Joseph Lannan

Biophysicist, PhD Candidate at NCSU

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WORK EXPERIENCE

PhD Candidate/Biophysics Researcher - NCSU, Elting lab

May 2020 - Current

Working on graduate research projects in Dr. Elting's Lab as a research assistant in pursuit of my PhD. The lab focuses on cellular biophysics using a variety of methods. My research focuses on investigating the cytoskeleton of *Spirostomum Ambiguum,* often called "the fastest cell" due to its ability to contract its giant single celled body in the blink of an eye. We found that its contraction is due to the unique filaments known as the myoneme that allow it to contract without using traditional contractile machinery.

President and Technical Director - Koinslot INC

2022 - Current

Company I co-founded to produce a nostalgic gaming system. Received initial funding and contracted with Betabox INC for use with education.

Technical Director - Sonar Applications INC

January 2020 - Current

Worked with Ethan Lannan to build out an audio social media app. App had around 1000 beta testers but the project was put on hold to pursue Koinslot but may be pivoted to better suit markets.

Condensed Matter Researcher - NCSU, Dougherty Lab

January 2018 - May 2019

Worked in Dr. Dougherty's Group in condensed matter. Experiments with growing monolayer transistors using vacuum deposition. Experience with AFM, Glovebox, spin coaters, vacuum chambers, and Lasers

Director of Technological Operations - Betabox Learning

July 2018 - August 2019

Worked as a generalist at the small startup Betabox. Responsibilities ranged from managing IT systems, programming, web design, building electronics, teaching k-12, logistics, and fabrication.

IT Technician/Administrator - Optix Media

September 2017 - AugustJuly 2018

Field Technician managing a wifi network for a number of apartment complexes. Responsibilities included managing Cisco network to solve customers issues when onsite support was needed.

System Administrator - NCSU, Physics Dept. IT

October 2015 - September 2017

Worked to set up and maintain computers in the physics department. Skills with bash and python, primarily on linux computers.

EDUCATION

North Carolina State University - Physics, Masters

North Carolina State University - Physics, PhD (in progress)

SKILLS

Programming - Python, Bash, mathematica, matlab, and C++

Fabrication - Metal, Wood, Electronics, Machining, 3D printing, Fusion 360, Laser Cutting

Lab Equipment - AFM, Glovebox, Spin coating, Vacuum Chambers, Laser Systems, Cell culture, SEM, TEM, Confocal Microscopy, Microinjection

COURSE WORK

Physics - Classical and Statistical Mechanics, Electrodynamics, Condensed Matter, Bio, and Quantum Mechanics

Mathematics- Geometry of Curves and Surfaces, Linear Algebra, Differential Equations

Programming - Intro Computer Science (Java), Lab Methods (Python, C++), Mathematical Computing (Python, Matlab), Physics comp. Methods (Python)

Physics Teaching - Pedagogy for physics.

Joseph M. Lannan

Curriculum Vitae

PERSONAL INFORMATION

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Email: jmlannan@ncsu.edu

Current Residence: Raleigh, NC, USA

Anticipated Graduation: Fall 2025

OBJECTIVES STATEMENT

I am passionate about basic research and technical challenges. I love applying physics to new biological systems and performing advanced and highly technical experiments. I particularly enjoy working on new systems and implementing new techniques and technologies in understudied systems. I am also passionate about entrepreneurship and building open source production chains that make technology and repairability more open and available to everyone.

During my research, I have worked on a large variety of microscopes and microscopy techniques in challenging systems. For my core research project, I worked on the non-model organism *Spirostomum*. This organism is capable of incredibly rapid contraction, presenting many difficulties that needed to be overcome for imaging. I designed and implemented innovative techniques for mounting, fixation, and imaging of *Spirostomum*. In addition to multiple light imaging modalities I have also performed electron and AFM imaging on the organism and related proteins.

