

## **Curriculum Vitae**

**Daniel Corbett Whittingslow**

### **MISSION STATEMENT**

I began the Medical Scientist Training Program (MSTP) at Emory University in July of 2013. This program concludes with the earning of an MD and PhD degree. Upon graduation, I plan to further develop my biotechnology and wearable sensors related research interests while serving in a clinical environment as a physician-scientist.

### **EDUCATION**

#### **Medical Degree**

**Jul 2013–Present**

**Emory University School of Medicine, Atlanta, GA**

Passed first US Medical Licensing Exam.

#### **PhD Biomedical Engineering**

**Aug 2016-Dec 2019**

**Georgia Institute of Technology, Atlanta, Georgia**

Thesis: “*Anatomy of a Joint Sound – Using Joint Acoustic Emissions to Diagnose and Grade Musculoskeletal Disease and Injury.*”

Adviser: Omer Inan, PhD

#### **B.S. Biomedical Engineering**

**Aug 2009-May 2013**

**Georgia Institute of Technology, Atlanta, Georgia**

Graduated *summa cum laude* with a Biomedical Engineering degree with a pre-medicine distinction and a minor in Spanish.

### **PUBLICATIONS (Chronological)**

1. JIA PAPER JUST ACCEPTED
2. Acoustic Emissions as a Non-invasive Biomarker of the Structural Health of the Knee. **DC Whittingslow**, HK Jeong, VG Ganti, NJ Kirkpatrick, GF Kogler, OI Inan - *Annals of Biomedical Engineering*, 2020.
3. **Whittingslow D**, Lara Orlandic, Talia Gergely, Sampath Prahalad, Omer Inan, Shelly Abramowicz. *Listening to the Jaw: TMJ Acoustic Emissions as a Digital Biomarker of Juvenile Idiopathic Arthritis*. *Journal of Oral and Maxillofacial Surgery*, 2020.
4. Robust Method for Mid-Activity Tracking and Evaluation of Ankle Health Post-Injury. S Mabrouk, **D Whittingslow**, O Inan - *IEEE Transactions on Biomedical Engineering*, 2020
5. A Pilot Study to Assess the Reliability of Sensing Joint Acoustic Emissions of the Wrist. DM Hochman, S Gharehbaghi, **D Whittingslow**, OI Inan - *Sensors*, 2020
6. Mabrouk S, Hersek S, Jeong HK, **Whittingslow D**, Ganti VG, Wolkoff P, Inan OT. *Robust Longitudinal Ankle Edema Assessment Using Wearable Bioimpedance Spectroscopy*. *IEEE Trans Biomed Eng*: 1, 2019.
7. Nicholas B. Bolus, Hyeon Ki Jeong, **Daniel C. Whittingslow**, O T Inan. *A Glove-Based Form Factor for Collecting Joint Acoustical Emissions: Design and Validation*. *IEEE Sensors*. 2019
8. H. K. Jeong, **D. Whittingslow** and O. T. Inan, "*b-Value: A Potential Biomarker for Assessing Knee-Joint Health Using Acoustical Emission Sensing*," in *IEEE Sensors Letters*, vol. 2, no. 4, pp. 1-4, Dec. 2018, Art no. 7001204.doi: 10.1109/LSENS.2018.2871981
9. B. Semiz\*, S. Hersek\*, **D. C. Whittingslow\***, L. Ponder, S. Prahalad and O. T. Inan, "*Using Knee Acoustical Emissions for Sensing Joint Health in Patients with Juvenile Idiopathic Arthritis: A Pilot Study*," in *IEEE Sensors Journal*.doi: 10.1109/JSEN.2018.2869990
10. O. Bicen, **D. Whittingslow** and O. Inan, "*Template-Based Statistical Modeling and Synthesis for Noise Analysis of Ballistocardiogram Signals: A Cycle-Averaged Approach*," in *IEEE Journal of Biomedical and Health Informatics*.doi: 10.1109/JBHI.2018.2871141

