

# MARIBEL VAZQUEZ, Sc.D.

## A. HIGHER EDUCATION

Massachusetts Institute of Technology (Cambridge, MA)	Doctor of Science	Mechanical Engineering	2001
Massachusetts Institute of Technology (Cambridge, MA)	Master of Science	Mechanical Engineering	1996
Cornell University (Ithaca, NY)	Bachelor of Science	Mechanical Engineering	1992

## B. EXPERIENCE AND APPOINTMENTS

2002- Present:	<b>Primary Appointment:</b> Assistant Professor of Biomedical Engineering The City College of the City University of New York (CCNY)
2001-2002:	<b>Primary Appointment:</b> Assistant Professor of Mechanical Engineering The City College of the City University of New York (CCNY)
1992-1995	<b>Primary Appointment:</b> Microcontamination and Manufacturing Engineer Intel Corporation (Portland, OR)

## C. PUBLICATIONS AND PRESENTATIONS (LAST 5 YEARS):

### C.1. Referred Journals

#### C.1.a. In Preparation

1. **Vazquez, M.**; Sharma, D.; Able, R.; Malcolm, L.; Holland, E.C., 'The Migration of Glioma Progenitors is Mediated by PDGF-Signaling,' *Cancer Research*.
2. **Vazquez, M.**; Ramcharan, M.; Gilchrist, M.L., 'Lipid-mediated Induction of Intracellular Nanoprobes within PDGF-Induced Glioma Cell Models,' *Analytical Chemistry*.

#### C.1.b. Submitted

3. Kong, Q.J.; **Vazquez, M.**, 'Shear-induced Fibroblast Networking within Collagen Matrixes,' *Tissue Engineering (Submitted 10/2005)*.
4. Kong, Q.J.; **Vazquez, M.**, 'Three-Dimensional Cellular Networking in Collagen Gels Populated with Medial Collateral Ligament Fibroblasts,' *Cell Communication and Adhesion Research (Submitted 09/2005)*.

#### C.1.c. Published

5. **Vazquez, M.**; McKinley, G.; Mitnik, L.; Desmarais, S.; Matsudaira, P.; Ehrlich D., 'Electrophoretic Injection within Microdevices,' *Anal Chem 2002, 93, pp3088-3098*.
6. **Vazquez, M.**; McKinley, G.; Mitnik, L.; Desmarais, S.; Matsudaira, P.; Ehrlich D., 'Electrophoresis using Ultra-High Voltages,' *J. of Chrom. B 2002, 779, pp163-171*.
7. **Vazquez, M.**; Schmalzing D.; Ehrlich, D.; Matsudaira, P.; McKinley, G., 'Shear Induced Degradation of Linear Polyacrylamide Solutions during Pre-electrophoretic Loading,' *Anal Chem 2001, 73, pp3035-3044*.

### C.2. Refereed Proceedings

1. Emerton, K.B.; **Vazquez, M.**, 'Live Cell Targeting of Labeled Organelles via Liposome Induction of Functionalized Nanoprobes,' *Proceedings of The Biomedical Engineering Society, Baltimore, MD, September 28-30, 2005*.
2. Kong, Q.J.; **Vazquez, M.**, 'Effects of Imposed Stress on 3D Cellular Networking between MCL Ligament Fibroblasts,' *Proceedings of Biomedical Engineering Society, Baltimore, MD, September 28-30, 2005*.
3. Able, R.A.; Sharma, D.; **Vazquez, M.**, 'The Chemotaxis of Gliomas towards Endothelial-Derived Cytokines,' *Proceedings of Biomedical Engineering Society, Baltimore, MD, September 28-30, 2005*.
4. Emerton, K.B.; **Vazquez, M.**, 'Bioconjugate Nano-Labeling of Intracellular Proteins within Fixed and Living Cells,' *2005 Summer Bioengineering Conference, Vail, Co, June 22-26, 2005*.
5. Emerton, K.B.; Gilchrist, M.L.; **Vazquez, M.**, 'Nanolabeling of Intracellular Proteins during Controlled Migration,' *Proceedings of Biomedical Engineering Society, Philadelphia, PA, Oct 13-16, 2004*.
6. Malcolm, L.; Sharma, D.; Able, R.; Holland, E.C.; **Vazquez, M.**, 'Chemotactic Migration of Glioma towards Endothelial-derived Cytokines,' *Proceedings of The Biomedical Engineering Society, Philadelphia, PA, Oct 13-16, 2004*.

