Cooling System for High Power Density Electronics," Journal of Thermal Science and Engineering Applications, Vol. 4, p. 021008 (2012); Top 10 Most Downloaded Articles for June 2012, October 2012;
14. Rivet, C., [*]Yuan, Y., **Borca-Tasciuc, D. A.** and Gilbert, R. "Altering Iron Oxide Nanoparticle Surface Properties Induce Cortical Neuron Cytotoxicity," ACS, Chemical Research in Toxicology, Vol. *25*, p. 153 (2012);
15. [*]Huang, S., [*]Wang, S., Gupta, A., **Borca-Tasciuc, D.-A.** and Salon, S. "On the measurement technique for specific absorption rate of nanoparticles in an alternating electromagnetic field", Measurement Science and Technology, Vol. 23, p. 035701 (2012);
16. [*]Kempitiya, A., **Borca-Tasciuc, D.-A.** and Hella, M.M., "Analysis and Optimization of Asynchronously Controlled Electrostatic Energy Harvesters," IEEE Transactions on Industrial Electronics, Vol. 59, p. 456 (2012).[*]Wang, S., **Borca-Tasciuc, D.-A**., and Kaminski, D., "Spectral Coupling of Fluorescent Solar Concentrators to Plasmonic Solar Cells," Journal of Applied Physics, Vol. 109, p. 074910 (2011).
17. [*]Wang, S., **Borca-Tasciuc, D.-A**., and Kaminski, D., "Spectral Coupling of Fluorescent Solar Concentrators to Plasmonic Solar Cells," Journal of Applied Physics, Vol. 109, p. 074910 (2011).
18. Cannarella, J., Selvaggi, J. , Salon, S., Tichy, J. and **Borca-Tasciuc, D. A**., "On the Coupling Factor between the Magnetic and Mechanical Domains in Electromagnetic Power Harvesting applications," IEEE Transactions on Magnetics, Vol. 47 (8), p. 2076 (2011).
19. [*]Yuan, Y. and **Borca-Tasciuc, D.-A**., "Comparison between experimental and predicted specific absorption rate of functionalized iron oxide nanoparticles suspensions," Journal of Magnetism and Magnetic Materials, Vol. 323 (20), p. 2463 (2011),
20. [*]Huang, S., **Borca-Tasciuc, D.-A**., and Tichy, J., "A simple expression for fluid inertia force acting on micro-plates undergoing squeeze film damping," Proceedings of Royal Academy A (published online before print on September 29, 2010), Vol. 467, p. 522 (2011).
21. [*]Gupta, A., Kane, R., and **Borca-Tasciuc, D.-A**., "Local Temperature Measurement in the Vicinity of Remotely Heated Nanoparticles," Journal of Applied Physics, Vol. 108, p 064901 (2010); Selected for AIP press release: http://www.physorg.com/news/2010-11-temperature-nanoparticles.html
22. Marrero, V., **Borca-Tasciuc, D.-A**., and Tichy, J., "Limits to lubrication theory in microsystems," ASME Journal of Tribology, Vol. 132, p. 031701 (2010). Top 10 Most Downloaded Articles for June, July, August and September 2010.
23. [*]Denver, H., [†]Martin, E. , [†]Heiman, T., [*]Gupta, A., and **Borca-Tasciuc, D.-A.**, "Fabrication of Polydimethylsiloxane Composites with Nickel Nanowires and Nanoparticles Fillers and Study of Their Mechanical and Magnetic Properties," Journal of Applied Physics, Vol. 106, p. 064909 (2009); Selected for October 5, 2009 issue of Virtual Journal of Nanoscale Science & Technology.
24. [*]Kempitiya, A., **Borca-Tasciuc, D.-A.**, Mohamed, H. S., and Hella, M. M., "Localized microwave heating in microwells for parallel DNA amplification applications," Applied Physics Letters, Vol. 94, p. 064106 (2009); Selected for February 15, 2009 issue of Virtual Journal of Biological Physics Research.
25. Pal, S. K., Son, Y., Borca-Tasciuc, T., **Borca-Tasciuc, D.-A**., Kar, S., Vajtai, R., Ajayan, P. M., "Thermal and electrical transport along MWCNT arrays grown on Inconel substrates," Journal of Materials Research, Vol. 23, p.2099 (2008).
26. [*]Gupta, A, [*]Denver, H., Hirsa, A., Stenken, J., and **Borca-Tasciuc, D.-A.**, "Localized, low-voltage electroosmotic pumping across nanoporous membranes," Applied Physics Letters, Vol. 91, p. 094101 (2007).
27. Borca-Tasciuc, T., **Borca-Tasciuc, D.-A**., and Chen G., "Photo-thermoelectric technique for anisotropic thermal diffusivity measurements," IEEE Transactions on Components and Packaging Technologies, Vol. 30, p.609 (2007).