11. Jeong, H.-K., Pouyan, M. B., **Whittingslow, D. C.**, Ganti, V., & Inan, O. T. (2018). *Quantifying the Effects of Increasing Mechanical Stress on Knee Acoustical Emissions Using Unsupervised Graph Mining*. IEEE Transactions on Neural Systems and Rehabilitation Engineering, 26(3), 594-601.
12. **Whittingslow, D.**, Semiz, B., Ponders, L., Wiens, A., Inan, O., & Prahalad, S. (2017). *Analysis and Implications of Non-Invasive Knee Acoustical Emissions in Juvenile Idiopathic Arthritis*. Arthritis & Rheumatology.
13. **Whittingslow, D.**, Semiz, B., Ponder, L., Vega-Fernandez, P., Inan, O., & Prahalad, S. (2017). *Knee Joint Sounds: A Non-Invasive Modality for Classifying Knee Joint Health in Juvenile Idiopathic Arthritis*. Paper presented at the ARTHRITIS & RHEUMATOLOGY.
14. Inan, O. T., **Whittingslow, D. C.**, Teague, C. N., Hersek, S., Pouyan, M. B., Millard-Stafford, M., Sawka, M. N. (2017). *Wearable knee health system employing novel physiological biomarkers*. *Journal of Applied Physiology*, 124(3), 537-547.
15. Evans, N. T., Torstrick, F. B., Lee, C. S., Dupont, K. M., Safranski, D. L., Chang, W. A., **Whittingslow, D. C.**, Gall, K. (2015). *High-strength, surface-porous polyether-etherketone for load-bearing orthopedic implants*. *Acta biomaterialia*, 13, 159-167.
16. Evans, N., Torstrick, F., Lee, C., Dupont, K., Safranski, D., Chang, W., ... **Whittingslow, D.**, Gall, K. (2015). *Surface porous PEEK with high strength for load-bearing orthopaedic implants*. Paper presented at the Abstracts of Papers of the American Chemical Society.
17. **Whittingslow, D.**, Evans, N., Carson, R., & Gall, K. (2012). *A Study on the Development and Characterization of PEEK for Improved Osseointegration*. Abstract presented at the Biomedical Engineering Society (BMES) Annual Meeting.

#### **CONFERENCE PRESENTATIONS**

1. **Daniel C. Whittingslow**, O T Inan, John Xerogeanes. *Joint-Associated Sounds: Translation to Orthopaedic Patients*. Oral presentation at the Quarterly Emory Orthopaedics Sports Research Meeting, Atlanta, GA.
2. **Daniel C. Whittingslow**, Sevda Gharebaghi, Hyeon-Ki Jeong, Nick Bolus, Talia Gergely, Lori Ponders, Omer T Inan, Sampath Prahalad. *Acoustic Emission Based Assessment of the Knee in Juvenile Idiopathic Arthritis*. Poster presentation at the 2019 Annual Pediatric Research Conference, Atlanta, GA.
3. **Daniel C. Whittingslow**, Lara Orlandic, Talia Gergely, Lori Ponders, Sampath Prahalad, Omer T. Inan, Shelly Abramowicz. *Assessment of the TMJ in Juvenile Idiopathic Arthritis Using Acoustic Emissions Generated from Jaw Movements in Two Planes*. Poster presentation at the Childhood Arthritis and Rheumatology Research Alliance (CARRA) 2019 Annual Meeting, Louisville, KY.
4. **Daniel C. Whittingslow**, Lara Orlandic, Talia Gergely, Lori Ponders, Sampath Prahalad, Omer T. Inan, Shelly Abramowicz. *Acoustic Emission Based Assessment of Temporomandibular Joints*. Oral Presentation at the American Academy of Craniomaxillofacial Surgeons (AACMFS) 2019 Annual Meeting, San Antonio, TX.
5. B. Semiz, S. Hersek, **D. Whittingslow**, L. Ponder, S. Prahalad, and O.T. Inan, *Change Point Detection in Knee Acoustic Emissions using the Teager Operator: A Preliminary Study in Patients with Juvenile Idiopathic Arthritis*. IEEE Biomedical and Health Informatics Conference (BHI), Chicago, IL, 2019
6. **D.C. Whittingslow**, H.K. Jeong, L Orlandic, T Gergely, L Ponders, O.T. Inan, S Prahalad, S Abramowicz. "Acoustic Emissions Generated by the TMJ of Patients with JIA and their Implication on Assessment and Screening". At ACR/ARHP. Chicago, IL. 2018.

#### **INVITED LECTURES**

- Whittingslow, D.C. 'Reimagining Technology to Solve Real World Problems'. Pediatric Rheumatology of the South (PRoS) Meeting Fall 2019 - Hosted by the Emory University School of Medicine and Children's Healthcare of Atlanta. See the Presentation Slides Here.
- Whittingslow, D.C. 'Reimagining Technology to Solve Real World Problems'. 2019.

