JOSHUA MAYOURIAN

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EDUCATION

Icahn School of Medicine at Mount Sinai *Projected May 2022*
M.D./Ph.D. in Design, Technology, and Entrepreneurship Candidate

Cooper Union for the Advancement of Science and Art *May 2014*
M.E., B.E. in Chemical Engineering; Minor in Biomedical Engineering
Overall GPA: 3.9/4.0; Major GPA: 3.9/4.0

BIOMEDICAL ENGINEERING-RELEVANT COURSEWORK

- Process Evaluation and Design
- Advanced Heat and Mass Transfer
- Advanced Chemical Reaction Engineering
- Convex Optimization Techniques
- Materials Science for Chemical Engineers
- Bioelectricity
- Biochemistry
- Bioengineering Applications to Sports Medicine
- Process Simulation
- Fluid Mechanics and Flow Systems
- Biological Systems
- Neuroscience and Biophysics I/II
- Engineering Design

PROJECT WORK/RESEARCH

Electrophysiology Researcher June 2013 - September 2014
Icahn School of Medicine at Mount Sinai *New York, NY*
- Mathematically modeled the electrical interactions of human mesenchymal stem cells (hMSCs) and cardiomyocytes (CMs)
- Developed a novel mathematical model of the electrophysiological activity of hMSCs
- Learned how to patch clamp in a whole-cell configuration for excitable and non-excitable cells
- Designed patch clamping experiments to examine electrophysiological interactions of hMSCs and CMs empirically

Biochemical Engineering Researcher January 2014 - May 2014
Cooper Union for the Advancement of Science and Art *New York, NY*
- Group leader in designing a biochemical plant to produce 50 million doses of trivalent influenza vaccine annually
- Performed an economic and environmental analysis on the plant design

Chemical Engineering Researcher January 2014 - May 2014
Cooper Union for the Advancement of Science and Art *New York, NY*
- Group leader in designing an ethylene plant to produce 700 metric tons of ethylene per day
- Performed an economic and environmental analysis on the plant design

Biomedical Engineering Researcher January 2014 - May 2014
Cooper Union for the Advancement of Science and Art *New York, NY*
- Developed the governing equations to mathematically model the thermal effects of ablation on capillary blood flow and oxygen transport
- Simulated the system on COMSOL Multiphysics.

Chemical Engineering Researcher September 2013 - December 2014
Cooper Union for the Advancement of Science and Art *New York, NY*
- Optimized the profit in ethylene production via thermal cracking

Neuroscience Researcher January 2013 - May 2013
Cooper Union for the Advancement of Science and Art *New York, NY*
- Empirically determined the conduction velocity of intact and regenerated earthworms

Tissue Engineering Researcher, Bioreactor Designer and Researcher June 2012 - October 2012
Icahn School of Medicine at Mount Sinai *New York, NY*
- Examined the role of paracrine signaling in MSCs improving CM function

- Developed a biomathematical model of paracrine signaling between MSCs and CMs using biotransport phenomena
- Grew and electrically paced Engineered Cardiac Tissue (ECT) with and without MSC supply to examine cardiac function
- Used ELISA, an immunoassay, to determine total protein levels within the ECT dishes
- Designed a novel bioreactor for culturing multiple ECTs together

Organic Chemistry Researcher January 2012 - May 2012
Cooper Union for the Advancement of Science and Art *New York, NY*
- Examined the conditions that would optimize percent yield of substituted guanidines
- Synthesized substituted guanidines using microwave irradiation
- Used NMR to analyze the percent yield of substituted guanidines

Orthopedic Clinical Researcher June 2011 - September 2011
Elmhurst Hospital *Elmhurst, NY*
- Learned to read X-rays to classify intertrochanteric fractures with AO classifications after a percutaneous compression plating

Biomedical Engineering Designer September 2010 - December 2010
Cooper Union for the Advancement of Science and Art *New York, NY*
- Designed an exercise machine that would stimulate obese users
- Tracked a user's peddling speed, and outputted this result into a racing video game

PUBLICATIONS/PRESENTATIONS

Mathematical Modeling of Electrophysiological Coupling in Mesenchymal Stem Cell Enhancement of Cardiomyocyte Function
Joshua Mayourian, Eric A. Sobie, Ph.D., and Kevin Costa, Ph.D.
- Master's Thesis Accepted, 2014
- Podium presentation at Cooper Union, 2014
- Poster presentation at the Icahn School of Medicine at Mount Sinai, 2013
- End of Year Show at Cooper Union, 2014

