Barclay Morrison III, Ph.D.

Professor of Biomedical Engineering

Curriculum Vitae

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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

2019 Great Teacher Award, Society of Columbia Graduates, Columbia University, New York, NY

C. 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 (untenured),Biomedical Engineering, Columbia University, NY

2012-2016 Associate Professor, 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

2016- Professor, Biomedical Engineering, Columbia University, NY

D. 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 31, 2023, ISI citation metrics: total citations 9,206, h index 35; Google Scholar citation metrics: total citations 13,947, h index 45)*

D.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*

D.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*)

9. (R) Pringle, A.K., **Morrison III, B.**, Bradley, M., Iannotti, F., and Sundstrom, L.E., *Characterisation of a novel class of polyamine-based neuroprotective compounds* Naunyn-Schmiedeberg's Arch.Pharm., 2003. **368**: p. 216-24.
10. (R) Sundstrom, L., **Morrison III, B.**, Bradley, M., and Pringle, A., *Organotypic cultures as tools for functional screening in the CNS.* Drug Discov.Today, 2005. **10**: p. 993-1000.
11. (R) *Cater, H.L., Sundstrom, L.E., and **Morrison III, B.**, *Temporal development of hippocampal cell death is dependent on tissue strain but not strain rate.* J.Biomech., 2006. **39**: p. 2810-8.
12. (R) ***Morrison III, B.**, Cater, H.L., Benham, C.D., and Sundstrom, L.E., *An in vitro model of traumatic brain injury utilising two-dimensional stretch of organotypic hippocampal slice cultures.* J.Neurosci.Meth., 2006. **150**: p. 192-201.
13. (RC) Cater, H.L., Gitterman, D.P., Davis, S.M., Benham, C.D., **Morrison III, B.**, and Sundstrom, L.E., *Stretch-induced injury in organotypic hippocampal slice cultures reproduces in vivo post-traumatic neurodegeneration: Role of glutamate receptors and voltage-dependent calcium channels.* J.Neurochem., 2007. **101**: p. 434-47.
14. (RSC) *Elkin, B.S., Azeloglu, E.U., Costa, K.D., and **Morrison III, B.**, *Mechanical heterogeneity of the rat hippocampus measured by AFM indentation.* J.Neurotrauma, 2007. **24**: p. 812-22.
15. (RS) *Elkin, B.S. and **Morrison III, B.**, *Region-specific tolerance criteria for the living brain.* Stapp Car Crash J., 2007. **51**: p. 127-38.
16. (RS) *Yu, Z., McKnight, T.E., Ericson, M.N., Melechko, A.V., Simpson, M.L., and **Morrison III, B.**, *Vertically aligned carbon nanofiber arrays record electrophysiological signals from hippocampal slices.* Nano Lett., 2007. **7**: p. 2188-95.
17. (RC) Ateshian, G.A., Costa, K.D., Azeloglu, E.U., **Morrison III, B.**, and Hung, C.T., *Continuum modeling of biological tissue growth by cell division, and alteration of intracellular osmolytes and extracellular fixed charge density.* J.Biomech.Eng., 2009. **131**: p. 101001.
18. (RSC) Gao, S., Simon, M.J., **Morrison III, B.**, and Banta, S., *Bifunctional chimeric fusion proteins engineered for DNA delivery: Optimization of the protein to DNA ratio.* Biochim.Biophys.Acta, 2009. **1790**: p. 198-207.
19. (RSC) Graudejus, O., Yu, Z., Jones, J., **Morrison III, B.**, and Wagner, S., *Characterization and application of an elastically stretchable microelectrode array to neural field potential recordings.* J.Electrochem.Soc., 2009. **156**: p. P85-P94.
20. (R) Margulies, S.S., Hicks, R.R., Ansel, B., Bullock, R., Clifford, D., Clifton, G., Conwit, R., Dash, P., Diaz-Arrastia, R., Dietrich, W.D., et al., *Combination therapies for traumatic brain injury - prospective considerations.* J.Neurotrauma, 2009. **26**: p. 925-39.
21. (RSC) *Simon, M.J., Gao, S., Banta, S., and **Morrison III, B.**, *TAT-mediated intracellular protein delivery to primary brain cells is dependent on glycosaminoglycan expression.* Biotechnology and Bioengineering, 2009. **104**: p. 10-9.
22. (RSC) *Yu, Z., Graudejus, O., Tsay, C., Lacour, S.P., Wagner, S., and **Morrison III, B.**, *Monitoring electrical activity from hippocampal tissue during large electrode deformation.* J.Neurotrauma, 2009. **26**: p. 1135-45.
23. (RC) Ateshian, G.A., **Morrison III, B.**, and Hung, C.T., *Modeling of active transmembrane transport in a mixture theory framework.* Ann.Biomed.Eng., 2010. **38**: p. 1801-14.

24. (RC) Choi, J.J., Wang, S., Tung, Y.S., **Morrison III, B.**, and Konofagou, E.E., *Molecules of various pharmacologically-relevant sizes can cross the ultrasound-induced blood-brain barrier opening in vivo.* Ultrasound Med.Biol., 2010. **36**: p. 58-67.

25. (RS) *Elkin, B.S., Ilankovan, A., and **Morrison III, B.**, *Age-dependent regional mechanical properties of the rat hippocampus and cortex.* J.Biomech.Eng., 2010. **132**.

26. (RS) *Elkin, B.S., Shaik, M.A., and **Morrison III, B.**, *Fixed negative charge and the Donnan effect: A description of the driving forces associated with brain tissue swelling and edema.* Phil.Trans.Royal Soc.London A, 2010. **368**: p. 585-603.

27. (RSC) Gao, S., Simon, M.J., **Morrison III, B.**, and Banta, S., *A plasmid display platform for the selection of peptides exhibiting a functional cell penetrating phenotype.* Biotech.Prog., 2010. **26**: p. 1796-1800.

28. (RSC) Lacour, S.P., Benmerah, S., Tarte, E., FitzGerald, J., Serra, J., McMahon, S., Fawcett, J.W., Graudejus, O., Yu, Z., and **Morrison III, B.**, *Flexible and stretchable micro-electrodes for in vitro and in vivo neural interfaces.* Med.Biol.Eng.Comp., 2010. **48**: p. 945-954.

29. (RSC) Li, G., Simon, M.J., Cancel, L., Shi, Z., Ji, X., Tarbell, J.M., **Morrison III, B.**, and Fu, B.M., *Permeability of endothelial and astrocyte cocultures: In vitro blood-brain barrier models for drug delivery studies.* Ann.Biomed.Eng., 2010. **38**: p. 2499-511.

30. (RSC) *Simon, M.J., Kang, W.H., Gao, S., Banta, S., and **Morrison III, B.**, *Increased delivery of TAT across an endothelial monolayer folowing ischemic injury.* Neurosci.Lett., 2010, **486**: 1-4.

31. (RS) *Yu, Z. and **Morrison III, B.**, *Experimental mild traumatic brain injury induces functional alteration of the developing hippocampus.* J.Neurophysiol, 2010. **103**: p. 499-510.

32. (RSC) *Simon, M.J., Kang, W.H., Gao, S., Banta, S., and **Morrison III, B.**, *TAT is not capable of transcellular delivery across an intact endothelial monolayer in vitro.* Ann.Biomed.Eng., 2011 **39**: p.394-401.

33. (RS) *Elkin, B.S., Ilankovan, A., and **Morrison III, B.**, *A detailed viscoelastic characterization of the P17 and adult rat brain.* J.Neurotrauma, 2011, **28**: p.2235-2244.

34. (RS) *Elkin, B.S., Shaik, M.A., and **Morrison III, B.**, *Chondroitinase ABC reduces brain tissue swelling in vitro.* J.Neurotrauma, 2011, **28**: p.2277-2285.