I am passionate about working on the technical side of science, including using new systems and techniques as well as developing novel methods. I am proficient in a significant number of microscopy and biological techniques including optical systems, microscopy maintenance, data analysis, image processing, biophysics, working as a microscope manager, and electronics design. I have a diverse set of skills that I believe can contribute to groundbreaking science and work with novel biophysics problems.

My expertise also extends to more advanced techniques such as immuno-TEM, microinjection, and working with custom optical setups. I have also worked as the superuser of an AFM for 3 years, where I have trained new users to run the equipment and helped run student labs. These experiences have honed my technical abilities as well as my teaching and communication skills, which I am eager to bring to your team.

I have also founded the company Koinslot, which aims to bring technology into underserved communities to get students excited about programming using gaming. This project aims to provide a fully open source hand held device that is easy to program and modify for teaching purposes. I personally designed the device, case, and hardware-level code backbone. This has combined many of my interests from electronics, programming, 3D printing and teaching. I am quite proud of the resulting company which is now mostly self-sufficient and capable of running under the guidance of my brother and co-founder.

I will be graduating with my PhD in physics in the summer and I am actively seeking a position outside of the US to advance my career. I am interested in learning new languages and broadening my cultural knowledge.

EDUCATION

North Carolina State University (2019-ongoing) - Physics, Ph.D. (in progress)

Transcript

North Carolina State University (2019-2022) - Physics, Masters

GPA: 3.9/4 - Diploma - Transcript

Degree awarded in the progress of my Ph.D.

North Carolina State University (2015-2018) - Physics, Bachelor of Science, Minor in Mathematics

GPA: 3.5/4 - Diploma - Transcript

This degree was achieved in three and a half years while working numerous part-time jobs to support myself. Graduated Magna Cum Laude.

Independence High School, Charlotte North Carolina (2011-2015)

GPA: 4.4

ADVANCED COURSEWORK

MBL Physiology Course

Selected from a highly competitive pool of applicants and received a scholarship to study at the historic physiology course at Woods Hole. This course consisted of one week of skills boot camp followed by three two week rotations in active research. I participated in rotations with Dr. Ratcliff, Dr. Mullens, and Dr. Brangwynne, where I studied snowflake yeast, extremophile archaea, and liquid phase separation of rRNA in mammalian nucleoli. See summary of the research here.

Biotechnology

Protein Interactions - Covered advanced techniques in the study of protein-protein interactions. We learned QPCR, Fluorescence Isometry, Calorimetry, EMSA, and many other techniques including wet lab instruction.

Electron Microscopy - Covered techniques for biological sample preparation for SEM and TEM. These techniques I later used in my studies on *Spirostomum*.

Core technologies - Covered standard biotechnology techniques including PCR, SDS-Page, culture, and many other techniques vital to my lab work.

Graduate Physics

Physics Qualifier Courses (2 semesters each) - Statistical and Thermal Mechanics, Electrodynamics, Quantum Mechanics

Computational Physics - Computational methods for solving graduate level physics problems.

Condensed Matter Physics (2 semesters) - First traditional course on condensed matter and second focus on current topics and applications. Includes studies on superconductors and quantum computing applications.

Quantum Optics - Advanced study of optics and light interaction with matter. Utilized Wigner formulation to study a variety of topics from simple optical systems to superluminescence and NMR

Biological Physics - Study of physics problems applied to biology. Applications of random walks, diffusion, entropic springs, all were used to further my research.

RESEARCH

PhD Candidate/Biophysics Researcher - NCSU, Elting lab

2020 - Current

I worked on graduate research projects in Dr. Elting's Lab as a research assistant in pursuit of my PhD. The lab focuses on cellular biophysics using a variety of methods. My research focuses on investigating the cytoskeleton of *Spirostomum ambiguum,* often called "the fastest cell" due to its ability to contract its giant single celled body in the blink of an eye. We found that its contraction is due to the unique filaments known as the myoneme that allow it to contract without using traditional contractile machinery. We found that the myoneme mesh is calcium activated and just through shortening of the filaments is able to recapitulate the organismal shape change. We began to investigate the molecular basis for myonemeal force generation and speculate on it being generate by a modulated entropic spring mechanism.. In addition to this project, I also worked on building and improving the design of magnetic tweezers as part of the synthetic cytoskeletons project.

