Derek Nichols

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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 AlChE.* November 1, 2018.

POSTERS

- **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