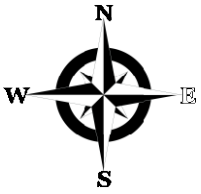
Nicholas Steven Witham
36 S. Wasatch Dr. SMBB 3224
Salt Lake City, UT 84112
Cell: (919) 621-5543
nicholas.witham@utah.edu



Objective

To research, develop, and provide people with high-performance sensors and actuators for assistive devices that are intuitive, affordable, and accessible

Areas of Interest

Rehabilitation Engineering, Artificial Muscles, High Density Biosensor Arrays, and BioMEMS

Education

University of North Carolina at Chapel Hill: **Aug 2014-Aug 2018**

B.S. UNC/NC State Joint Department of Biomedical Engineering
Cumulative GPA 3.64 and Major GPA 3.62
Honors and Distinction

University of Utah: **Aug 2018-Present**

Ph.D. Biomedical Engineering – Bioinnovate Track
Cumulative GPA 4.0 and Major GPA 4.0

Work Experience

Microsystems Lab (UofU)

Lead Researcher of CSTAs **Aug 2018-Present**

- Designing and conducting experiments aimed at manufacturing concentric syndiotactic textile actuators (CSTAs), optimized for assistive device applications
- Designing and making scientific equipment to determine textile parameters

GAIA, LLC

Founder & CEO **Aug 2019-Present**

- Directing the R&D of the Myoplexer™ and other assistive device products
- Overseeing the patenting, regulatory, and financing processes of the company

Biomedical Engineering Graduate Student Advisory Committee (UofU)

Outreach Event Chair **Sep 2018-Present**

- Organizing a STEM education event focused on introducing children with limb differences and their parents to rehab engineering, while fostering community

Neuromuscular Rehabilitation Engineering Lab (NCSU)

Research Intern/Scientific Programmer **May 2017-Aug 2017**

- Composing Matlab code to visualize High Density EMG, temperature, pressure, and moisture signals in real time on 3D anatomical models
- Assisting with experiments involving both amputees and able-bodied persons

Sports Oncology Lab and Applied Physiology Lab (UNC)

Research Intern/Scientific Programmer **Aug 2016-Aug 2018**

- Researching alternate methods of indirect calorimetry and VO2 measurement in patients with compromised health, primarily utilizing pulse oximetry
- Fulfilling normal intern tasks such as revising papers for publication

The Helping Hands Project, LLC (UNC)

Innovation Chair **Oct 2016-Aug 2018**

- Researching, designing, and making open-source 3D printed prosthetic hands
- Networking with professionals related to prosthetics and 3D printing
- Directing a R&D team that improved the organization and its pediatric prostheses

Heimdall Health, LLC

Co-Founder **Jul 2019-Present**

- Leading the ideation, design, and implementation for the Mapping Otoscope™

UNC/NC State Biomedical Engineering Honors Thesis

Independent Researcher of Artificial Muscles **Mar 2017-Apr 2018**

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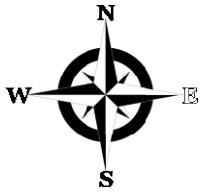

- Designing and conducting experiments aimed at increasing the contraction potential and reducing the temperature of Twisted Coiled Polymer (mfTCP) Muscles
- Designing and making scientific equipment for coiling and twisting tensioned fibers

Feelin' DNA, LLC (UNC)

Co-Founder/Design Chair **Feb 2017-Jan 2018**

- Structuring the organization and advising on the design and production processes used to make 3D printed scientific diagrams for visually impaired children

Publications

08/17:
N. S. Witham, L. Pan, M. Liu, and H. Huang. "The Cardinal Method of High Density Biosensor Display (Abstract)." BMES (Biomedical Engineering Society) 2017 Annual Meeting, Phoenix, AZ, USA. Library of Annual Meeting Abstracts, 2017. http://submissions.mirasmart.com/SecureView/BMESArchive/rad20iqlru2.pdf

04/18:
N. S. Witham. "Functional Actuation of Twisted Coiled Polymer (TCP) Muscles in Organic Temperature Ranges (Thesis)." Carolina Digital Repository (CDR) Honors Thesis Collection, University North Carolina at Chapel Hill, NC, USA.

04/18:
N. S. Witham. "Functional Actuation of Twisted Coiled Polymer (TCP) Muscles in Organic Temperature Ranges (Abstract)." Celebration of Undergraduate Research, University North Carolina at Chapel Hill, NC, USA.

10/18:
N. S. Witham. "Power Efficient and Easily Manufactured Mandrel Formed Twisted Coiled Polymer Muscles (Invention Disclosure)." Center for Technology & Venture Commercialization, University of Utah, UT, USA.

Presentations

10/17:
N. S. Witham, L. Pan, M. Liu, and H. Huang. "The Cardinal Method of High Density Biosensor Display (Poster)." BMES (Biomedical Engineering Society) 2017 Annual Meeting, Phoenix, AZ, USA.

01/18:
N. S. Witham. "HHP (Helping Hands Project) Prosthetic Device Compilation (Course Lecture)." Joint Department of Biomedical Engineering Junior Design Lecture, University North Carolina at Chapel Hill, NC, USA.

04/18:
N. S. Witham and K. P. Donnelly. "Functional Actuation of Twisted Coiled Polymer (TCP) Muscles in Organic Temperature Ranges (Honors Thesis Defense)." UNC & NC State Joint Department of Biomedical Engineering Honors Thesis Defense, University North Carolina at Chapel Hill, NC, USA.