Magnetic tweezing: Separate approaches were used to build magnetic tweezers, the first being a large pointed solenoid fabricated from mu-metal, a high magnetic permeability metal idea for the project. The second was a novel approach using a yoke to wrap the magnetic field back on itself that accomplished similarly high fields using less material and allowing for 2D spatial control of the field. Quantification of the forces that these devices were able to apply to magnetic particles in different solutions was done with an undergraduate student in the lab. Future applications of the tweezers include using them to emulate cytoskeletal transport, structure and force generation

Immuno-TEM imaging of *Spirostomum Ambiguum*: I performed the advanced imaging technique, Immuno-TEM on the *Spirostomum* myoneme. This technique labeled centrin on the myoneme both confirming the presence of centrin in contracted and elongated cells and showing the structure of centrin binding filaments in the myoneme. I further analyzed the structures of the uncontracted myoneme using ai-computer vision and graph theory analysis. These data require advanced technique development including novel fixation methods, microtomy, labeling methods, and TEM scope usage.

Confocal fluorescence imaging of *Spirostomum Ambiguum*: *Spirostomum* presents many unique challenges that need to be overcome for imaging. For one, its ability to contract presents issues with live imaging making it necessary to use high speed imaging to capture it. Additionally, Spirostomum is sensitive to many chemicals, it even finds use as a model organism for the detection of contaminants in water. This sensitivity makes fixation for IF or SEM difficult and some unique methods needed to be used to use these imaging modalities. I have also applied image analysis techniques using Imagej and used biophysical modeling to understand force generation of the *Spirostomum* cytoskeleton.

Multiscale computational modeling of *Spirostomum Ambiguum* myoneme and related proteins: I performed MDS simulations to analyse the effects of calcium binding to the myoneme. Some preliminary results showed that the myoneme changes persistence length as measured by correlation function of the angles between residues of Sfi1. To model the effects of filament contraction across the whole organism, I worked with Carlos Floyd to develop models of the whole Spirostomum informed by Fluorescence microscopy. These models used energy minimization with the myoneme modeled as springs and were able to recapitulate the shape change of Spirostomum contraction using a minimal model.

Undergraduate Condensed Matter Researcher - NCSU, Dougherty Lab

January 201 8 - Dec 2018

Worked in Dr. Dougherty's Group in condensed matter. Experiments with growing monolayer transistors using vacuum deposition. Experience with AFM, Glovebox, spin coaters, vacuum chambers, and Lasers

Work consisted of creating organic semiconductor devices using the novel material C8-BTBT. We investigated surface effects on field effect transistors that were grown with C8-BTBT in monolayers. We found that initial layers of c8btbt exhibited a change in crystal structure when grown on a surface vs bulk. The surface grown C8-BTBT showed defects that prevented large devices from functioning, however the first few layers of a field effect transistor have been shown to contribute most to charge carrier mobility. Additionally we found defects created by the deposition of gold contacts on top of C8-BTBT monolayers.

PUBLICATIONS AND PREPRINTS

Culture and imaging techniques for the study of the ultrafast giant cell *Spirostomum ambiguum* - In progress

Fishnet mesh of centrin-Sfi1 drives ultrafast calcium-activated contraction of the giant cell *Spirostomum ambiguum*

Joseph Lannan, Carlos Floyd, L. X. Xu, Connie Yan, Wallace F. Marshall, Surirayanarayanan Vaikuntanathan, Aaron R. Dinner, Jerry E. Honts, Saad Bhamla, and Mary Williard Elting

