

# Barclay Morrison III, Ph.D.

Associate Professor of Biomedical Engineering

## *Curriculum Vitae*

Prepared December 17, 2015

### CONTENTS

A. Field of Specialization.....	2
B. Academic Training.....	3
B.1 Educational Background.....	3
B.2 Academic Honors and Fellowships.....	3
C. Teaching Experience.....	3
C.1 Courses Taught.....	3
C.1.c CourseWorks Evaluation.....	8
C.2 Research Training and Mentoring .....	9
D. Positions Held since Final Degree.....	12
E. Publications .....	12
E.1 Doctoral Thesis.....	12
E.2 Full-length, Peer Reviewed Publications .....	12
E.3 Manuscripts under Review .....	17
E.4 Refereed Conference Proceedings .....	18
E.5 Book Chapters.....	19
E.6 Refereed Abstracts.....	19
E.7 Popular Press Articles .....	27
E.8 Press Releases and Quotations .....	27
F. Research funding .....	28
F.1 Current Funding.....	28
F.2 Pending Funding .....	29
F.3 Completed Funding .....	30
F.4 Direct Student Support .....	34
F.5 Direct Fellow Support .....	34
G. Other Honors and Awards .....	35
Honors and Awards won by Morrison Research Group .....	35
H. Patents .....	37
I. Professional Service.....	37
I.1 Editorial Positions .....	37
I.2 Professional Board Positions.....	37
I.3 Consulting .....	37
I.4 Conference Organization.....	37
I.5 Session Chair .....	38
I.6 Conference Panel Participant.....	39

I.7	Grant Reviewer.....	40
I.8	Manuscript Reviewer .....	40
I.9	Abstract Reviewer .....	41
I.10	Membership in Professional Societies .....	42
I.11	Invited Presentations .....	42
J.	Academic Service.....	46
J.1	University Committees.....	46
J.2	School of Engineering and Applied Science Committees and Duties.....	46
J.3	Departmental Committees and Duties.....	47
J.4	Department, School, and University Outreach .....	47

## **Work Address**

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## **A. Field of Specialization**

### **Traumatic Brain Injury Biomechanics, Prevention, and Treatment**

Traumatic brain injury results in approximately 50,000 deaths and 85,000 permanently disable persons per year in the United States with an estimated primary care cost of \$76 billion per year. The clinical situation is quite dire as there are no drug treatments which target the underlying pathobiology of TBI. This profound need for improvements in the prevention and treatment of TBI is the driving force behind my research. My long term goal is to understand the consequences of mechanical forces on the most complex system of the human body, the brain, and to develop strategies to mitigate and perhaps reverse these injurious effects. My research explores the specific cellular, molecular, and metabolic effects of injury on brain cells in response to precisely controlled biomechanical stimuli. My research program has three main focus areas:

- 1) Improvement of prevention strategies through development of critical biomechanical data for the living brain
- 2) Identification of novel treatment options by understanding the post-traumatic pathobiology in greater detail
- 3) Engineering new research tools to enhance studies in the first two areas

## **B. Academic Training**

### **B.1 Educational Background**

1988 -1992 Johns Hopkins University, Baltimore, MD

B.S., Biomedical Engineering

1992-1994 University of Pennsylvania, Philadelphia, PA

M.S.E., Bioengineering

1994-1999 University of Pennsylvania, Philadelphia, PA

Ph.D., Bioengineering

**Dissertation:** "Differential Genomic Expression after Mechanical Injury of Organotypic Brain Slice Cultures: An *In Vitro* Model of Traumatic Brain Injury" (Published)

**Sponsor:** Tracy K. McIntosh, Ph.D.

### **B.2 Academic Honors and Fellowships**

1993-1997 Ashton Fellowship, University of Pennsylvania, Philadelphia, PA

1999 The S.R. Pollack Award for Excellence in Graduate Bioengineering Research, University of Pennsylvania, Philadelphia, PA

1999 Biomedical Engineering Society Graduate Student Research Award

1999 First Place, National Neurotrauma Society Student Competition

2006 The Kim Award for Student-Faculty Involvement, Fu Foundation School of Engineering and Applied Science, Columbia University, New York, NY

## **C. Teaching Experience**

### **C.1 Courses Taught**

#### **2003 Spring**

BMEN E6002 Advanced Quantitative Physiology II: Enrollment **33**

BMEN E3910 Biomedical Engineering Design  
Advisor Helmet Project, **4** students

#### **2003 Fall**

ENGI E1102 Gateway Lab (Advisor, **8** students)

BMEN E3810 BME Laboratory I: Enrollment **66**

BMEN E3998 Undergraduate Independent Research: Enrollment **1**

#### **2004 Spring**

ENGI E1102 Gateway Lab (Advisor, **13** students, 2 groups)

BMEN E3910 Biomedical Engineering Design  
Advisor: Helmet Project, **5** students  
Advisor: Neuron Electrode Array Project, **4** students

BMEN E4002	Quantitative Physiology II: Enrollment <b>77</b>
BMEN E6002	Advanced Quantitative Physiology II: Enrollment <b>42</b>
BMEN E9100	Masters Research: Enrollment <b>1</b>

**2004 Summer**

Summer Undergraduate Research Fellowship Advisor (**2** students)  
Intel Science Talent Search Advisor (**1** student)

**2004 Fall**

ENGI E1102	Gateway Lab (Advisor, <b>5</b> students)
BMEN E3810	BME Laboratory I: Enrollment <b>70</b> Student Evaluation: 3.46 / 5.0
BMEN E3998	Undergraduate Independent Research: Enrollment <b>9</b>

**2005 Spring**

ENGI E1102	Gateway Lab (Advisor, <b>6</b> students)
BMEN E3910	Biomedical Engineering Design Advisor: Helmet Project, <b>4</b> students Advisor: Protective Athletic Cup Project, <b>6</b> students Advisor: Automated Slide Locator, <b>4</b> students
BMEN E4002	Quantitative Physiology II: Enrollment <b>88</b> Student Evaluation: 3.97 / 5.0
BMEN E6002	Advanced Quantitative Physiology II: Enrollment <b>41</b> Student Evaluation: 3.51 / 5.0
BMEN E9100	Masters Research: Enrollment <b>1</b>

**2005 Summer**

Summer Undergraduate Research Fellowship Advisor (**1** student)  
Intel Science Talent Search Advisor (**1** student)

**2005 Fall**

ENGI E1102	Gateway Lab (Advisor, <b>4</b> students)
BMEN E3910	Biomedical Engineering Design Advisor: Helmet Project, <b>5</b> students
BMEN E3998	Undergraduate Independent Research: Enrollment <b>1</b>
BMEN E9100	Masters Research: Enrollment <b>2</b>
BMEN E9500	Doctoral Research: Enrollment <b>1</b>

**2006 Spring**

BMEN E3920	Biomedical Engineering Design Advisor: Helmet Project, <b>5</b> students
BMEN E3998	Undergraduate Independent Research: Enrollment <b>2</b>
BMEN E4002	Quantitative Physiology II: Enrollment <b>73</b> Student Evaluation: 4.09 / 5.0
BMEN E6002	Advanced Quantitative Physiology II: Enrollment <b>28</b> Student Evaluation: 3.59 / 5.0
BMEN E9100	Masters Research: Enrollment <b>1</b>

BMEN E9500	Doctoral Research: Enrollment <b>1</b>
<b>2006 Summer</b>	
BMEN E9100	Masters Research: Enrollment <b>1</b>
<b>2006 Fall</b>	
BMEN E3910	Biomedical Engineering Design Faculty Advisor: Helmet Project, <b>6</b> students
BMEN E3998	Undergraduate Independent Research: Enrollment <b>1</b>
BMEN E9500	Doctoral Research: Enrollment <b>2</b>
<b>2007 Spring</b>	
BMEN E3920	Biomedical Engineering Design Faculty Advisor: Helmet Project, <b>6</b> students
BMEN E4002	Quantitative Physiology II: Enrollment <b>70</b> Student Evaluation: 4.26 / 5.0
BMEN E9100	Masters Research: Enrollment <b>1</b>
BMEN E9500	Doctoral Research: Enrollment <b>2</b>
<b>2007 Fall</b>	
BMEN E3910	Biomedical Engineering Design Faculty Advisor: Gravity Neutral Orthotic, <b>4</b> students
BMEN E6002	Computational Modeling of Physiological Systems: Enrollment <b>26</b> Student Evaluation: 3.60 / 5.0
BMEN E9100	Masters Research: Enrollment <b>1</b>
BMEN E9500	Doctoral Research: Enrollment <b>1</b>
<b>2008 Spring</b>	
BMEN E3920	Biomedical Engineering Design Faculty Advisor: Gravity Neutral Orthotic, <b>3</b> students
BMEN E3998	Undergraduate Independent Research: Enrollment <b>1</b>
BMEN E4002	Quantitative Physiology II: Enrollment <b>92</b> Student Evaluation: 4.14 / 5.0
BMEN E9100	Masters Research: Enrollment <b>1</b>
BMEN E9500	Doctoral Research: Enrollment <b>1</b>
<b>2008 Fall</b>	
BMEN E3820	Biomedical Engineering Laboratory II: Enrollment <b>53</b> Neurophysiology Module (New Module)
BMEN E3910	Biomedical Engineering Design Faculty Advisor: Gravity Neutral Orthotic, <b>5</b> students
BMEN E3998	Undergraduate Independent Research: Enrollment <b>2</b>
BMEN E6003	Computational Modeling of Physiological Systems: Enrollment <b>16</b> Student Evaluation: 4.13 / 5.0
BMEN E9100	Masters Research: Enrollment <b>1</b>
BMEN E9500	Doctoral Research: Enrollment <b>1</b>
<b>2009 Spring</b>	

BMEN E3920	Biomedical Engineering Design Faculty Advisor: Gravity Neutral Orthotic, <b>5</b> students
BMEN E3998	Undergraduate Independent Research: Enrollment <b>1</b>
BMEN E4002	Quantitative Physiology II: Enrollment <b>74</b> Student Evaluation: 4.07 / 5.0
BMEN E9100	Masters Research: Enrollment <b>1</b>
BMEN E9500	Doctoral Research: Enrollment <b>2</b>

**2009 Fall**

BMEN E3820	Biomedical Engineering Laboratory II: Enrollment <b>44</b> Neurophysiology Module
BMEN E3998	Undergraduate Independent Research: Enrollment <b>3</b>
BMEN E6003	Computational Modeling of Physiological Systems: Enrollment <b>33</b> Student Evaluation: 3.38 / 5.0
BMEN E9500	Doctoral Research: Enrollment <b>2</b>