28. Borca-Tasciuc, T., **Borca-Tasciuc, D.-A.**, Graham, S., Goods, S., Kelley, J., and Young, N., "Dependence of Mechanical and Transport Properties of Ni Alloys on Electrodeposition Conditions and Temperature Annealing," Journal of Microelectromechanical Systems, Vol. 15, p. 1051 (2006).
29. Borca-Tasciuc, T., Vafaei, S., **Borca-Tasciuc, D.-A**., Wei, B. Q., Vajtai, R., and Ajayan, P. M., "Anisotropic thermal diffusivity of aligned multiwall carbon nanotube arrays," Journal of Applied Physics, Vol. 98, p. 054309 (2005).
30. **Borca-Tasciuc, D.-A**. and Chen, G., "Anisotropic Thermal Properties of Nanochanneled Alumina Templates," Journal of Applied Physics, Vol. 97, p. 084303 (2005).
31. **Borca-Tasciuc, D.-A**., Chen, G., Prieto, A., Martin-Gonzalez, M. S., Stacy, A., Sands, T., Ryan, M. A., Fleurial, J. P., " Thermal Properties of Electrodeposited Bismuth Telluride Nanowires Embedded in Amorphous Alumina," Applied Physics Letters, Vol. 85, p. 6001 (2004).
32. Wolter, S., **Borca-Tasciuc, D.-A**., Chen, G., Prater, J. T., Sitar, Z., "Processing and Thermal Properties of Highly Oriented Diamond Thin Films," Thin Solid Films, Vol. 469-470, pp. 105 (2004); Invited talk at International Conference on Metallurgical Coatings and Thin Films (ICMCTF) in San Diego, CA, April 19–23.
33. Wolter, S. D., **Borca-Tasciuc, D.-A**., Chen, G., Govindaraju, N., Collazo, R., Okuzumi, F., Prater, J. T., Sitar, Z., "Thermal Conductivity of Epitaxially Textured Diamond Films," Diamond and Related Materials, Vol. 12, p. 61 (2003).
34. Borca-Tasciuc, T., **Achimov, D.-A**., Liu, W. L., Chen, G., Lin, C.-H., Delaney, A., and Pei, S. S., "Thermal Conductivity of InAs/AlSb Superlattices," Microscale Thermophysical Engineering, Vol. 5 p. 225 (2001)
35. Chen, G., Borca-Tasciuc, T., Yang, B., Song, D., Liu, W. L., Zeng, T., and **Achimov, D.-A.**, "Heat Conduction Mechanisms and Phonon Engineering in Superlattice Structures," Thermal Science and Engineering (published in Japan), Vol. 7, p. 43 (1999).

(NOTE: Achimov is maiden name)

C. **Conference papers (referred)**

1. Kempitiya, A., **Borca-Tasciuc, D.-A.,** and Hella, M. "Low Power Energy Harvesting System IC for Tri-plate Electrostatic Converters," accepted, Power MEMS 2011, 15 -18 Nov 2011 - Seoul, Republic of Korea.
2. Oxaal, J., Kempitiya, A., Hella, M., and **Borca-Tasciuc, D.-A.,** "A Tri-Plate Variable Capacitor for Electrostatic Energy Harvesting," accepted, IMECE2011-64436, Proceedings of the ASME International Mechanical Engineering Congress & Exposition (IMECE2011), November 11-17, 2011, Denver, Colorado, USA.
3. Yuan, Y. Rivet, C., Gilbert, R., and **Borca-Tasciuc, D.-A.,** "Cytotoxic effects of Iron Oxide Nanoparticles on Primary Neuron and Astrocyte Cultures," accepted, 2011 Biomedical Engineering Society Annual Meeting, October 12-15, 2011; to be held in Hartford, Connecticut, USA.
4. Yuan, Y. and **Borca-Tasciuc, D.-A.** "The Influence of Coating and Agglomeration on Specific Absorption Rate of Iron Oxide Nanoparticles," Proceedings of ASME 2011 9th International Nanochannels, Microchannels, and Minichannels, ICNMM2011-58217, June 19-22, 2011, Edmonton, Canada.
5. Choi, J., Yoo, Y., Sung, B., Kim, H, and **Borca-Tasciuc, D.-A.,** "An Experimental Investigation of the Miniature Loop Heat Pipe Cooling Systems for High Power Density Computer Chips," Proceedings of ASME 2011 9th International Nanochannels, Microchannels, and Minichannels, ICNMM2011-58218, June 19-22, 2011, Edmonton, Canada.
6. Hella, M., Kempitiya, A., Mohamed, H., and **Borca-Tasciuc, D.-A.** ,"Ultra-High Frequency IC Design for Intelligent Genetic Analysis Systems," IEEE Radio Wireless Week, 16-19 January, 2011.