35. (RSC) Gao, S., Simon, M.J., **Morrison III, B.**, and Banta, S., *An unusual cell penetrating peptide identified using a plasmid display-based functional selection platform.* ACS Chem.Bio., 2011 **6**: p.484-91.

36. (RSCl) ***Morrison III, B.**, Elkin, B.S., Dolle, J.P., Yarmush, M.L., *In vitro models of traumatic brain injury.* Ann.Rev.Biomed.Engin., 2011, **13**: p.91-126.

37. (RSC) *Kang, W.H., Simon, M.J., Gao, S., Banta, S., and **Morrison III, B.**, *Attenuation of astrocyte activation by TAT delivery of a peptide JNK inhibitor.* J.Neurotrauma, 2011, **28**: 1219-1228.

38. (RS) *Elkin, B.S., Ilankovan, I., **Morrison III, B.**, *Dynamic, regional mechanical properties of the porcine brain: Indentation in the coronal plane*. J.Biomech.Eng., 2011, **133**: 071009.

39. (RSP) *Finan, J.D., Elkin, B.S., Pearson, E.M., Kalbian I.L., **Morrison III, B.**, *Viscoelastic properties of the rat brain in the sagittal plane: effects of anatomical structure and age.* Ann.Biomed.Eng., 2012, **40**: 70-78..

40. (RSC) Graudejus, O., Goletiani, C., Yu, Z., **Morrison III, B.**, and Wagner, S., *Encapsulating elastically stretchable neural interfaces: yield, resolution,and recording/stimulation of neural activity.* Advanced Functional Materials, 2012, **22**: 640-651.

41. (RC) Saggu, R., **Morrison III, B.**, Lowe, J.P., Pringle, A.K., *Interleukin-1b does not affect the energy metabolism of rat organotypic hippocampal-slice cultures.* Neuroecience Letters, 2012, **508**: 114-118.

42. (RCI) Ateshian, G.A., **Morrison III, B.**, Holmes, J.W., and Hung, C.T., *Mechanics of cell growth.* Mechanics Research Communications, 2012, **42**: 118-125.

43. (RC) Baseri, B., Choi, J.J., Deffieux, T., Samiotaki, M., Tung, Y., Small, S.A., **Morrison III, B.**, and Konofagou, E.E., *Activation of signaling pathways following localized delivery of systemically administered neurotrophic factors across the blood–brain barrier using focused ultrasound and microbubbles.* Phys.Med.Biol., 2012, **57**: N65-N81.

44. (RSC) *Effgen, G.B., Hue, C.D., Vogel, E.W., Panzer, M.B., Meaney, D.F., Bass, C.R., **Morrison III, B.**, A *multiscale approach to blast neurotrauma modeling: Part II: Methodology for inducing blast injury to in vitro models*, Frontiers in Neurology, 2012, **3**: 10.3389/fneur.2012.00023.

45. (RSC) Yu, Z., McKnight, T.E., Ericson, M.N., Melechko, A.V., Simpson, M.L., **Morrison III, B.**, *Vertically aligned carbon nanofiber as nano-neuron interface for monitoring neural function*, Nanomedicine: Nanotechnology, Biology, and Medicine, 2012, **8**: 419-423.

46. (RC) Panzer, M.B., Matthews, K.A., Yu, A.W., **Morrison III, B.**, Meaney, D.F., Bass, C.R., A *multiscale approach to blast neurotrauma modeling: Part I: Development of novel test devices for in vivo and in vitro blast injury models,* Frontiers in Neurology, 2012, **3**:46. doi: 10.3389/fneur.2012.00046.

47. (RSC) Dixon, S.J., Lemberg, K.M., Lamprecht, M.R., Skouta, R., Zaitsev, E., Gleason, C.E., Patel, D., Bauer, A.J., Cantley, A., Yang, W.S., **Morrison III, B.**, Stockwell, B.R., *Ferroptosis: an iron-dependent oncogenic-RAS-selective form of cell death*, Cell, 2012, **149**:1060-1072.

48. (RPC) Choo, A.M., Miller, W.J., Chen, Y., Nibley, P., Goletiani, C., **Morrison III, B.**, Kutzing, M.K., Firestein, B.L., Sul, J.Y., Haydon, P.G., Meaney, D.F., *Antagonism of astroglial purinergic signaling improves recovery from traumatic brain injury*, Brain, 2013, **136**: 65-80.

49. (RPC) Chen, C., Wu, S., Finan, J.D., **Morrison III, B.**, and Konofagou, E.E., *An experimental study on the stiffness of size-isolated microbubbles using atomic force microscopy*, IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control, 2013, **60**: 524-534.

50. (RC) Dolle, J.P., **Morrison III, B.**, Schloss, R.S., and Yarmush, M.L., *An organotypic uniaxial strain model using microfluidics,* Lab Chip, 2013, **13**: 432-42.

51. (RSC) Mao, H., Elkin, B.S., Genthikatti, V.V., **Morrison III, B.**, Yang, K.H., *Why is CA3 more vulnerable than CA1 in experimental models of controlled cortical impact-induced brain injury?*, J. Neurotrauma, 2013, **30**: 1521-1530.

52. (RSC) *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.

53. (RS) *Elkin, B.S., **Morrison III, B.**, *Viscoelastic properties of the P17 and adult rat brain in the coronal plane*, J.Biomech.Eng., 2013, **135**: 114507.

54. (RC) Dolle, J.P., **Morrison III, B.**, Schloss, R.S., and Yarmush, M.L., *Brain-on-a-chip microsystem for investigating traumatic brain injury: Axon diameter and mitochondrial membrane changes play a significant role in axonal response to strain injuries.* Technology (Singapore), 2014. **2**: 106.

55. (RSC) *Effgen, G.B., Vogel, E.W., Lynch, K.A., Lobel, A., Hue, C.D., Meaney, D.F., Bass, C.R., and **Morrison III, B.**, *Isolated primary blast alters electrophysiological function with minimal cell death in organotypic hippocampal slice cultures*, *J.Neurotrauma*, 2014 **31**: 1202-10.

56. (RSP) *Finan, J.D., Fox, P.M., **Morrison III, B.**, *Non-ideal effects in indentation testing of soft tissues*, Biomech. Model. Mechanobiol., 2014, **13**: 573-84.

57. (RC) Gullotti, D., Panzer, M., Beamer, M., Chen, Y.C., Patel, T., Yu, A., Jaumard, N., Winkelstein, B., Bass, C.R., **Morrison III, B.**, and Meaney, D.F., *Significant head accelerations can influence immediate neurological impairments in a murine model of blast-induced traumatic brain injury*. J.Biomech.Eng. 2014, **136**: 091004.

58. (RSC) *Hue, C.D., Cao, S., Bass, C.R., Meaney, D.F., and **Morrison III, B.**, *Repeated primary blast injury causes delayed recovery, but not additive disruption, in an in vitro blood-brain barrier model*. J.Neurotrauma, 2014, **31**: 951-60.

59. (RSC) *Hughes, R.H., Silva, V.A., Ahmed, I., Shreiber, D.I., **Morrison III, B.**, *Neuroprotection by genipin against reactive oxygen and reactive nitrogen species-mediated injury in organotypic hippocampal slice cultures*, Brain Res., 2014, **1543**: 308-314.

60. (RS) *Lamprecht, M.R. and **Morrison III, B.**, *GPR30 activation is neither necessary nor sufficient for acute neuroprotection by 17β-estradiol after an ischemic injury in organotypic hippocampal slice cultures*, Brain Res., 2014, **1563**: 131-7.