- AMSC Health Tech Event 2019. Hosted by the Morehouse School of Medicine at Atlanta Metropolitan State College.
- Whittingslow, D.C. *'How to Get into Med School and Other Tips from an MD/PhD Student'*. 2018. Georgia Institute of Technology – GT 1000 Class Lecture.
  - Whittingslow, D.C. *'Introduction to Mathematical Modeling in the Context of Biomedical Analysis of Concussions'*. 2016. Georgia Institute of Technology – Class Lecture.
  - Whittingslow, D.C. *'Tips for Being a Successful Medical School Applicant'*. 2014. Student Hospital Connection Group at Georgia Tech.

## **PATENTS**

Multi-Modal system for tracking respiratory health – “Covid Patch” – Pending

A Glove-Based Form Factor for Bio-acoustical Sensing – Pending

Semi-porous PEEK for Orthopedic Applications manufacturing synthesis process. Patent US 9085665 B1 reflects assignment to Vertera, Inc.

## **EXPERIENCE**

### ***Academic:***

#### **Telemedicine-Enabled Heel Height Detection Program June 2020**

- During the COVID-19 pandemic, developed a program that enabled heel height discrepancies to be measured via a submitted photo and computer vision for Dr. X's ACL patients
- Can be found under “Tracking Heel Height” at <https://aclrehab.dcwittingslow.com/rehabilitation/>

#### **Post-Doctoral Researcher in Inan Research Lab Jan 2020 – June 2020**

- Advised and instructed Inan Lab members on techniques for continuing the joint acoustic emission research.

#### **Graduate Research Assistant in Inan Research Lab Feb 2016 - Dec 2019**

- Work full time on PhD in Dr. Omer Inan's Lab at Georgia Institute of Technology on minimally invasive physiological monitoring
- Created and tested a cadaveric model of joint sounds
- Advised lab mates on physiologic aspects of their projects

#### **Team Leader – Introduction to Health Informatics Jul 2016 - Dec 2019**

- Served as a graduate mentor to a team of computer science students to design a mobile app for use in collecting, aggregating, and analyzing clinical surveys.

#### **Teaching Assistant in Problems in Biomedical Engineering Aug 2016-May 2017**

- Facilitated several small groups of undergraduate biomedical engineering students in developing novel technologies for mitigating the effects of concussions
- Taught one large lecture on mathematical modeling, and met with all groups twice weekly

#### **Graduate Research Assistant in Willett Research Lab Dec 2015-Feb 2016**

- Rotated through Dr. Willett's Musculoskeletal Research Lab at Georgia Institute of Technology
- Created a mouse model of distal tibia fracture
- Trained on micro-CT, 3d reconstruction, and 3d fabrications

**Graduate Research Assistant in Hammond Research Lab**

**Nov 2015-Dec 2015**

- Rotated through Dr. Hammond's Soft Robotics Lab at Georgia Institute of Technology
- Created a microprocessor controlled, soft pressure sensor for use in prosthetic hands
- Trained on rapid 3d prototyping and conductive fluidics

**Minimally Invasive Surgical Representative**

**Jul 2013-Jul 2014**

- Coordinated shadowing opportunities between medical students and physicians

**Developed/Patented Biomaterial for Orthopedic Applications**

**May 2013**

- Primary author of patent for the semi-porous biomaterial synthesis process I developed in Dr. Gall's biomaterials lab.
- Patent US 9085665 B1 reflects assignment to Vertera, Inc.
- Vertera, Inc. successfully integrated porous PEEK into cervical fixation cages for commercial applications.
- This success led to Vertera being acquired by Nuvasive in 2017.

**Mitral Valve Stent Technology Developer**

**Jan 2013-May 2013**

- Worked with Dr. Christopher Petit, an interventional cardiologist, to design a minimally invasive stent for implantation of an artificial mitral valve as part of Georgia Tech's Senior Design Project

**Undergraduate Research Assistant**

**Aug 2011-May 2013**

- Worked in Dr. Kenneth Gall's biomaterials lab classifying polyether ether ketone (PEEK)
- Fabricate novel approaches to enhancing osseointegration while maintaining structural integrity
- Run tests using hydraulic machinery while learning material science principles.

