# Imon Chakraborty, Ph.D.

**Associate Professor & Director**
**Vehicle Systems, Dynamics, and Design Laboratory (VSDDL)**
**Department of Aerospace Engineering**
**Auburn University**
**Auburn, AL 36849, USA**
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## EDUCATION

**2015** **Doctor of Philosophy (Ph.D.), Aerospace Engineering**
Georgia Institute of Technology, Atlanta, GA, USA
Dissertation: *Subsystem Architecture Sizing and Analysis for Aircraft Conceptual Design*
Advisor: Dr. Dimitri N. Mavris

**2011** **Master of Science in Aerospace Engineering (MSAE)**
Georgia Institute of Technology, Atlanta, GA, USA
Special Problem: *Control of Aggressive Vehicle Maneuvers for Collision Avoidance and Mitigation*
Advisor: Dr. Panagiotis Tsiotras

**2009** **Bachelor of Technology (B.Tech), Mechanical Engineering**
National Institute of Technology Tiruchirappalli, Tiruchirappalli, Tamil Nadu, India

## PROFESSIONAL EXPERIENCE

**Auburn University** **Aug 2018 – present**
Associate Professor, Department of Aerospace Engineering **Aug 2024 - present**
Assistant Professor, Department of Aerospace Engineering **Aug 2018 – Jul 2024**
Director, Vehicle Systems, Dynamics, and Design Laboratory (VSDDL)

*** Research:** Aircraft flight dynamics, control, and flight simulation; aircraft and subsystems design; aircraft performance; integrated design of novel aircraft and propulsion architectures

*** Teaching:** **AERO 3220** Aerospace Systems, **AERO 3230** Flight Dynamics,
**AERO 4710/4720** Aircraft Design, **AERO 5210/6210** Flight Simulation
**AERO 4970/7970** Fly-by-Wire for Fixed Wing Aircraft

**Georgia Institute of Technology** **Jan 2016 – Jul 2018**
Research Engineer II
Aerospace Systems Design Laboratory (ASDL), School of Aerospace Engineering

- Conducted and supervised research in collaboration with industry partners/sponsors or as part of internal research and development; developed and delivered lectures on aircraft design and performance in graduate-level Aircraft Design class

**Georgia Institute of Technology** **Aug 2011 – Dec 2015**
Graduate Research Assistant
Aerospace Systems Design Laboratory (ASDL), School of Aerospace Engineering

**Georgia Institute of Technology** **Aug 2009 – Jul 2011**
Graduate Research Assistant
Dynamics and Control Systems Laboratory (DCSL), School of Aerospace Engineering

## PROFESSIONAL AFFILIATIONS

**American Institute of Aeronautics and Astronautics (AIAA),** Associate Fellow (Class of 2023)

**Vertical Flight Society (VFS)**, Member

## AVIATION

**Private Pilot**, Airplane Single Engine Land (PPL-ASEL), 2013 – present

- Pilot-in-command (PIC) experience on Vans RV-6A, Cessna 172, Cessna 152, Diamond DA20, Diamond DA40, and Piper PA-28 aircraft

**Aircraft Owners and Pilots Association (AOPA)**, Member

## PROFESSIONAL AND UNIVERSITY SERVICE

Member, AIAA Aircraft Design Technical Committee (2016 – present)

- Technical Discipline Chair/Co-Chair, Aircraft Design, AIAA SCITECH Forum (2020 – present)

Former Member, AIAA Modeling and Simulation Technologies Technical Committee

Faculty advisor, Auburn University Design, Build, Vertical Flight (DBVF) team

Faculty advisor, Auburn University Design, Build, Fly (DBF) team

AU Aerospace Flight Mechanics, Control, and Design (FMCD) Group (2018 – present)

Reviewer for archival journals and peer-reviewed conferences

- ***AIAA Journal of Aircraft*** (eISSN: 1533-3868); ***IMechE Part G: Journal of Aerospace Engineering*** (eISSN: 2041-3025), ***IMechE Part C: Journal of Mechanical Engineering Science*** (eISSN: 2041-2983), ***Engineering Optimization*** (eISSN: 1029-0273); ***Journal of Aerospace Operations*** (eISSN: 2211-0038); ***Aerospace*** (ISSN 2226-4310); ***Applied Sciences*** (ISSN 2076-3417); ***CEAS Aeronautical Journal*** (eISSN: 1869-5590); ***American Control Conference*** (ACC); ***Conference on Decision and Control (CDC)***

## HONORS AND AWARDS

**Best Paper Award**, AIAA Electric Aircraft Technology Technical Committee (EAT TC) (2022)

- Chakraborty and Mishra, "*Sizing and Analysis of a Lift-Plus-Cruise VTOL Aircraft with Electrified Propulsion Systems*", AIAA-2022-3513

**Best Paper Award**, AIAA Aircraft Design Technical Committee (ADTC) (2021)

- Chakraborty and Mishra, *"A Generalized Energy-Based Vehicle Sizing and Performance Analysis Methodology"*, AIAA-2021-1721