61. (RCI) Meaney, D.F., **Morrison III, B.**, and Bass, C.R., *The mechanics of traumatic brain injury: A review of what we know, and what we need to know, for reducing its societal burden*. J.Biomechanical Eng., 2014, **136**: 021008.

62. (RC) Patel, T.P., Gullotti, D.M., Hernandez, P., O'Brien, W.T., Capehart, B.P., **Morrison III, B.**, Bass, C.R., Eberwine, J.E., Abel, T., and Meaney, D.F., *An open-source toolbox for automated phenotyping of mice in behavioral tasks*, Front.Behav.Neurosci., 2014, **8**: 349, doi: 10.3389/fnbeh.2014.00349.

63. (RS) *Kang, W.H. and **Morrison III, B.**, *Functional tolerance to mechanical deformation developed from organotypic hippocampal slice cultures*, Biomech.Model.Mechanobiol., 2015, **14**: 561-75.

64. (RSC) *Kang, W.H., Cao, W., Graudejus, O., Patel, T.P., Wagner, S., Meaney, D.F., and **Morrison III, B.**, *Alterations in hippocampal network activity after in vitro traumatic brain injury*, J.Neurotrauma., 2015, **32**: 1011-9.

65. (RSC) *Kang, W.H. and **Morrison III, B.**, Predicting changes in cortical electrophysiological function after in vitro traumatic brain injury, Biomech.Model.Mechanobiol., 2015, **14**: 1033-44.

66. (RS) *Lamprecht, M.R. and **Morrison III, B.**, *A combination therapy of 17β-estradiol and memantine is more neuroprotective than monotherapies in an organotypic brain slice culture model of traumatic brain injury*, in J.Neurotrauma, 2015, **32**: 1361-8.

67. (RSC) *Hue, C.D., Cho, F.S., Cao, S., Bass, C.R., Meaney, D.F., and **Morrison III, B.**, *Dexamethasone potentiates in vitro blood-brain barrier recovery after primary blast injury by glucocorticoid receptor-mediated upregulation of ZO-1 tight junction protein*. J.Cerebral Blood Flow & Metab., 2015, **35**: 1191-8.

68. (RC) Beamer, M., Tummala, S., Gullotti, D., Kopil, K., Gorka, S., Abel, T., Bass, C.R., **Morrison III, B.**, Cohen, A.S., and Meaney, D.F., *Primary blast injury causes cognitive impairments and hippocampal circuit alterations.* Experimental Neurology, 2016, 283: (Pt.A), 16-28.

69. (RSPC) *Finan, J.D., Cho, F.S., Kernie, S.G., **Morrison III, B.** *Intracerebroventricular administration of chondroitinase ABC reduces acute edema after traumatic brain injury*. BMC Research Notes, 2016, **9**: 160.

70. (RSC) *Effgen, G.B., Ong, T., Nammalwar, S., Ortuno, A.I., Meaney, D.F., Bass, C.R., **Morrison III, B.** *Primary blast exposure increases hippocampal vulnerability to subsequent exposure reducing long-term potentiation*. J.Neurotrauma, 2016, **33**: 1901-12.

71. (RSC) *Hue, C.D., Cho, F.S., Cao, S., Nicholls, R.E., Vogel III, E.W., Sibindi C., Arancio O., Bass C.R., Meaney D.F., **Morrison III B.** *Time course and size of blood-brain barrier opening in a mouse model of blast-induced traumatic brain injury.* J.Neurotrauma, 2016, **33**: 1202-11.

72. (RSC) *Vogel III, E.W., Effgen, G.B., Patel, T.P., Meaney, D.F., Bass, C.R., **Morrison III, B.** *Isolated primary blast inhibits long-term potentiation in organotypic hippocampal slice cultures.* J.Neurotrauma, 2016, 33:652-61.

73. (RS) *Effgen, G.B. and **Morrison III, B.**, *Electrophysiological and pathological characterization of the period of heightened vulnerability to repetitive injury in an in vitro stretch model.* J.Neurotrauma., 2017, **34**: 914-24.

74. (RS) *Effgen, G.B. and **Morrison III, B.**, *Memantine reduced cell death, astrogliosis, and functional deficits in an in vitro model of repetitive mild traumatic brain injury*. J.Neurotrauma, 2017, **34**: 934-42.

75. (RSC) Hu, F., Lamprecht, M.R., Wei, L., **Morrison III, B.**, and Min, W., *Bioorthogonal chemical imaging of metabolic activities in live mammalian hippocampal tissues with stimulated raman scattering.* Scientific Reports, 2016, **6**: p. 39660.

76. (RSC) *Lamprecht, M.R., Elkin, B.S., Kesavabhotla, K., Crary, J.F., Raghupathi, R., **Morrison III, B.** Strong c*orrelation of genome-wide expression after traumatic brain injury in vitro and in vivo implicates a role for SORLA*. J.Neurotrauma, 2017, **34**: 97-108.

77. (RSC) *Vogel III, E.W., Morales, F.N., Meaney, D.F., Bass, C.R., and **Morrison III, B.**, *Phosphodiesterase-4 inhibition restored hippocampal long term potentiation after primary blast*. Experimental Neurology, 2017, **293**: p. 91-100.

78. (RSC) *Vogel III, E.W., Rwema, S.H., Meaney, D.F., Bass, C.R., **Morrison III, B.** *Primary blast injury depressed hippocampal long-term potentiation through disruption of synaptic proteins.* J. Neurotrauma, 2017, **34**: 1063-73.

79. (RSPC) *Finan, J.D., Sundaresh, S., Elkin, B.S., McKhann 2nd, G.M., and **Morrison III, B.**, *Mechanical properties of living, human cortical grey and white matter*. Acta Biomaterialia, 2017, **55**: 333-9.

80. (RSC) Evans, B.S., Newell, E., Mahajan, M., Tsang, S.H., Ferguson, P.J., Mahoney, J., Hue, C.D., Vogel III, E.W., **Morrison III, B.**, Arancio, O., Nicholls, R.E., Bassuk, A.G., and Manajan, V.B., *Acute vitreoretinal trauma and inflammation after traumatic brain injury in mice*. Annals of Clinical and Translational Neurology, 2018, **5**: 240-51

81. (RC) Chierto, E., Simon, A., Castoldi, F., Meffre, D., Cristinziano, G., Sapone, F., Carrete, A., Borderie, D., Etienne, F., Rannou, F., **Morrison III, B.**, Massaad, C., Jafarian-Tehrani, M. *Mechanical Stretch of High Magnitude Provokes Axonal Injury, Elongation of Paranodal Junctions, and Signaling Alterations in Oligodendrocytes*. Molecular Neurobiology, 2018.

82. (RSC) Swiatkowski, P., Sewell, E., Sweet, E.S., Dickson, S., Swanson, R.A., McEwan, S.A., Cuccolo, N., McDonnell, M.E., Patel, M.V., Varghese, N., **Morrison III, B.**, Reitz, A.B., Meaney, D.F., Firestein, B.L. *Cypin: A novel target for traumatic brain injury*. Neurobiology of Disease, 2018. **119**: 13-25.

83. (RSC) Takahashi, Y., Yanaoka, T., Sugaya, H., Basilio, A.V., Xu, P., Ateshian, G.A., **Morrison III, B.** *Prediction of Probability of Fatality Due to Brain Injury in Traffic Accidents*. Traffic Injury Prevention, 2019. **20**: S27-31.