7. Emerton, K.B.; **Vazquez, M.**, 'Single-cell Microfluidic Chemotaxis System links Ligand Gradients to Activated Signaling Proteins,' *Proceedings of The Biomedical Engineering Society, Nashville, TN, Oct 1-4, 2003.*
8. Elaktaa, I.; Malcolm, L.; Kong, Q.; **Vazquez, M.**, 'Optimized DNA Separations using Microfluidic Devices,' *Proceedings of The Biomedical Engineering Society, Nashville, TN, Oct 1-4, 2003.*
9. **Vazquez, M.**, 'Dynamics within Microdevices,' *Proceedings of International Symposium on Separation of Peptides, Polynucleotides. Orlando, FL. November 14, 2001.*
10. **Vazquez, M.**, 'Pre-Electrophoretic loading within Microdevices', *Proceedings of the American Electrophoresis Society-AIChE Conference, Reno, NV. November 8, 2001.*

### **C.3. Invited Lectures**

1. *Yale University (Biomedical Engineering Seminar)*, 'A Quantitative Approach to the Study of Cell Migration,' New Haven, CT, July 2005.
2. *Weill Cornell College of Medical Sciences (Biophysics Seminar)*, 'Nanotechnology and Microfluidics in the Study of Cell Migration,' New York, NY, May 2005.
3. *The Cooper Union College of Engineering*, 'Microfluidic Technology and its Applications in Biomedical Engineering and Technology,' New York, NY, March 2005.
4. *The Pennsylvania State University (Biomedical Engineering Summer Institute)*, 'Functionalized QD to Label Intracellular Organelles,' College Park, PA, July 2004.
5. *National Institute of Dental and Intracranial Research (NIDCR)*, 'Nano-targeting of Cascade Proteins During Controlled Migration,' Bethesda, MD, December 2003.
6. *American Association for the Advancement of Science (AAAS) Latin American Women's Lecture Series*, 'Transitions Towards Biomedical Engineering,' Recife, Brazil, July 2003.
7. *Electrochemical Society Centennial Meeting (Analytical Microdevices)*, 'DNA Separations within Microdevices,' Philadelphia, PA, May 14, 2002.
8. *Hospital for Special Surgery (Laboratory for Soft Tissue Research)*, 'Microdevices for Biomedical Applications,' New York, NY, April 2002.
9. *Department of Defense (Scientists Helping America Conference)*, 'Microdevices as Potential Biodetectors,' Washington, DC, March 2002.
10. *Cornell University (Biomedical Engineering Seminar)*, 'Bioseparations using Microdevices,' Ithaca, NY, February 2002.
11. *New Jersey Institute of Technology (Mechanical Engineering Seminar)*, 'DNA Electrophoresis within Microfabricated Channels,' Newark, NJ, September 2001.
12. *Benjamin Levich Institute for PhysioChemical Hydrodynamics (Institute Seminar)*, 'Polymer Loading within Electrophoretic Devices,' New York, NY, September 2001.