Biorxiv (2025)

doi: https://doi.org/10.1101/2024.11.07.622534

Abstract

Spirostomum is a unicellular ciliate capable of contracting to a quarter of its body length in less than five milliseconds. When measured as fractional shortening, this is an order of magnitude faster than motion powered by actomyosin. Myonemes, which are protein networks found near the cortex of many protists, are believed to power *Spirostomum* contraction. Fast contraction, slow elongation, and calcium-triggering are hallmarks of myoneme-based motion. The biochemical basis of this motion and the molecular mechanism that supports such fast speeds are not well understood. Previous work suggests that myoneme structures in some protists are rich in centrin and Sfi1 homologs, two proteins that may underlie contraction. Centrin undergoes a significant conformational change in the presence of calcium, allowing it to bind to other centrin molecules. To understand *Spirostomum* contraction, we measure changes in cortical structures and model contraction of the whole cell and of the underlying protein complexes. We provide evidence that centrin/Sfi1 structures are responsible for contraction, which we propose is powered by a modulated entropic spring. Using this model, we recapitulate organismal-scale contraction in mesh simulation experiments and demonstrate the importance of structural organization of myoneme in a fishnet-like structure. These results provide a cohesive, multiscale model for the contraction of *Spirostomum*. Deeper understanding of how single cells can execute extreme shape changes holds potential for advancing cell biophysics, synthetically engineering contractile machinery, and cellular-inspired engineering designs.

ADDITIONAL RESEARCH PROJECTS

Imaging of archaea with SEM and ExM

For this project I worked with Dyke Mullins lab to perform SEM and ExM imaging of a number of understudied organisms. I performed one of the first ExM experiments on archaea at the time. We also produced some of the first SEM images published on some of these organisms.

Wikipedia images: https://en.wikipedia.org/wiki/Haloferax_mediterranei, https://en.wikipedia.org/wiki/Haloquadratum_walsbyi, https://en.wikipedia.org/wiki/Haloarcula

Coordinated movement of snowflake yeast

For this project I worked with Will Ratcliff's lab to investigate the behavior of genetically modified yeast that was selected for clumping and multicellular like growth. We found that the yeast was able to under go directed movement to produce organism-like shape change despite not being selected for directly. This has implications for the transition of single celled organisms to multicellular. We found that the development of coordinated movement of cells and organization could emerge just from entanglement of cells without being selected for directly, potentially allowing for what has been thought of as a huge hurdle in the development of multicellular life to be overcome.

Condensate separation of rRNA in the nucleus

For this project I worked with Cliff Brangwynne's lab to microinject labeled rRNA sequence as well as SARS-COVID

RNA to investigate the condensate dynamics of the nucleolus. This project showed that sequences were able to separate into different parts of the nucleolus, showing the importance of sequence dependent condensation for the organization of the nucleolus.

CONFERENCES, PRESENTATIONS, AND TRAVEL

American Society for Cell Biology San Diego (2024)

Title: Fishnet mesh of centrin-Sfi1 drives ultrafast calcium-activated contraction of the giant cell *Spirostomum ambiguum*

Authors: Joseph Lannan, Jerry Honts, Saad Bhamla, Mary Elting

Type: Poster and oral presentation

Triangle Cytoskeleton Raleigh (2024)

Title: Fishnet mesh of centrin-Sfi1 drives ultrafast calcium-activated contraction of the giant cell *Spirostomum ambiguum*

Authors: Joseph Lannan, Jerry Honts, Saad Bhamla, Mary Elting

Type: Poster presentation

Betabox Learning Corner, Invited Speaker (2024)

Description: General public talk about science for k-12 school teachers.

Type: Oral presentation

MBL Whitman Researcher Woods Hole (2024)

Traveled to MBL with Whitman fellow, Mary Elting (PI) for 5 weeks. I conducted research on *Spirostomum ambiguum* using a multitude of techniques including microinjection, birefringence microscopy, and FLIM.

American Society for Cell Biology Boston (2023)

Title: Ultrafast contraction: Investigating the structures underlying myoneme force generating networks in Spirostomum sp.

Authors: Joseph Lannan, Jerry Honts, Saad Bhamla, Mary Elting

Type: Poster presentation

Physiology Course at Marine Biological Laboratory Woods Hole (2023)

Participated in the summer course at the Marine Biological Laboratory in Woods Hole. Course consisted of quantitative biological studies on a number of organisms. Selected from a highly competitive pool of applicants and received a scholarship. See summary of research here.