**2010 Spring**

BMEN E3998	Undergraduate Independent Research: Enrollment <b>1</b>
BMEN E4002	Quantitative Physiology II: Enrollment <b>62</b> Student Evaluation: 3.89 / 5.0
BMEN E9100	Masters Research: Enrollment <b>1</b>
BMEN E9500	Doctoral Research: Enrollment <b>2</b>

**2010 Summer**

Summer Undergraduate Research Fellowship Advisor (**1** student)  
Amgen Undergraduate Research Fellowship Advisor (**1** student)

**2010 Fall**

BMEN E1001	Engineering in Medicine: Enrollment <b>72</b> Guest Lecturer
BMEN E3820	Biomedical Engineering Laboratory II: Enrollment <b>33</b> Neurophysiology Module
BMEN E3998	Undergraduate Independent Research: Enrollment <b>3</b>
BMEN E6003	Computational Modeling of Physiological Systems: Enrollment <b>52</b> Student Evaluation: 4.09 / 5.0
BMEN E9100	Masters Research: Enrollment <b>3</b>
BMEN E9500	Doctoral Research: Enrollment <b>1</b>

**2011 Spring**

BMEN E3820	Biomedical Engineering Laboratory II: Enrollment <b>37</b> Neurophysiology Module
BMEN E3998	Undergraduate Independent Research: Enrollment <b>1</b>
BMEN E4002	Quantitative Physiology II: Enrollment <b>65</b> Student Evaluation: 4.14 / 5.0
BMEN E9100	Masters Research: Enrollment <b>4</b>

**2011 Fall**

BMEN E1001	Engineering in Medicine: Enrollment <b>78</b> Guest Lecturer
BMEN E6003	Computational Modeling of Physiological Systems: Enrollment <b>39</b> Student Evaluation: 3.77 / 5.0
BMEN E9100	Masters Research: Enrollment <b>1</b>
BMEN E9500	Doctoral Research: Enrollment <b>2</b>
BMEN E3910	Biomedical Engineering Design Faculty Advisor: Absorbable Suture, <b>4</b> students

**2012 Spring**

BMEN E3820	Biomedical Engineering Laboratory II: Enrollment <b>46</b> Neurophysiology Module
BMEN E3998	Undergraduate Independent Research: Enrollment <b>1</b>
BMEN E4002	Quantitative Physiology II: Enrollment <b>66</b> Student Evaluation: 4.19/5.0
BMEN E9100	Masters Research: Enrollment <b>1</b>
BMEN E9500	Doctoral Research: Enrollment <b>2</b>

**2012 Fall**

BMEN E6003	Computational Modeling of Physiological Systems: Enrollment <b>40</b> Student Evaluation: 4.13/5.0
BMEN E9500	Doctoral Research: Enrollment <b>2</b>
BMEN E3910	Biomedical Engineering Design Faculty Advisor: Cerebral Perfusion, <b>4</b> students

**2013 Spring**

BMEN E3820	Biomedical Engineering Laboratory II: Enrollment <b>44</b> Neurophysiology Module
BMEN E4002	Quantitative Physiology II: Enrollment <b>72</b> Student Evaluation: 4.33/5.0
BMEN E9500	Doctoral Research: Enrollment <b>2</b>

**Fall 2013:**

BMEN E6003	Computational Modeling of Physiological Systems: Enrollment <b>31</b> Student Evaluation: 4.23/5.0
BMEN E9500	Doctoral Research: Enrollment <b>2</b>
BMEN E3910	Biomedical Engineering Design Faculty Advisor: Mobility Device for Seniors, <b>4</b> students Faculty Advisor: Concussion Detection, <b>4</b> students

**Spring 2014:**

BMEN E3820	Biomedical Engineering Laboratory II: Enrollment <b>41</b> Neurophysiology Module
BMEN E3998	Projects in Biomedical Engineering: Enrollment <b>1</b>

BMEN E4002 Quantitative Physiology II: Enrollment **56**

Student Evaluation: 4.34/5.0

BMEN E9500 Doctoral Research: Enrollment **2**

**Fall 2014:**

BMEN E3998 Projects in Biomedical Engineering: Enrollment **1**

BMEN E6003 Computational Modeling of Physiological Systems: Enrollment **41**

Student Evaluation: 4.27/5.0

BMEN E9100 Masters Research: Enrollment **2**

BMEN E9500 Doctoral Research: Enrollment **1**

BMEN E3910 Biomedical Engineering Design

Faculty Advisor: Dehydration Sensor, **4** students

**Spring 2015:**

BMEN E3820 Biomedical Engineering Laboratory II: Enrollment **41**

Neurophysiology Module

BMEN E3998 Projects in Biomedical Engineering: Enrollment **2**

BMEN E4002 Quantitative Physiology II: Enrollment **73**

Student Evaluation: 4.37/5.0

BMEN E9100 Masters Research: Enrollment **2**

**Fall 2015:**

BMEN E3998 Projects in Biomedical Engineering: Enrollment **1**

BMEN E6003 Computational Modeling of Physiological Systems: Enrollment **43**

Student Evaluation: pending/5.0

BMEN E9100 Masters Research: Enrollment **2**

BMEN E3910 Biomedical Engineering Design

Faculty Advisor: Resource Constrained Medical Devices, **4** students

**C.1.c CourseWorks Evaluation**

*(Online student evaluation system was not implemented until the fall of 2004)*

Year	Course	Enrollment	Avg. Rating / 5.0
2004	BMEN E3810	70	3.46
2005	BMEN E4002	87	3.97
	BMEN E6002	41	3.51
2006	BMEN E4002	73	4.19
	BMEN E6002	27	3.29
2007	BMEN E4002	69	4.26
	BMEN E6002	26	3.60
2008	BMEN E4002	91	4.14
	BMEN E6003	16	4.10



2009	BMEN E4002	75	4.07
	BMEN E6003	33	3.38
2010	BMEN E4002	62	3.89
	BMEN E6003	52	4.09
2011	BMEN E4002	65	4.14
	BMEN E6003	38	3.77
2012	BMEN E4002	66	4.19
	BMEN E6003	40	4.13
2013	BMEN E4002	72	4.33
	BMEN E6003	31	4.23
2014	BMEN E4002	56	4.34
	BMEN E6003	41	4.27
2015	BMEN E4002	73	4.37
	BMEN E6003	43	pending

## C.2 Research Training and Mentoring

<i>Summary</i>			
	<i>Total</i>	<i>Completed</i>	<i>In Progress</i>
<b><i>Masters<sup>a</sup></i></b>	7	7	0
<i>As Sponsor</i>	1	1	0
<i>As Supervisor</i>	6	6	0
<b><i>Doctoral</i></b>	31	26	5
<i>As Sponsor</i>	11	7	4
<i>As Reader</i>	20	19	1
<b><i>Undergraduates</i></b>	62	59	3
<b><i>High School</i></b>	7	7	0

(<sup>a</sup>Masters students are defined as those in the terminal M.S. program. Doctoral students are defined as those in the M.S. leading to Ph.D. program.)

### *Post-Doctoral Research Fellows Sponsored*

1. Cezar Goletiani, 2008 – 2010  
(Ph.D. from Georgian Academy of Sciences, Georgia. Subsequent position: Post-doc, New York Medical College)
2. John D. Finan, 2010 – 2012  
(Ph.D. from Duke University. Current position: Research Scientist, NorthShore Hospital System)
3. Patricia Washington, 2014 –  
(Ph.D. from Georgetown University)

### *Post-Doctoral Research Fellows Self-sponsored*

1. John D. Finan, 2012 – 2014  
(Charles H. Revson Senior Fellowship in the Biomedical Sciences, Ph.D. from Duke University, Current position: Research Scientist, NorthShore Hospital System)

#### *Doctoral Students Sponsored*

1. Zhe Yu, 2004 – 2009  
“Experimental Mild TBI Causes Functional Alterations of the Developing Hippocampus & Development of Electrophysiology Research Platforms”  
(Current position: Associate Professor, Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences)
2. Ben S. Elkin, 2004 – 2010, with distinction  
“Biomechanics and Biological Consequences of Traumatic Brain Injury”  
(Current position: Biomechanist, MEA Forensic Engineers & Scientists)
3. Melissa J. Simon, 2005 – 2010  
“Delivery to Brain Cells using Cell-Penetrating Peptides: Evaluation of the TAT Peptide and Development of Techniques for Identifying Novel Peptides”  
(Current position: Analyst, Insight Strategy Advisors)
4. Charles R. Haggart, 2010 (Co-sponsored with Dr. Jeff Holmes)  
“Mechanical Regulation of Myocyte Growth and Remodeling in Cultured Rat Right Ventricular Papillary Muscles”  
(Current position: NRSA Postdoctoral Trainee, University of Virginia)
5. Michael R. Lamprecht, 2007 – 2014  
“A Potential Combination Therapy for Traumatic Brain Injury: 17 $\beta$ -Estradiol and Memantine”  
(Current position: Research Scientist, EpiBone)
6. Woo Hyeun Kang, 2008 – 2014  
“Reducing the Societal Costs of Traumatic Brain Injury: Astrocyte-Based Therapeutics and Functional Injury Tolerance of the Living Brain”  
(Current position: Consultant, ClearView Healthcare Partners)
7. Christopher D. Hue, 2010 – 2015  
“Blood-Brain Barrier Dysfunction and Repair after Blast-Induced Traumatic Brain Injury”  
(Current position: Medical School Student, University of Toronto)
8. Gwen Effgen, 2010 –
9. Edward Vogel, 2011 –
10. Sowmya Sundaresh, 2014 –
11. Sonali Ahuja, 2014 –

#### *Doctoral Student Thesis Committee Membership*

1. Kristi Hultman, 2007 (Applied Physics)
2. Johnathan Lai, 2007 (Biomedical Engineering)
3. Matt Neimark, 2007 (Biomedical Engineering)
4. Shan Gao, 2009 (Chemical Engineering)
5. James Choi, 2009 (Biomedical Engineering)
6. Wei Yuan, 2009 (Biomedical Engineering, *City College of NY*)