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87. *Kang, W.H., Yu, Z., and **Morrison III, B.**, *Changes in electrophysiological function after controlled deformation of hippocampal slice cultures*. BMES, 2011. (Abstract)

88. *Kang, W.H., Yu, Z., and **Morrison III, B.**, *Changes in electrophysiological function after controlled deformation of hippocampal slice cultures*. J.Neurotrauma, 2011. (Abstract)

89. *Lamprecht, M.R., Effgen, G.B., Elkin, B.S., and **Morrison III, B.**, *Memantine and estrogen combination therapy for traumatic brain injury*. BMES, 2011. (Abstract)

90. *Lamprecht, M.R., Effgin, G.B., Elkin, B.S., and **Morrison III, B.**, *Combinational drug therapies as treatment for traumatic brain injury*. J.Neurotrauma, 2011. (Abstract)

91. Panzer, M.B., Bass, C.R., Capehart, B.P., **Morrison III, B.**, and Meaney, D.F., *A novel method for exposing tissue cultures to blast overpressure for determining injury criteria*. BMES, 2011. (Abstract)

92. Ahmed, I., Morrison III, B., Hughes, R.R., and Shreiber, D.I., *Genipin provides neuroprotection following glutamate exposure in organotypic hippocampal slice cultures*. BMES, 2012. (Abstract)

93. Bogdanowicz, D.R., Subramony, S.D., Levine, W.N., **Morrison III, B.**, and Lu, H.H., *Methods for directing stem cell differentiation*. Gordon Research Conference: Musculoskeletal Biology and Bioengineering, 2012. (Abstract)

94. Chen, C.C., Wu, S.Y., Finan, J.D., **Morrison III, B.**, and Konofagou, E.E., *An experimental study on the stiffness of size-isolated microbubbles used for blood-brain barrier opening*. International Society for Therapeutic Ultrasound, 2012. (Abstract)

95. *Effgen, G.B., Gill, E., and **Morrison III, B.**, *A combination of 17-beta-estradiol and memantine after repetitive, mild traumatic brain injury reduces injury synergy*. J.Neurotrauma, 2012. (Abstract)

96. *Effgen, G.B., Panzer, M.B., Bass, C.R., Meaney, D.F., and **Morrison III, B.**, *An in vitro model of blast-induced traumatic brain injury*. Ninth World Congress on Brain Injury, 2012. (Abstract)

97. Gullotti, D., Chen, Y., Patel, T., Merdiushev, T., Jaumard, N., Winkelstien, B., **Morrison III, B.**, Bass, C.R., Panzer, M., and Meaney, D., *A model of blast induced traumatic brain injury in mice*. BMES, 2012. (Abstract)

98. *Haider, S.F., Hue, C.D., Bass, C.R., Meaney, D.F., and **Morrison III, B.**, *Increased solute permeability of an in vitro blood-brain barrier model exposed to blast overpressure*. Annual Biomedical Research Conference for Minority Students, 2012. (Abstract)

99. *Hue, C.D., Vo, K.V., Panzer, M.B., Bass, C.R., Meaney, D.F., and **Morrison III, B.**, *Blast-induced disruption of an in vitro blood-brain barrier model*. J.Neurotrauma, 2012. (Abstract)

100. *Hughes, R.R., Silva, V.A., Ahmed, I., Shreiber, D.I., and **Morrison III, B.**, *Neuroprotection by genipin against free-radical mediated injury in organotypic hippocampal slice cultures*. J.Neurotrauma, 2012. (Abstract)

101. *Kang, W.H., Yu, Z., and **Morrison III, B.**, *Quantification and prediction of electrophysiological function in the hippocampus after in vitro traumatic brain injury*. J.Neurotrauma, 2012. (Abstract)

102. Konofagou, E., Baseri, B., Choi, J.J., Deffieux, T., Samiotaki, M., Tung, S., Small, S.A., and **Morrison III, B.** *Activation of signaling pathways following localized delivery of systemically-administered neurotrophic factors across the blood-brain barrier using focused ultrasound and microbubbles*. Focused Ultrasound Symposium, 2012. (Abstract)

103. Wood, G., Rafaels, K., Yu, A., Shridharani, J., Panzer, M., Meaney, D., **Morrison III, B.**, Laskowitz, D., Wang, H., and Bass, C.R., *Interspecies scaling of blast-induced apnea*. BMES, 2012. (Abstract)

104. Yu, A., Wang, H., Matthews, K., Rafaels, K., Laskowitz, D., Gullotti, D., Meaney, D., **Morrison III, B.**, and Bass, C.R., *Mouse lethality risk and intracranial pressure during exposure to blast*. BMES, 2012. (Abstract)

105. *Effgen, G.B., Vogel, E.W., Lynch, K.A., and **Morrison III, B.**, *In vitro primary blast injury induces cell death in the hippocampus*, in *IRCOBI*. 2013. (Abstract)

106. *Effgen, G.B., Vogel, E.W., Lynch, K.A., and **Morrison III, B.**, *Isolated primary blast-exposure induces cell death in the hippocampus*, in *National Neurotrauma Symposium*. 2013. (Abstract)

107. *Finan, J.D. and **Morrison III, B.**, *Chondroitinase abc reduces post-traumatic edema in mice*, in *National Neurotrauma Symposium*. 2013. (Abstract)

108.* Hue, C.D., Bass, C.R., Meaney, D.F., and **Morrison III, B.**, *Interval-specific, blood-brain barrier disruption in vitro after repetitive primary blast injury*, in *IRCOBI*. 2013. (Abstract)

109. *Hue, C.D., Cao, S., Bass, C.R., Meaney, D.F., and **Morrison III, B.**, *Window of heightened vulnerability to repetitive primary blast injury in an in vitro blood-brain barrier model*, in *National Neurotrauma Symposium*. 2013. (Abstract)

110. *Vogel, E.W., Effgen, G., Bass, C.R., Meaney, D.F., and **Morrison III, B.**, *Primary blast injury initiates functional differences in rat organotypic hippocampal slices*, in *IRCOBI*. 2013. (Abstract)

111. *Vogel, E.W., Effgen, G., Bass, C.R., Meaney, D.F., and **Morrison III, B.**, *Primary blast injury induces electrophysiological changes in rat organotypic hippocampal slices*, in *National Neurotrauma Symposium*. 2013. (Abstract)

112. *Effgen, G.B., Nammalwar, S., Bass, C.R., Meaney, D.F., and **Morrison III, B.**, *Primary blast does not increase vulnerability of the brain to subseqent primary blast or glutamate exposure*, in *National Neurotrauma Symposium*. 2014. (Abstract)

113. *Finan, J.D., Cho, F.S., Kernie, S.G., and **Morrison III, B.**, *Intracerebroventricular delivery of chondroitinase abc reduces post-traumatic brain edema in mice*, in *National Neurotrauma Symposium*. 2014. (Abstract)

114. *Hue, C.D., Cao, S., Bass, C.R., Meaney, D.F., and **Morrison III, B.**, *Dexamethasone potentiates recovery of the blood-brain barrier after primary blast injury in vitro*, in *National Neurotrauma Symposium*. 2014. (Abstract)

115. ***Morrison III, B.**, Effgen, G.B., Hue, C.D., Vogel, E.W., Bass, C.R., and Meaney, D.F., *Studying blast traumatic brain injury with in vitro models*, in *United States National Congress on Theoretical and Applied Mechanics*. 2014. (Abstract)

116. ***Morrison III, B.**, Effgen, G.B., Hue, C.D., W., V.E., Bass, C.R., and Meaney, D.F., *Blast traumatic brain injury: Insights from in vitro models*, in *World Congress of Biomechanics*. 2014. (Abstract)

117. ***Morrison III, B.**, Finan, J.D., and Elkin, B.S., *A novel therapy for traumatic brain injury with a biomechanical basis*, in *World Congress of Biomechanics*. 2014. (Abstract)

118. ***Morrison III, B.** and Kang, W.H., *Electrophysiological changes within the hippocampus after controlled biaxial deformation*, in *World Congress of Biomechanics*. 2014. (Abstract)