## **D. AWARDED FUNDING (LAST 5 YEARS)**

### **D.1. Research (Total Cost)**

- |  |                             |
|--|-----------------------------|
| 1. 'A Microfluidic System to Study Glioma Infiltration'  | <b>\$152,000</b>            |
| <b>Principal Investigator:</b> Maribel Vazquez, Sc.D./ <b>Co-PI:</b> Eric C. Holland MD, PhD.        |                             |
| <b>Agency:</b> NIH (CA096299-09)   | <b>Type:</b> U56 Pilot      |
| Supports study of the PDGF-mediated migration of glial progenitor cells (mouse-derived).             |                             |
| 2. 'NER: Multivalent Nanoprobes to Target Intracellular Proteins'                                    | <b>\$126,954</b>            |
| <b>Principal Investigator:</b> Maribel Vazquez, Sc.D./ <b>Co-PI:</b> M. Lane Gilchrist               |                             |
| <b>Agency:</b> NSF (BES043971)   | <b>Type:</b> Nanoinitiative |
| Supports development of methods to develop functionalized nanoprobes for intracellular applications. |                             |
| 3. 'SENSORS: A Novel Nano-Microfluidic System for Intracellular Sensing'                             | <b>\$341,128</b>            |
| <b>Principal Investigator:</b> Maribel Vazquez, Sc.D.  |                             |
| <b>Agency:</b> NSF (BES0428573)  | <b>Type:</b> Biosensors     |
| Supports development of microbiosensors for antigen detection.                                       |                             |
| 4. 'A Model Microfluidic Chemotaxis System'  | <b>\$331,946</b>            |
| <b>Principal Investigator:</b> Maribel Vazquez, Sc.D.  |                             |
| <b>Agency:</b> NIH (GM071702-01)   | <b>Type:</b> R21            |
| Supports development of a microfabricated system to study chemotaxis of connective tissue cells.     |                             |

5. 'A Microfluidic System to Co-Localize ERK Proteins during Medulloblastoma Dispersal'  
**Principal Investigator:** Maribel Vazquez, Sc.D. **\$100,000**  
**Agency:** Pediatric Brain Tumor Society **Type:** 2-year **Period:** 01/2005-12/2007  
 Supports use of microfluidics to identify protein distribution during cell locomotion.
6. 'A  $\mu$ Migration Assay for Temporal Protein Localization' **\$420,750**  
**Principal Investigator:** Maribel Vazquez, Sc.D./**Co-PI:** Eric C. Holland MD, PhD.  
**Agency:** NIH(CA118255-01) **Type:** R21 **Period:** 07/2005-06/2007  
 Supports development of assays that assess location of PDGF pathway proteins via nanolabeling.

## **D.2. Equipment (Total Cost)**

1. 'Acquisition of a Confocal Microscope' **\$375,123**  
**Principal Investigator:** John M. Tarbell, Ph.D./ **Co-PI:** Maribel Vazquez, Sc.D. (1 of 7)  
**Agency:** DoD **Type:** Equipment **Period:** 06/2004-12/2005  
 Supports initial development of a CCNY microscopy facility for the School of Engineering.
2. 'Development of a Micro- and Nanoscale Fabrication Facility' **\$180,000**  
**Principal Investigator:** Maribel Vazquez, Sc.D./**Co-PI:** Alexander Couzis, Ph.D.(1 of 5)  
**Agency:** DoD **Type:** Equipment **Period:** 12/2002-06/2004  
 Supports establishment of a shared microfabrication facility in the specified engineering laboratories.

## **E. PROFESSIONAL ACTIVITIES**

1. Review Panelist for NSF Biological and Environmental Sciences (BES), Bi-annual 2002-PRESENT
2. Review Panelist for NSF Electrical and Communications Systems (ECS), Bi-annual 2003-PRESENT
3. MIT Mechanical Engineering Visiting Committee, Alumni Member, 2002-PRESENT
4. American Electrophoresis Society, Co-Organizer Microdevice Session, 2001-2002
5. Einstein Conference of the New York Academy of Sciences, Conference Co-organizer, 2004-2005
6. NanoDay in New York, CCNY Co-faculty organizer and presenter, 2003-2004
7. New Century Scholars, Teaching Workshop Participant, 2002

## **F. COMMUNITY INVOLVMENT AND PRESENTATIONS**

- New York City Public Schools:** P.S. 128: *Role Models in Engineering*  
 P.S. 189: *Latino Role Models in Science*  
 A. Philip Randolph High School: *Engineering for Tomorrow*  
 John F. Kennedy High School: *The Future of Science*  
 Bronx High School Superintendent Office: *Pre-Engineering Education*
- City College Community:** Science, Technology, and Mathematics Summer Program (2002-PRESENT)  
 Biomedical Engineering Workshop for NYC Teachers (2002, 2003)  
 Society of Hispanic Professional Engineers Leadership Conference (2001-PRESENT)  
 Dominican Consulate of New York & Dominican Institute at CCNY (2002-2005)