7. Michael Albro, 2009 (Biomedical Engineering)
8. Peng Shi, 2009 (Biomedical Engineering)
9. Guanglei Li, 2010 (Biomedical Engineering, *City College of NY*)
10. Gregory Fomovsky, 2010 (Biomedical Engineering)
11. Melinda Kutzing, 2011 (Biomedical Engineering, *Rutgers University*)
12. Stanley Huang, 2011 (Biomedical Engineering)
13. Parisa Saboori, 2011 (Biomedical Engineering, *City College of NY*)
14. Rudy Cloots, 2011 (Materials Technology, *Eindhoven University of Technology*, Netherlands)
15. Jean-Pierre Dolle, 2012 (Biomedical Engineering, *Rutgers University*)
16. Yao-Sheng Tung, 2012 (Biomedical Engineering)
17. Brenda Chen, 2012 (Biomedical Engineering)
18. Maged Elwassif, 2013 (Biomedical Engineering, *City College of NY*)
19. Gesthimani Samiotaki, 2014 (Biomedical Engineering)
20. Kate M. O'Neill, expected 2016 (Biomedical Engineering, *Rutgers University*)

#### *Masters Student Research Sponsored*

1. Shamik Chaudhuri, 2006 – 2008

#### *Masters Student Research Supervised*

1. Patricia Park, 2003 – 2004
2. Mariel Kozberg, 2009
3. Bridget Matikainen, 2009 – 2010
4. Kai-Roy Wang, 2010-2011
5. Elise Gill, 2011
6. Ryan Van Echo, 2013

#### *Undergraduate Student Research Supervised*

1. Joshua Lennon, 2003 – 2004; 2. Shira Katseff, 2003 – 2004; 3. Christina Fan, 2003 – 2005; 4. Lawrence David, 2003 – 2005; 5. Weng Si Ho, 2004; 6. Eric Chang, 2004; 7. Rene Choi, 2004; 8. Barry Whol, 2004; 9. Tim Chou, 2004 – 2005 ; 10. Gidon Ofek, 2004 – 2005; 11. Zafeer Baber, 2004 – 2005 ; 12. Kristin Olsen, 2004 – 2007; 13. Hyun Choi, 2005 – 2006 ; 14. Pravin Chottera, 2005 – 2006; 15. Kartik Kesavabhotla, 2007 – 2008; 16. Nina Xu, 2007; 17. Steve Xu, 2007; 18. Ashok Ilankovan, 2007 – 2009; 19. Mohammed Shaik, 2008 – 2011; 20. Vikrum Thimmappa, 2008 – 2009; 21. Hsuan Lai, 2008; 22. Chris Nguyen, 2009 – 2010; 23. Chris Puleo, 2009 – 2010; 24. Gwen Effgen, 2009 – 2010; 25. Patrick Fox, 2009 – 2011 ; 26. Anthony Assad, 2010; 27. Jessica Chen, 2010 – 2011; 28. Erica Pearson, 2011; 29. Irene Kalbian, 2011; 30. Deryn Jakolev, 2011; 31. Kimberly Lynch, 2011 – 2013; 32. Josh Muniz, 2011 – 2012; 33. Victoria Silva, 2011 – 2012; 34. Kiet Vo, 2011 – 2012; 35. Mayra Velazquez, 2011 – 2012 ; 36. Christian Carter, 2011 – 2012; 37. Meredith Venerus, 2011; 38. Syed Haider, 2012; 39. Chris So, 2012-2013; 40. Daniel Campo, 2012; 41. Shruthi Nammalwar, 2012 – 2015; 42. Tiffany Ong, 2012-2015; 43. Siqui Cao, 2012 – 2014; 44. Elena Ripp, 2012; 45. Zafirah Baksh, 2012; 46. Akaljot Singh, 2013;

47. Ayelet Lobel, 2012 – 2014; 48. Thanh Nguyen, 2012 -2013; 49. Morgan Caglianone, 2013-2014; 50. Tighe Costa, 2013-2014; 51. Leonard Ash, 2013; 52. Frances Cho, 2013-2015; 53. Jessica Villacorta, 2013; 54. John Brady, 2013-2015; 55. Andrea Ortuno, 2013-2015; 56. Cosmas Sibindi, 2014; 57. Samuel Weinreb, 2014; 58. Steve Rwema, 2015- ; 59. Thalia Matos 2015; 60. Jehelia Odidi, 2015; 61 Stephanie Yang, 2015- ; 62. Nathalie Morales, 2015;

#### *High School Students Supervised*

1. Sarah Goldman, 2004 – 2005; 2. Stephanie David, 2006, 3. Aaron Huang, 2012 – 2013; 4. Charles Levin, 2012; 5. Lamia Ateshian, 2013; 6, Jessica Lang, 2013; 7, Zoe Ross, 2014

### **D. Positions Held since Final Degree**

1999-1999 Post-doctoral Fellow, Department of Neurosurgery, University of Pennsylvania, Philadelphia, PA  
**Mentor:** Tracy K. McIntosh, Ph.D.

2000-2002 Post-doctoral Fellow, Clinical Neurosciences Department, Southampton University, UK  
**Mentor:** Lars E. Sundstrom, Ph.D.

2003-2008 Assistant Professor of Biomedical Engineering, Columbia University, NY  
2004- Director, Neurotrauma and Repair Laboratory, Columbia University, NY  
2008-2012 Associate Professor (untentured), Biomedical Engineering, Columbia University, NY  
2012- Associate Professor (tenured), Biomedical Engineering, Columbia University, NY  
2012-2014 Vice Chair, Biomedical Engineering, Columbia University, NY  
2014- Vice Dean of Undergraduate Programs, Fu Foundation School of Engineering and Applied Science, Columbia University, NY

### **E. Publications**

*(\* indicates Morrison as corresponding author; underline indicates Morrison's mentees; **bold number** indicates published while at Columbia; in Morrison's field, the senior author is either first or last; T publication derived from thesis; R undergone stringent editorial review by peers; I invited and carries special prestige and recognition; S published with a student; P published with a post-doc; C published with faculty colleagues; as of March 23, 2015, ISI citation metrics: total citations 1239, h index 19; Google Scholar citation metrics: total citations 2153, h index 26)*

#### **E.1 Doctoral Thesis**

"Differential Genomic Expression after Mechanical Injury of Organotypic Brain Slice Cultures: An *In Vitro* Model of Traumatic Brain Injury", (1999), *University of Pennsylvania*

#### **E.2 Full-length, Peer Reviewed Publications**

1. (TR) **Morrison III, B.**, Meaney, D.F., and McIntosh, T.K., *Mechanical characterization of an in vitro device to quantitatively injure living brain tissue*. Ann.Biomed.Eng., 1998. **26**: p. 381-90.
2. (TR) **Morrison III, B.**, Saatman, K.E., Meaney, D.F., and McIntosh, T.K., *In vitro central nervous system models of mechanically induced trauma: A review*. J.Neurotrauma, 1998. **15**: p. 911-28.
3. (TR) O'Dell, D.M., Raghupathi, R., Crino, P.B., **Morrison III, B.**, Eberwine, J.H., and McIntosh, T.K., *Amplification of mRNAs from single, fixed, TUNEL-positive cells*. BioTechniques, 1998. **25**: p. 566-8.
4. (TR) **Morrison III, B.**, Eberwine, J.H., Meaney, D.F., and McIntosh, T.K., *Traumatic injury induces differential expression of cell death genes in organotypic brain slice cultures determined by complementary DNA array hybridization*. Neurosci., 2000. **96**: p. 131-9.
5. (TR) **Morrison III, B.**, Meaney, D.F., Margulies, S.S., and McIntosh, T.K., *Dynamic mechanical stretch of organotypic brain slice cultures induces differential genomic expression: Relationship to mechanical parameters*. J.Biomech.Eng., 2000. **122**: p. 224-30. (Best Paper Award in the journal for that year)
6. (R) **Morrison III, B.**, Pringle, A.K., McManus, T., Ellard, J., Bradley, M., Signorelli, F., Iannotti, F., and Sundstrom, L.E., *L-arginyl-3,4-spermidine is neuroprotective in several in vitro models of neurodegeneration and in vivo ischaemia without suppressing synaptic transmission*. Brit.J.Pharm., 2002. **137**: p. 1255-68.
7. (R) Cater, H.L., Chandratheva, A., Benham, C.D., **Morrison III, B.**, and Sundstrom, L.E., *Lactate and glucose as energy substrates during, and after, oxygen deprivation in rat hippocampal acute and cultured slices*. J.Neurochem., 2003. **87**: p. 1381-90.
8. (RC) \***Morrison III, B.**, Cater, H.L., Wang, C.B., Thomas, F.C., Hung, C.T., Ateshian, G.A., and Sundstrom, L.E., *A tissue level tolerance criteria for living brain developed with an in vitro model of traumatic mechanical loading*. Stapp Car Crash J., 2003. **47**: p. 93-105. (Best paper award in the journal for that year)
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2. (RSC) \*Lamprecht MR, Elkin BS, Kesavabhotla K, Crary JF, Raghupathi R, Morrison III B. Correlation of genome-wide expression after traumatic brain injury in vitro and in vivo implicates a role for SORLA. submitted.

#### E.4 Refereed Conference Proceedings

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## E.5 Book Chapters

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## E.6 Refereed Abstracts

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## **E.7 Popular Press Articles**

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(IC) **Morrison III, B.**, Meaney, D.F., Bass, C.R., Fundamental insights into blast TBI, in The Challenge: The Future of Research, Summer 2013  
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## **E.8 Press Releases and Quotations**

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- 1/29/2009 "Stretchy Electrodes Wire Up Cells"  
<http://www.technologyreview.com/biomedicine/22031/>
- 9/2009 "Preventing traumatic brain injury", featured in Engineering News - the Columbia University's School of Engineering and Applied Sciences (SEAS) newsletter  
[http://engineering.columbia.edu/web/newsletter/fall\\_2009/preventing\\_traumatic\\_brain\\_injury](http://engineering.columbia.edu/web/newsletter/fall_2009/preventing_traumatic_brain_injury)
- 4/19/2010 "Ultrathin silk-based electronics make better brain implants"  
<http://www.wired.com/wiredscience/2010/04/silk-brain-computer-interface/>
- 6/9/2010 Portilla, L.M. and B. Alving, Reaping the benefits of biomedical research: partnerships required. Sci.Transl.Med., 2010. 2(35): p. 35cm17.  
<http://stm.sciencemag.org/content/2/35/35cm17.full>
- 6/8/2011 "Imaging method reveals hidden brain injuries"  
<http://www.technologyreview.com/biomedicine/37722/>
- 10/16/2012 "Understanding the biomechanics of brain injury to find treatments for injured soldiers, athletes", featured in The Record, Columbia University
- 3/11/2015 "Steroids rapidly restore blood-brain barrier function after blast"  
<http://engineering.columbia.edu/steroids-rapidly-restore-blood-brain-barrier-function-after-blast-0>
- 9/23/2015 "Prof. Barclay Morrison lecture underscores advances in brain injury research"  
<http://engineering.columbia.edu/prof-barclay-morrison-lecture-underscores-advances-brain-injury-research>

## F. Research funding

### F.1 Current Funding

(The % numbers indicate effort dedicated to the project)

<b>PI: Morrison III, B.</b>	<b>10%</b>	<b>9/15-8/17</b>
Research Initiatives in Science & Engineering (RISE)		Total: \$160,000
Columbia University		

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“Novel edema therapy”

The purpose of this grant is to test the efficacy of anti-edema treatments to control brain swelling after traumatic brain injury in the mouse.