119. *Vogel III, E., Villacorta, J., Bass, C.R., Meaney, D.F., and **Morrison III, B.**, *Primary blast injury eliminates long-term potentiation in rat organotypic hippocampal slice cultures*, in *National Neurotrauma Symposium*. 2014. (Abstract)

120. *Vogel III, E., Villacorta, J., Bass, C.R., Meaney, D.F., and **Morrison III, B.**, *Primary blast injury erases long term potentiation in rat brain organotypic hippocampal slices*, in *IRCOBI*. 2014. (Abstract)

121. Yu, A.W., Panzer, M.B., Bigler, B.R., Wood, G.W., Rzeznik, C.L., Aklshareef, A., Meaney, D.F., **Morrison III, B.**, and Bass, C.R., *In vs. Out: Controversies in shock tube blast experiments*, in *Personal Armour Systems Symposium*. 2014. (Abstract)

122. *Vogel III, E., Effgen, G.B., Bass, C.R., meaney, D.F., and **Morrison III, B.**, *Primary blast injury impairs learning in rat organotypic hippocampal slices. State-of-the-Science (SoS) Meeting on the Biomedical Basis for mTBI Environmental Sensor Threshold Values*. 2014. (Abstract).

123. *Effgen, G.B., Nammalwar, S., Ong, T., Ortuno, A.I., Bass, C.R., Meaney, D.F., and **Morrison III, B.**, *Repetitive primary blast-induced vulnerability and deficits in long-term potentiation without cell death*. *National Neurotrauma Symposium*. 2015. (Abstract).

124. *Effgen, G.B., Ong, T., Nammalwar, S., Ortuno, A.I., Bass, C.R., Meaney, D.F., and **Morrison III, B.**, *Primary blast exposure reduces brain tolerance to subsequent blast*. *IRCOBI*. 2015. (Abstract).

125. *Kang, W.H., Cao, W., Graudejus, O., Patel, T.P., Wagner, S., Meaney, D.F., and **Morrison III, B.**, *Traumatic brain injury in a dish enabled by the stretchable microelectrode array*. *Materials Research Society*. 2015. (Abstract).

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127. *Vogel III, E.W., Bass, C.R., Meaney, D.F., and **Morrison III, B.**, *Delayed inhibition of long-term potentiation in rat brain slice cultures caused by primary blast exposure*. *IRCOBI*. 2015. (Abstract).

128. Graudejus, O., Mandlik, P., Ahuja, S., **Morrison III, B.**, and Wagner, S., *From lab-to-marketplace: Challenges and discoveries during the commercialization of a stretchable microelectrode array.* Material Research Society. 2016. (Abstract).

129. Yu, A., **Morrison III, B.**, Meaney, D.F., and Bass, C.R., *Investigation of CSF cavitation as an injury mechanism of traumatic brain injury*, in *BMES*. 2016. (Abstract).

130. *Vogel III, E.W., Bass, C.R., Meaney, D.F., and **Morrison III, B.**, *Roflumilast treatment prevented primary blast-induced deficits in long-term potentiation*, in *National Neurotrauma Symposium*. 2016. (Abstract).

132. *Vogel III, E.W., Bass, C.R., Meaney, D.F., and **Morrison III, B.**, *Drug treatment prevents primary blast-induced deficit in long-term potentiation in rat brain slice cultures*, in *IRCOBI*. 2016. (Abstract).

133. ***Morrison III, B.**, Vogel III, E.W., Varghese, N., Bass, C.R., and Meaney, D.F., *Toward a tissue-level tolerance criteria for computational models of blast traumatic brain injury*, in *Military Health System Research Symposium*. 2017. (Abstract)

134. Graudejus, O., Wong, R.P., Varghese, N., Wagner, S., and **Morrison III, B.**, *A stretchable microelectrode array to reproduce a blunt trauma: Electrophysiology, mechanical stretching, and imaging of cells in vitro, concurrently and independently* in *National Neurotrauma Symposium*. 2018.

135. Graudejus, O., Wong, R.P., Varghese, N., Wagner, S., and **Morrison III, B.**, *3 methods - 1 tool: Electrophysiology, mechanical stretching, and imaging of cells in vitro, concurrently and independently* in *International Meeting on Substrate-Integrated Microelectrode Arrays*. 2018.

136. ***Morrison III, B.**, *Biomechanics, traumatic brain injury, and cerebal edema*, in *Society of Engineering Sciences Annual Technical Meeting*. 2018.

137. *Sundaresh, S.N., Finan, J.D., and **Morrison III, B.**, *Regional differences in the mechanical properties of porcine brain tissue*, in *National Neurotrauma Symposium*. 2018.

138. *Sundaresh, S.N., Finan, J.D., and **Morrison III, B.**, *Regional and directional differences in the material properties of porcine brain tissue*, in *IRCOBI Proceedings*. 2018.

139. *Varghese, N. and **Morrison III, B.**, *Long term potentiation deficits and recovery following repeated blast-induced traumatic brain injury in rat organotypic hippocampal slices*, in *National Neurotrauma Symposium*. 2018.

140. *Varghese, N. and **Morrison III, B.**, *Recovery of long term potentiation in rat brain organotypic hippocampal slice cultures following repeated blast-induced traumatic brain injury*, in *IRCOBI Proceedings*. 2018.

141. *Varghese, N. and **Morrison III, B.**, *Informing return-to-combat criteria in soldiers following blast-induced traumatic brain injury based on recovery of long term potentiation in rat organotypic hippocampal slice cultures*, in *Military Health System Research Symposium*. 2018.

142. *Sundaresh, S.N., Finan, J.D., Elkin, B.S., Lee, C., Xiao, J., and **Morrison III, B.**, *Characterization of porcine brain tissue mechanical properties at large deformations*, in *IRCOBI Proceedings*. 2019.

143. *Sundaresh, S.N., Finan, J.D., Elkin, B.S., Lee, C., Xiao, J., and **Morrison III, B.**, *Regional and directional characterization of porcine brain tissue mechanical properties at large deformations*, in *National Neurotrauma Syposium*. 2019.

144. *Varghese, N. and **Morrison III, B.**, *Recovery of long term potentiation in rat organotypic hippocampal slice cultures to inform return-to-duty criteria in soldiers following blast-induced traumatic brain injury*, in *Military Health System Research Symposium*. 2019.

145. *Varghese, N. and **Morrison III, B.**, *Characterizing recovery of long term potentiation following repeated blast-induced traumatic brain injury in rat brain organotypic hippocampal slice cultures*, in *IRCOBI Proceedings*. 2019.

146. *Varghese, N. and **Morrison III, B.**, *Effects of repeated blast-induced traumatic brain injury in rat organotypic hippocampal slices on long term potentiation*, in *National Neurotrauma Symposium*. 2019.

147. *Basilio, A.V., Lichay, L., Xu, P., Takahashi, Y., Yanaoka, T., Sugaya, H., Ateshian, G.A., **Morrison III, B.** *Improvements for simulating cerebral edema and delayed fatality after traumatic brain injury using triphasic swelling biomechanics*. *IRCOBI Proceedings*. 2020.

148. *Varghese, N. and **Morrison III, B.**, *Ibuprofen ameliorates long term potentiation deficits following repeated blast-induced traumatic brain injury in rat organotypic hippocampal slice cultures*, in *Military Health System Research Symposium*. 2020.

149. *Dwyer M.R., Varghese N., Wong R., Rowan C., Graudejus O., **Morrison III B.** Repeated stimulation and induction of long term potentiation with dtretchable microelectrode arrays. In: *National Neurotrauma Symposium*, 2021.

150. *Kim C.Y., **Morrison III B.** Long term potentiation deficits after repetitive mild primary blast. In: *Military Health Systems Research Symposium*, 2021.

