Noel Martin Naughton
nnaught2@illinois.edu
noelmnaughton.com
(651) 503-9041

Education

Ph.D. in Mechanical Engineering **2016 – 2019**
University of Illinois at Urbana-Champaign, Urbana, IL
Diffusion-Weighted MRI of Skeletal Muscle: Estimation of Microstructural Parameters
Research Advisor: John Georgiadis

M.S. in Mechanical Engineering **2014 – 2016**
University of Illinois at Urbana-Champaign, Urbana, IL
A Lattice Boltzmann Method of Diffusion-Weighted Magnetic Resonance Imaging in Skeletal Muscle

B.S. in Mechanical Engineering | minor in Catholic Studies; *magna cum laude* **2010 – 2014**
University of Saint Thomas, Saint Paul, MN

Fellowships & Grants

Beckman Institute Postdoctoral Fellowship **2021 – 2024**
Mistletoe Research Fellowship **2020 – 2021**
$10,000 Unfettered Research Grant & Mistletoe Startup Collaboration participant
NSF Graduate Research Fellowship **2016 – 2019**
XSEDE startup allocation **2018 – 2019**
100,000 CPU hours & 1000 GPU hours on SDSC Comet cluster

Professional Experience

Beckman Institute Postdoctoral Fellow – U. of Illinois at Urbana-Champaign **2021 – present**
Project: *Modeling dMRI tractography-based muscle architectures with Cosserat rods*
Postdoctoral Research Associate – University of Illinois at Urbana-Champaign **2020 – 2021**
Project: *A CyberOctopus that Learns, Evolves, and Adapts* (ONR MURI grant)
Assistant Rowing Coach – University of Illinois Rowing Club, Urbana, IL **2015 – 2018**
Graduate Research Assistant – University of Illinois at Urbana-Champaign **2014 – 2016**
Design Engineer – Water Tank Solutions, St. Paul, MN **2014**

Teaching Experience

Graduate Teaching Assistant – University of Illinois at Urbana-Champaign **2017, 2019**
ME 320: Introduction to Heat Transfer Lab – Fall 2019 List of teachers ranked as excellent by their students; received additional designation of ***outstanding***
ME 520: Conductive Heat Transfer
Undergraduate Teaching Assistant – University of St. Thomas, St. Paul, MN **2013, 2014**
ENGR 382: Introduction to Heat Transfer
ENGR 383: Introduction to Fluid Mechanics Lab
ETLS 777: Finite Element Analysis

Community Outreach

NCSA-NVIDIA AI Hackathon – Developed hackathon problem and served as jury member **2020**
Mentoring Undergraduates in Science and Engineering (MUSE) **2018 – 2019**

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Mentored two undergraduate students in data processing and visualization

Magnetic Moment Video Finalist – ISMRM Annual Meeting, Montreal, Canada (video link) **2019**
STEM outreach talk – Urbana Middle School, Urbana, IL **2019**
STEM outreach talk – Trinity High School, Eagan, MN **2014**
Afterschool STEM Tutor – Tutor-Mentor Program, University of St. Thomas **2011 – 2012**

Professional Societies

American Society of Mechanical Engineers (ASME)
International Society for Magnetic Resonance in Medicine (ISMRM)
Biomedical Engineering Society (BMES)
Society of Catholic Scientists (SCS)

Invited Talks

"Using lattice Boltzmann simulations to analyze dMRI physics in skeletal muscle." Anomalous Relaxation and Diffusion Study Group, September 17, 2020. Centre for Advanced Imaging, The University of Queensland, Australia. Virtual talk.

Peer-Reviewed Journal Articles

Naughton NM, Sun J, Tekinalp A, Chowdhary G, and Gazzola M. *Elastica: A compliant mechanics environment for soft robotic control.* IEEE Robotics and Automation Letters, 2021; 6.2:3389-3396. doi: 10.1109/LRA.2021.3063698.

Sullivan DJ, Wu X, Gallo NR, **Naughton NM**, Georgiadis JG, and Pelegri AA. *Sensitivity analysis of effective transverse viscoelastic and diffusional properties of tissue with myelinated axons*. Physics in Medicine and Biology, 2021; 66.3:035027. doi: 10.1088/1361-6560/aba0cc

Naughton NM, Tennyson CG, and Georgiadis JG. *Lattice Boltzmann method for simulation of diffusion magnetic resonance imaging physics in multiphase tissue models*. Physical Review E, 2020; 102.4:043305. doi: 10.1103/PhysRevE.102.043305.