7. Kempitiya, A., **Borca-Tasciuc, D.-A.**, and Hella, M., "Low Power Electrostatic Energy Harvesting System IC," Proceedings of Power MEMS 2010 , Leuven Belgium, Nov. 30-Dec. 3, 2010, p.91.
8. Huang, S., **Borca-Tasciuc, D.-A.**, and Tichy, J., "Liquid Squeeze Film Damping in Microsystem Applications," Proceedings of ASME 2010 3rd Joint US-European Fluids Engineering Summer Meeting and 8th International Nanochannels, Microchannels, and Minichannels, FEDSM2010-ICNMM2010, August 2-4, 2010, Montreal, Canada.
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12. Fornasiero, M. and **Borca-Tasciuc, D.-A.**, "Thermal Conductivity of Nanofluids with Well Dispersed and Clustered Nanoparticles," Materials Research Society Fall Meeting, Nov. 30-Dec. 4, 2009, Boston MA; Material Research Society Symposium Proceedings, Vol. 1207 (2010) paper # 1207-N07-05.
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23. **Borca-Tasciuc, D,-A**., Pietruszka, L., and Borca-Tasciuc, T., "Thermal Transport Measurements in Multi-Wall Carbon Nanotube Strands Using the 3ω Method," Semiconductor Thermal Measurement, Modeling, and Management Symposium, San Jose, CA – March 15-17, 2005.
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27. **Borca-Tasciuc, D. A.,** Chen, G., Martin-Gonzales, M. S., Prieto A. M., Stacy, A., Borshchevsky, A., Fleurial, J.-P., and Ryan, M.-A., "Thermal Diffusivity Characterization of Bi_2Te_3 Nanowire Array Inside Amorphous Alumina Templates," Proceedings of International Mechanical Engineering Congress and Exhibitions, paper IMECE2002-32774, New Orleans, LA, November 17-22, 2002.
28. Yang, R., **Borca-Tasciuc, D.-A.,** and Chen, G., "Heat Conduction and Energy Conversion in Nanoscale," 20th Symposium on Energy Engineering Sciences, Argonne, IL, May 20-21, 2002.
29. **Borca-Tasciuc, D.-A**., Chen, G., Borchevsky, A., Fleurial, J.-P., Ryan, M., Lin, Y.-M., Rabin, O., and Dresselhaus, M. S., "Thermal Characterization of Nanowire Arrays in a-Al_2O_3," Materials Research Society Symposia Proceedings, Symposium V: Nanophase and Nanocomposite Materials, Vol. 703, page V2.7.1, Boston, MA, December 2-6, 2002.
30. Chen, G., Yang, B., Liu, W. L., Borca-Tasciuc, T., Song, D., **Achimov, D.-A**., M.S. Dresselhaus, M.S., Liu, J. L., and Wang, K. L., "Thermoelectric Property Characterization of Low-Dimensional Structures," Proceedings of 20th International Conference on Thermoelectrics, pp. 30-34, Bejing, China, June 8-11, 2001 (invited).
31. Kumar, R., **Achimov, D.-A**. Zeng, T., and Chen, G.,"Thermal Conductivity of Nanochanneled Alumina," Proceedings of International Mechanical Engineering Congress and Exposition, ASME HTD-Vol. 366-2, pp. 393-398, Orlando, FL, November 5-10, 2000.

V. Summary of Current Research Interest

Current research interests branches in two main directions:

1) Energy transport at micro- and nanoscale
2) Microsystems (with emphasis on applications in biomedical field and power harvesting)

1) Energy transport at micro- and nanoscale

Thermal transport in micro- and nano-systems is important to many of today's emerging technologies from nanoparticle-based hyperthermia for cancer therapy to thermal management of electronics. When size shrinks to dimensions below characteristic length scales of the thermal energy carriers, the classical theory based on diffusive transport, which is used to describe the transfer of heat in macroscale systems, is not valid anymore. For example, increased scattering of heat carriers from the boundaries of nanoscale systems results in an increase of the resistance to

heat flow. Therefore, thermal properties, such as thermal conductivity, become size dependent experiencing a significant decrease from their bulk values. On the other hand, nanomaterials where the scattering is precluded, such as carbon nanotubes, have been shown to have remarkable high thermal conductivity due to unobstructed flow of the heat carriers along the hollow mono-atomic cylinder structure.

