Charles R. O'Neill

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Education:

Ph.D., Mechanical and Aerospace Engineering, Oklahoma State University, 2011
M.S., Mechanical Engineering, Oklahoma State University, 2003
B.S., Aerospace Engineering, Oklahoma State University, 2001
Private Pilot, Aircraft Single-Engine Land

Professional Experience:

Aerospace Engineering and Mechanics Department, University of Alabama
-Assistant Professor 2014–present

- Developed and operated Aircraft Rapid Prototyping Laboratory

Cessna Aircraft, Wichita, KS
-Aerospace Engineer, Rapid Prototyping Department 2012–2013

- Aerodynamic analysis and design of a high performance multi-engine jet aircraft in a rapid prototyping environment.
- Whole aircraft turbulent and inviscid CFD analysis for S&C, loads, and performance estimates in a time critical environment.
- Low and High Speed wind tunnel tests. Reduction and analysis of wind-tunnel data for S&C and CFD validation.
- Daily rapid ball-park estimates and consulting of aerodynamics in design and prototype environment.

Computational Aero-Servo-Elasticity Laboratory (CASELab), Stillwater, OK
-Research Fellow 2004–2011
-Research Assistant 2001–2004

- Development, analysis, operation, and visualization of unsteady computational fluid dynamics (CFD) for aeroelastic (flutter) simulations.
- Supported STARS aeroelasticity group at NASA Dryden Research Center. Aeroelasticity/flutter analysis of the F-18, Hyper-X, and various other systems.
- Validated and verified CFD based simulations with analytical and experimental models.
- Stability and control analysis of 4 UAV aircraft and one civil aviation aircraft.

Aircraft Operations, Design and Construction

-Unmanned Aerial Vehicle 2001–present

- Built and operated small UAV/UAS aircraft and sailplanes.
- Designed and built a multiple-payload electrically powered unmanned aircraft (10 ft span, 35 lb gross weight, 16 lb payload, 5 lb NiCd batteries, 200 ft takeoff distance).
- Won international 2001 AIAA Design-Build-Fly UAV competition.
- Advised and reviewed approximately 20 UAV designs from 2002 to present.

-Experimental Aircraft: Kitfox IV-1200 N194C 1994–2000

- Constructed a tube and fabric experimental aircraft
- Conducted system testing and evaluation.

-Civil Aviation 1992–2004

- Piloted and maintained civil aviation aircraft.
- Conducted flight tests and evaluation of C-172RG with test pilot (May 2001).

Educational Activities:

Courses Developed and Taught (171 students)

- AEM 313, Aerodynamics I
- AEM 368, Flight Dynamics & Control I
- AEM 495, Senior Seminar
- AEM 491-150, SP: Aircraft Prototyping Studio
- AEM 491-001, SP: Rocket Reentry Research
- AEM 594, Integrated Aircraft Research
- AEM 594, Aircraft Performance Characterization
- AEM 599, Thesis Research
- AEM 614, Airfoil and Wing Theory
- AEM 617, Aircraft Systems
- GES 554, Partial Differential Equations

Student Advising

- Ph.D. Advisor,
  - C. D. Simpson,
  - C. Ross Simpson,
- M.S. Advisor
  - C. Phillip (track II), 2017
  - A. Denton (track II), 2017
  - S. Pomroy, 2017.

    - C. Brantigan (track II), 2016
    - D. Welch, (track II), 2016
    - C. Simpson, 2014–2016
- Ph.D. Committee
    - Outside Member, Wufeng Tian, Math, Dr. Zhao, 2014.
    - Outside Member, Bingqing Lu, Geology, Dr. Zhang, present
    - Outside Member, Tyler Brooker, AEM, Dr. Olcmen, present
    - Outside Member, Narendra Chaganti, AEM, Dr. Olcmen, present
- M.S. Committee,
    - Member, Jacob Wilroy, AEM, Dr. Lang, 2016
    - Member, Matthew Westberry, ME (track II), 2016.
    - Chair, C. Simpson, AEM, Dr. O'Neill, 2016.
    - Member, Andrew Wrist, AEM, Dr. Hubner, 2016.
    - Outside Member, Juhyung Kim, ECE, Dr. Kim, 2015.
- Undergraduate REU scholar
    - C. Johnson (2015)
    - B. Wallace (2016).
- Undergraduate researcher
    - A. Benabbou, N. Holt, B. Griffith, J. Thomson, M. Wagenmaker, G. Webster (Computer Based Honors Program, 2016-2017)
    - J. Richards, 2014–present
    - Abraham Ortiz, Alex West, Griffin Uthe, David Maulick, C. Ross Simpson (2015-2016).
    - R. Ruggles, B Wallace (Computer Based Honors Program, 2015)

Research

External Funding

- *New Construction Guide Savings Analysis Update*, New Buildings Institute, $39,585 (0.3 share), 05/01/2016-10/1/2016, co-PI, Dr. Z. O'Neill
- *Building Energy Audits Using Unmanned Aerial Vehicles*, American Society of Heating, Refrigerating and Air-Conditioning Engineers, $5,000 (0.5 share), 09/01/2016-05/31/2017, co-PI, Dr. Z. O'Neill

Other Funding

- NASA Langley summer internship for graduate student (C. Simpson) in FUN3D research group, 2015.