American Physical Society March Meeting Las Vegas (2023)

Title: Ultrafast contraction: Investigating the structures underlying myoneme force

generating networks in Spirostomum sp.

Authors: Joseph Lannan, Jerry Honts, Saad Bhamla, Mary Elting

Type: Talk

MBL Whitman Researcher Woods Hole (2022)

Traveled to MBL with Whitman fellow, Fred Chang for two weeks. I conducted research on *Spirostomum Ambiguum* and light controlled protein networks. I was trained on a number of techniques including microinjection, birefringence microscopy, and scanning confocal.

Triangle Cytoskeleton Raleigh (2022)

Title: Creating Synthetic Cytoskeletons with Magnetic Tweezers and Light Controlled Protein networks

Authors: Joseph Lannan, Jerry Honts, Saad Bhamla, Mary Elting

Type: Poster presentation

Biomaterials Day Raleigh (2022)

Title: Creating Synthetic Cytoskeletons

Authors: Joseph Lannan, Grant Sherrill , Mary Elting

Type: Poster Presentation

WORK EXPERIENCE

PhD Candidate/Biophysics Researcher - NCSU, Elting lab

May 2020 - Current

Working on graduate research projects in Dr. Elting's Lab as a research assistant in pursuit of my PhD. The lab focuses on cellular biophysics using a variety of methods. My research focused on building and using magnetic tweezers to investigate cell physiology. Skills primarily included using SEM, TEM and Confocal microscopy as well as microinjection and cell culture techniques.

President and Technical Director - Koinslot INC.

2022 - Current

Company I co-founded to produce a nostalgic gaming system. Received initial funding and contracted with Betabox INC for use with education.

Technical Director - Sonar Applications INC.

January 2020 - 2022

Worked with Ethan Lannan to build out an audio social media app. App had around 1000 beta testers but the project was put on hold to pursue Koinslot, but may be pivoted to better suit markets.

Teaching Assistant - NCSU, Physics Department

January 2019 - May 2020

Teaching assistant at NCSU. I taught physics labs for undergraduate engineering students and worked in the physics tutoring center. Labs were pre prepared lesson plans with a short lecture created by me to introduce the lab. The Tutoring center consisted of helping students with assignments and preparing for exams.

Condensed Matter Researcher - NCSU, Dougherty Lab

January 2018 - Dec 2018

Worked in Dr. Dougherty's Group in condensed matter. Experiments with growing monolayer transistors using vacuum deposition. Experience with AFM, Glovebox, spin coaters, vacuum chambers, and Lasers

Director of Technological Operations - Betabox Learning

July 2018 - August 2019

Worked as a generalist at the small startup Betabox. Responsibilities ranged from managing IT systems, programming, web design, building electronics, teaching k-12, logistics, and fabrication. Started as a part time fabricator before moving up to higher positions

IT Field Technician and System Administrator - Optix Media

September 2017 - AugustJuly 2018

Managed a wifi network for a number of apartment complexes. Responsibilities included managing a Cisco network to solve customers issues.

System Administrator - NCSU, Physics Dept. IT

October 2015 - September 2017

Worked to set up and maintain computers in the Physics Department. Skills with bash and python, primarily on linux computers.

CERTIFICATES AND AWARDS

MBL Physiology Graduate (2023)

The Bruce and Betty Alberts End Scholarship in Physiology (2023)

Advanced Open Water Diver PADI/SSI

Second level of scuba diving certification for experienced divers allowing for deeper dives, access to additional dive sites, and specialization courses. Complete with specializations in deep diving, enriched air, underwater navigation, underwater naturalist, and fish identification.

Center for The Physics of Biological Function (2020) - The Physics of Life Summer School

Certificate

IBM Quantum Computing Open Source Development (2020) - Quiskit Summer Jam 2020

Certificate

DiversityEdu, DEI in the workplace (2020) - DiversityEdu: Personal Skills for a Diverse Campus

Certificate

ADDITIONAL LEADERSHIP ROLES AND EXPERIENCE

Lab Mentor (2020-Current)- Mentored multiple undergraduate researchers on the *Spirostomum* project who have become excellent scientists and produced significant results in both our lab and others.