Investigations of thermal transport in nanostructured materials and nanofluids. Understanding thermal transport in nanostructured material systems is critical to a wide range of industrial applications from thermal management of computers to thermoelectric energy conversion. In this context, we are carrying out experimental investigation of thermal properties of nanostructured materials such as carbon nanotubes, nanowires materials including bismuth telluride (for thermoelectric energy conversion) and thin films. *Our studies to date advanced the understanding of how various parameters such as grain size and orientation, nanoscale dimension (i.e. diameter for a nanowire, thickness for a superlattice), or interfaces (for example, those between adjacent carbon nanotubes or between carbon nanotubes and substrate) affect thermal transport in these material systems.*

We are also taking a leading role in implementing nanoscale heat transfer topics in undergraduate education. An experimental module that we just developed for the thermal and fluids engineering lab investigates the thermal conductivity of nanofluids (nanoparticle suspension in a carrier fluid) and magnetic nanofluids (suspensions of magnetic nanoparticles). From previous investigations, nanofluids have been shown to possess enhanced thermal properties such as thermal conductivity, thermal diffusivity, or convective heat transfer coefficients. They have numerous potential applications, especially for industrial cooling.

Heat generation and dissipation in RF heated magnetic nanoparticle assemblies. Nanoparticles have numerous uses in the medical field from drug delivery vectors to magnetic resonance imaging and hyperthermia for cancer treatment. Two examples where understanding heat transport in nanoparticle systems is critical are cancer hyperthermia and local control of biological processes via conjugated, remotely heated nanoparticles. In nanoparticle-based cancer hyperthermia, AC electromagnetic fields in the radiofrequency (RF) range is used to heat up superparamagnetic nanoparticles loaded to cancerous tissue. With this method heat can be delivered precisely to the targeted volume and there is no limitation of efficacy in deep tumor treating. It is also envisioned that combining hyperthermia with magnetic resonance imaging (MRI) could provide simultaneous imaging/treatment of a cancer tumor. However, there is a significant lack of understanding the fundamental heat generation and heat transport mechanisms associated with nanoparticles heated in AC magnetic field. For example, existing models may underestimate by orders of magnitude the heating rates observed experimentally in certain situations. *We are investigating heat generation and dissipation in RF heated nanoparticle assemblies in order to understand the main parameters that affect these processes, such as nanoparticle coating, concentration and cluster formation. In parallel, we are exploring the potential to actuate biological process at cellular level employing RF actuated magnetic particles. We showed that experimental heat generation or specific absorption rate (SAR) in magnetic nanofluids with agglomerates agrees with SAR predictions only when experimental AC susceptibility values are used for these predictions.* Hence *we demonstrated that dipolar interaction between nanoparticles in a cluster may affect the effective magnetic properties and the heat generation rate. To better understand the limitations of local heating, we devised a new technique to measure the temperature in the vicinity of RF heated nanoparticles. For the experimental conditions we investigated so far, the measured temperature rise in the vicinity of RF heated nanoparticles was similar to the average or "bulk" temperature, in agreement with theoretical predictions.*

Currently we continue to investigate magnetic properties and heat dissipation in other magnetic nanoparticle systems with different surface characteristics, while exploring their use for controlling biological processes such as nerve growth.

Plasmonic nanoparticle for efficient, low cost solar cell systems. We are also investigating novel methods for enhancing the efficiency of solar energy conversion systems with fluorescent solar concentrators and photovoltaic cells. Fluorescent solar concentrators (FSC) consist of a clear material sheet doped with fluorescent dyes that absorb sunlight and re-emit photons at higher, weakly reabsorbed wavelength; the photons are then guided by total internal reflection towards the edge of the (FSC) where an enhanced radiation flux is provided to small-area photovoltaics cells. Its main purpose is to decrease the cost associated with large-area photovoltaics and sun-tracking systems. *We are investigating a novel method to efficiently couple FSC to photovoltaic cells in collaboration with Professor Deborah Kaminski. This method employs nanoparticles that exhibit a plasmonic effect to match the peak in the absorption spectrum of the solar cell to that of dye fluorescent emission. The absorption enhancement is predicted by Mie theory, which takes into account the size effect on dielectric properties of the nanoparticles. For the specific system under consideration, namely FSC consisting of Lumogen red dye in polymethylmethacrylate matrix with a conservative gain (increase in radiation flux on the edge) of 1.5 and silver nanoparticles in organic solar cells (based on poly(3-hexylthiophene) (P3HT)- [6,6]-phenyl-C61-butyric acid methyl ester (PCBM) blend) we found that efficiency can increase by a factor of 3 when matching the absorption to fluorescent emission spectrum.* In the future we plan to carry out similar studies on silicon-based solar cells with surface plasmonic structures.

2) Microsystems

Microsystems or Micro-Electro-Mechanical Systems (MEMS; also referred to as micromachines) are miniaturized mechanical elements integrated with sensors, actuators and associated control electronics on a common substrate (most often silicon). Few examples of widely used microsystems are the accelerometer for vehicle crash sensing in airbag control, the inkjet printer head to deposit ink droplets onto the paper, the interferometer modulator display of cellular phones or the DNA hybridization arrays for gene expression analysis. What is common about these microdevices is their manufacturing, which typically is done using techniques similar to the ones used for IC technologies- key for economic manufacturing of products. This is a powerful incentive that continues to drive an ever increasing interest in MEMS systems. Nowadays, companies around the world are in race to deliver better, smaller and inexpensive MEMS-based alternatives in virtually every field and industry including consumer products, industrial process monitoring, medicine and scientific discovery.