Manufacturing the Next Generation of Vaccines
Ghazal Erfani, Ciera Lowe, and Joshua Mayourian
- End of Year Show at Cooper Union, 2014

Role of Paracrine Signaling in Mesenchymal Stem Cells Improving Cardiomyocyte Function
Joshua Mayourian, Timothy Cashman, Kevin Costa, Ph.D.
- Podium presentation at the BMES National Meeting in Atlanta, 2012
- Poster presentation at the Icahn School of Medicine at Mount Sinai, 2012

Design of Stimulating Exercise Machines for Obese Teens
Joshua Mayourian, Joseph Kreitinger, Eric Leong, Jonathan Ostrander, Kristof Toth, Ellie Rappaport, David Wootton, Ph.D.
- Podium presentation at the Cooper Union for the Advancement of Science and Art, 2010

INVENTIONS

Length Controlled Bioreactor September 2013 - Present
Joshua Mayourian (co-inventor), Kevin Costa (co-inventor), Ph.D. *New York, NY*
- Designed a novel length controlled bioreactor to analyze ECTs activation threshold, stress, and force at different tissue lengths (technology disclosure form in progress)

WORK EXPERIENCE

Cooper Union for the Advancement of Science and Art January 2013 - June 2013
Graduate Bioelectricity Course Teacher Assistant *New York, NY*
- Volunteered as a teaching assistant in a graduate bioelectricity class as a junior
- Created homework assignments and solutions, and graded both homework assignments and exams throughout the semester
- Assisted students out of class with any questions they had regarding the course material

Icahn School of Medicine at Mount Sinai Summer 2012 & 2013
Summer Undergraduate Research Fellow *New York, NY*
- Tissue engineering researcher at the Costa lab in an extremely competitive and intensive research summer program
- Attended journal club and weekly research presentations

Elmhurst Hospital June 2011 - September 2011
Volunteer/Clinical Researcher *Elmhurst, NY*

· Observed Orthopedic surgeons, and assisted in orthopedic clinic
· Assisted data collection for Intertrochanteric fractures treated with PCCP following AO classification system

Self-Employed September 2009 - June 2010
Tutor *Roslyn, NY*

· Instructed high school students in Physics, Mathematics, Chemistry, and Spanish

Beth Shalom Day Camp June 2010 - August 2010
Lifeguard *Roslyn, NY*

· Obtained 1A lifeguard and CPR certification
· Instructed children on all different levels how to swim

Sid Jacobson Jewish Community Center February 2008
Hurricane Katrina Relief Volunteer *New Orleans, LA*

· Assisted in cleaning up and rebuilding numerous households in New Orleans after Hurricane Katrina

SKILLS

Laboratory Equipment

· Patch Clamp, Gas Chromatograph, Mass Spectrometer, Absorption Spectrometer, IR Spectrometer, Fluoresence Spectroscopy, Flame Atomic Absorption Spectroscopy, HPLC, UV-Vis Spectroscopy, ELISA Immunoassay

Computer Programs

· MATLAB, HTML, CSS, Python, QBasic, LaTeX
· CellML, COMSOL, Pro/II Processing Engineering Software, AutoCAD, Solidworks, Mastercam, Microsoft Office

Languages

· Fluent in Hebrew and English and conversant in Spanish and Persian

HONORS

N.I.H Fully-Funded Medical Scientist Training Program, ISMMS 2014

Accepted Early Assurance into the Icahn School of Medicine at Mount Sinai M.D./Ph.D. Program

Daniel Okrent Cooper Fund Scholar, Cooper Union 2013

Responsible for Greatness Award, Cooper Union 2013

Goldwater Scholarship Honorable Mention, 2013

Deans List, The Cooper Union, Fall 2010, Spring 2011, Fall 2011, Spring 2012, Fall 2012, Spring 2013, Fall 2013, Spring 2014

Full-tuition scholarship, The Cooper Union, 2010-2014

Unsung Hero, Long Island Sports Awards, 2010

Long Island Math Fair, Silver Medal, 2009, Bronze Medal, 2008

MEMBERSHIPS

Cooper Union Basketball Team, Starting Point Guard, Captain *September 2010 - Present*

Tau Beta Pi, Secretary, Member, Engineering Honors Society *September 2012 - Present*

Cooper Union Pre-Medicine Mentorship Club, Founder *September 2013 - Present*

Zeta Psi Fraternity, Treasurer and Athletic Chair *January 2011 - Present*

American Institute of Chemical Engineers, Member *September 2011 - Present*

Biomedical Engineering Society, Member *September 2012 - Present*

Biophysical Society, Member *August 2013 - Present*