Noah Love - Current Elting lab member working on trapping and live imaging of *Spirostomum*. Also working on microfluidics and electrospinning based imaging of *Spirostomum*.

DJ Teasley - Current Elting lab member working on drug perturbations of *Spirostomum,* focusing on the role of microtubules on contraction and cortical structure of *Spirostomum.*

Vineet Krishna - Current Elting lab member working on drug perturbations of *Spirostomum,* focusing on mechano-sensitivity and ion channels on *Spirostomum* contraction.

Copeland Lachapelle - Former Elting lab member, now attending Hobgood Academy. Researched *Spirostomum* trapping and imaging as well as magneto-tactic bacteria with magnetic tweezers.

Grant Sherrill - Former Elting lab member, now ORAU Contractor-Computational Toxicologist at the EPA. Worked to help quantify magnetic tweezer field and force generation.

Physics Tutor (2020-Current) - Tutored multiple students struggling with physics, all with successful outcomes.

Physics Senior Design Mentor (2023) - Mentored a group of three senior undergraduates working on their capstone project to build a computer vision tracking system of TEM samples for performing serial electron microscopy.

Traditional serial TEM relies on the careful cutting and tracking of millions of individual slices of samples. The recent achievements of the Fly Connectome project took years to generate their data set. The aim of this project was to implement a shotgun approach to collecting TEM data utilizing image tracking and AI to help automate the tasks of cutting samples and reconstructing TEM data.

AFM Super User (2020-2025) - Superuser of an Asylum MFP-3D. Performed maintenance and support for users. Worked with course instructors to teach AFM for Earl classroom teaching. Performed multiple AFM experiments from condensed matter to biological samples.

3D Printer Super User (2020-2025) - Superuser of a Prusa MK3S+ 3D printer. Performed maintenance and support for users and assisted with 3D design.

Physics Senior Design (2019) - Physics undergraduate capstone project. I worked with a team as the team leader and organizer to build a Purcel swimmer robot as a physics demo to show how swimming at low Reynolds number is significantly different from our traditional ideas of swimming. Robot had three segments and multiple modes to show scallop theorem and the reversibility of liquids at low Reynolds number. We overcame a number of issues such as buoyancy in different liquids, visibility of the experiment to an audience, and general programming and hardware design.

Leadership Roles and Corporate Management (2018-Current) - Worked in advanced technical leadership positions in 3 companies where I have managed workers and worked with non-technical leadership to produce products and services. I have taken leadership roles in IT and tech management where I was responsible for independently managing systems and personnel in high impact and time sensitive situations.

COMPANIES FOUNDED

Koinslot INC. (2022)

Company I founded to produce a nostalgic gaming system. Co-founders include my brother, Ethan Lannan and my friend from undergrad, Erik Lutz. Received initial funding and contracted with Betabox INC for use with education. I serve as president of the company. My work is on building out the hardware for the system while working with our programming, website and marketing team to design a product. The mission of the company is to provide a cheap and easy to program education system to engage k-12 students in hardware and embedded programming with Betabox INC. Website: kywy.io

Sonar Application INC. (2020)

Worked with Ethan Lannan to build out an audio social media app. App had around 1000 beta testers but the project was put on hold to pursue Koinslot. The project may be pivoted to better suit markets in the future.

SKILLS

Programming

Python - Experience with automation and data collection in python, using raspberry pi's in experimental setups. Experience with data analysis and figure creating in python using pandas, matplotlib and seaborn. Some experience with website building in Django. Worked with python on a number of physics problems.

Bash - Experience working with bash in linux environments. Creating basic scripts for things like cron.

Mathematica - Used mathematic to quickly solve physics problems and perform numerical analysis.

Matlab - Used mathematic for automation and computer vision problems as well as data analysis.