Coming up with an application that may benefit from a MEMS device is usually not the main challenge. For most of the part, the difficult task is to analyze and model these miniaturized systems. Often they work on multiple energy domains: mechanical, electrical, chemical, optical etc. In addition, phenomena that we are used to ignore in macroscale systems such as capillarity or surface stiction are main players in Microsystems, while predominant effects at macroscale such as gravity can be ignored.

As can be seen from above discussion, MEMS is a wide field. However, at present, *my interest in this area is mainly focused on microscale power generators and BioMEMS for detection of biothreat agents.*

Power harvesting MEMS

The availability of microscale power generators are thought to be critical for the development of ambient intelligence technologies, a vision where thousands of miniaturized electronic sensors and

actuators are seamlessly integrated with the environment, responding to the needs of people. At the core of these technologies is the wireless sensor node, which has to be energetically autonomous. *In this context we investigate two different techniques for converting kinetic (or mechanical vibration) energy to electric energy. A novel method that we have proposed recently is by using variable capacitors with a switchable liquid/air dielectric medium. We recently laid out the theoretical framework describing these devices and found that the predicted power output is four orders of magnitude higher than that of state-of-the-art capacitive converters.* At present we are working simultaneously on several fronts to bring this idea to life including dynamic modeling of variable capacitor and system level analysis of the circuit integrated with the variable capacitor.

Liquid Squeeze Film Damping

We are also carrying out theoretical and experimental investigations of squeeze film damping in Microsystems, a phenomenon of critical importance to liquid dielectric media electrostatic converters as well other liquid dynamic MEMS. *Recently we have published a simple solution for the hydrodynamic force acting on a plate vibrating in an incompressible fluid, with distinctive terms describing inertia and viscous damping. Similar to the damping constant describing viscous losses, an inertia constant, given by $\rho L^3 W/h$ (where ρ is fluid density, L and W are plate length and width, respectively, and h is separation distance), may be used to accurately calculate fluid inertia for small-oscillation Reynolds numbers. In contrast with viscous forces that suppress the amplitude of the oscillation, it was found that fluid inertia acts as an added mass, shifting the natural frequency of the system to a lower range while having little effect on the amplitude.* At present, we are continuing our studies with experimental investigations of squeeze film damping in systems consisting of microscale plates vibrating normal to a parallel substrate.

BioMEMS

In the field of BioMEMS, the timely detection of biothreat agents with different genetic materials remains a challenging biological surveillance problem. Since these agents have different genetic material, identification of a specific threat requires specific assay, probes, and reagents. These methods require bulky equipment and highly trained personal, which makes on field, real-time DNA identification almost impossible with existing technologies. *To address these major needs, we are investigating a fully integrated, turnkey platform for nucleic acid extraction, purification, amplification, and detection (EPAD platform) for real time identification of viruses and other biothreat agents. This novel instrumentation will integrate miniaturized fast nucleic acid amplification systems using transmission line microwave heating amplification chambers and a detection microarray for multiplex analyses all on the same platform. Recently we have demonstrated local microwave heating employing a transmission line configuration for energy delivery in collaboration with Professor Mona Hella. Our results suggest that microwave heating is an efficient, rapid heating technique suitable for programmable, parallel DNA amplification platforms to be employed in future genetic analysis systems.* At present, we continue our efforts, investigating a series of aspects relevant to this technology such as thin film temperature probes for RF heating applications and device design for efficient heating and heat dissipation.

VI. Reviews of Manuscripts and Research Proposals

Proposal reviews for funding agencies:
National Science Foundation panel reviewer
Kentucky Science and Engineering Foundation proposal reviewer

Journal article reviews:
Journal of Applied Physics

Thin Solid Films
ASME Journal of Tribology
Applied Physics A
Journal of Microelectromechanical Systems
Measurement Science and Technology
Smart Materials and Structures
Nanotechnology
Proceedings of Royal Society A
Journal of Micromechanics and Microengineering
ASME Journal of Electronic Packaging
ASME Journal of Heat Transfer
Physica Scripta

Conference article reviews:
ASME/JSME 2011 8th Thermal Engineering Joint Conference (AJTEC2011)
First Joint Advanced Electron Microscopy School for Nanomaterials and the Workshop on Nanomaterials (AEM-NANOMAT09)
The Sixth International Conference on Nanochannels, Microchannels, and Minichannels
IMECE 2006
2nd Energy Nanotechnology Conference 2007

VII. Service

A. Undergraduate Student Advising

1. Faculty advisor for Society of Women Engineers, RPI branch, since Fall 2010.
2. Chapter advisor for La Sociedad de Damas of Sigma Delta Sorority since Fall 2009.
3. Advisor for more than 40 undergraduate students since Fall 2007.

