

# Derek Nichols

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## EDUCATION

GEORGIA INSTITUTE OF TECHNOLOGY, ATLANTA, GA

*Expected Graduation: TBD*

*George W. Woodruff School of Mechanical Engineering*

- Pursuing a PhD in Mechanical Engineering

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

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, M. DeFore, B. Rafferty, F. Palacios. Characterization and Control of a Nacelle Inlet Flow in Crosswind. *AIAA Aviation*. June 21, 2019.

## CONFERENCE PRESENTATIONS

- **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.
- **D. Nichols**, B. Vukasinovic, A. Glezer, M. DeFore, B. Rafferty, F. Palacios. Characterization and Control of a Nacelle Inlet Flow in Crosswind. *AIAA Aviation*. June 21, 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.

## 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 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-Present

- 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

## 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

## ACADEMIC EXPERIENCE

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### MEMS SENIOR DESIGN: FOLDIE – THE LAUNDRY FOLDING ROBOT

Fall 2016

- Laundry folding robot project self-led by an interdisciplinary team of engineering students
- \$650 operating budget to design, prototype, build, and test the design of the system
- Won best presentation, 2<sup>nd</sup> overall in electrical engineering, and 2<sup>nd</sup> overall in mechanical engineering

### FRESHMEN ENGINEERING PROJECT

January 2014-April 2014

- The *da Vinci* Surgical System and Its Benefits to Radical Prostatectomies
- Observed gallbladder removals with the *da Vinci* Surgical System
- Swanson School of Engineering 2014 freshmen engineering conference award winner for best poster in session

### PITT MAKERSPACE VOLUNTEER

April 2016-May 2017

- Swanson School's Makerspace is a place for engineering students to create, innovate and collaborate
- Volunteered three days a week overseeing and assisting in the fabrication and design of student projects

### PI TAU SIGMA

October 2015-Present

- National mechanical engineering honor society
- Held the office of treasurer

## COMPUTER SKILLS

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|-------------------|------------|------------|----------|----------|--------|---------|
| Experienced with: | SolidWorks | Siemens NX | Autodesk | MATLAB   | DaVis  | Tecplot |
| Exposure to:      | EES        | UNIX       | C++      | Assembly | Python | ANSYS   |