04/18:
J. T. Alvarez, C. Clinard, E. Jia, J. Raynor, A. Romero, D. Selezneva, and N. S. Witham*.

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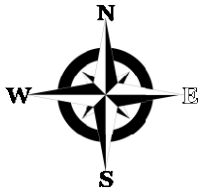

"Wearable Biosensor Array for Actuation of Upper-Limb Prosthetic Device (Poster)." UNC & NC State Joint Department of Biomedical Engineering Senior Design Symposium, University North Carolina at Chapel Hill, NC, USA.

04/18:
N. S. Witham and K. P. Donnelly. "Functional Actuation of Twisted Coiled Polymer (TCP) Muscles in Organic Temperature Ranges (Presentation)." Celebration of Undergraduate Research, University North Carolina at Chapel Hill, NC, USA.

04/19:
N. S. Witham, F. Mogharrabi, D. Anderson, R. M. Shorti, J. Huang, and T. LeSueur. "Myoplexer." Bench to Bedside 2019 Medical Device Competition, Salt Lake City, UT, USA.

04/19:
N. S. Witham, S. V. Mastrangelo, T. Marrouche, A. Kachel, and B. McRae. "Heimdall Health - the Mapping Otoscope." Bench to Bedside 2019 Medical Device Competition, Salt Lake City, UT, USA.

Honors

07/10: Eagle Scout (Constructed 7 octagon picnic tables for outdoor classroom)

01/15-07/18: Dean's List UNC-CH (GPA > 3.50 with no grade below C)

05/18: Nominated For Senior Awards
- Scholarly Achievement (high GPA, extracurricular research, and independent projects)
- Citizenship and Service (volunteering, community service, and public aid)
- Leadership (peer mentorship and extracurricular leadership)

08/18: Graduated from UNC-CH & NCSU
- Honors (GPA > 3.30, two semester honors thesis research project, public research presentation, and thesis defense)
- Distinction (GPA > 3.50)
- Carolina Research Scholar (2 research intensive courses, an interdisciplinary course, and public research presentation)

03/19: Get Seeded ($1,600) – for GAIA, LLC

04/19: Bench to Bedside
- Grand Prize ($25,000) – for Heimdall Health, LLC
- Best in Medicine ($5,000) – for GAIA, LLC

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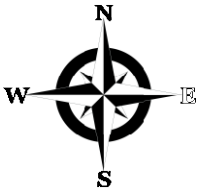

Fellowships & Scholarships

05/17: REU NSF Grant #1361549 Recipient (Summer internship at the Neuromuscular Rehabilitation Engineering Lab at NCSU, $5,700)

08/17: Office of Undergraduate Research Travel Grant (UNC, $500)

10/17: Sarah Steele Danhoff Undergraduate Research Award (UNC, $500)

Certifications

Medical:

AED & CPR	**Sep 2016**
Wilderness First Aid	**Dec 2012**

Research:

CITI

• Biomedical Responsible Conduct of Research	**May 2017**
• University of Utah Human Research	**Aug 2018**

AALAS

• Introduction to Cats	**Nov 2018**
• Introduction to Rats	**Nov 2018**
• Occupational Health and Safety	**Nov 2018**
• Common Compliance Issues	**Nov 2018**
• University of Utah Core	**Nov 2018**

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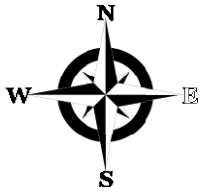

Skills

Coding/Programming:
Matlab, Arduino, LabView, C++, C, and Python

Software:
CAD
- SolidWorks, Fusion 360, and MeshMixer

Vector Graphics
- Adobe Illustrator, CorelDraw, Eagle, and Inkscape

Finite Element Modeling
- SolidWorks, Comsol, and FEbio

Video/Audio Editing
- Adobe Premier Pro

Simulation Program with Integrated Circuit Emphasis (SPICE)
- Multisim

Trade Skills:
Rapid prototyping:
- PCB prototyping, 3D printing, Laser Cutting/Engraving, Electrical instrumentation, Lathing, and Woodworking with shop tools

Managerial
- Project planning, effective communication, problem solving, decisive action, delegation, team incentivization, and time management

Scientific
- Grant writing, academic paper composition, statistical analysis, experiment design

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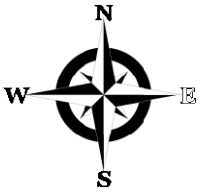

References

University of Utah

Florian Solzbacher, Ph.D.
Email: florian.solzbacher@utah.edu
Phone: 801-587-3917

Christopher Reiche, Ph.D.
Email: christopher.reiche@utah.edu

UNC Sports Oncology Lab and Applied Physiology Lab

Claudio Battaglini, Ph.D., FACSM
Email: claudio@email.unc.edu
Phone: 919-843-6045

Neuromuscular Rehabilitation Engineering Laboratory

He (Helen) Huang, Ph.D.
Email: hhuang11@ncsu.edu
helen-huang@unc.edu
Phone: 919-515-5218

Ming Liu Ph.D.
Email: mliu10@ncsu.edu
Phone: 919-515-8541

University of North Carolina at Chapel Hill

Kenneth Donnelly, Ph.D.
Email: kdonnell@email.unc.edu

Devan Hubbard, Ph.D.
Email: dhubbard@email.unc.edu
Phone: 919-515-6813