B. Service to University

1. School of Engineering Undergraduate Curriculum Committee- Fall 2012- present MANE Undergraduate Curriculum Representative
2. Member, MANE undergraduate committee;
3. Member, MANE graduate curriculum committee;
4. Member, MANE diversity and outreach committee.

B. Professional Societies

ASME member (August 2005)
MRS member (December 2003)
IEEE member (December 2009)

C. Community and Public Service

Topic chair for “Power Harvesting MEMS” 2012 ASME International Mechanical Engineering Congress and Exposition
Topic co-chair for “Heat and Mass Transfer in Biotechnology,” 2012 ASME International Mechanical Engineering Congress and Exposition
Track co-chair for “Single-Phase Liquid Flow” 11th International Conference on Nanochannels, Microchannels, and Minichannels July 8-12, 2012 Puerto Rico, Canada

Organizer "DeWitt Poster Session for Undergraduate Research in Thermal/Fluids Sciences," 2012 ASME International Mechanical Engineering Congress and Exposition

Track co-chair for "Single-Phase Liquid Flow" 9th International Conference on Nanochannels, Microchannels, and Minichannels June 19-22, 2011 Edmonton, Canada

Track co-chair for "Single-Phase Liquid Flow" 8th International Conference on Nanochannels, Microchannels, and Minichannels August 1-5, 2010 Montreal, Canada

VIII. Professional and Public Lectures

a. Invited presentations (presenter's name is underlined)

1. **Borca-Tasciuc, D.-A.** , Yuan, Y. Wang, S. and Huang, S. "Towards Understanding and Controlling the Thermal Power of Magnetic Nanofluids in Alternating Magnetic Field for Hyperthermia Applications," ICNMM2012-73105 , Keynote at 10th International Conference on Nanochannels, Microchannels and Minichannels (ICNMM), July 8-12, Puerto Rico USA.
2. **Borca-Tasciuc, D.-A.** "Towards Understanding and Controlling the Thermal Power of Magnetic Nanoparticles in Alternating Magnetic Field for Hyperthermia Applications" The City College of New York, February 9, 2012
3. **Borca-Tasciuc, D.-A.** "Magnetic nanoparticles for cancer hyperthermia, " Special Seminar, Electrical and Computer Engineering Department, University of Connecticut , October 12, 2011, Storrs, Connecticut
4. **Borca-Tasciuc, D.-A.,** "Spectral Coupling of Fluorescent Solar Concentrators with Plasmonic Solar Cells," Women's International Research Engineering Summit in Orlando, Florida, March 29-April 1, 2011
5. **Borca-Tasciuc, D.-A.,** "Investigation of functionalized iron oxide nanoparticles suspensions for cancer hyperthermia applications," Women's International Research Engineering Summit in Orlando, Florida, March 29-April 1, 2011
6. **Borca-Tasciuc, D.-A.**, "Kinetic to Electric Energy Converters Employing Interdigitated Capacitors with Switchable Liquid-Air Dielectric Media," 4th International Workshop on Soft Computing Applications, SOFA 2010, 15-17 July 2010, Arad, Romania.
7. **Borca-Tasciuc, D.-A.**, "Kinetic to Electric Energy Converters Employing Interdigitated Capacitors with Switchable Liquid-Air Dielectric Media," Faculty of Electronics and Telecommunications, "Gheorghe Asachi" Technical University of Iasi, July 20, 2010, Iasi, Romania.
8. **Borca-Tasciuc, D.-A.**, "Kinetic to Electric Energy Converters Employing Interdigitated Capacitors with Switchable Liquid-Air Dielectric Media" Instituto de Microelectrónica Madrid, June 1st 2009.
9. **Borca-Tasciuc, D.-A.,** invited poster on research activities at Women's International Research Engineering Summit in Barcelona, Spain, June 2nd 2009.
10. Castillo, E., Choudhury, S., Shim, H. W., Kuppers, J., Huang, H., and **Borca-Tasciuc, D.-A.** "Thermal characterization of silicon carbide nanowire films" Benet Labs Materials Forum: Nano-scale Materials and Modeling Albany, NY February 19, 2009
11. Gupta. A, Kane, R., and **Borca-Tasciuc, D.-A.**, "Fluorescent quantum dots thermometry for nanoscale temperature measurement in RF heated nanoparticle suspensions" Benet Labs Materials Forum: Nano-scale Materials and Modeling Albany, NY February 19, 2009
12. Gupta, A., Denver, H., Joshi. A., Kane, R., Hella, M., and **Borca-Tasciuc, D.-A.** " Fluorescent quantum dots thermometry for nanoscale temperature measurement in RF heated nanoparticle suspensions," 6th US-Japan Joint Seminar on Nanoscale Transport Phenomena-Science and Engineering, Boston, MA, July 13-16, 2008

a. Contributed conference presentations – (presenter's name is underlined)

