

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 Concentrations: 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

- **Nichols, D.A.**, Sondh, I., Little, S., Zunino, P., and Gottardi R., "Design and validation of an osteochondral bioreactor for the screening of treatments for osteoarthritis," *Biomedical Microdevices*, Vol. 20, No. 18, 2018.

CONFERENCE PAPERS

- **Nichols, D.A.**, Vukasinovic, B., Glezer, A., and Rafferty, B., "Formation of a Nacelle Inlet Ground Vortex in Crosswind," AIAA Paper 2022-1698, January 2022.
- **Nichols, D.A.**, Vukasinovic, B., Glezer, A., DeFore, M., and Rafferty, B., "Steady and Unsteady Control of Nacelle Inlet Flow in Crosswind," AIAA Paper 2021-1556, January 2021.
- **Nichols, D.A.**, Vukasinovic, B., Glezer, A., DeFore, M., and Rafferty, B., "Fluidic Control of Nacelle Inlet Flow in Crosswind," AIAA Paper 2020-2955, June 2020.
- **Nichols, D.A.**, Vukasinovic, B., Glezer, A., DeFore, M., Rafferty, B., and Palacios, F., "Characterization and Control of a Nacelle Inlet Flow in Crosswind" AIAA Paper 2019-3685, June 2019.

CONFERENCE PRESENTATIONS

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

- Donnalaja, F., Riccardis, G., **Nichols, D.A.**, et al., “Osteochondral Bioreactor for Drug Screening and Toxicity Assessments,” 26th Congress of the European Society of Biomechanics, July 13, 2021.
- Gottardi, R., Riccardis, G., Avolio, M., **Nichols, D.A.**, et al., “A 3D Printed Microfluidic Bioreactor to Engineering Biphasic Musculoskeletal Construct,” Biomedical Engineering Society Annual Meeting, Atlanta, GA, October 18, 2018.
- Gottardi, R., Riccardis, G., **Nichols, D.A.**, et al., “A 3D Printed Microfluidic Bioreactor to Engineering Biphasic Musculoskeletal Construct,” Orthopedic Research Society Annual Meeting, New Orleans, LA, March 2018.
- **Nichols, D.A.**, Sondh, I., Zunino, P., and Gottardi, R., “Optimizing an Osteochondral Bioreactor for the Screening of Treatments for Osteoarthritis,” Science 2016, Pittsburgh, PA, October 2016.
- Sondh, I., **Nichols, D.A.**, Bayer, E., Gottardi, R., and Little, S.R., “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,” Rafferty, B., DeFore, M., Glezer, A., Vukasinovic, B., **Nichols, D.A.**, 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 Certificate	Spring 2020
• Center for the Integration of Research, Teaching, and Learning (CIRTL) associate level certificate	
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

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
Altoona Public Access Channel Cameraman and Editor	2010 - 2013

AWARDS & HONORS

ASME Graduate Teaching Fellowship	2022
Best Paper, Fluid Dynamics, AIAA SciTech 2022	2022
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