

Derek Nichols

dnichols32@gatech.edu
www.derek-nichols.com

EDUCATION

GEORGIA INSTITUTE OF TECHNOLOGY, ATLANTA, GA

Expected Graduation: April 2023

George W. Woodruff School of Mechanical Engineering

- Pursuing a PhD in Mechanical Engineering
- Masters earned Spring 2021
- Proposed Thesis Title: Characterization and Control of Inlet Nacelle Flow in the Presence of Crosswind and Ground Effects

UNIVERSITY OF PITTSBURGH, PITTSBURGH, PA

Graduation Date: April 30, 2017

Swanson School of Engineering

- Bachelor's Degree in Mechanical Engineering - *Summa Cum Laude*
- Minors in Bioengineering and Mathematics

RESEARCH EXPERIENCE

CROSSWIND NACELLE SEPARATION FUNDAMENTAL PHYSICS

August 2017-Present

- Researching under Professor Ari Glezer
- Funded by The Boeing Company
- Awarded NSF GRFP fellowship to fund tuition and stipend for three years
- Awarded Orville and Wilbur Wright Graduate Award by AIAA to support research
- Perform experiments to better understand nacelle separation produced by crosswinds
- Responsible for developing new and innovative ways to negate the effects of inlet separation during takeoff and landing
- Investigate the effect of the ground plane and the possible formation of a ground vortex

OSTEOCHONDRAL BIOREACTOR RESEARCH PROJECT

December 2014-February 2018

- Researched with university professors Dr. Paolo Zunino and Dr. Riccardo Gottardi
- Awarded SSOE Summer 2016 Research Internship to conduct full time research over the summer
- Developed bioreactor prototypes used to test drugs for osteoarthritis with the goal of maximizing drug exposure using microfluidics
- Created models in SolidWorks for testing in ANSYS to assess drug exposure
- 3D printed models tested in a laboratory to compare theoretical and actual results

JOURNAL PUBLICATIONS

- **D. Nichols**, I. Sondh, S. Little, P. Zunino, R. Gottardi. Design and validation of an osteochondral bioreactor for the screening of treatments for osteoarthritis. *Biomedical Microdevices*. February 14, 2018.
- **D. Nichols**, I. Sondh, P. Zunino, R. Gottardi. Creating an Osteochondral Bioreactor for the Screening of Treatments for Osteoarthritis. *Ingenium 2017*. February 2017.

CONFERENCE PAPERS

- **D. Nichols**, B. Vukasinovic, A. Glezer, B. Rafferty. Formation of a Nacelle Inlet Ground Vortex in Crosswind. *AIAA SciTech 2022 Forum*. January 5, 2022.
- **D. Nichols**, B. Vukasinovic, A. Glezer, M. DeFore, B. Rafferty. Steady and Unsteady Control of Nacelle Inlet Flow in Crosswind. *AIAA SciTech 2021 Forum*. January 4, 2021.
- **D. Nichols**, B. Vukasinovic, A. Glezer, M. DeFore, B. Rafferty. Fluidic Control of Nacelle Inlet Flow in Crosswind. *AIAA Aviation 2020 Forum*. June 17, 2020.
- **D. Nichols**, B. Vukasinovic, A. Glezer, M. DeFore, B. Rafferty, F. Palacios. Characterization and Control of a Nacelle Inlet Flow in Crosswind. *AIAA Aviation 2019 Forum*. June 21, 2019.

CONFERENCE PRESENTATIONS

- **D. Nichols**, B. Vukasinovic, A. Glezer. Vortex Dynamics in Axisymmetric Inlet Over a Plane in a Cross Flow. *74th Annual Meeting of the APS Division of Fluid Dynamics*. November 21, 2021.
- **D. Nichols**, B. Vukasinovic, A. Glezer, M. DeFore, B. Rafferty. Adaptable Fluidic Control of Round Inlet Flow in Cross Flow. *73rd Annual Meeting of the APS Division of Fluid Dynamics*. November 22, 2020.
- **D. Nichols**, B. Vukasinovic, A. Glezer, M. DeFore, B. Rafferty. Fluidic Control of Round Inlet Flow in a Crosswind. *72nd Annual Meeting of the APS Division of Fluid Dynamics*. November 25, 2019.
- R. Gottardi, G. Riccardis, M. Avolio, **D. Nichols**, et al. A 3D Printed Microfluidic Bioreactor to Engineer Biphasic Construct. *2018 AIChE*. November 1, 2018.

- R. Gottardi, G. Riccardis, M. Avolio, **D. Nichols**, et al. A 3D Printed Microfluidic Bioreactor to Engineering Biphasic Musculoskeletal Construct. *Tissue Engineering and Regenerative Medicine International Society – World Annual Meeting*. September 6, 2018.

POSTERS

- F. Donnalaja, G. Riccardis, **D. Nichols**, et al. Osteochondral Bioreactor for Drug Screening and Toxicity Assessments. 26th Congress of the European Society of Biomechanics. July 13, 2021.
- R. Gottardi, G. Riccardis, M. Avolio, **D. Nichols**, et al. A 3D Printed Microfluidic Bioreactor to Engineering Biphasic Musculoskeletal Construct. Biomedical Engineering Society Annual Meeting, Atlanta, GA. October 18, 2018.
- R. Gottardi, G. Riccardis, **D. Nichols**, et al. A 3D Printed Microfluidic Bioreactor to Engineering Biphasic Musculoskeletal Construct. Orthopedic Research Society Annual Meeting, New Orleans, LA. March 2018.
- **D. Nichols**, I. Sondh, P. Zunino, R. Gottardi. Optimizing an Osteochondral Bioreactor for the Screening of Treatments for Osteoarthritis. Science 2016, Pittsburgh, PA, October 2016.
- I. Sondh, **D. Nichols**, E. Bayer, R. Gottardi, S.R. Little. Development of a bioreactor aimed at designing spatial and temporal drug delivery profiles for bone regeneration protocols. Biomedical Engineering Society Annual Meeting, Minneapolis, MN, October 2016.

TEACHING EXPERIENCE

FLUID MECHANICS GUEST LECTURER

Fall 2020, Fall 2021

- Co-instructor for Ari Glezer's Fluid Mechanics class
- Taught lectures, facilitated the online chat to answer lecture questions real-time, helped to create exam questions, and made important decisions relevant to course structure
- Average CIOS grade of 4.92/5 measuring overall teaching effectiveness for Fall 2020

FLUID MECHANICS TEACHING ASSISTANT

Fall 2019

- Head TA for Ari Glezer's Fluid Mechanics class
- Average CIOS grade of 4.97/5 measuring overall teaching effectiveness
- Wrote homework and exam problems and solutions, study guides, and lesson plans
- Held weekly office hours and review sessions for the exams

TECH TO TEACHING CERTIFICATE

Fall 2019-Fall 2020

- To fulfill the foundations of teaching and learning, took Fundamentals in Teaching and Learning (Fall 2019) and Course Design (Spring 2020) to give theoretical basis for teaching
- Will aim to take the Teaching Capstone in Fall 2020 to assess my teaching abilities

CIRTL CERTIFICATE

Spring 2020

- Center for the Integration of Research, Teaching, and Learning (CIRTL) associate level certificate

MEMS SENIOR DESIGN UNDERGRADUTE TEACHING ASSISTANT

Spring 2017

- Asked by Dr. Schmidt to help assist senior design because of our team's drive and work ethic
- First time UTAs were ever employed for Pitt's MEMS senior design class
- Created lectures and lesson plans for both senior design and its prequel class
- Ushered groups along and assessed their progress throughout the course
- Acted as project sponsors for team continuing the Foldie project