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58155-LS-MUR PI: Meaney, D.F. (Penn) 9/10-12/16

**Co-PI: Morrison III, B.** 20%

Co-PI: Bass, C.R. (Duke)

DoD: Multi University Research Initiative (MURI) Total: \$5,952,269; Morrison: \$1,724,000

“Blast Induced Threshold for Neural Networks (BITNeT)”

The purpose of this grant is to determine thresholds for brain tissue to blast-induced injury and neuronal dysfunction.

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R43 NS086118 PI: Graudejus, O. 7/14-12/16

**Co-I: Morrison III, B.** 10%

NIH: NINDS Total: \$550,480; Morrison \$128,416

“Lab-To-Marketplace: Commercialization of a stretchable microelectrode array”

The purpose of this grant is to develop a commercially viable process for producing stretchable microelectrode arrays so that they may be sold for research purposes.

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R01AG038961 PI: Konofagou, E.E. (Columbia) 8/11-5/16

**Co-I: Morrison III, B.** 10%

National Institutes of Health Total: \$1,434,000; Morrison: \$150,000

“Assessment of ultrasound-facilitated neurotherapeutics”

The purpose of this grant is to use ultrasound to transiently open the blood brain barrier and to deliver therapeutic compounds in sufficient quantity to reduce Alzheimer’s disease symptoms in a mouse model.

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5R01EB009041 PI: Konofagou, E.E. 9/14-8/19

**Co-I: Morrison III, B.** 10%

NIBIB Total: \$3,041,154; Morrison \$250,000

“Optimization of ultrasound-facilitated blood-brain barrier opening”

The purpose of this competitive renewal grant is to optimize ultrasound parameters for non-invasive opening of the BBB.

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## F.2 Pending Funding

PI: Nicholls, R. (Columbia) 9/15-8/18

**Co-I: Morrison III, B.** 10%

Department of the Army Total: \$725,000; Morrison \$235,000

“TBI-Induced Formation of Toxic Tau and Its Biochemical Similarities to Tau in AD Brains”

The purpose of this grant is to explore whether blast brain injury modified tau into a

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toxic, prion-like molecule similar to that in Alzheimer's disease.

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### F.3 Completed Funding

W81XWH-11-MRPRA- PI: Arancio, O. (Columbia) 9/12-8/15  
TRA Co-I: Morrison III, B. 10%

Telemedicine and Advanced Technology Research Center Total: \$800,000; Morrison \$235,000

"The role of PP2A methylation in susceptibility and resistance to TBI and AD-induced neurodegeneration"

The purpose of this grant is to explore the molecular mechanisms that underlie the cognitive decline and mental health problems resulting from blast-induced traumatic brain trauma.

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PI: Morrison III, B. 0% 6/14-5/15

DoD: Defense University Research Instrumentation Program (DURIP) Total: \$285,000

"Multi-user high-speed 3D optical imaging system dedicated to engineering research and education"

The purpose of this equipment grant is to obtain a high-speed, 3D imaging system to support brain injury activities.

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PI: Arancio, O. (Columbia) 7/12-12/13

Co-I: Morrison III, B. 4%

National Football League Charities Total: \$100,000; Morrison \$8,000

"The role of PP2A methylation in Chronic Traumatic Encephalopathy Susceptibility and Recovery"

The purpose of this grant is to explore the molecular mechanisms that underlie the cognitive decline and mental health problems resulting from repetitive traumatic brain injuries.

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PI: Morrison III, B. 0% 11/12-10/13

CUMC Center for Injury Epidemiology and Prevention Total: \$10,000

"Molecular mechanisms of repetitive, mild traumatic brain injury"

The purpose of this pilot grant is to test molecular mechanisms which give rise to secondary injury syndrome in traumatic brain injury.

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R01 EB009041 PI: Konofagou, E.E. (Columbia) 09/08-08/13

Co-I: Morrison III, B. 10%

National Institutes of Health Total: \$2,236,475; Morrison: \$150,000

"Optimization of ultrasound-facilitated blood-brain barrier opening"

The purpose of this grant is to optimize ultrasound parameters to transiently and safely

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open the blood brain barrier and to identify mechanisms of opening.

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10-3215-BIR	PI: Shreiber, D.I. (Rutgers)	6/10-5/13
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**Co-I: Morrison III, B.**      4%

New Jersey Commission on Brain Injury Research	Total: \$494,993; Morrison: \$164,992
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“Evaluation of genipin as a multi-potent therapeutic agent following brain injury”

The purpose of this grant is to test whether the natural product genipin is neuro-protective and neuro-regenerative after traumatic brain injury.

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DTNH2208C00088	PI: <b>Morrison III, B.</b>	09/08-02/13
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25%

National Highway Traffic Safety Administration	Total: \$934,000
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“Critical studies to advance brain injury biomechanics through SIMon”

The purpose of this grant is to generate critical data necessary for NHTSA’s finite element model of the human head for car crash testing, including functional tolerance criteria and age-dependent, anisotropic brain material properties.

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CBET-0853946	PI: Banta, S. (Columbia)	06/09-05/12
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**Co-PI: Morrison III, B.**      2%

National Science Foundation	Total: \$300,000
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“Directed evolution of specific cell penetrating peptides”

The purpose of this grant is to use phage display and directed evolution to discover new cell penetrating peptides with the ability to target cargoes to specific brain cell types.

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09-3209-BIR	PI: Firestein, B. (Rutgers)	06/08-05/12
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**Co-PI: Morrison III, B.**      8%

Co-PI: Wagner S. (Princeton)

Co-PI: Meaney D.F. (Penn)

New Jersey Commission on Brain Injury Research	Total: \$1,800,000; Morrison: \$300,000
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“The mechanisms and efficacy of using uric acid to improve outcome after traumatic brain injury”

The purpose of this grant is to evaluate the efficacy of uric acid in preventing both cell death and neuronal dysfunction after TBI.

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57510-LS-RIP	PI: <b>Morrison III, B.</b>	11/10-10/11
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0%

DoD: Defense University Research Instrumentation Program (DURIP)	Total: \$83,000
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“Multi-department, multi-user microelectrode array electrophysiology setup dedicated to engineering research and education”

The purpose of this equipment grant is to obtain an electrophysiology rig to support ongoing research projects and education of graduate and undergraduate students.

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R21 MH080024	PI: Banta, S. (Columbia)	05/07-04/10
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**Co-PI: Morrison III, B.**      10%

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National Institutes of Health NIMH Total: \$361,580

“Delivery Systems for Precision Brain Cell Targeting”

The goal of this project is to develop homing peptides with the ability to systemically treat injured brain cells by targeted delivery of therapeutic compounds.

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R21 EY18505 PI: Konofagou, E.E. (Columbia) 09/07-08/09

**Co-I: Morrison III, B.** 10%

National Institutes of Health NEI Total: \$412,250

“Ultrasound-Induced Drug Delivery through the Blood-Brain Barrier”

The main objective is to determine the factors in the effective molecular delivery in the hippocampus of wild-type mice and mice affected by neurodegenerative disease.

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PI: Kaufmann, P. (Columbia) 07/08-06/09

**Co-I: Morrison III, B.** 8%

Columbia University Clinical and Translational Science Award (Phase 2) Total: \$125,000

“Gravity Neutral Orthotic (GNO)- Design and evaluation of a novel rehabilitation device for people with severe physical disability”

The purpose of this grant is to develop an orthotic device to improve mobility of severely disable children with spinal muscular atrophy.

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W81XWH-08-1-0293 PI: Bergold, P. (SUNY Downstate) 09/08-04/09

**Co-I: Morrison III, B.** 4%

US Army Medical Research and Materiel Command Total: \$180,000; Morrison: \$38,000

“Multidrug treatment of traumatic brain injury”

The purpose of this grant is to use an organotypic model of TBI to test the therapeutic efficacy of drug combinations.

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R21 NS052794 **PI: Morrison III, B.** 15% 05/06-04/08

National Institutes of Health NINDS Total: \$374,233

“Elastomeric Microelectrode Array for in-Vitro Brain”

The purpose of this R21 proposal is to develop a stretchable microelectrode array on a silicone rubber substrate that is compatible with *in vitro* models of stretch injury enabling continuous electrophysiological recording pre-, during, and post-stretch.

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R03 NS054256 **PI: Morrison III, B.** 1% 06/06-05/08

National Institutes of Health NINDS Total: \$148,717

“Temporal transcriptomes of TBI and OGD for dissemination (T3OD)”

The purpose of this R03 is to measure temporal changes in mRNA levels across the entire genome after traumatic brain injury and oxygen glucose deprivation and to release these datasets via the NCBI Gene Expression Omnibus and the NIH's Neuroscience Microarray Consortium.

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**PI: Morrison III, B.**      10%      02/07-01/09

The Gatsby Initiative in Brain Circuitry      Total: \$50,000

“Novel nanofiber technology for dissection of neural circuit function “

The purpose of this proposal is to develop carbon nanofiber-based, microelectrode arrays for multimode recording of neuronal function.

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W911NF-08-1-0236      **PI: Morrison III, B.**      0%      04/08-04/09

DoD: Defense University Research Instrumentation Program (DURIP)      Total: \$196,680

“Multi-Department, Multi-User Flow Cytometer Dedicated to Engineering Research and Education”

The purpose of this grant is to purchase a multi-user piece of equipment to enhance ongoing and future research projects funded or of interest to the DoD.

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PI: Vunjak-Novakovic, G. (Columbia)      04/08-03/09

**Co-I: Morrison III, B.**      0%

New York State’s Stem Cell Board      Total: \$1,000,000

“Institutional Development of Stem Cell Research Capabilities”

The purpose of this grant is to establish an imaging core facility in the BME department.