C\C++ - Experience programming microcontrollers in C and C++.

Github Link

Fabrication

3D printing - Experience working with 3D printers and 3D modeling. Experience with both FDM and SLA printers.. Working at Betabox I maintained a number of printers. I have experience with printers from makerforge, prusa, QiDi, Elegoo and more. I have also constructed a custom coreXY 3d printer from scratch. See some of the projects I have shared on printables.com here.

Electronics - Capable of fabricating electronics circuits with circuit layout tools and board creation in Kicad, as well as experience in fabricating with reflow ovens and hand soldering. Extensive knowledge of circuit design. Also capable of creating semiconductor chip devices through vapor deposition and lithography.

Laser Cutting - Experience designing for and using a number of different laser cutters.

Metal - Experience fabricating with metal on the lathe and mill. Some experience with mig welding as well as weld prep and cleanup.

Wood - Experience fabricating with wood shop tools such as table saws, chop saws, band saws, routers (CNC, table, and hand), sanders and more. Additional experience working with hand tools. I have fabricated things from scientific setups to furniture.

Lab Equipment

AFM - Experience using an Asylum AFM to image organic semiconductor samples. Worked as superuser of Earl AFM in NCSU physics department, including regular training of users as well as assisting with teaching labs.

Cell Culture - Experience with aseptic technique for culture of protists, yeast, bacteria, and mammalian cells.

SEM & TEM - Experience with performing Scanning and Transmission electron microscopy. Sample preparation for both including ultramicrotomy and high pressure freezing for TEM. Have also performed negative staining of proteins and immuno-labeled TEM.

Light Microscopy - Highly experienced using an Andor Dragonfly spinning disk confocal microscope for imaging live and fixed cells. Experience with Leica Stellaris, Nikon AX / AX R NSPARC scanning confocal, Nikon SoRa/Yokogawa, Zeiss lightsheet 7, birefringence microscopy (polscope), Lumicks C-trap, and limited usage on many other platforms.

Laser Systems - Experience running and maintaining laser systems. I have performed alignments and calibration of setups. I have run Laser ARPES and fluorescence thermometer experiments that were hand built and maintained by me.

Microinjection - Experience using Sutter instruments and Eppendorf microinjection setups for the injection of cells.

Microbiology - Experience manipulating genes and proteins.

Vacuum Systems - Experience running and maintaining vacuum systems, sputter coating, and vacuum deposition systems.

Software

Imagej - Highly experienced using image processing, quantitative analysis, and scripting in Imagej

Image Analysis Software - Experienced in working with Imaris, Illastik, and building pipelines through python and matlab.

Autodesk - Highly proficient in creating parametric 3D designs and manufacturing in autodesk fusion 360. Experienced in other parts of their software suite.

Microsoft Office Suite - Competent in Microsoft office software suite. Proficient in working with excel sheets

from macros to basic functionality.

Adobe - Proficient in photo editing, figure creation, video editing, and designing workflows in the adobe suite.

Linux - Proficient in working with the linux operating system.

REFERENCES

Dr. Mary Elting - Principal Investigator Graduate
Email: mary.elting@ncsu.edu

Dr. Daniel Dougherty - Principal Investigator Undergraduate
Email: dbdoughe@ncsu.edu

Dr. Sharonda LeBlanc - Graduate Committee Member
Email: sleblan@ncsu.edu

Dr. Julio Monti Belmonte - Graduate Committee Member
Email: jbelmon2@ncsu.edu

Dr. Saad Bhamla - External Collaborating Author
Email: saadb@chbe.gatech.edu

Dr. Jerry Honts - External Collaborating Author
Email: jerry.honts@drake.edu

Dr. Marshall Wallace - External Collaborating Author
Email: wallace.marshall@ucsf.edu

Dr. Marc Begley - Former Elting Lab Member, Senior Coworker
Email: mabegley@ncsu.edu

DJ Teasley - Mentee, Current Elting Lab Member, Junior Coworker
Email: deteasley@ncsu.edu