

Grant A. Hartung

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Objective Obtaining a PhD in Neural Bioengineering with a focus on stochastic tissue modeling and simulations

Education **University of Illinois at Chicago (UIC)**
Master's of Science in Neural Engineering *Exp: May 2015*

University of Illinois at Chicago (UIC)
Bachelor of Science in Bioengineering with a Neural Engineering concentration, Fall 2012
Minor: Mechanical Engineering

Research Interest

Utilizing stochastic simulations at the single-cell level to create relevant simulations based on scientific data.

Research Experience

Current Projects:

10/14 – present **Stochastic Tissue Simulation – Dr. Andreas Linninger**

Kinetics of transport, reactions and other subcellular activities are more accurately modeled using stochastic simulations based on monte carlo methods than deterministic rate equations based on ordinary differential equations. Our goal is to create simulations that explain the molecular phenomenon that produce recorded data. Current environment being simulated is the Calcium ion lifespan in a series of single boutons of a dendrite in repetitive firing as a network.

6/13 - present **Fast Axonal Transport Simulation - Dr. Gerardo Morfini**

Creating a visual simulation of axonal transport with which we can test different theories of mechanisms behind fast axonal transport. Programming in Matlab utilizing GUIs, active drawing plots, and highly engineered code allows testing of everything from speed to dissociation and plane-of-focus that allows us to simulate theories behind changes in axonal transport and quantitatively compare the results with those of the actual experiments being conducted.

2/13 - present **Short and Long-Term Pharmacokinetic Model for Existing and Novel Nanoparticles - Dr. G. Ali Mansoori**

We are creating a model that will help to understand the pharmacokinetics of nanoparticles that have been previously studied. The model hopes to lead to a predictive simulation for novel functionalizations and unique nanoparticles yet to be developed. Our current focus is on explaining the data inconsistencies with the currently accepted molecular model of carbon nanomaterials in vivo.

08/13 – 5/14 **Low-Cost Bedside Communication Device - Graduate Assistant of Engineering World Health Design/Build Team**

08/13 – 5/14 **Low-Cost, Robust Surgical Lamp With Built-In Renewable Energy Source - Graduate Assistant of Engineering World Health Design/Build Team**

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Past Projects:

8/11-11/12 **Biofiltration and Toxicity of Nanoparticles as Trends - Dr. G. Ali Mansoori**

Reviewed the last 40 years of nanoparticle research in vivo to discern governing factors of toxicity and filtration of nanoparticles out of the body. A general pharmacokinetic overview of the field that renders new patterns. Paper can be found at: <http://www.scitechnol.com/2324-8777/2324-8777-2-113.pdf>

Senior Design

"An Acoustic Signal Acquisition System for a Fetal Heart Rate Monitoring Device" (April 26, 2011) - **Heartsounds Inc.**

Created an apparatus to acquire and filter in real time up to 3 separate fetal heart rate signals during pregnancy and delivery. Digitized filtered analog signal was processed through a blind-source separation algorithm to differentiate multiple individual fetal heartbeats. Adapted new scientific practice (silicon-infused piezoelectric microphones) to acquire such a signal efficiently (SNR of at least 10 dB) with extreme cost-efficiency. Project was heavily reliant on data collection. A prototype was fabricated and performed exceeding expectations.

Neural Engineering Lab (September 2011) - Dr. John Hetling PhD

Created a device to control a computer cursor via physical arm movements without touching the mouse. First student team to ever accomplish this task. Project was heavily reliant on data collection.

1/10-8/10 **University of Chicago Human Neuroscience Department - Dr. Ana Solodkin PhD**

Bioengineer and Information Technologist/Programmer – HIPPA Certified

Utilized magnetic fields to induce brain-derived neural stimulation which elicited hand and foot motion. Upon the elicitation of motion, the lower leg and forearm neural potentials were measured in both control subjects and subjects suffering from degenerative nerve disorders. The results created a system to quantitatively determine patient nerve degeneration.

- Compiled and troubleshoot multiple types of code through open science grid computers using unix command line (RHE Linux)
- Responsible for lab-wide bioengineering-related troubleshooting

7/09-9/09 **UIC Pathology Department Medical Branch - Dr. Virgilia Macias PhD**
Research Project Patient Admission Clerk – HIPPA Certified

- Recruited patients into Pathology Department research programs

4/09-9/09 **UIC Pathology Department (West Campus) - Dr. Andre Balla PhD**
Research Assistant

This study was designed to examine the effects of flak seed oil on ovarian cancer from chicken subjects.