Naughton, NM and Georgiadis JG. *Global sensitivity analysis of skeletal muscle dMRI: Effects of microstructural and pulse parameters*. Magnetic Resonance in Medicine, 2020; 83:1458-1470. doi: 10.1002/mrm.28014

Naughton NM and Georgiadis JG. *Comparison of two-compartment exchange and continuum models of dMRI in skeletal muscle*. Physics in Medicine and Biology, 2019; 64(15):155004. doi: 10.1088/1361-6560/ab2aa6

Naughton NM, Plourde BD, Stark JR, Hodis S, Abraham JP. *Impacts of waveforms on the fluid flow, wall shear stress, and flow distribution in cerebral aneurysms and the development of a universal reduced pressure*. Journal of Biomedical Science and Engineering. 2014; 7(01):7. doi: 10.4236/jbise.2014.71002.

Peer-Reviewed Conference Articles

Naughton NM and Georgiadis JG. *Connecting Diffusion MRI to Skeletal Muscle Microstructure: Leveraging Meta-Models and GPU-acceleration*. Proceedings of the Practice and Experience in Advanced Research

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Computing on Rise of the Machines (learning) (PEARC '19). p7, (July 2019), Chicago, IL, USA. doi: 10.1145/3332186.3333054

Publications in Process

Chang HS, Halder U, Gribkova E, Tekinalp A, **Naughton NM,** Gazzola M, and Mehta P. *Controlling a CyberOctopus soft arm with muscle-like actuation.* arXiv:2010.03368

Zhang X, Naughton NM, Parthasarathy T, and Gazzola M. *Terrestrial limbless gait selection through friction modulation.* (Submitted to Nature Physics).

Patents

Plourde BP, Abraham JP, Plourde D, Pakonen R, Gikling A, and **Naughton NM.** WTS LLC, 2016. *Fluid heating system.* U.S. Patent Application 14/954,292.

Conference Abstracts

Cahoon SM, Gallo NR, **Naughton NM**, Anderson AT, and Georgiadis JG. *Regional Intrinsic Properties of Axons and Glia from in vivo MRElastography of Human Corpus Callosum.* Biomedical Engineering Society Annual Meeting, (October 2020), Virtual Meeting.

Gallo NR, Cahoon SM, Anderson AT, **Naughton NM**, Pelegri AA, and Georgiadis JG. *Variation of In Vivo Anisotropic MRE Metrics in Corpus Callosum: Effect of Aging.* International Society of Magnetic Resonance in Medicine Annual Meeting (August 2020), Virtual Meeting. ***Magna Cum Laude***

Naughton NM, Gallo NR, Anderson AT, and Georgiadis JG. *Comparison of dMRI Models for Skeletal Muscle Microstructure Estimations with Numerical Simulations and Myocardial Porcine Phantom.* International Society of Magnetic Resonance in Medicine Annual Meeting (May 2019), Montreal, Canada.

Naughton NM, Jain A, and Georgiadis JG. *Polynomial Meta-Model of Bloch-Torrey Equation for Track-based Regularization of Microstructural Inversion.* International Society of Magnetic Resonance in Medicine Annual Meeting (May 2019), Montreal, Canada.

Naughton NM, Wang A, and Georgiadis JG. *Fascicle Ellipticity as an Explanation of Transverse Anisotropy in Diffusion MRI Measurements of Skeletal Muscle.* International Society of Magnetic Resonance in Medicine Annual Meeting (May 2019), Montreal, Canada.

Naughton NM, Gallo NR, Anderson AT, and Georgiadis JG. *Microstructural Parameter Estimation of Skeletal Muscle using Random Forest Model of dMRI.* International Society of Magnetic Resonance in Medicine Annual Meeting (May 2019), Montreal, Canada.

Naughton NM, Gallo NR, Vaicik M, Anderson AT, Sutton BP, and Georgiadis JG. *Estimation of Extracellular Matrix Diffusion Properties in Decellularized Porcine Myocardium from DTI.* International Society of Magnetic Resonance in Medicine Annual Meeting (June 2018), Paris, France.

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Naughton NM and Georgiadis JG. *Effect of Exercise on Myocellular Lipid Content and Diffusion Tensor Imaging Measurements*. Biomedical Engineering Society Annual Meeting (October 2017), Phoenix, Arizona.

Naughton NM and Georgiadis JG. *Effect of Sarcolemma Water Permeability on Muscle DTI Measures Following Exercise*. Biomedical Engineering Society Annual Meeting, (October 2016), Minneapolis, Minnesota.