151. *Varghese N., **Morrison III B.** Ibuprofen reduced long term potentiation deficits after repeated blast traumatic brain injury in rat hippocampal slice cultures. In: *National Neurotrauma Symposium*, 2021.

152. *Varghese N., **Morrison III B.** Ibuprofen ameliorates long term potentiation deficits following repeated blast-induced traumatic brain injury in rat organotypic hippocampal slice cultures. In: *Military Health Systems Research Symposium*, 2021.

153. *Dwyer, M.R., Polsfuss, I., and **Morrison III, B.**, Plasticity deficits after in vitro stretch injury on stretchable microelectrode arrays, In *Northeast Bioengineering Coference*, 2022.

154. *Dwyer, M., Kim, C., Varghese, N., and **Morrison III, B.**, NTS-105 decreases cell death after in vitro stretch injury, In *National Neurotrauma Symposium*, 2022.

155. *Varghese, N. and **Morrison III, B.**, Cyclooxygenase and EP3 receptor inhibition following repeated blast-induced traumatic brain injury in rat organotypic hippocampal slice cultures ameliorates long term potentiation deficits, In *National Neurotrauma Symposium*, 2022.

156. *Kim, C. and **Morrison III, B.**, Progesterone decreased long term potentiation deficits after repetitive mild primary blast, In *National Neurotrauma Symposium*, 2022.

157. *Varghese, N., Kim, C., and **Morrison III, B.**, Cyclooxygenase and EP3 receptor inhibition ameliorates long term potentiation deficits following blast-induced traumatic brain injury in rat organotypic hippocampal slice cultures, In *Military Health Systems Research Symposium*, 2022.

158. *Amelinez-Robles, N., Varghese, N., and **Morrison III, B.**, Alteration of GABAa receptor subunit composition implicated in neuronal network changes in organotypic hippocampal slice cultures following blast-induced traumatic brain injury, In *Gulf Coast Undergraduate Research Symposium*, 2022.

159. *Varghese, N., Amelinez-Robles, N., and **Morrison III, B.**, Alteration of GABAA receptor subunit composition following blast-induced traumatic brain injury implicated in network changes in organotypic hippocampal slice cultures, In *Biomedical Engineering Society*, 2022.

160. ***Morrison III, B.**, Tolerance criteria for concussion, In *World Congress of Biomechanics*, 2022.

161. *Varghese, N. and **Morrison III, B.**, Partial depletion of microglia attenuates long term potentiation deficits following repeated blast traumatic brain injury in organotypic hippocampal slice cultures, In *International Forum on Blast Injury Countermeasures*, 2022.

162. ***Morrison III, B.**, Electrophysiological consequences of concussion in brain slice cultures, In *Application of Instrumented Mouthguards to Optimise Player Welfare*, 2022.

163. *Kim, C.Y., Varghese, N., Kleinberger, M., and **Morrison III, B.**, *Increasing inter-blast interval attenuated long-term potentiation deficits but not heightened vulnerability following repeated low level blast*, in *Military Health Systems Research Symposium*. 2023.

164. *Dwyer, M.R., Polssfuss, I., Herbert, K., Parry, T.J., Verdoorn, T.A., Buller, B., Barry, S., Billing, B., and **Morrison III, B.**, *NTS-105, a active neurosteroid, improves outcome after in vitro stretch injury in hippocampal slices*, in *National Neurotrauma Symposium*. 2023.

165. *Kim, C.Y., Varghese, N., Kleinberger, M., and **Morrison III, B.**, *Heightened vulnerability following repeated low level blast despite a lack of long-term potentiation deficits*, in *National Neurotrauma Symposium*. 2023.

E. 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*

2018 Elected Fellow of the *American Institute for Medical and Biological Engineering*

2019 Great Teacher Award, The Society of Columbia Graduates, *Columbia University*

2019 Elected President of the *International Research Council on Biomechanics of Injury*

E.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 24th 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 51st 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 26th 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 36th 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 28th 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 17β-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**

2019 **National Defense Science and Engineering Graduate Fellowship (C.Y. Kim)**; "Effect of repetitive low level blast exposures on neural networks of organotypic hippocampal slice cultures", Advisor: **B. Morrison III**

2022 **Data Blitz Special Presentation at the National Neurotrauma Symposium (M.R. Dwyer)** "NTS-105 decreases cell death after in vitro stretch injury", Advisor **B. Morrison III**

F. 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. Enzyme combinations to reduce brain tissue swelling (US9040040 B2)
4. Systems and methods for real-time concussion diagnosis by electroencephalogram activity monitoring (PCT application filed 6/17)
    i. Licensed to NoMo Diagnostics Inc. (12/17)
5. Hyaluronidase for the treatment of cerebral edema (PCT application filed 12/17)

G. Professional Service

G.1 Editorial Positions

2010 – 2013 Associated Editor, *BMC Neuroscience*
2011 2012 Review Editor, *Frontiers in Neurotrauma*
2012 – 2018 Associate Editor, *Journal of Biomechanical Engineering*
2016 – Associate Editor, *Journal of Neurotrauma*
2020 – Associate Editor, *Brain Multiphysics*
2023 – Guest Associate Editor, *Journal of Biomechanical Engineering*, Special Issue: "Impact and Injury Biomechanics"

G.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 – 2016 International Research Council on Biomechanics of Injury, Membership & Awards Committee
2015 – 2020 Scientific Advisory Board, Center for Injury Epidemiology and Prevention at Columbia University Medical Center, NY
2015 – 2018 Vice President, International Research Council on Biomechanics of Injury
2016 – 2022 Board of Directors, Football Research, Inc., NY
2018 – President, International Research Council on Biomechanics of Injury

G.3 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. International Research Council on Biomechanics of Injury (2012 – present)
5. American Institute for Medical and Biological Engineering, Fellow (2018 – present)
6. Society for Neuroscience (1995 - 2010)
7. Material Research Society (2004 – 2012, 2015)
8. American Society of Mechanical Engineers (2013 – 2018)

G.4 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 29th 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 24th 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. May16, 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 *6th 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 – Brain Insight Lecture Series, *Columbia University*, NY.
74. November 5, 2015 Kavli Salon on Neurodegeneration III, Roundtable discussion, *Rockefeller University*, NY.
75. December 4, 2015 “Reproducing mild traumatic brain injury in a slice culture model”, for the Columbia Translational Neuroscience Initiative, *Columbia University*, NY.
76. May 6, 2016 “Comparing primary and tertiary phases of blast traumatic brain injury with an in vitro model”, for Department of Anatomy & Neurobiology, *Virginia Commonwealth University*, VA.
77. June 16, 2016 “Studying repetitive TBI in a culture dish”, for the Center for Injury Epidemiology and Prevention, *Columbia University*, NY.
78. July 13, 2016 “Biomechanics for Prevention: Preventing synergy of repetitive mTBI” for the Big Ten–Ivy League Traumatic Brain Injury Research Collaboration, Philadelphia, PA.
79. October 12, 2016 “Mild TBI and Learning Impairments in an Organotypic Slice Culture Mode” for *Burke Medical Research Institute*, White Plains, NY.
80. December 14, 2016 “Synaptic Disruption after Mild Traumatic Brain Injury in an Engineered Organotypic Slice Culture System” for Department of Biomedical Engineering, *Southern University of Science and Technology*, Shenzhen, China.
81. February 16, 2017 “Mechanobiology of Traumatic Brain Injury: Applications to Prevention and Treatment” for Columbia Engineering in Medicine Symposium, *Columbia University*, NY.
82. March 13, 2017 “In Pursuit of Treatments for Traumatic Brain Injury” for Institute of Engineering in Biology and Medicine, *Pontificia Universidad Catolica de Chile*, Santiago, Chile.
83. March 14, 2017 “Columbia Engineering: An Undergraduate Snapshot” for Institute of Engineering in Biology and Medicine, *Pontificia Universidad Catolica de Chile*, Santiago, Chile.
84. April 2, 2017 “Primary Blast Injury Decreases Neuronal Plasticity” for Northeastern Bioengineering Conference, *New Jersey Institute of Technology*, NJ.