- Created ovarian tissue microarrays
- Increased productivity 800% with notably higher consistency than previous assistants improving project results for medical research team

9/08-9/09 **UIC Pathology Department (West Campus) - Dr. Virgilia Macias PhD**
Research Assistant

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Evaluated transferrin receptor expression in relation to prostate cancer.

- Identified and marked on digital microarrays cellular level cancerous prostate tissue requiring attention to detail

Publications

- 2013 **Grant Hartung**, G. Ali Mansoori, "In Vivo General Trends, Filtration and Toxicity of Nanoparticles." J Nanomaterials & Molecular Nanotechnology 2013; 2(3) 1-21 (Invited Paper)
- 4/13 **Grant Hartung**, "Fullerenes; Possible to Evacuate Post-Administration or Are They Just Toxic?" Undergraduate Bioengineering Student Journal of the University of Illinois at Chicago 2013; 4(1):9-14. (Invited Paper)

Posters and Presentations

- 4/13 **Grant Hartung**, G. Ali Mansoori, *In Vivo Biofiltration: Emerging Trends of Nanoparticles* "Nanomaterials & Molecular Nanotechnology. **Paper presented** at Midwest Biomedical Engineering Career Conference, Chicago, Illinois.
- 6/13 **Grant Hartung**, G. Ali Mansoori, *In Vivo Biofiltration: Emerging Trends of Nanoparticles* "Nanomaterials & Molecular Nanotechnology. **Paper presented** at Biosensors & Bioelectronics - 2013, Northbrook, Illinois

Teaching Experiences

07/13 - Present **Graduate Teaching Assistant for Introduction to Engineering - Chris Kuypers**

- Collected attendance for 300-650 students in class on a weekly basis
- Graded assignments and recorded grades for all students
- Taught classes, held technical workshops and tutored students in engineering-specific topics

07/11 - 08/12 **Teaching Assistant and Bioengineering Coordinator for Introduction to Engineering course at UIC**

- General bioengineering liaison for incoming freshman and transfer students
- Created and Implemented bioengineering specific curriculum
- Taught detailed guidance and comprehensive assessments of bioengineering field

Professional Affiliations

Engineering World Health Founder (10/08-6/09), Graduate Assistant (8/13-Present)
BioMedical Engineering Society Student Member (10/08 – 9/10)
Society of Automotive Engineers Student Member (5/10-12/12)
Journal of Neural Engineering (Registered 2/12)
Bioengineering Organizational Alliance (08/11-5/12)
UIC Alumni Association - (5/13-Present)

Skills Computer: Designing and assembling custom computers, network assembly and maintenance, general IT

Programming Proficient in: Matlab, C#, C++, LabView, Microsoft office, Adobe Dreamweaver, Acrobat, FileZilla FTP *Working knowledge in:* HTML, Java, Autodesk 3D Studios Max, solidworks, Autocad, hardware and network diagnostics and assembly

Wood: lathing, carpentry (both design and fabrication), routing

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Plumbing: design and fabrication of intricate in home and irrigation systems of both PVC and copper

Electrical: 12V DC, 120V AC, 240V AC and 3-phase AC design and fabrication of entire rooms and systems, knowledge with Remote-Control systems for both design and fabrication, soldering, prototype circuit board design and installation experience

Machinist: Lathing, Milling, Welding (Arc, Mig, Tig, and Oxy-Acetylene for steel and Mig, Arc, and Oxy-Acetylene for aluminum), precision drilling (drill press, lathe or mill), knotching

Auto mechanic, landscaper, repairman, carpenter, woodworker, and mason

Awards

June 18, 2013 **Best Poster Award - OMICS Group 2013 Biosensors & Bioelectronics Conference**

April 13, 2012 **Chancellor's Student Service Award**

April 18, 2008 **Best New Society (BMES)**

Non-Relevant Work Experience

8/12-Present **Franck's Construction**

Intensive handyman work focusing on carpentry. Main focus of work was rehabilitating houses and rebuilding houses. The work included the use of intricate masonry, carpentry, roofing, painting, plumbing, electrical and interior design work. The work at times extended to gardening, landscaping, machining, and even automotive repair work.

SAE Mini Baja Team Chief fabricator and machinist (07/09-06/11), Co-captain (06/11–8/12)

Led and was head of recruitment for an undergraduate engineering design and build team which annually created a fully operational, full size, manned off-road vehicle. Competed in multiple SAE sponsored week long international competitions against over 100 different universities in design and operation events. The custom prototypes required multiple custom metal frame, steering, and drivetrain parts for which I was the machinist, fabricator and welder for the team.

References upon request