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PI: Kaufmann, P. (Columbia)      05/07-05/08

**Co-I: Morrison III, B.**      0%

Columbia University Clinical and Translational Science Award (Phase 1)      Total: \$25,000

“Gravity Neutral Orthotic (GNO) – Design and Evaluation of a device to improve the lives of severely disabled children with Spinal Muscular Atrophy (SMA)”

The purpose of this grant was to develop a collaborative team for design of an orthotic device to improve mobility of severely disabled children with spinal muscular atrophy.

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**PI: Morrison III, B.**      10%      05/05-04/08

Southern Consortium for Injury Biomechanics & National Highway Traffic Safety Administration      Total: \$300,000

“Quantitative tolerance criteria for SIMon: cell death and dysfunction”

The goal of this project is to determine mechanical tolerance criteria for living brain tissue for both cell death and functional impairments. The tolerance criteria will be implemented into NHTSA’s finite element crash simulator to predict the biological response to virtual crashes.

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PI: Banta, S. (Columbia)      08/05-12/07

**Co-PI: Morrison III, B.**      10%

The Brain Trust      Total: \$200,000

“Directed evolution of cell penetrating peptides for therapeutic delivery across the blood-brain barrier to specific cellular targets”

The goal of this research is to discover cell penetrating peptides that can shuttle

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therapeutic cargoes across the blood brain barrier and target specific brain cell types.

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**PI: Morrison III, B.** 50% 01/01-12/03

Co-PI: Sundstrom, L.E.

Defense Evaluation and Research Agency & the Medical Research Council Total: £200,000

“Development of a clinically relevant *in vitro* model of traumatic brain injury”

The goal of this research was to develop an *in vitro* model of traumatic brain injury to replace *in vivo* models.

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**PI: Morrison III, B.** 50% 01/01-12/03

Co-PI: Sundstrom, L.E.

European Commission Total: €315,000

“Establishment of a clinically relevant model of shear injury in organotypic brain slice cultures”

The purpose of this project was to build a physical injury device compatible with long-term organotypic slice cultures to study functional consequences of traumatic brain injury and to track the long term recovery of function over time after injury.

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#### **F.4 Direct Student Support**

- 2007-2010 M.J. Simon, National Science Foundation Graduate Research Fellowship; “Discovery of Protein Engineering Design Principles for Cell-Specific, Cell-Penetrating Peptides”, Advisor: **B. Morrison III**
- 2008-2010 B.S. Elkin, Natural Sciences and Engineering Research Council of Canada Postgraduate Scholarship “Mechanical Properties of Brain Tissue: Implications for Traumatic Brain Injury” Advisor: **B. Morrison III**
- 2009-2012 M.R. Lamprecht, National Science Foundation Graduate Research Fellowship; “Utilizing Dual Sensing Electrode Arrays to Delineate the Role of Astrocytes in Spike-Timing-Dependent Plasticity after Traumatic Brain Injury”, Advisor: **B. Morrison III**
- 2012-2015 C.D. Hue, National Science Foundation Graduate Research Fellowship; “Engineering Novel Cell Penetrating Peptides for Therapeutic Delivery Across the Blood-Brain Barrier to Specific Cellular Targets”, Advisor: **B. Morrison III**
- 2012-2015 E.W. Vogel, National Defense Science and Engineering Graduate Research Fellowship; “Quantitative Thresholds For Blast Traumatic Brain Injury”, Advisor: **B. Morrison III**

#### **F.5 Direct Fellow Support**

- 2012-2014 J.D. Finan, Charles H. Revson Senior Fellowship in the Biomedical Sciences; “Anti-edema treatments for brain swelling”, Advisor: **B. Morrison III**
- 2015 E. Chierito, Mobility Grant, Universite Paris Descartes; “Organotypic cerebellar slice cultures on deformable substrates”, Advisors: M. Jararian-Tehrani & **B. Morrison III**

## **G. Other Honors and Awards**

- 1999 Biomedical Engineering Society Travel Award
- 1999 National Neurotrauma Society Travel Award
- 2001 Richard Skalak Best Paper Award in the *Journal of Biomechanical Engineering* for 2000, Bioengineering Division of the American Society of Mechanical Engineers:  
**Morrison III, B.**, Meaney, D.F., Margulies, S.S., and McIntosh, T.K., *Dynamic mechanical stretch of organotypic brain slice cultures induces differential genomic expression: Relationship to mechanical parameters.* J.Biomech.Eng., 2000. **122**: p. 224-30.
- 2004 John Paul Stapp Best Paper Award in the *Stapp Car Crash Journal* for 2003:  
**Morrison III, B.**, Cater, H.L., Wang, C.B., Thomas, F.C., Hung, C.T., Ateshian, G.A., and Sundstrom, L.E., *A tissue level tolerance criteria for living brain developed with an in vitro model of traumatic mechanical loading.* Stapp Car Crash J., 2003. **47**: p. 93-105.
- 2006 The Kim Award for Student-Faculty Involvement, Fu Foundation School of Engineering and Applied Science, Columbia University, New York, NY
- 2006 Invited speaker, annual National Neurotrauma Symposium
- 2009 Keynote speaker, annual meeting of the International Research Council on Biomechanics of Injury
- 2010 Invited speaker, annual National Neurotrauma Symposium
- 2013 Cover image, Journal of Neurotrauma for Hue, C.D., Cao, S., Haider, S.F., Vo, K. V., Effgen, G.B., Vogel, E.W., Panzer, M.B., Bass, C.R., Meaney, D.F., **Morrison III, B.**, *Blood-brain barrier dysfunction after primary blast injury in vitro*, J. Neurotrauma, 2013, **30**: 1652-1663.
- 2015 Elected Vice President of the International Research Council on Biomechanics of Injury

### **G.1 Honors and Awards won by Morrison Research Group**

- 2005 **Student Travel Grant (Z. Yu)** from the NINDS Neural Interfaces Workshop 2005; “Highly compliant electrode arrays for improved modulus matching”, Advisor: **B. Morrison III**
- 2006 **Student Travel Grant (Z. Yu)** from the 24<sup>th</sup> Annual National Neurotrauma Symposium; “A new tool to study post-traumatic neuronal dysfunction: stretchable microelectrode arrays”, Advisor: **B. Morrison III**
- 2006 Extraordinary Teaching Assistant Award (B.S. Elkin), from the Fu Foundation School of Engineering and Applied Science, Columbia University, Advisor: **B. Morrison III**

- 2007 **National Science Foundation Graduate Research Fellowship (M.J. Simon);** “Discovery of Protein Engineering Design Principles for Cell-Specific, Cell-Penetrating Peptides”, Advisor: **B. Morrison III**
- 2007 **Stapp Student Award (B.S. Elkin)** from the 51<sup>st</sup> Stapp Car Crash Conference; “Region-specific tolerance criteria for the living brain”, Second Place, Advisor: **B. Morrison III**
- 2008 **Natural Sciences and Engineering Research Council of Canada Postgraduate Scholarship (B.S. Elkin)** “Mechanical Properties of Brain Tissue: Implications for Traumatic Brain Injury” Advisor: **B. Morrison III**
- 2008 **Student Travel Grant (M.J. Simon)** from the 26<sup>th</sup> Annual National Neurotrauma Symposium; “TAT-mediated intracellular delivery is dependent upon cell-type and phenotype: implications for delivery to activated astrocytes following injury” Advisor: **B. Morrison III**
- 2009 **National Science Foundation Graduate Research Fellowship (M.R. Lamprecht);** “Utilizing Dual Sensing Electrode Arrays to Delineate the Role of Astrocytes in Spike-Timing-Dependent Plasticity after Traumatic Brain Injury”, Advisor: **B. Morrison III**
- 2010 **Student Award (B.S. Elkin)** from the 36<sup>th</sup> Northeast Bioengineering Conference “Chondroitin Sulfate Proteoglycans Contribute to Brain Tissue Swelling Behavior”, Advisor: **B. Morrison III**
- 2010 **Student Travel Grant (B.S. Elkin)** from the 28<sup>th</sup> Annual National Neurotrauma Symposium, “The effect of chondroitinase ABC on brain tissue swelling *in vitro*”, Advisor: **B. Morrison III**
- 2010 **Ph.D. Student Poster Competition Finalist (B.S. Elkin)** from the Summer Bioengineering Conference of ASME, “Mechanical properties of the rat brain: effect of age and anatomical region”, Advisor: **B. Morrison III**
- 2011 **Student Travel Grant (M.R. Lamprecht)** from the Annual National Neurotrauma Symposium, “Combinational Drug Therapies as Treatment for Traumatic Brain Injury”, Advisor: **B. Morrison III**
- 2011 **Student Travel Grant (C.D. Hue)** from the Annual National Neurotrauma Symposium, “Blast overpressure induces disruption of brain endothelial monolayer integrity”, Advisor: **B. Morrison III**
- 2011 **Student Poster Competition Finalist (M.R. Lamprecht)** from the Annual National Neurotrauma Symposium, “Combinational Drug Therapies as Treatment for Traumatic Brain Injury”, Advisor: **B. Morrison III**
- 2012 **The Murray Mackay Young Researcher Award (C.D. Hue)** from the International Research Council on Biomechanics of Injury, “Blast-induced disruption of an in vitro blood-brain barrier model”, Advisor: **B. Morrison III**
- 2012 **Oral Presentation Award in Engineering, Mathematics and Physics (S.F. Haider)** from the Annual Biomedical Research Conference for Minority Students, “Increased solute permeability of an in vitro blood-brain barrier model exposed to blast overpressure”, Advisor **B. Morrison III**
- 2012 **Student Poster Competition Finalist (G.B. Effgen)** from the Annual National Neurotrauma Symposium, “A combination of 17 $\beta$ -estradiol and memantine after repetitive, mild traumatic brain injury reduces injury synergy”, Advisor: **B. Morrison III**

- 2013 **Columbia University Presidential Award for Outstanding Teaching by Graduate Students - Finalist (C.D. Hue)**, Advisor **B. Morrison III**
- 2014 **Acorda Scientific Excellence Award from Acorda Therapeutics (A. Huang)**, Advisor **B. Morrison III**
- 2014 **Student Travel Grant (C.D. Hue)** from the Annual National Neurotrauma Symposium, “Dexamethasone potentiates recovery of the blood-brain barrier after primary blast injury in vitro”, Advisor: **B. Morrison III**

## **H. Patents**

- 1. Spermidine derivatives for the treatment of chronic neurodegenerative diseases (European patent #EP2003704764; US patent application #20050124554)
- 2. Treatment of chronic neurodegenerative and related diseases (European patent #EP1471901)
- 3. Chondroitinase ABC reduces brain tissue swelling (patent filed November 23, 2011)