Scholarly Activities

Refereed Publications:

1. F. Niu, Z. O'Neill, and C. O'Neill, Data-Driven Based Estimation of HVAC Energy Consumption with an Improved Fourier Series Decomposition in a University Dormitory, *J. Building Performance Simulation*, Forthcoming.

2. C. O'Neill and Z. O'Neill. Field Investigations of Nanoscale Particle Dispersion and Deposition Emitted from 3D Printers in Ventilated Spaces. *2016 ASHRAE Annual Meeting*. St. Louis, MO. June 25–29, 2016.
3. L. Song and C. O'Neill, A High-Order Symmetric Interior Penalty Discontinuous Galerkin Scheme to Simulate Vortex Dominated Incompressible Fluid Flow, *AIMS Mathematics*, 1(1): 43-63, April 2016.
4. Z. O'Neill. and C. O'Neill, Development of a Probabilistic Model for Estimating Building Energy Performance, *Applied Energy*. 164 (2016) 650-658. dx.doi.org/10.1016/j.apenergy.2015.12.015
5. C. O'Neill, Mathematics Preparation and Performance in Graduate Level Engineering Courses with Distance and Local Students, *ASEE Southeast Section Conference*, 2016.
6. N. Moffitt, C. O'Neill, C. Pinkerman, A. Hassett and A. Arena, Comparison of Methods for Implementing Well-Posed Boundary Conditions in Galerkin CFD Solvers, *51st AIAA ASM*, TX, Jan 2013.
7. C. O'Neill and A. Arena, Time-Domain Training Signals Comparison for Computational Fluid Dynamics Based Aerodynamic Identification, *Journal of Aircraft*, Mar-Apr 2005.
8. T. Cowan, C. O'Neill and A. Arena, Application of the Transpiration Boundary Condition to CFD Solutions in a Non-Inertial Reference Frame, *Journal of Aircraft,* Sep-Oct 2004.
9. C. O'Neill and A. Arena, Aircraft Flight Dynamics with a Non-Inertial CFD Code, *43rd AIAA ASM*, Reno, NV, 2004.
10. C. O'Neill and A. Arena, Comparison of Time-Domain Training Signals for CFD Based Aerodynamic Identification, *42nd AIAA ASM*, Reno, NV, 2004.
11. 2001 AIAA Design-Build-Fly: OSU Orange/Shamu, Invited Presentation, *19th AIAA Applied Aerodynamics Conference*, Anaheim, CA, June 2001.

Service Activities

- Department
  - Fluid Mechanics Research Group
  - Aeronautics Research Group
  - Mathematics Qualifying Exam Committee
  - Prospective Student Committee
- Reviewer
  - AIMS Mathematics
  - Journal of Aircraft
  - Machining Science and Technology
  - PDE mathematics book review, John Wiley & Sons
- Student Organization
  - Founding Advisor for Crimson Aviators pilot club
  - Advisor for TuskaUAV aerospace vehicle club

- Invited Presentations
    - *Unmanned Aerial Vehicles*, Exchange Club and Civitan Club, Tuscaloosa, 2016

Selected Engineering Research & Development Projects

- Hypersonic Inflatable Aeroshell Decelerator (HIADS) NASA student competition, 2015-2016. The team progressed to the semi-finals with a "best proposal from the systems perspective" comment from the judges, 2015-2016.
- Development, integration, and flight-testing of an unmanned aircraft for evaluating a Static Plasma Array electric control system, 2015-2016.
- Characterization and evaluation of 3D printer nanoparticle contamination within a confined laboratory environment, 2015.
- Development and creation of a 1.5 meter discus launched glider (DLG) for high performance sailplane testing and evaluation, 2015.

Awards & Fellowships

1. Cessna SPOT award: Development of an in-house store separation simulation capability, $1500
2. NASA Graduate Student Research Program Fellowship, $76k
3. Lew Wentz Undergraduate Research Program, $5000
4. Eagle Scout, Airport identification at KELK