PAUL Z ELIAS

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EDUCATION

09/2004 – 02/2011 *MASSACHUSETTS INSTITUTE OF TECHNOLOGY* Cambridge, MA

PhD in Biomedical Engineering, February 2011
-Harvard-MIT Division of Health Sciences and Technology
-Cumulative Graduate GPA: 4.8 / 5.0
-Thesis Title: Collagen Scaffolds for Treatment of Penetrating Brain Injury in a Rat Model

Master of Science in Aeronautics and Astronautics, June 2006
Thesis Title: Incremental Adaptation to Yaw Head Movements During 30 RPM Centrifugation

MIT Graduate Level Engineering Coursework: Feedback Control Systems, Solid Mechanics, Dynamics, Applied Mathematics for Engineers, Human Factors Engineering, Biomaterials – Tissue Interactions

Harvard Medical School Coursework: Human Functional Anatomy, Human Pathology, Neuroscience, Cardiovascular Pathophysiology, Respiratory Pathophysiology, Molecular Biology and Genetics in Modern Medicine, Biostatistics and Epidemiology

Clinical Education: Two 6-week "Introduction to Clinical Medicine" courses at the West Roxbury VA Hospital (Boston VA Healthcare System) involving training in conducting patient histories and physical exams, as well as participating in discussion of patient diagnosis and treatment

09/1999 – 12/2003 *UNIVERSITY OF WASHINGTON* Seattle, WA

Bachelor of Science in Bioengineering with Distinction and College Honors, December 2003
-Cumulative GPA: 3.71 / 4.00, Departmental GPA: 3.74 / 4.00
-University of Washington Undergraduate Scholar Award (1999-2001), Dean's List 12 Quarters

RESEARCH & WORK EXPERIENCE

07/2012 – Present **DEPARTMENT OF BIOENGINEERING, UNIVERSITY OF WASHINGTON**
- Senior Fellow
- Laboratories of Dr. Suzie Pun, PhD, Associate Professor of Bioengineering, and Dr. Philip Horner, PhD, Associate Professor of Neurological Surgery
- Craig H. Neilsen Foundation Postdoctoral Fellowship Award

- Currently developing drug delivery systems for treatment of spinal cord injury
- Designing and synthesizing a thermosensitive hydrogel biomaterial for controlled delivery of multiple therapeutic agents
- Conducting polymer synthesis using Atom Transfer Radical Polymerization (ATRP)
- Investigating effects of the biomaterial in an *in vivo* rat model of cervical spinal cord injury

09/2006 – 02/2011 **TISSUE ENGINEERING LABORATORIES, BOSTON VA HEALTHCARE SYSTEM**
-Research Assistant
-PhD Research Advisor: Dr. Myron Spector, PhD, Professor of Orthopedic Surgery (Biomaterials), Harvard Medical School

- Investigated the treatment of penetrating brain injuries using collagen biomaterials, neural progenitor cells, and a therapeutic protein (soluble Nogo receptor)
- Fabricated and characterized collagen biomaterials for *in vitro* and *in vivo* applications
- Conducted mechanical testing of brain tissue and collagen biomaterials, along with signal processing, data analysis, and viscoelastic modeling using MATLAB
- Performed stereotactic neurosurgical procedures on rats and delivered post-operative care
- Prepared and implanted biomaterial constructs containing adult rat hippocampal neural progenitors and soluble Nogo receptor protein into a rat model of penetrating brain injury
- Analyzed rat brain specimens using immunohistochemistry and immunofluorescence techniques

09/2004 – 08/2006 **MAN VEHICLE LABORATORY, MASSACHUSETTS INSTITUTE OF TECHNOLOGY**
-Research Assistant
-Master's Degree Research Advisor: Dr. Laurence Young, PhD, Apollo Program Professor of Astronautics and Professor of Health Sciences and Technology, MIT