## **I. Professional Service**

### **I.1 Editorial Positions**

2010 – 2013 Associated Editor, *BMC Neuroscience*  
2011 – 2012 Review Editor, *Frontiers in Neurotrauma*  
2012 – Associate Editor, *Journal of Biomechanical Engineering*

### **I.2 Professional Board Positions**

2006 – 2013 Engineering Conferences International, Advisory Board Member  
2012 – International Research Council on Biomechanics of Injury, Council Member  
2012 – 2015 International Research Council on Biomechanics of Injury, Publications Committee  
2014 – International Research Council on Biomechanics of Injury, Membership & Awards Committee  
2015 – Vice President International Research Council on Biomechanics of Injury

### **I.3 Consulting**

- 1. NeoStem, Inc., NY, 2014
- 2. Falcon Sports Biomedical Engineering & Design, Inc., NY 2014 –

### **I.4 Conference Organization**

1. Material Research Society, Spring 2006, San Francisco: Symposium CC: Electrobiological Interfaces on Soft Substrates with Stephanie Lacour (Princeton University) and Joao Conde (Instituto Superior Tecnico)
2. IASTED International Conference on Biomechanics (BioMech 2006), Palma De Mallorca, Spain, Advisory Board
3. Material Research Society, Spring 2007, San Francisco: Advanced Materials for Neuroprosthetics with Daryl Kipke (University of Michigan), Stephanie Lacour (Cambridge University), Dustin Tyler (Case Western Reserve)
4. Material Research Society, Spring 2008, San Francisco: Materials and Technology for Fully Elastic Electronic Applications with Stephanie Lacour (Cambridge University) John Rogers (University of Illinois, Urbana-Champaign), Takao Someya (University of Tokyo)
5. Engineering Conference International, Nanotechnology for the Study of Cellular and Molecular Interactions, session titled "Nanoscience for Neuroscience", June 14-18<sup>th</sup>, 2009.
6. Engineering in Medicine and Biology Conference, Co-chair of track 6.9 Neural Trauma with Michelle LaPlaca (Georgia Technical Institute), September 2-6<sup>th</sup>, 2009.
7. Material Research Society, Spring 2010, San Francisco: Stretchable electronics and conformal biointerfaces with Stephanie Lacour (Cambridge University) John Rogers (University of Illinois, Urbana-Champaign), Siegfried Bauer (Johannes-Kepler Universität Linz)
8. Material Research Society, Fall 2011, Boston: Compliant electronics and photonics with Sigfried Bauer (Johannes-Kepler Universität Linz), Kunigunde Cherenack (ETH), and Tsuyoshi Sekitani (University of Tokyo)
9. Biomedical Engineering Society, Fall 2011, Hartford: Neural Engineering Track Chair with Lance Kam (Columbia University)
10. 6<sup>th</sup> International Conference on Biomechanics, International Association of Science and Technology for Development (IASTED), Conference Chair, November 7-9<sup>th</sup>, 2011.
11. 17<sup>th</sup> US National Congress on Theoretical & Applied Mechanics, Minisymposium Chair with King Yang (Wayne State University), "Traumatic Brain Injury Biomechanics", June 15-20<sup>th</sup>, 2014.

## **I.5 Session Chair**

1. 5<sup>th</sup> World Congress on Biomechanics, 2006, Munich, Germany: Impact biomechanics; spine kinematics and injury biomechanics with Dale Bass (University of Virginia)
2. IEEE Engineering in Medicine and Biology Conference 2006, New York City: Neural and Rehabilitation Engineering, and Neuromuscular Systems
3. Material Research Society, Spring 2006, San Francisco: Electrode coating: Electrical transfer I
4. Material Research Society, Spring 2007, San Francisco: Surface Biofunctionalization
5. NIH, NINDS workshop Combination Therapies for TBI, 2008, Rockville, MD: "Strategies for Testing Combination Therapies for TBI: *in vitro* screening" with Dr. David Meaney (University of Pennsylvania)

6. NIH, NINDS Workshop, Neurological Effects of Blast Injury, 2008 Rockville, MD: "Understanding the Biophysics and Biomechanics of the Brain" with Dr. Christopher White (*National Institute of Standards and Technology*).
7. Material Research Society, Spring 2008, San Francisco: Chaired 3 Sessions
8. Engineering Conference International, Nanotechnology for the Study of Cellular and Molecular Interactions, session titled "Nanoscience for Neuroscience", June 14-18<sup>th</sup>, 2009.
9. Engineering in Medicine and Biology Conference, "Neural Trauma", September 2-6<sup>th</sup>, 2009.
10. Northeast Bioengineering Conference, "Imaging of Biomaterials", March 28<sup>th</sup>, 2010.
11. Material Research Society, "Electrode-tissue Interface", April 8-9<sup>th</sup>, 2010.
12. 6<sup>th</sup> World Congress on Biomechanics, 2010, Singapore: "Head/Brain Injury: Tolerances", August 1-6<sup>th</sup>, 2010.
13. Material Research Society, Chaired 2 Sessions, November 29-30, 2011.
14. 45<sup>th</sup> Winter Conference on Brain Research, Snowbird, UT: "Blast traumatic brain injury", January 21-26, 2012
15. Biomedical Engineering Society, Fall 2012, Atlanta: "Neuro Trauma Injury & Repair I", October 26, 2012.
16. Biomedical Engineering Society, Fall 2012, Atlanta: "Neuro Trauma Injury & Repair II", October 27, 2012.
17. International Research Council on Biomechanics of Injury Conference, 2013, Gothenburg, Sweden: "Tissue Characterization II", September 12, 2013
18. International Research Council on Biomechanics of Injury Conference, 2013, Gothenburg, Sweden: "Tissue Characterization III", September 13, 2013
19. Biomedical Engineering Society, Fall 2013, Seattle: "Clinical Biomechanics", September 28, 2013.
20. International Research Council on Biomechanics of Injury Conference, 2014, Berlin, Germany: "Tissue Biomechanics - Tissue Characterization I", September 10, 2014
21. International Research Council on Biomechanics of Injury Conference, 2014, Berlin, Germany: "Tissue Biomechanics - Tissue Characterization II", September 11, 2014
22. Material Research Society, "Stretchable Electronic Materials for Transducers, Biosensors and Optical Devices I", April 8<sup>th</sup>, 2015.
23. International Research Council on Biomechanics of Injury Conference, 2015, Lyon, France: "Brain / Head Injury/ Tissue Biomechanics", September 10, 2015
24. International Research Council on Biomechanics of Injury Conference, 2015, Lyon, France: "Blast Injury", September 10, 2015

## **I.6 Conference Panel Participant**

1. Brain Injuries and Neuro-Regeneration Panel, Biomedical Science and Engineering Conference, Oak Ridge National Laboratory, May 26<sup>th</sup>, 2010.
2. IEEE EMBS Forum on Grand Challenges in Neuroengineering, Bethesda, May 7<sup>th</sup> & 8<sup>th</sup>, 2010
3. Kavli Salon on Neurodegeneration III, Rockefeller University, NY, November 5<sup>th</sup>, 2015

## **I.7 Grant Reviewer**

2009	Center for Materials Innovation, Washington University in St. Louis
2009	The Severnside Alliance for Translational Research, United Kingdom
2009	Collaborative and Multidisciplinary Pilot Research (CaMPR) Phase I, Irving Institute for Clinical and Translational Research, Columbia University
2010	United States-Israel Binational Science Foundation, Israel
2010	Wessex Medical Research, United Kingdom
2010	Wellcome Trust, United Kingdom
2010	National Football League Charities Medical Research Grants (internal Columbia review)
2011	Emerging Technologies and Training in Neurosciences (ETTN-10), National Institutes of Health (2X)
2012	New Jersey Commission on Spinal Cord Research
2012	Research Council Katholieke Universiteit Leuven, Netherlands
2012	Emerging Technologies and Training in Neurosciences (ETTN-10), National Institutes of Health
2012	Collaborative and Multidisciplinary Research (CaMPR) Award Phase I, (internal Columbia review)
2013	Collaborative and Multidisciplinary Research (CaMPR) Award Phase II, (internal Columbia review)
2015	Research Initiative in Science and Engineering (RISE) (internal Columbia review)
2015	Blavatnik Awards for Young Scientists (internal Columbia review)

## **I.8 Manuscript Reviewer**

1. *ACS Nano*
2. *Acta Biomaterialia*
3. *Annals of Biomedical Engineering*
4. *American Association of Pharmaceutical Scientists Journal*
5. *Biomechanics and Modeling in Mechanobiology*
6. *Biomedical Microdevices*
7. *Biophysical Journal*
8. *Cellular and Molecular Bioengineering*
9. *Computational Material Science*
10. *Computer Methods in Biomechanics and Biomedical Engineering*
11. *Cytoskeleton (formerly Cell Motility and the Cytoskeleton)*
12. *Experimental Neurology*
13. *IEEE Transactions on Biomedical Engineering*



14. *Journal of Biomechanics*
15. *Journal of Biomechanical Engineering*
16. *Journal of the Mechanical Behavior of Biomedical Materials*
17. *Journal of Neural Engineering*
18. *Journal of Neurotrauma*
19. *Journal of Physical Chemistry*
20. *Mechanical and Chemical Biosystems*
21. *Nature Nanotechnology*
22. *Neurobiology of Disease*
23. *PLoS ONE*
24. *Restorative Neurology and Neuroscience*

## **I.9 Abstract Reviewer**

1. National Neurotrauma Society annual meeting, 2001
2. 1<sup>st</sup> Joint Symposium of the National and International Neurotrauma Societies, 2002
3. Material Research Society, Symposium CC: Electrobiological Interfaces on Soft Substrates, Spring 2006
4. Material Research Society, Symposium U: Advanced Materials for Neuroprosthetics, Spring 2007
5. ASME Summer BED Conference Ph.D. student competition, 2007
6. Material Research Society, Symposium M: Materials and Technology for Flexible, Conformable, and Stretchable Sensors and Transistors, Spring 2007
7. National Neurotrauma Society annual meeting, 2008
8. ASME Summer BED Conference Ph.D. student competition, 2008
9. ASME Summer BED Conference Ph.D. student competition, 2009
10. National Neurotrauma Society annual meeting, 2009
11. Northeast Bioengineering Conference, 2010
12. Biomedical Science & Engineering Center Conference, Oak Ridge National Laboratory, 2010
13. Engineering in Medicine and Biology Conference, 2011
14. Biomedical Engineering Society Conference, 2011
15. 6<sup>th</sup> International Conference on Biomechanics, IASTED, 2011
16. Engineering in Medicine and Biology Conference, 2012
17. International Research Council on Biomechanics of Injury Conference, 2013
18. Engineering in Medicine and Biology Conference, 2013
19. Biomedical Engineering Society Conference, 2013
20. National Neurotrauma Society annual meeting, 2014
21. International Research Council on Biomechanics of Injury Conference, 2014
22. International Research Council on Biomechanics of Injury Conference, 2015

