

Derek Nichols

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EDUCATION

GEORGIA INSTITUTE OF TECHNOLOGY, ATLANTA, GA

Expected Graduation: April 2023

Ph.D., M.S., Mechanical Engineering

- 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

B.S., Mechanical Engineering

- *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 Engineer 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.

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