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| **Derek Nichols** | | | | | | |
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| dnichols32@gatech.edu  www.derek-nichols.com | | | | | | |
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| **EDUCATION** | | | | | | |
| GEORGIA INSTITUTE OF TECHNOLOGY, ATLANTA, GA  *Ph.D., M.S., Mechanical Engineering* | *Expected Graduation*: Winter 2023 | | | | | |
| * 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  *B.S., Mechanical Engineering* | *Graduation Date*: April 30, 2017 | | | | | |
| * *Summa Cum Laude* * Minor Degrees: Bioengineering; Mathematics | | | | | | |
| **RESEARCH EXPERIENCE** | | | | | | |
| FLUID MECHANICS RESEARCH LAB (FMRL)  *Georgia Institute of Technology, Professor Ari Glezer* | | | | 2017 - Present | | |
| * 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 * Decrease inlet flow distortion by up to 60% and 50% at 30 and 35 knots crosswind, respectively * Investigate the effect of the ground plane and the possible formation of a ground vortex | | | | | | |
| OSTEOCHONDRAL BIOREACTOR RESEARCH PROJECT  *University of Pittsburgh, Dr. Paolo Zunino and Dr. Riccardo Gottardi* | | | | 2014 - 2018 | | |
| * Developed microfluidic bioreactor prototypes used to test drugs for osteoarthritis * Simulated fluid flow and 3D printed models tested in a laboratory to compare results * Optimized model to maximize drug exposure to the test cells achieving 2.4x delivery versus original design | | | | | | |
| 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., and Glezer, A., “Scaling Characteristics of Ground Vortices in a Nacelle Inlet Flow Field,” AIAA Paper 2023-1981,January 2023. * **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., “Formation and Stability of a Ground Vortex in the Cross Flow over an Axisymmetric Inlet,” *75th Annual Meeting of the APS Division of Fluid Dynamics,* November 21, 2022. * **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 AlChE,* November 1, 2018. * Gottardi, R., Riccardis, G., Avolio, M., **Nichols, D.A.,** 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 | | | |  | | |
| * Donnaloja, F., Riccardis, G., **Nichols, D.A.**, et al., “Biphasic Bioreactor for Osteochondral Drug Screening and Toxicity Assessments,” 6th TERMIS World Congress, November 15, 2021. * Donnaloja, 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. * “Aerodynamic Flow Control Systems and Methods,” Glezer, A., Vukasinovic, B., **Nichols, D.A.**, Application No PCT/US2019/063764, June 4, 2020. | | | | | | |
| **SKILLS** | | | | | | |
| Programming Languages | | | | | | |
| * Experienced with: MATLAB, HTML, CSS * Exposure to: Python, C/C++, Assembly, UNIX, Mathematica | | | | | | |
| Software | | | | | | |
| * ANSYS, AutoDesk, EES, Excel, Git, LabVIEW, LaVision DaVis, Power Automate, Siemens NX, SolidWorks, Tecplot | | | | | | |
| Laboratory | | | | | | |
| * Particle image velocimetry, experimental flow visualization, experimental design, laser and camera optics | | | | | | |
| **TEACHING EXPERIENCE** | | | | | | |
| Thermodynamics Instructor of Record | | | | Spring 2023 | | |
| * Developed and delivered all course material in conjunction with ASME Graduate Teaching Fellowship | | | | | | |
| 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 | |
| **ACADEMIC EXPERIENCE** | | | | | | |
| 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 * Used as an example in CMU MBA Technology and Future of Work curriculum * Won best presentation, 2nd overall in electrical engineering, and 2nd overall in mechanical engineering | | | | | | |
| FRESHMEN ENGINEERING PROJECT | | | | Spring 2014 | | |
| * The *da Vinci* Surgical System and Its Benefits to Radical Prostatectomies * Observed gallbladder removals with the d*a Vinci* Surgical System * Swanson School of Engineering 2014 Freshmen Engineering Conference award winner for best poster in session | | | | | | |
| **PROFESSIONAL EXPERIENCE** | | | | | | |
| SMITHMYER’S ELECTRONICS | | | May 2015 - August 2015 | | | |
| * Responsible for assessing building blueprints and making sure equipment is up to code * Learned how to create electrical components for needed applications * Installed wiring and devices on commercial buildings * Worked on a $50,000 project for a new AMC movie theater | | | | | | |
| ALLEGHENY LUTHERAN SOCIAL MINISTRIES | | | May 2014 - August 2014 | | | |
| * Maintained the grounds and buildings and repaired broken equipment | | | | | | |
| PANTHER VISION | | | October 2014 - May 2017 | | | |
| * Filmed and worked scoreboard for Pitt men’s and women’s basketball games * Worked scoreboard for Pitt baseball and softball games * Trained new members on equipment and practices | | | | | | |
| WEIS MARKETS | | June 2011- August 2013 | | | | |
| LOWE’S HOME IMPROVEMENT | | May 2017 - August 2017 | | | | |
| ALTOONA CURVE BASEBALL CAMERAMAN | | 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 * Redesigned and maintain group website (https://sites.gatech.edu/megradmentalhealth) * Project/hiring manager for tool aimed at providing graduate students with resources for conflict resolution | | | | | | |
| 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 Fellowship | | | | | | 2016 |
| Freshman Engineering Conference Best Poster | | | | | | 2014 |
| **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 |
| The Order of the Engineer | | | | | | 2017 - Present |