85. April 14, 2017 “Continuing Efforts to Reduce the Societal Costs of Brain Injury: Material Properties, Mild Injury, and Interventions”, for Department of Biomedical Engineering, *University of Virginia*, VA.
86. April 22, 2017 “Traumatic Brain Injury from a Biomedical Engineering Perspective” for Days on Campus, *Columbia University*, NY.
87. April 28, 2017 “Rescuing Deficits in Neuronal Plasticity after Mild Traumatic Brain Injury” for Faculty of Basic and Biomedical Sciences, *Paris Descartes University*, Paris, France.
88. May 11, 2017 “Investigating Traumatic Brain Injury: Engineering and Neuroscience Collide” for the Neuroscience Education, University Research and Outreach Group, *University of Chicago*, IL.
89. October 10, 2017 “Thinking about concussion” for Columbia University Scholars Program, *Columbia University*, NY.
90. November 19, 2017 “NoMo Diagnostics, Concussion Detection Technology” for New York Angels, NY.
91. May 23, 2018 “Concussion Biomechanics and Mechanisms” for the Epidemiology and Population Health Summer Institute at Columbia University (EPIC), Mailman School of Public Health, *Columbia University*.
92. October 12, 2018 “Biomechanics, Traumatic Brain Injury, and Cerebral Edema”, Session keynote for the technical meeting of the Society of Engineering Science session, Madrid, Spain.
93. October 17, 2018 “Approaches to the Prevention and Treatment of Concussion” for the Neuroscience and Law Center, *Fordham Law School*.
94. November 12, 2018 “A Treatment for Cerebral Edema Grounded in Biomechanics” for the Department of Biomedical Engineering, *University of Delaware*.
95. February 21, 2019 “A Biomechanically-Inspired Treatment for Cerebral Edema” for the Engineering in Medicine Symposium, *Columbia University*.
96. March 15, 2019 “Biomechanical Insights into Brain Edema and its Treatment” for the Department of Bioengineering, *Stanford University*.
97. April 16, 2019 “Biomechanical Insights to Improve Treatment of Traumatic Brain Injury” for the Department of Mechanical Engineering, *Columbia University*.
98. April 26, 2019 “Deficits in Neuronal Functional after Blast Exposure” for the Army Research Laboratory, Aberdeen Proving Grounds, MD.
99. September 26, 2019 “Traumatic Brain Injury Biomechanics and Mechanisms” for the Department of Neurosurgery Grand Rounds, *Columbia University Irving Medical Center.*
100. May 11, 2022 “Partial Depletion of Microglia Attenuates Long Term Potentiation Deficits Following Repeated Blast Traumatic Brain Injury In Organotypic Hippocampal Slice Cultures” for the *International Forum on Blast Injury Countermeasures*.
101. July 14, 2022 “Tolerance criteria for concussion” for the *World Congress of Biomechanics*.
102. July 21, 2022 **“**Electrophysiological Consequences of Concussion in Brain Slice Cultures” for *Application of Instrumented Mouthguards to Optimise Player Welfare*.
103. September 19, 2022 “Modeling Concussion with Brain Slice Cultures” for the *Department of Mechanical Engineering*, *University of Aveiro, Portugal*.

104. November 3, 2022 “Neuronal Dysfunction in brain slice cultures after concussion” for the *Parker H. Petit Institute for Bioengineering and Bioscience, GaTech*.

H. Academic Service

H.1 University Committees

2007 – 2013 University Institutional Animal Care and Use Committee (Morningside)
2013 – University Financial Conflict of Interest Committee (Morningside), Co-chair 2018-2020, chair 2021
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 – 2016 Provost’s Middle States Commission on Higher Education Accreditation Subcommittee
2015 – 2017 Chandler Classroom Steering Committee
2015 – 2016 Educational Policy and Planning Committee, Columbia College and General Studies, working group for course numbering
2016 – 2017 University Travel Policy Committee
2017 – 2019 JED Foundation Assessment Steering Committee
2017 – Center for Teaching and Learning Advisory Board
2019 Vice President of Student Affairs, Office of University Life Search Committee
2019 SEAS Representative to the visiting Association of University Administrators group from the UK
2020 – SIS Replacement Advisory Committee
2021 – 2022 Undergraduate Expansion Study Steering Committee
2023 – Provost’s Middle States Commission on Higher Education Accreditation Subcommittee

H.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
2016 Presenter, SEAS Strategic Forum Discussion on Graduate Education
2016 SEAS Website Redesign Review Committee
2016 – 2018 Academic Integrity Task Force

2016 – 2019 ABET Coordination Team for Reaccreditation
2016 – 2017 Initiated the Johnson and Johnsons Scholars Program
2016 – 2017 Initiated Engineering Summer Scholarship for students on financial aid
2017 – 2018 Johnson and Johnsons Scholars Program, Principal Investigator
2017 – 2019 Interschool Committee to institute new timing for Course Evaluations
2018 – 2019 Provost's Academic Review Preparation Committee, met with internal and external review panels
2018 – 2019 Johnson and Johnsons Scholars Program, Principal Investigator
2019 Interviewed candidate for SEAS Associate Director of Wellness
2019 Led task force to improve first-year exposure to SEAS majors and generate a request for proposals to enhance offerings
2019-2020 Johnson and Johnsons Scholars Program, Principal Investigator
2019 – 2020 Organized Faculty Teaching Innovations Lunch Series
2019 Multivariable Calculus Review of the Impact on Student Preparation
2019 Assisted in preparing presentation to the Board of Trustees subcommittee on the Undergraduate Experience
2020 Orchestrated introduction of Spatial Visualization and Reasoning Skills in the Summer Bridge Program of the Academic Success Program
2020 Initiated efforts to develop online interactive modules for calculus review
2020 SEAS Dean's Retreat participant
2020 Reviewed Admissions Applications for Egleston Candidates
2020-2021 SEAS Education Working Group
2020-2021 SEAS Diversity, Equity, Inclusion Commission
2020 Laboratory Course and Senior Design kits with Environmental Health & Safety and Office of General Council
2020 Teaching Laboratory Facilities Reopening Group
2020 Columbia Engineering Branding Review
2021 SEAS Executive Committee Retreat
2021 Reviewed Admissions Applications for Egleston Candidates
2021 – 2022 SEAS Undergraduate Expansion Committee
2021 – 2022 Core and Student Life Undergraduate Expansion Committee
2022 SEAS Website Redesign Workshop
2022 Reviewed Admissions Applications for Egleston Candidates
2022 – ABET Accreditation Committee
2022 – Dual Degree with Ecole Polytechnique Implementation Committee
2023 Reviewed Admissions Applications for Egleston Candidates

H.3 Departmental Committees and Duties

2003 – 2012 Undergraduate Student Advisor
2003 – 2012 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
2012 – Administrative Committee, 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
2018 Panelist, Careers in Academia for the Department of Biomedical Engineering Retreat
2019-2020 Department of Biomedical Engineering 20th Anniversary Organizing Committee
2020- Undergraduate Curriculum Committee
2021 Departmental Graduation Event, Speaker
2023 Piloting In-Major Tutoring for Quantitative Physiology II