- Studied human vestibular adaptation to head movements made in a rotating environment, with application to artificial gravity for human spaceflight
- Modified and implemented a quantitative motion sickness model in MATLAB/Simulink to predict human tolerance and adaptation to a repetitive vestibular stimulus
- Designed a human subjects research protocol and conducted experiments
- Trained and supervised undergraduate students

05/2003 – 08/2004 **APPLIED BIOMECHANICS LABORATORY, UNIVERSITY OF WASHINGTON**

-Research Assistant
-Undergraduate Research Advisor: Dr. Randal Ching, PhD, Research Associate Professor of Mechanical Engineering, University of Washington

- Investigated mechanical properties of the cervical spine in compression and lateral bending, with application towards better automotive safety standards and improved computational models

06/2001 – 09/2002 **DEPARTMENT OF NEUROLOGICAL SURGERY, UNIVERSITY OF WASHINGTON**

-Undergraduate Laboratory Assistant
-Laboratory of Dr. Robert Rostomily, MD, Associate Professor of Neurological Surgery

- Performed RNA extraction and quantification, PCR, RT-PCR, gel electrophoresis, tissue cryosectioning, fluorescence antibody staining, etc.

06/1999 – 09/1999 **GROUP HEALTH COOPERATIVE** Seattle, WA

-Phlebotomist and Laboratory Assistant

Journal Publications:

Elias PZ, Spector M, "Treatment of Penetrating Brain Injury in a Rat Model Using Collagen Scaffolds Incorporating Soluble Nogo Receptor." J Tissue Eng Regen Med. 2012 Oct 5. (Online).

Elias PZ, Spector M, "Characterization of a Bilateral Penetrating Brain Injury in Rats and Evaluation of a Collagen Biomaterial for Potential Treatment." J Neurotrauma. 2012 Jul; 29(11): 2086-102.

Elias PZ, Spector M, "Implantation of a Collagen Scaffold Seeded with Adult Rat Hippocampal Progenitors in a Rat Model of Penetrating Brain Injury." J Neurosci Methods. 2012 Jul; 209(1): 199-211.

Elias PZ, Spector M, "Viscoelastic Characterization of Rat Cerebral Cortex and Type I Collagen Scaffolds for Central Nervous System Tissue Engineering." J Mech Behav Biomed Mater. 2012 Aug; 12: 63-73.

Elias PZ, Jarchow T, Young LR, "Incremental Adaptation to Yaw Head Movements During 30 RPM Centrifugation." Exp Brain Res. 2008 Aug; 189(3): 269-277.

Elias PZ, Jarchow T, Young LR, "Modeling Sensory Conflict and Motion Sickness in Artificial Gravity." Acta Astronautica. 2008 Jan-Feb; 62(2-3): 224-231.

Elias PZ, Nuckley DJ, Ching RP, "Effect of loading rate on the compressive mechanics of the immature baboon cervical spine." J Biomech Eng. 2006 Feb;128(1):18-23.

Rostomily RC, Elias M, Deng M, **Elias P**, Born DE, Muballe D, Silbergeld DL, Futran N, Weymuller EA, Mankoff DA, Eary J, "Clinical utility of somatostatin receptor scintigraphic imaging (octreoscan) in esthesioneuroblastoma: A case study and survey of somatostatin receptor subtype expression." Head Neck. 2006 Feb; 28(4): 305-312.

Conference Publications:

Elias PZ, Nuckey DJ, Ching RP, "Effect of loading rate on compressive failure mechanics of the cervical spine." Injury Biomechanics Research: 31st International Workshop, San Diego, CA, pp. 185-196, 2003.

Ching RP, **Elias PZ**, Harrington RM, Nuckley DJ, "Neck injury mechanics in lateral bending." Injury Biomechanics Research: 32nd International Workshop, Nashville, TN, pp. 271-276, 2004.

Journal Review: Reviewer for ***Biomaterials*** and ***Tissue Engineering***.