1. **Borca-Tasciuc, D.-A.,** and Yuan, Y., "Transition from superparamagnetism to ferromagnetism in colloids with clusters of tightly packed nanoparticles and its influence on specific absorption rate," ASME IMECE 2012, Houston, Texas, November 9-15, 2012.
2. Oxaal, J., Wang, S., Hella, M., and **Borca-Tasciuc, D.-A.,** "Electrostatic MEMS Vibration Energy Harvester," ASME IMECE 2012, Houston, Texas, November 9-15, 2012.
3. Feng, G., Hsu, L., Wang, S., Feliz, Y, **Borca-Tasciuc, D.-A.** and Moraru, C. I., "Nanoporous Surfaces for Biofilm Formation Control for Food Safety Application, "2012 MRS Fall Meeting & Exhibit, Boston, MA November 25 - 30, 2012
4. Borca-Tasciuc, T. Sano, W., Szabo, Z., **Borca-Tasciuc, D.-A.,** "Introducing Nanotechnology into the Thermal and Fluids Curricula: Pool Boiling Heat Transfer in Nanofluids," ASME Summer Heat Transfer Conference, Puerto Rico. July 8-12, 2012
5. Borca-Tasciuc, T. and **Borca-Tasciuc, D.-A.** "Critical Heat Flux Enhancement for Joule Heated Microwires in Mixtures of TiO and AlO Nanofluids," 10th International Conference on Nano, Micro, and Mini Channels, Puerto Rico. July 8-12, 2012
6. Choi, J., Sung, B., Nguyen, X., Kim, C., Yoo, J., **Borca-Tasciuc, D.-A.,** "An advanced evaporator design and manufacturing for miniature loop heat pipe applications," ASME Summer Heat Transfer Conference , Puerto Rico. July 8-12, 2012
7. Feng, G., Hsu, L., Wang, S., Feliz, Y., *Borca-Tasciuc, D.-A.*, Worobo, R., Moraru, C. I., "Differential attachment and biofilm formation by foodborne microorganisms on surfaces with nanoscale topography," Annual Meeting of IFT, Las Vegas, NV, June 25-28, 2012
8. **Borca-Tasciuc, D.-A.,** Huang, S., Wang, S., and Yuan, Y., "Challenges in Evaluating and Predicting the Heat Generation Rate of Magnetic Nanoparticles in Alternating Magnetic Field," CBET Grantee Conference, June 6-8, 2012
9. Huang, S., Wang, S.-Y., Gupta, A., **Borca-Tasciuc, D.-A.,** and Saloon, S. "Potentyial sources of errors in measuring and evaluating the specific absorption rate of magnetic nanoparticles in alternating magnetic field, " International Conference on the Scientific Applications of the Magnetic Carriers, Minneapolis, Minnesota, May 22-26, 2012
10. Yuan, Y. and **Borca-Tasciuc, D.-A.,** " The effect of the coating and clustering on the specific absorption rate of magnetic nanoparticles in alternating magnetic field," International Conference on the Scientific Applications of the Magnetic Carriers, Minneapolis, Minnesota, May 22-26, 2012
11. Yuan, Y., Rivet, C. J., **Borca-Tasciuc, D.-A.,** and Gilbert, R. J., "Characterization of neuron interaction with magnetic nanoparticles in alternating magnetic field," International Conference on the Scientific Applications of the Magnetic Carriers, Minneapolis, Minnesota, May 22-26, 2012
12. **Borca-Tasciuc, D.-A.,** Huang, S., Wang, S., and Yuan, Y., "Challenges in Evaluating and Predicting the Heat Generation Rate of Magnetic Nanoparticles in Alternating Magnetic Field," ASME 2012 3rd Micro/Nanoscale Heat & Mass Transfer International Conference, Atlanta, Georgia, March 3-6, 2012
13. Yuan, Y., Rivet, C., Gilbert, R., and **Borca-Tasciuc, D.-A.** " Cytotoxicity and Heat Generation Rate Studies of Iron Oxide Nanoparticles with Different Coatings for Biomedical Applications," IMECE2011-66218, ASME International Mechanical Engineering Congress & Exposition, November 11-17, 2011, ASME-IMECE Denver, Colorado, USA
14. Yuan, Y., Rivet, C., Gilbert, R., and Borca-Tasciuc, D.-A., "Alteration of cortical neuron behavior using radio-frequency heated magnetic nanoparticles," BIT's 2nd Annual World Congress of NeuroTalk-2011, May 22-25 2011, Dalian China
15. Yuan, Y. and Borca-Tasciuc, D.-A., "Agglomeration enhancement on specific absorption rate (SAR) of iron oxide nanoparticles," BIT's 4th World Cancer Congress 2011, May 22-25 2011, Dalian, China
16. **Borca-Tasciuc, D.-A.,** Borca-Tasciuc, T., Hirsa, A., Plawsky, J., and Szabo, Z., "Introducing Nanotechnology into the Thermal and Fluids Curricula: A Multi-Department, Modular Laboratory," NSF Engineering Education Awardees Conference, March 13-15, Reston Virginia.