H.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 Davis Scholars lunch for prospective families
2015 Perspectives on Diversity Alumni Brunch
2015 SEAS Awards of Distinction Dinner, speaker
2015 Archimedes Dinner
2015 Carleton Commons Dedication lunch
2015 SWE dinner, speaker
2015 Academic Success Program lunch
2015 SEAS Senior Dinner
2015 Columbia Engineering Class Day
2015 Prospective Egleston Scholars reception
2015 Alumni Reception and Dinner
2015 Convocation
2015 Egleston Family welcome reception
2015 Academic Assembly
2015 SEAS Manhattanville brainstorming session, participant
2015 Just Desserts, speaker
2015 SEAS Strategy meeting on undergraduate education, chaired & presented
2015 Race, Ethnicity and University Life: Next Steps from Office of University Life
2015 Chairs' Meeting, presentation on advising

2015 SEAS Faculty Meeting, presentation on advising
2015 Columbia Engineering Alumni Association Cruise
2015 Summer Engineering Research Invitational, speaker
2015 – 2016 Organizing Committee, Science Expo, The School at Columbia University
2016 SEAS strategy meeting on graduate education, presented
2016 Egleston Scholar enhanced advising
2016 Scholarship Dinner
2016 Columbia Engineering Young Alumni dinner, speaker
2016 Lynn Conway Lunch on Diversity in STEM
2016 Magill Lecture by Lynn Conway
2016 Engineering Strategic Discussion Dinner
2016 Senior Toast
2016 Egleston Recruitment Dinner
2016 Days on Campus Reception, speaker
2016 Davis Scholars Lunch for prospective families
2016 Diversity brunch
2016 Deans in Halls, named guest
2016 Awards of Distinction dinner
2016 Senior Dinner
2016 Academic Success Program lunch, speaker
2016 Egleston Scholars Graduation Reception, speaker
2016 Rio Innovation Hub Design Challenge, chaperone
2016 New Faculty Orientation, speaker
2016 First in Family Orientation, speaker
2016 Transfer Student Welcome Reception
2016 Academic Resource Fair
2016 ResInc Welcome Reception, speaker
2016 Just Desserts Networking Reception, speaker
2016 American Council of Engineering Companies of New York Annual Engineering Excellence Awards, judge
2016 Work-Life Balance in Academia Panelist, SEAS Path to Professorship Workshop
2017 Met with Boeing representatives for recruiting students
2017 Senior Toast
2017 American Council of Engineering Companies of New York Engineering Excellence Awards Gala
2017 Columbia Engineering Scholarship Dinner
2017 Johnson and Johnson Scholars meeting, presenter
2017 Student Leadership Lunch
2017 Davis Scholars Lunch, Days on Campus
2017 Diversity Brunch, Days on Campus
2017 Columbia Engineering Awards of Distinction Dinner, speaker

2017 Columbia Engineering Senior Dinner
2017 Academic Success Program Senior Banquet, speaker
2017 Alumni Dinner
2017 Oversaw renovations of CEPSR 414
2017 – 2018 Oversaw implementation of APMA E2000 Multivariable Calculus of Engineers
2017 – 2018 Oversaw implementation of ORCA E2500 Foundations in Data Science
2017 Egleston Scholars Welcome Reception, speaker
2017 New Family Orientation, panelist
2017 New Faculty Orientation, speaker
2017 Academic Assembly
2017 Visiting Student Reception
2017 Transfer and Combined Plan Student Reception
2017 SCOOPS activity for first year students
2017 Family Weekend Welcome Reception
2017 Just Desserts Student-Alumni Networking Reception, speaker
2017 Tree Lighting Ceremony, speaker
2018 Pi-Day Student Reception, speaker
2018 Columbia Engineering Scholarship Dinner
2018 Columbia Engineering Awards of Distinction Dinner, speaker
2018 Columbia Engineering Senior Dinner
2018 Academic Success Program Senior Banquet, speaker
2018 Columbia Engineering Awards of Distinction Dinner, speaker
2018 Faculty Roundtable on Financial Conflict of Interest, panelist
2018 Columbia Engineering Senior Dinner
2018 Columbia Engineering Benefactors Dinner
2018 Engineering Class Day, speaker
2018 Senior Toast
2018 Columbia Engineering Scholarship Dinner
2018 Engineering Reunion Dinner
2018 NSOP Family Program Resource Program, panelist
2018 Egleston Scholars Reception
2018 Columbia Engineering Family Dinner
2018 Columbia Engineering Visiting Students Welcome
2018 Parents Weekend Welcome with Dean Boyce
2018 Columbia Engineering representative to welcome Cuban President Miguel Diaz-Canal
2018 American Council of Engineering Companies (ACEC) Engineering Excellence Awards, judge
2018 Mental Health Task Force Mixer, representative
2018 Met with Jeffry Franklin, Columbia Engineering Alumnus
2018 Tree Lighting Ceremony, speaker

2019 Met with Rear Admiral Mike Bernacchi, head of all Naval Reserve Officers Training Corps (NROTC)
2019 Columbia Engineering Alumni Association Dinner
2019 SEAS Scholarship Dinner
2019 American Council of Engineering Companies of New York Engineering Excellence Awards Gala
2019 Undergraduate Admissions Diversity Brunch
2019 SEAS Awards of Distinction Dinner
2019 Panel Participant, “How to get into graduate school”
2019 Senior Toast
2019 SEAS Archimedes Award Dinner
2019 Academic Success Program Graduation Lunch
2019 SEAS Senior Dinner
2019 Egleston Graduation Reception, speaker
2019 NROTC Commissioning Ceremony, speaker
2019 NSOP Leadership Meeting
2019 New Faculty Orientation: Student Advising, presenter
2019 NSOP First-in-Family Reception
2019 NSOP Academic Resource Panel, speaker
2019 NSOP Egleston Reception, speaker
2019 Convocation Representative for SEAS
2019 SEAS Academic Assembly
2019 Visiting and Exchange Students Welcome
2019 Transfer and Combined Students Welcome
2019 Columbia Engineering Alumni Association Ties and Scarves Event
2019 Columbia Engineering Alumni Association Just Desserts, speaker
2019 Board of Visitors Reception
2019 SEAS Work-Life Balance Panel: Path to Professorship, speaker
2019 Tree Lighting Ceremony, speaker
2020 Faculty panel for admitted students
2020 Class Day Speaker
2020 Egleston Yield Reception
2020 Egleston Graduation Event Speaker
2020 SEAS Webinar / Town Hall with parents and students (incoming & returning students)
2020 Convocation Representative for SEAS
2020 Academic Assembly
2020 Egleston Welcome Reception
2020 3-2 Student Welcome Assembly
2020 Family Weekend Speaker
2020 SEAS New Faculty Orientation, Advising

2020	American Council of Engineering Companies of New York Engineering Excellence Awards Judging
2020	Work Life Balance Panel Moderator
2021	Summer Opportunities Webinar for Students & Families
2021	Got FU'd Faculty Participant
2021	Days on Campus Faculty Panel
2021	Senior Toast
2021	Class Day Speaker
2021	Graduate Walk Dean's Office Representative
2021	NROTC Commissioning Ceremony, Speaker
2021	SEAS Family Orientation Lecture
2021	Admissions Trianing SEAS
2021	SEAS Ties and Scarves Reception
2021	New faculty orientation
2021	Family Weekend Welcome Seminar
2022	Admissions Panel Yield Event
2022	SEAS Class Day Speaker (Class '22)
2022	SEAS Graduation Makeup Speaker (Class '21)
2022	NROTC Commissioning Ceremony, Speaker
2022	Admissions Training Seminar
2022	Center for Student Advising Update Seminar
2022	Just Desserts Speaker
2022	International Parents Reception
2022	New Faculty Orientation
2022	SEAS Ties and Scarves Reception
2022	Parents Council Reception