**President- Biomedical Engineering Honor Society**

**Feb 2012-May 2013**

- Nominated and elected in my junior year to lead Georgia Tech's chapter of the National Biomedical Engineering Honor Society, Alpha Eta Mu Beta

**Language of Business and Technology Program Participant**

**May 2011-Aug 2011**

- Learned the language of medical and business professionals in Spanish and English while studying in Cádiz and Madrid, Spain.
- Studied trends in international medicine and business; notably the discrepancy <sup>[[ ]]</sup><sub>ISEP</sub> between the hospitals and the engineering firms

**Peer Led Undergraduate Study Leader at Georgia Tech**

**Aug 2010 – Dec 2010**

- Directed a twice-weekly Calculus tutorial session supervised by the Office of Student Success Programs.
- Responsible for preparing a lesson and designing a website to publicize the meetings and curriculum.

## **Extracurricular**

### **Website Developer**

**January 2018-Present**

- Designed, built and maintained the websites for the Dr. Gottschalk and Wagner's Upper Extremity Group ([www.atlantashoulderinstitute.com](http://www.atlantashoulderinstitute.com)), Dr. 'X' Xerogeanes ACL website ([www.aclrehab.dcwhittingslow.com](http://www.aclrehab.dcwhittingslow.com)), AJ Donohoue Foundation (501(c)(3)), the Inan Research Lab ([irl.gatech.edu](http://irl.gatech.edu)), and Pete's Bar ([petesbarjax.com](http://petesbarjax.com))

### **MD/PhD Student Advisory Board Treasurer**

**July 2017 – July 2018**

- Managed the Budget and planned several social events for our group of 70 students and faculty.

### **Georgia Tech Senior Design Judge**

**July 2016 - Present**

- Volunteered to judge senior design projects at the annual Senior Design Expo.

### **La Feria de Salud Volunteer**

**Oct 2014**

- Performed health services for underserved Hispanic population in Atlanta
- Provided clinical guidance and counseling to patients

### **Surgical Team Assistant/Translator- Chinandega, Nicaragua**

**May 7-18, 2011**

- Assisted a team of four surgeons for 50+ general surgical cases under the Amigos Por Cristo organization.
- Translated and facilitated conversation between patients and surgeons including pre-op instructions and post-op consultations.

### **Engineering World Health Program Coordinator**

**Jan 2010-May 2012**

- Assess and rebuild medical devices for use in third world hospitals

### **Foundation for the International Medical Relief of Children**

**Apr 2011-May 2013**

- Serve as the Vice President
- Plan, organize, and fund local and international healthcare outreach programs

### **Peer Leader- Georgia Tech Hanson Residence Hall**

**Aug 2010 – May 2013**

- Foster the development of relationships and community among twenty-two diverse, male residents.
- Plan and implement programs to assist new students to fully assimilate into the college environment.

### **Hanson Homeless Ministry -Georgia Tech**

**Jan 2009 – May 2013**

- Plan and organize a group of approximately 15 people to prepare pancakes and deliver to a nearby park
- Designated Spanish Minister, in charge of conversing with any homeless Hispanics.

## **Honduras Mission Volunteer Leader**

**Jun 2009 – Jul 2009**

- Led a short-term mission trip to Honduras under the United Methodist Volunteers in Mission organization;

### **SKILLS**

- Experience with human cadaver dissections and knowledge of anatomy
- Ability to read/interpret multiple imaging modalities (MRI, CT, EKG, X-ray)
- Ability to perform micro-CT
- Mathematical/Physical Modelling Expertise
- Mechanics of Material Testing Proficiency (UTS, Fatigue, Bending, etc.)
- Computer Programming Proficiency (Matlab, Python, LabView)
- 3D Modeling Proficiency (SolidWorks)
- Rapid 3D prototyping
- Product Fabrication (laser cutting, lathe, CNC, etc.)
- Circuit design and microprocessor utilization
- Soft Robotics and Silicone Casting proficiency
- Fluency in Spanish
- CPR/ACLS Healthcare Provider certified

### **RECOGNITIONS AND AWARDS**

Dean's List (all semesters), Faculty Honors (Fall '09, Summer '11), Recipient of the Ty Cobb Educational foundation scholarship, the Georgia Tech IMPACT scholarship, the Georgia Tech Campoamor Scholarship, James "Rhio" O'Connor Scholarship essay contest winner