17. Wang, S. and **Borca-Tasciuc, D.-A.,** "Coupling Solar Concentrators to Plasmonic Solar Cell," Materials Research Society Fall Symposium, Nov. 29-Dec. 3, 2010 Boston MA
18. Yuan Y. and **Borca-Tasciuc, D.-A**. "On the Correlation Between the Properties of Magnetic Fluids and their Specific Absorption Rates," Materials Research Society Fall Symposium, Nov. 29-Dec. 3, 2010 Boston MA
19. Wang, S., Fornasiero, M., **Borca-Tasciuc, D.-A**. "Thermal conductivity of iron oxide nanofluids", Advanced Materials Forum, Albany NY, June 14-15 2010
20. Kempitiya, A., Baker, M., Hella, M., **Borca-Tasciuc, D.-A.**, "Novel Circuit and Electrostatic Micro-generator Architectures for Enhancing Vibration to Electric Energy Conversion, 2010 CATS Annual Technology Showcase and Dinner, Troy NY May 10, 2010.
21. **Borca-Tasciuc, D.-A.,** Borca-Tasciuc, T., Hirsa, A., Plawsky, J., and Szabo, Z., "Introducing Nanotechnology into the Thermal and Fluids Curricula: A Multi-Department, Modular Laboratory," NSF Engineering Education Awardees Conference, January 31-February 2, Reston Virginia.
22. Huang, S, Gupta, A., and **Borca-Tasciuc, D.-A.**, "Local Temperature Measurement of Quantum Dots Conjugated Iron oxide Nanoparticles, "Materials Research Society Fall Meeting, Nov. 30-Dec. 4, 2009.
23. Denver, H., Heiman, T., Martin, E., Gupta, A, Tang, X., Shima, M., and **Borca-Tasciuc, D.-A.**" "Mechanical and Magnetic Properties Characterization of Highly-aligned Nickel Nanowires / Elastomer Composites,"-Material Research Society Fall Meeting, November 26-30, 2007.
24. Denver, H., Heiman, T., Martin, E., and **Borca-Tasciuc, D.-A.,** " Fabrication and Characterization of Nickel Nanowire Polymer Composite " - 3rd Annual Tech Valley Engineering Symposium, April 17, 2007.
25. Sayed Salem, M. (Marwa), Sayed Salem, M. (Mona), Zekry, A. E. H , Ragai, H. F., **Borca-Tasciuc, D.-A.,** Hella, M. "Low Power Controller Circuit for Electrostatic MEMS Converters" - 3rd Annual Tech Valley Engineering Symposium, April 17, 2007.
26. Sayed Salem, M. (Mona), Sayed Salem, M. (Marwa), Zekry, A. E. H , Ragai, H. F., Hella, M., and **Borca-Tasciuc, D.-A.** "Modeling and Fabrication of an Electrostatic MEMS Power Converter" - 3rd Annual Tech Valley Engineering Symposium, April 17, 2007.
27. Gupta, A., Hirsa, A., and **Borca-Tasciuc, D.-A.,** "Electroosmotic micro-pump array for local control of droplets**,"** presented at 59th Annual Division of Fluid Dynamics Meeting, November 19-21, 2006 Tampa, FL.

IX. Honors and Awards

1. 2008 NSF CAREER Award
2. Faculty Appreciation Award -Sigma Delta Sorority / Office of Minorities 2010
3. RPI School of Engineering Research Excellence Award 2011

Awards received by students

1. John Oxaal - *ASME IMECE 2012, 1st Place –Society Wide Micro and Nano-Technology Forum* (more than 200 posters participating)
2. Shuyi Wang- *RPI 2012 Founders Award*
3. Yazmin Feliz –*RPI 2011 Founders Award*
4. Adriana Rojas- *RPI 2011 Founders Award*
5. Heather Denver – 2008 NSF Graduate fellowship awards
6. Elizabeth Martin - 2nd place RPI 2008 Undergraduate Research Forum(Applied Research); - - *RPI 2008 Founders Award of Excellence*
7. Timothy Heiman –2nd place RPI 2008 Undergraduate Research Forum(Applied Research); *-RPI 2008 Founders Award of Excellence*