JOSHUA TIMMONS

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EDUCATION

Northeastern University – Boston, MA **B.S. Biology; Minor Economics**
GPA: 3.69 September 2012—August 2016
Courses: Bioinformatics Programming, Bioinformatics Methods 1, Fundamentals of Computer Science 2, Biological Electron Microscopy, Plant Biotechnology, Biochemistry, Genetics & Molecular Biology, Cell & Molecular Biology, Organic Chemistry 1, Organic Chemistry 2, Statistics and Software, Applied Econometrics, Math for Economics.
Awards: *Magnum Cum Laude,* Northeastern Honors Recipient, Advanced Research and Creative Endeavor Award, Above and Beyond CEP Award, National Merit Scholar.

EXPERIENCE

Synthetic Biology Software **Lattice Automation Inc.**
Junior Software Developer July 2016—Present
Programming tools for synthetic biology using Java, React, Node, MongoDB, and GraphQL Ideated and prototyped a tool for automated MoClo assembly tool from scratch with Java. Interacted with end-users to develop the application for combinatorial assembly of genetic parts into functional genetic units output to robotic assembly instructions. Researched and prototyped a tech stack for a synbio platform using web development practices in Node.js, ES6, and React. Designed half the MongoDB database, established best coding practices with static code analysis (ESLint) and continuous integration testing (CircleCI), and initiated a wiki for faster developer onboarding. Developed significant portions of the platform, including restriction digest and ligation algorithms, folder navigation, as well as sequence and genetic assembly viewers.

- Ortiz, J., Carr, S.B., Pavan, M., McCarthy, L., Timmons, J.J., Densmore, D.M. (2017). Automated Robotic Liquid Handling Assembly of Modular DNA Devices. *JoVE.* (*under review*)

Neuro-Oncology Research **Beth Israel Deaconess Medical Center**
Student Researcher (Co-op) July 2014—Present
Investigated Glioblastoma multiforme and emerging treatment modalities, particularly tumor treating fields (alternating electric fields). Designed and implemented a MATLAB workflow for segmenting MRI's using SPM's New Segment algorithm saving >100 hours per patient FEA model. Created an algorithm, *ab initio,* for the generating electrode models matching NovoTTF, a tumor-treating device, using inverse deformation fields from the segmentation and surface recognition (under review). Researched, designed, and implemented a study determining the influence of Substance P on the immunogenic response of C57BL-6 mice post-tail vein injection of B16-BL6 melanoma. Performed data analytics on the results of a Phase 1 Metronomic Temozolomide study and carried out a literature review for Spinal Cord Glioblastoma, a rare and poorly understood cancer (also under review).

- Timmons, J.J., Lok, E., San, P., Bui, K., Wong, E.T. (2017). Semi-Automated MRI Segmentation Workflow for Glioblastoma Treated by Tumor Treating Fields. (*under review* & *Poster session at ANA*)
- Timmons, J.J., Zhang, K., Fong, J., Lok, E., Swanson, K., Gautam, S., Wong, E.T. (2017). Literature of Spinal Cord Glioblastoma. (*under review*)
- Patnaik, A., Swanson, K.D., … Timmons, J.J., … Cantley, L.C. (2017). Cabozantinib eradicates advanced murine prostate cancer by activating anti-tumor innate immunity. *Cancer Discovery*
- Timmons, J.J., Clohessy, S., & Wong, E.T. (2016). Injection of Syngeneic Murine Melanoma Cells to Determine Their Metastatic Potential in the Lungs. *JoVE*
- Pyay, S., Timmons, J.J., Lok, E., Swanson, K.D., & Wong, E.T. (2016). Analysis of Glioblastoma physical characteristics in patients benefitting from tumor treating electric fields therapy. *Poster session at CNO*

International Genetically Engineered Machine **Northeastern University**
Founder, Captain January 2015—July 2016
Secured funds, recruited members and advisers, and presented for Northeastern's first iGEM team. Researched and implemented a project for the heterologous production of therapeutic antibodies in microalgae, an inexpensive and rapidly scalable production platform. Designed plasmids in Benchling and assembled them in the wet lab with PCR, restriction digest, and Gibson Assembly. Lead the 2016 iGEM team to engineer *E. coli* for an improved microbial electrolysis cell.

- Beal, J., Haddock-Angelli, T., Gershater, M., de Mora., K., Lizarazo, M., Hollenhorst, J., Rettberg, R., & iGEM Interlab Study Contributors. (2016). Reproducibility of Fluorescent Expression from Engineered Biological Constructs in *E. coli. PlosOne. (contributor)*

TECHNICAL SKILLS

Programming: Competent with Java, JavaScript, MATLAB. Experience with Python, R, Perl, TCL.
Software: R Studio, AWS, GitHub, MATLAB, Benchling, Adobe Illustrator, Sketch, Linux.
Biology: Western Blot, ELISAs, PCR, transmission electron microscopy, scanning electron microscopy, mouse handling, mouse surgery, tissue culturing, Gibson assembly, restriction digest, DNA electrophoresis, DNA purification, transformation.

PROJECTS

Automated Microbial Electrolysis Cell: Built an Arduino-controlled, two-cell batch-fed MEC to compare performance of engineered vs. non-engineered *E. coli* (co-cultured with *G. sulfurreducens*). Used solenoids, peristaltic pumps, and sensors.
External Electric Fields and Tubulin Heterodimer: Have used NAMD, the molecular dynamics program, to determine the structural effects of an external electric field on an equilibrated tubulin heterodimer through simulation. Early results suggest EEFs may reduce the rate of heterodimer inclusion into a growing microtubule by rigidifying the heterodimer into a "bent" formation. Simulations have been performed on AWS compute clusters and a IBM Blue Gene/Q cluster at the University of Toronto.