Antonios Gementzopoulos

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EDUCATION

Ph.D. Aerospace Engineering, University of Maryland, College Park, expected 2024

M.Res. Aeronautical Engineering, University of Cambridge, 2019

B.S. Mechanical Engineering, New York University, Tandon School of Engineering, 2018

RESEARCH EXPERIENCE

2024– NASA Goddard Space Flight Center
University Space Research Association (USRA) Intern

This project seeks to develop Monte Carlo uncertainty quantification tools as well as data visualization software, for the Energetic Neutral Atom (ENA) imager. This effort is part of the NASA Storm Time O+ Ring current Imaging Evolution (STORIE) mission.

2020– Separated and Transient Aerodynamics Laboratory (STAL)
University of Maryland, College Park
Graduate Research Assistant, Department of Aerospace Engineering

This dissertation encompasses an experimental investigation of the aerodynamics of wing-gust encounters as well as the development of lift regulation strategies for gust load alleviation. Emphasis is placed on simultaneous measurement of the load transients, unsteady pressure distributions and flowfields associated with trasnsverse gust encounters, as well as the incorporation of flow sensing information in estimation and control frameworks.

2021– NATO Applied Vehicle Technology (AVT) Panel
AVT–347: Large-amplitude gust mitigation strategies for rigid wings
Technical Team Member

This panel consists of an international team of scientists committed to determining the most promising control methods for large-amplitude gust encounters and integrating flow models into control algorithms. Participation in this group involves presenting and sharing research results as well as discussing research ideas and questions.

2018–19 Whittle Laboratory
University of Cambridge
Graduate Research Assistant

This project aimed to create a methodology capable of predicting Low Frequency Rumble (LFR) in aviation gas turbines, by characterizing the reflectivity of the Nozzle Guide Vanes (NGV). A thermoacoustic solver was developed and used to predict the reflectivity of one-dimensional subsonic and chocked nozzles.

2016–18 Dynamical Systems Laboratory
New York University, Tandon School of Engineering
Undergraduate Researcher

This research studied causal relationships in swimmer models as part of a project to develop biomimetic underwater robots. Transfer entropy was validated as a tool to quantify information transfer between tandem airfoils in a uniform flow.

PUBLICATIONS

Journal Articles

[1] **A. Gementzopoulos**, G. Sedky, and A. Jones, "Role of vorticity distribution in the rise and fall of lift during a transverse gust encounter," *Phys. Rev. Fluids*, vol. 9, p. 014 701, 1 Jan. 2024.

[2] **A. Gementzopoulos**, O. Wild, and A. Jones, "Flow sensing through unsteady pressure measurements during transverse wing-gust encounters," *Under Review*, Sep. 2024.

[3] O. Wild, **A. Gementzopoulos**, and A. Jones, "Three-dimensionality of sideslip wings in strong transverse gust encounters," *Under Review*, Jun. 2024.

[4] G. Sedky, **A. Gementzopoulos**, F. D. Lagor, and A. R. Jones, "Experimental mitigation of large-amplitude transverse gusts via closed-loop pitch control," *Physical Review Fluids*, vol. 8, no. 6, p. 064 701, 2023.

[5] X. Xu, **A. Gementzopoulos**, G. Sedky, A. R. Jones, and F. D. Lagor, "Design of optimal wing maneuvers in a transverse gust encounter through iterated simulation or experiment," *Theoretical and Computational Fluid Dynamics*, pp. 1–20, 2023.

[6] X. Xu, **A. Gementzopoulos**, G. Sedky, A. R. Jones, and F. D. Lagor, "Iterative maneuver optimization in a transverse gust encounter," *AIAA Journal*, vol. 61, no. 5, pp. 2083–2099, 2023.

[7] G. Sedky, **A. Gementzopoulos**, I. Andreu-Angulo, F. D. Lagor, and A. R. Jones, "Physics of gust response mitigation in open-loop pitching manoeuvres," *Journal of Fluid Mechanics*, vol. 944, A38, 2022.

Conference Articles

[1] O. Wild, **A. Gementzopoulos**, and A. Jones, "Navigating unsteady airwakes: Three-dimensionality and sideslip in strong transverse gust encounters," in *AIAA Scitech 2024 Forum*, 2024, p. 1120.

[2] Y. T. Lee, **A. Gementzopoulos**, N. Chitrala, A. V. Suresh Babu, A. Jones, and A. Gopalarathnam, "Combined theoretical and experimental investigation of airfoil encountering transverse gust," in *AIAA Aviation 2023 Forum*, 2023, p. 4012.

[3] **A. Gementzopoulos**, G. Sedky, and A. Jones, "Lift and vortex development during transverse wing-gust encounters for a blunt-edge airfoil," in *AIAA Scitech 2022 Forum*, 2022, p. 0045.

[4] G. Sedky, **A. Gementzopoulos**, F. D. Lagor, and A. Jones, "Experiments in transverse gust mitigation using open-loop pitch maneuvers," in *AIAA Scitech 2022 Forum*, 2022, p. 0333.

Conference Abstracts

[1] **A. Gementzopoulos**, O. Wild, and A. Jones, "Measuring leading-edge vortex circulation using a leading-edge pressure sensor," *Bulletin of the American Physical Society*, 2024.

[2] **A. Gementzopoulos**, O. Wild, and A. Jones, "Unsteady lift estimation using distributed pressure sensing in the presence of uncertainty," *Bulletin of the American Physical Society*, 2023.

[3] O. Wild, **A. Gementzopoulos**, and A. Jones, "Three-dimensionality in swept wing-gust encounters," *Bulletin of the American Physical Society*, 2023.

[4] **A. Gementzopoulos**, G. Sedky, and A. Jones, "Predicting lift in unsteady separated flows using classical aerodynamics," *Bulletin of the American Physical Society*, 2022.

[5] G. Sedky, **A. Gementzopoulos**, F. Lagor, and A. Jones, "Transverse gust mitigation via closed-loop control," *Bulletin of the American Physical Society*, 2022.

[6] S. Peterson, M. Rosen, **A. Gementzopoulos**, P. Zhang, and M. Porfiri, "Cause-and-effect relationships in tandem swimmer models using transfer entropy," in *APS Division of Fluid Dynamics Meeting Abstracts*, 2017, pp. M9–008.

TRAINING

2022 Particle Image Velocimetry
Burgers Program for Fluid Dynamics
Delft University of Technology, Netherlands, October 10-14 2022

2019 Combustion Aerodynamics and Technical Computing
National Centre for Combustion and Aerothermal Technology
Loughborough University, United Kingdom, January 2019

2019 Combustion-Turbine Interaction and Integration
Oxford Thermofluids Institute
Oxford University, United Kingdom, March 2019

2019 Compressor Stall
Whittle Laboratory
Cambridge University, United Kingdom, February 2019

GRANTS AND AWARDS

Awards and Honors

2023 Clark Doctoral Fellows Mid-Career Award

2023 Outstanding Graduate Assistant Award

2017 Undergraduate Student Research Fellowship

2014–18 Tandon Scholarship of Academic Merit

COURSES TAUGHT

University of Maryland, College Park

Dynamics of Aerospace Systems (Teaching Assistant)

Aerodynamics (Teaching Assistant)

MEMBERSHIPS

The American Institute of Aeronautics and Astronautics

American Physical Society Division of Fluid Dynamics

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