Derek Nichols

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

EDUCATION

GEORGIA INSTITUTE OF TECHNOLOGY, ATLANTA, GA — *Expected Graduation*: April 2023
Mechanical Engineering, Ph.D., M.S.

- Graduate Research Advisor: Dr. Ari Glezer
- Proposed Thesis Title: Characterization and Control of Inlet Nacelle Flow in the Presence of Crosswind and Ground Effects
- Minor Degrees: Environmental Fluid Mechanics; Teaching in Higher Education

UNIVERSITY OF PITTSBURGH, PITTSBURGH, PA — *Graduation Date*: April 30, 2017
Mechanical Engineering, B.S.

- *Summa Cum Laude*
- Minor Degrees: Bioengineering; Mathematics

RESEARCH EXPERIENCE

FLUID MECHANICS RESEARCH LAB (FMRL) — 2017 - Present
Georgia Institute of Technology, Professor Ari Glezer

- Funded by The Boeing Company, Georgia Tech, and the NSF GRFP
- Perform experiments to better understand nacelle separation produced by crosswinds
- Develop 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 — 2014 - 2018
University of Pittsburgh, Dr. Paolo Zunino and Dr. Riccardo Gottardi

- Developed microfluidic bioreactor prototypes used to test drugs for osteoarthritis
- Optimized model to maximize drug exposure to the test cells
- Simulated fluid flow and 3D printed models tested in a laboratory to compare 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. Donnaloja, 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.

PATENT APPLICATIONS

- "Adaptable Flow Control for Engine Nacelles," B. Rafferty, M. DeFore, A. Glezer, B. Vukasinovic, **D. Nichols**. Application No 15,931,328. November 11, 2021.

TEACHING EXPERIENCE

Undergraduate Fluid Mechanics Teaching Associate — Fall 2021

- Average CIOS score of 4.93/5 measuring overall teaching effectiveness

Undergraduate Fluid Mechanics Teaching Associate — Fall 2020

- Average CIOS score of 4.85/5 measuring overall teaching effectiveness

Georgia Tech's Tech to Teaching Certificate — Fall 2020

- Completed three graduate-level courses to prepare future faculty in teaching pedagogy and course design

CIRTL Associate Level Certificate — Spring 2020

Undergraduate Fluid Mechanics Teaching Assistant — Fall 2019

- Average CIOS score of 4.91/5 measuring overall teaching effectiveness

MEMS Senior Design Undergraduate Teaching Assistant — Spring 2017

MEMS Fundamentals of Engineering Projects Undergraduate Teaching Assistant — Spring 2017

AWARDS & HONORS

National Science Foundation Graduate Research Fellowship Program (NSF GRFP) Fellow — 2019 - Present

AIAA Orville and Wilbur Wright Graduate Award — 2019

Georgia Tech President's Fellowship — 2017 - 2020

Pitt Mobile App Challenge - Finalist — 2017

Best MEMS Senior Design Presentation — 2016

Pitt SSOE Design Expo - 2nd Overall MEMS Design — 2016

Pitt SSOE Design Expo - 2nd Overall ECE Design — 2016

SSOE Summer Research Scholarship — 2016

Freshman Engineering Conference Best Poster — 2014

LEADERSHIP AND SERVICE

FMRL Lab Manager — 2021 - Present

- Manage lab operations, oversee lab/laser inspections, and schedule preventative maintenance on equipment
- Redesigned and maintain lab website (https://fmrl.gatech.edu)

Woodruff School Graduate Mental Health and Wellness Committee Member — 2021 - Present

- Advocate for graduate student rights and protective policies within the department
- Ideate, design, and execute conflict resolution tool with support from the department

Georgia Tech President's Undergraduate Research Award (PURA) Reviewer — 2019 - Present

Georgia Tech Muay Thai Senior Member - Officer — 2017 - 2020

Georgia Tech NASA Robotic Mining Mechanical Engineering Lead — 2018

Pitt MEMS Senior Design Project Sponsor — Spring 2017

Pitt Makerspace Volunteer — 2015 - 2017

PROFESSIONAL SOCIETIES

American Institute of Aeronautics and Astronautics — 2018 - Present

American Physical Society — 2018 - Present

American Society of Mechanical Engineers — 2021 - Present

Pi Tau Sigma Mechanical Engineering Honor Society — 2015 - Present