23. National Neurotrauma Society annual meeting, 2015

**I.10 Membership in Professional Societies**

1. Biomedical Engineering Society (BMES, 1995 - present)
2. Engineering in Medicine and Biology Society (IEEE EMBS, 1995 - present)
3. National Neurotrauma Society (1995 - present)
4. Society for Neuroscience (1995 - 2010)
5. Material Research Society (2004 – 2012, 2015)

**I.11 Invited Presentations**

1. April 7, 1997 “*In vitro* mechanical injury of organotypic brain slice cultures” for the Head Injury Research Center of the *University of Pennsylvania*
2. June 19, 1998 “An *in vitro* model of brain trauma: A combination of engineering and molecular biology” for the Institute for Medicine and Engineering of the *University of Pennsylvania*
3. July 15, 1999 “Mechanisms of cell death after traumatic brain injury: implications for therapeutic strategies” for the Department of Clinical Neurological Sciences, *University of Southampton*, UK
4. July 16, 1999 “Mechanisms of cell death after traumatic brain injury: implications for therapeutic strategies” for the Department of Neurosurgery, *King’s College Hospital*, UK
5. October 13, 1999 “Differential genomic expression after *in vitro* mechanical injury of organotypic brain slice cultures” for the joint BMES EMBS Annual Conference, Atlanta, GA
6. October 27, 1999 “Differential gene expression after mechanical injury of organotypic brain slice cultures” for the 29<sup>th</sup> Annual Meeting of the Society for Neuroscience, Miami, FL
7. October 16, 2000 “*In vitro* traumatic brain injury affects the expression of both cell death and cell survival genes” for the International Workshop on Medical and Engineering Aspects of Dynamic Head and Neck Injuries, Cranfield, UK
8. February 15, 2001 “Re-engineering *in vitro* models of traumatic brain injury” for the Neuroscience Research Department, Glaxo SmithKline, Harlow, UK
9. February 23, 2001 “Can animal models of traumatic brain injury be reproduced in tissue culture?” for the CNS Seminar Series, *Southampton University*, UK
10. December 14, 2001 “Molecular Consequences of *In vitro* Traumatic Brain Injury of Organotypic Slice Cultures” for the Department of Bioengineering, *University of Toledo*
11. March 14, 2002 “Molecular consequences of *in vitro* traumatic brain injury of organotypic slice cultures” for the Department of Bioengineering, *University of Pittsburgh*
12. April 19, 2002 “Molecular consequences of *in vitro* traumatic brain injury of organotypic slice cultures” for the Department of Bioengineering, *Wayne State University*

13. April 22, 2002 “Utilizing *in vitro* models to study traumatic brain injury” for the Biomechanics Division of the National Highway Traffic Safety Administration, Washington, D.C.
14. April 23, 2002 “Utilizing *in vitro* models to study traumatic brain injury” for the Division of Neurosciences, Walter Reed Army Institute of Research, Silver Spring, MD
15. April 25, 2002 “Molecular consequences of *in vitro* traumatic brain injury of organotypic slice cultures” for the Department of Biomedical Engineering, *City College of New York*
16. April 29, 2002 “Molecular consequences of *in vitro* traumatic brain injury of organotypic slice cultures” for the Department of Biomedical Engineering, *Columbia University*
17. May 21, 2003 “Development of universal injury criteria for living brain tissue” for the NATO sponsored Personal Protection joint AVT-HFM Meeting, Koblenz, Germany.
18. October 27, 2003 “A tissue level tolerance criteria for living brain developed with an *in vitro* model of traumatic mechanical loading”, Stapp Car Crash Conference, San Diego, CA.
19. July 21, 2005 “Quantitative Tolerance Criteria for SIMon: Cell Death and Dysfunction” Southern Consortium for Injury Biomechanics, *University of Alabama*, Birmingham, AL.
20. October 6, 2005 “Brain constitutive properties measured with atomic force microscopy: implications for head injury” for the Department of Biomedical Engineering, *Georgia Technical Institute*
21. November 17, 2005 “Are sub-regions of the hippocampus more vulnerable to post-traumatic cell death? Insights from atomic force microscopy and an *in vitro* model” for the Virginia Tech - Wake Forest Center for Injury Biomechanics, *Virginia Technical Institute*
22. November 30, 2005 “*In vitro* approaches can increase our understanding of head injury biomechanics using atomic force microscopy and an organotypic slice culture model of traumatic brain injury” for the Department of Biomedical Engineering, *City College of New York*
23. December 1, 2005 “Heterogeneous constitutive properties of the hippocampus measured by atomic force microscopy may explain trauma-induced, regional patterns of cell death” for the Departments of Biomedical Engineering and Mechanical and Aerospace Engineering, *University of Virginia*
24. December 12, 2005 “Hippocampal mechanical properties determined with the atomic force microscope: implications for head injury” for the Department of Biomedical Engineering, *Wayne State University*
25. February 20, 2006 “Regional brain material properties and injury tolerance criteria” for the Department of Neurosurgery, *University of Pennsylvania*
26. March 30, 2006 “Structural properties of the hippocampus and injury tolerance criteria” for the Department of Biomedical Engineering, *Duke University*
27. June 19, 2006 “Understanding the biomechanics of head injury” for the Summer Undergraduate Research Fellowship program, *Columbia University*
28. July 8, 2006 “Flexible microelectrode arrays” for the 24<sup>th</sup> Annual National Neurotrauma Society Conference, St. Louis, MO
29. November 3, 2006 “Is post-traumatic, intra-hippocampal regional vulnerability a function of biomechanical heterogeneity?” for the Spinal Cord and Brain Injury Research Center, *University of Kentucky*

30. December 13, 2006 “Quantitative tolerance criteria for SIMon: Cell death and dysfunction” for the Southern Consortium of Injury Biomechanics, *University of Alabama*
31. February 26, 2007 “Advances in cellular brain injury biomechanics” for the Brain Injury Symposium, National Highway Traffic Safety Administration
32. March 6, 2007 “Flexible electronics and stretchable microelectrode arrays” for the Center for Biomaterials & Advanced Technologies, Medical Devices Group, Ethicon, Inc. (J&J)
33. March 12, 2007 “Reducing the societal cost of traumatic brain injury”, for the Virginia Tech - Wake Forest Center for Injury Biomechanics, *Virginia Technical Institute*
34. April 27, 2007 “Toward understanding regional vulnerability in traumatic brain injury” for the Department of Biomedical Engineering, *New Jersey Institute of Technology*
35. May 16, 2007 “Softening the impact of traumatic brain injury” for the Spinal Cord and Brain Injury Research Center, *University of Kentucky*
36. December 6, 2007 “Quantitative tolerance criteria for SIMon: Cell death and dysfunction” for the Southern Consortium of Injury Biomechanics, *University of Alabama*
37. January 27, 2008 “Biomechanics and modeling of mild traumatic brain injury” for the *Winter Conference on Brain Research*, Snowbird, UT
38. February 11, 2008 “Mind storm: Traumatic brain injury... a silent epidemic” for Café Science, *Columbia University*
39. May 8, 2008 “Development of methods to enable the directed evolution of cell penetrating peptides for targeted brain cell delivery” *Wyeth Research*, NJ
40. October 3, 2008 “The Neurotrauma and Repair Laboratory” for the Graduate Student Seminar Series, *Columbia University*, NY.
41. October 15, 2008 “Modeling traumatic brain injury: lessons learned and critical data” for the Man Vehicle Laboratory, *Massachusetts Institute of Technology*, MA.
42. November 14, 2008 “Enabling data for modeling traumatic brain injury” for the Biomechanics & Injury Mitigation Systems, *Johns Hopkins University Applied Physics Laboratory*, MD.
43. March 19, 2009 “Modeling traumatic brain injury *in vitro*: functional changes in the absence of cell death” for the Biomedical Science and Engineering Conference, *Oak Ridge National Laboratory*, TN.
44. April 6, 2009 “Vertically aligned carbon nanofiber arrays for neuroscience” for the CTSA Nanotechnology Seminar Series, *Columbia University Medical Center*, NY.
45. June 5, 2009 “Brain tissue heterogeneity and implications for traumatic brain injury” for Grand Rounds in the Department of Neurosurgery, *Medical College of Wisconsin*, WI.
46. June 17, 2009 “Vertically aligned carbon nanofiber arrays for electrophysiological and electrochemical recordings from brain slices” for the Nanotechnology for the Study of Cellular and Molecular Interactions Conference, *Engineering Conferences International*, Barga, Italy.
47. September 3, 2009 “Quantification of functional alterations after *in vitro* traumatic brain injury” for the “Neural Injury” session at the *Engineering in Medicine and Biology Conference*, MN.
48. September 4, 2009 “Neural sensing of electrical activity with stretchable microelectrode arrays” for the “Neural Sensing and Applications” session at the *Engineering in Medicine and Biology Conference*, MN.