## **G. COURSES PRESENTED**

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|--|--------------------------------------|
| ME 23000: Engineering Thermodynamics       | Undergraduate-Level, Core Curriculum |
| BME 22000: Tools for Biomedical Engineers* | Undergraduate-Level, Core Curriculum |
| BME 31000: Experimental Methods I*         | Undergraduate-Level, Core Curriculum |
| ME 46300: Micro- and Nanotechnology*       | Undergraduate-Level, New Curriculum  |
| BME I7900: Microfluidics in Biotechnology* | Graduate-Level, Doctoral Elective    |
| BME I0000: BME Department Seminar Series   | Graduate-Level, Required Course      |

\* Denotes new courses developed and taught at the college for the first time

## **H. STUDENT THESES AND RESEARCH**

### **H.1. Ph.D. Dissertation Involvement**

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|--------------------------|-------------------------------------|---------------------------|
| 1. Mr. Qingjun Kong      | ME 2002, Ph.D. Expected 2007        | <u>Mentor:</u> M. Vazquez |
| 2. Mr. Richard Able      | Biochem 2004, Ph.D. Expected 2009   | <u>Mentor:</u> M. Vazquez |
| 3. Ms. Melissa Ramcharan | BME 2005, Ph.D. Expected 2010       | <u>Mentor:</u> M. Vazquez |
| 4. Ms. Jennifer Madeo    | BME 2001, Ph.D. <i>Awarded 2005</i> | Mentor: M. Gunner         |
| 5. Mr. Makonnen Payne    | ChE 2003, Ph.D. Expected 2008       | Mentor: A. Couzis         |
| 6. Mr. Vivek Dwivendi    | ChE 2003, Ph.D. Expected 2008       | Mentor: A. Couzis         |
| 7. Mr. Shyam Vaidya      | ChE 2005, Ph.D. Expected 2010       | Mentor: A. Couzis         |

### **H.2. Master's Thesis Involvement**

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|--------------------------|-----------------------------------|---------------------------|
| 1. Mr. Ran Sela          | BME2003, M.S. <i>Awarded 2005</i> | <u>Mentor:</u> M. Vazquez |
| 2. Ms. Sowmita Narayan   | BME2003, M.S. <i>Awarded 2005</i> | Mentor: S. Weinbaum       |
| 3. Ms. Harsha Jattani    | BME2002, M.S. <i>Awarded 2004</i> | Mentor: M.L. Gilchrist    |
| 4. Ms. Georgina Bermudez | BME2005, M.S. Expected 2006       | <u>Mentor:</u> M. Vazquez |

### **H.3. Baccalaureate Thesis Involvement**

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|--------------------------|------------------------------|---------------------------|
| 1. Ms. Lori-Ann Malcolm  | ChE B.S. <i>Awarded 2004</i> | <u>Mentor:</u> M. Vazquez |
| 2. Mr. Islam Elaktaa     | ChE B.S. <i>Awarded 2005</i> | <u>Mentor:</u> M. Vazquez |
| 3. Ms. Divya Sharma      | BME B.S. Expected 2006       | <u>Mentor:</u> M. Vazquez |
| 4. Mr. Neranjan De Silva | BME B.S. Expected 2007       | <u>Mentor:</u> M. Vazquez |

## **I. ACADEMIC ADMINISTRATION**

1. Faculty Search Committee Member for Biomedical and Mechanical Engineering Depts (2002-PRESENT)
2. Faculty Search Committee Member for Chemical Engineering and The Levich Institute (2002-PRESENT)
3. School Of Engineering Core Curriculum Committee (2002-PRESENT)
4. Master's Student Advisor for the Biomedical Engineering Department (2002-2005)
5. CUNY Honors College Admissions Committee (2003, 2004)
6. Faculty Advisor for the Society of Women Engineers (SWE) and Biomedical Engineering Society (BMES)
7. CCNY College Diversity Panel(2004-PRESENT, Appointed by CCNY president)