49. September 9, 2009 “Advances in the study of brain injury biomechanics”, **Keynote lecture** for the *International Research Council on Biomechanics of Injury* conference, UK.
50. November 12, 2009 “Studying traumatic brain injury through a combination of biomechanics and cell biology”, for Grand Rounds, Department of Neurosurgery, *Columbia University Medical Center*, NY.
51. February 11, 2010 “Compliant tissue/electronics interfaces for biomedical studies”, for the Electrical Engineering Department, *Princeton University*.
52. March 18, 2010 “Brain material properties and tolerance criteria: critical ingredients for computational models of brain injury” for the Mechanical Engineering department, *City College of New York*.
53. March 28, 2010 “Mechanical properties of anatomical structures of the rat brain” for the *Northeast Bioengineering Conference*, NY.
54. May 5, 2010 “Material properties and failure criteria for brain: understanding brain injury biomechanics” for the Department of Chemistry, Chemical Biology, and Biomedical Engineering, *Stevens Institute of Technology*.
55. June 15, 2010 “Outcome measures in *in vitro* modeling of TBI / validation of *in vitro* models” for the *National Neurotrauma Symposium*, NV.
56. August 3, 2010 “Determining a mechanical tolerance criterion for neuron function within the hippocampus” for the *6<sup>th</sup> World Congress on Biomechanics*, Singapore.
57. August 12, 2010 “Heterogeneous material properties and tolerance criteria for brain injury models” for the DoD Brain Injury Computational Modeling Expert Panel, FL.
58. October 20, 2011 “Region and mechanism-specific tolerance criteria for traumatic brain injury” for the Columbia University Seminar on Injury Prevention, NY.
59. November 9, 2011 “Traumatic Brain Injury Tolerances: *In Vitro* Insights” for the Safar Center, University of Pittsburgh Medical Center, PA.
60. January 12, 2012 “Biomechanical insight to traumatic brain injury from brain slice models” for the Center for Neuroscience & Regenerative Medicine, Uniformed Services University of the Health Sciences, MD.
61. November 14, 2012 “Brain trauma: Biomechanical Insights” for First Year Seminars in Modern Biology, *Columbia University*, NY
62. March 21, 2013 “Traumatic Brain Injury: Inertia- and Blast-Injuries and an Edema Therapy” for Grand Rounds, Department of Neurosurgery, *Columbia University Medical Center*, NY
63. August 10, 2013 “Better Strategies to Prevent Brain Injuries”, for *Aspen BrainLab*, Aspen, CO
64. October 2, 2013 “Brain trauma from Blast” for First Year Seminars in Modern Biology, *Columbia University*, NY
65. December 10, 2013 “From biomechanics to cerebral edema after traumatic brain injury” for Visiting Professor Research Seminar, Department of Anesthesiology, *Columbia University Medical Center*, NY
66. March 3, 2014 “Traumatic brain injury: at the intersection of neuroscience and biomechanics” for the Current Issues in Neuroscience seminar series, *Teacher College, Columbia University*, NY

67. September 23, 2014 “Biomechanics at the mesoscopic scale: Knowledge and tools to define tolerance” for Army Research Laboratory, Aberdeen Proving Grounds, MD
68. October 14, 2014 “Traumatic brain injury alters electrophysiological function in organotypic brain slice cultures” for The Head Injury Center CNS Injury Seminar Series, *University of Pennsylvania*, PA
69. November 12, 2014 “Mild traumatic brain injury – in a dish!?” for First Year Seminars in Modern Biology, *Columbia University*, NY
70. December 4, 2014 “Neuronal network function is altered after in vitro traumatic brain injury” for the Neuroscience Seminar, *Tulane University*, LA
71. February 6, 2015 “Learning deficits in hippocampal slice cultures after traumatic brain injury” for the Biomedical Engineering Seminar Series, *New Jersey Institute of Technology*, NJ
72. June 23, 2015 “Traumatic brain injury”, for the GEM4 2015 Summer Institute, *Carnegie Mellon University*, PA
73. September 17, 2015 “Heading Off Damage: New insights in traumatic brain injury”, for Columbia University’s Mortimer B. Zuckerman Mind Brain Behavior Institute, Stavros Niarchos Foundation Speaker Series, *Columbia University*, NY.
74. December 4, 2015 “Reproducing mild traumatic brain injury in a slice culture model”, for the Columbia Translational Neuroscience Initiative, *Columbia University*, NY.

## **J. Academic Service**

### **J.1 University Committees**

- 2007 – 2013 University Institutional Animal Care and Use Committee (Morningside)
- 2013 – University Financial Conflict of Interest Committee (Morningside)
- 2013 – University Committee on Animal Welfare
- 2014 Promotions and Tenure Committee, School of Arts and Sciences (*ad hoc*, external reader)
- 2014 – Committee on Instruction, Columbia College and General Studies, SEAS representative
- 2014 – Educational Policy and Planning Committee, Columbia College and General Studies, SEAS representative
- 2014 – Provost’s Middle States Commission on Higher Education Accreditation Subcommittee
- 2015 – Chandler Classroom Steering Committee
- 2015 – EPPC Working Group on Implementation of the Course Number Guidelines

### **J.2 School of Engineering and Applied Science Committees and Duties**

- 2012 – 2014 SEAS Committee on Instruction
- 2012 – 2014 SEAS Advisory Committee on Undergraduate Curriculum
- 2013 Chair, SEAS-level Tenure Review Committee (*ad hoc*)
- 2014 – Vice Dean for Undergraduate Programs, SEAS
- 2014 – Co-Chair, SEAS Committee on Instruction

2015 – Facilitator, SEAS Strategic Forum Discussion on Undergraduate Education

### **J.3 Departmental Committees and Duties**

2003 – Undergraduate Student Advisor  
2003 – Graduate Student Advisor  
2003 – 2005 Chair of the International Student Exchange Program Committee  
2003 – 2007 Chair of the Industrial Liaison Committee  
2004 – 2005 Chair of the Departmental Holiday Reception Committee  
2004 – 2006 Member of the ABET Committee  
2004 – 2014 Member of the Undergraduate Curriculum Committee  
2004 – 2014 Member of the Undergraduate Laboratory Committee  
2004 – 2006 Member of the BME New Science Building Space Proposal Committee  
2004 – 2008 Member of the Biomechanics Track Faculty Search Committee  
2005 Member of the Coulter Foundation Partnership Preliminary Application Committee  
2006 – 2007 Chair of the Biomechanics Track Faculty Search Committee: Hired Drs. Chris Jacobs and Hayden Huang  
2006 – 2012 Member of the Undergraduate Teaching Laboratory Committee  
2006 Chair of the Undergraduate Teaching Laboratory Committee  
2007 – 2008 Chair of the Biomechanics Track Faculty Search Committee: Hired Dr. Henry Hess  
2007 – 2010 Chair of the Undergraduate Curriculum Committee  
2007 – 2010 3-2 Program (Transfer Student) Advisor  
2008 – 2009 Instituted an Online Undergraduate Advising and Academic Tracking System  
2009 Member of the Search Committee for Instructor in Biomedical Engineering: Hired Dr. Aaron Kyle  
2010 Instituted a totally revised Online Undergraduate Advising and Academic Tracking System  
2011 – 2013 Member of the ABET Renewal Committee  
2012 – 2014 Vice-chair, Department of Biomedical Engineering  
2013 – 2014 Member of the Biomedical Engineering Instructor Search Committee: Hired Dr. Katherine Reuther  
2013 – 2014 Chair, Biomedical Engineering Neural Engineering Faculty Search Committee: Hired Dr. Josh Jacobs

### **J.4 Department, School, and University Outreach**

2003 Organized the BME-Center for Career Education Orientation  
2004 Engineering Invitational Presentation on BME Senior Design  
2004 Parents' Weekend Open House  
2004 Organized the BME-Center for Career Education Orientation  
2005 Days on Campus Luncheon and Laboratory Tours

2005	Organized Engineering Open House for Rising Sophomores
2005	Organized Sophomore Group Advising Session
2005	Departmental Participant in Days on Campus Luncheon and Laboratory Tours
2005	Hosted Katherine Jernberg, Dean of Admissions, Keck Graduate Institute
2006	Departmental Gateway Lecture
2006	Participant in Collegiate School Laboratory Tours
2006	SURF lecture, "Understanding the biomechanics of head injury"
2006	Departmental Coordinator for Summer Engineering Invitational
2006	Academic Resources Fair Departmental Representative
2006	Prospective Student Host: Brandon Boston
2006	Prospective Student Host: Nicholas Fountoulakis
2007	Departmental Gateway Lecture
2007	Prospective Student Host: Janelle Geddes
2007	BMES Career Panel Member during Engineering Week
2007	Faculty Representative at Summer Engineering Invitational
2007	3-2 Program Student Orientation
2007	Organized two Faculty Academic Advising Training Sessions
2007	Conducted the Town Hall Meeting for Junior BME Students
2008	Café Science, Featured Scientist
2008	Departmental Gateway Lecture
2008	Departmental Representative for Days on Campus
2008	Prospective student host: Colin Hoffman
2008	Departmental Representative at the Engineering Invitational Parent Student Reception
2008	Prospective student host: Nabil Mehta
2008	Departmental Representative for SEAS Major Night
2008	3-2 Program Student Orientation
2008	Conducted the Town Hall Meeting for Junior BME Students
2008	Met with Diversified Search Ray & Berndston to inform the search for Dean of Division of Student Affairs
2009	Untenured Faculty Focus Group Leader
2009	Facilitator of a meeting between Junior Faculty and Dean Feniosky Pena-Mora
2009	Presented to the SEAS Committee on Instruction the BME system for undergraduate advising and tracking
2009	Days on Campus Biomedical Engineering Department Representative
2009	Participant in Collegiate School Laboratory Tours
2009	Prospective student host: Natasha Satya
2009	Engineering Invitational Biomedical Engineering Lecture
2009	New Student Orientation Program Biomedical Engineering Representative
2009	SEAS Parents Weekend Lecture
2009	Conducted the Town Hall Meeting for Junior BME Students



- 2010 Departmental Gateway Lecture
- 2010 Addressed the President's Council, Cold Spring Harbor Laboratory
- 2011 Participant in Collegiate School Laboratory Tours
- 2012 Science Expo, The School at Columbia
- 2012 First Year Seminars in Modern Biology BIOL C2908, "Brain Trauma: Biomechanical Insights"
- 2012 Participant in Collegiate School Laboratory Tours
- 2013 Alumni Weekend Departmental Lunch representative
- 2013 Participant in Collegiate School Laboratory Tours
- 2013 First Year Seminars in Modern Biology BIOL C2908, "Brain Trauma: Biomechanical Insights"
- 2013 – 2014 Organizing Committee, Science Expo, The School at Columbia University
- 2014 ResInc, introductions at fall kickoff speaker series
- 2014 Just Desserts, Dean's office representative
- 2014 Student Leadership Dinner, Dean's office representative
- 2014 First Year Seminars in Modern Biology BIOL C2908, "Mild traumatic brain injury – in a dish!?"
- 2014 Engineering Career Fair Dinner, Dean's office representative
- 2014 Faculty Excellence Celebration dinner with donors, Dean's office representative
- 2015 Columbia Engineering Scholarship Dinner, Dean's office representative
- 2015 Columbia Engineering Alumni Association Dinner, speaker
- 2015 Columbia Engineering Days on Campus, speaker
- 2015 Columbia Engineering Class Day, speaker
- 2015 Columbia Engineering Alumni Association Cruise, Dean's office representative
- 2015 Summer Engineering Research Invitational, speaker
- 2015 – 2016 Organizing Committee, Science Expo, The School at Columbia University