**Best Paper Award**, AIAA Aircraft Design Technical Committee (ADTC) (2015)

- Chakraborty et al., *"A Requirements-driven Methodology for Integrating Subsystem Architecture Sizing and Analysis into the Conceptual Aircraft Design Phase,"* AIAA-2014-3012

**2016 20 Twenties**, Penton's Aviation Week Network & AIAA

**2015 William T. Piper, Sr. General Aviation Systems Graduate Award**, AIAA Foundation

- Chakraborty, I., "Facilitating the Development of Pilot-Friendly General Aviation Aircraft"

## FUNDED RESEARCH

**Externally funded research**

**Summary:** From August 2018 to present, **$1,739,765** in externally funded research that Dr. Chakraborty is either the overall PI or institutional PI for.

(figures in **bold** indicate external funds for which Dr. Chakraborty is overall or institutional PI)

1. ***OpenAirFrame: A Framework for eVTOL Multimodal Design-Space Exploration and Optimization*** – NASA SBIR Phase I; 80NSSC24PB305, Design, Analysis and Research Corporation (prime contractor) and Auburn University (sub-contractor); Auburn PI: Dr. Imon Chakraborty; Budget **$47,900**/$150,000; 08/07/2021 – 02/06/2025
2. ***SAF-Compatible Hybrid-Electric Propulsion for a Fixed-Wing Aircraft*** – NASA SBIR Phase I; 80NSSC24PB343; Rune Aero Inc. (prime contractor) and Auburn University (sub-contractor); Auburn PI: Dr. Imon Chakraborty; Budget **44,500**/$150,000; 08/07/2024 – 02/06/2025
3. ***Flight Simulation-Driven Research into Simplified Vehicle Operations for Urban Air Mobility*** – Federal Aviation Administration (FAA), Aviation Research Grants Program Cooperative Agreement #692M152140004; PI: Dr. Imon Chakraborty; Budget **$223,786**/$100,836/$324,622 (FAA/cost share/total); 08/18/2021 – 01/31/2023
4. ***Modular Generalized Framework for Assessing Aircraft Aero-Propulsive, Stability, and Control Characteristics*** – NASA Aeronautics Research Mission Directorate, Transformational Tools and Technologies (TTT) Project; 80LARC19C0013, Research in Flight (prime contractor) and Auburn University (sub-contractor); Auburn PI: Dr. Imon Chakraborty, Budget **$280,000**/$540,000 (AU/Total); Duration: 12/18/2018 – 12/15/2021
5. ***Air Vehicle Gust Response Analysis for Conceptual Design*** – NASA Ames Research Center, Research in Flight (prime contractor) and Auburn University (sub-contractor); STTR Phase I award #80NSSC19C0538 (ARC), Budget **$62,500**/$125,000 (AU/Total), Duration: 08/19/2019-09/18/2020; Phase II award #80NSSC21C0025 (ARC), Budget **$375,000**/$750,000 (AU/Total), Duration: 01/26/2021 – 01/25/2023
6. ***Use of Pilot Models to Support Design, Analysis, and Certification of UAM Vehicles*** – NASA Armstrong Flight Research Center, Systems Technology Inc. (prime contractor) and Auburn University (sub-contractor), SBIR Phase II award #80NSSC21C0321, Budget: **$99,334** (AU)/$750,000 (total); Duration: 07/20/2021 – 07/19/2023
7. ***Dual-Use UAM e-VTOL Aircraft – Design, Analysis and Testing Capabilities*** – Air Force Agility Prime Phase I STTR proposal, Award #FA864921P0142, DARcorporation (prime contractor) and Auburn University (sub-contractor); Auburn PI: Dr. Imon Chakraborty; **$74,793** (AU)/$150,000 (total); Duration: 01/15/2021 – 07/15/2021
8. ***An Agile, Adaptive Flight Research Simulator for Dual-Use Military and Urban Air Mobility Aircraft Development*** – Air Force Agility Prime Phase I STTR proposal, Award #FA864921P0075, Avilution (prime contractor) and Auburn University (sub-contractor); Auburn PI: Dr. Imon Chakraborty; **$45,460** (AU)/$150,000 (total); Duration: 11/27/2020 – 05/15/2021
9. ***Electric Scalable Aerial Transport (eSCAT)*** – Air Force Agility Prime Phase I STTR proposal, Award #FA864921P0182, Research in Flight (prime contractor) and Auburn University (sub-contractor);

Auburn PI: Dr. Imon Chakraborty; **$45,524** (AU)/$150,000 (total); Duration: 02/10/2021 – 08/09/2021

10. ***Electric Extended Range Airship with Modular Payload (e2-RAMP)*** – Air Force Agility Prime Phase I STTR proposal, Award # FA864921P0213, Research in Flight (prime contractor) and Auburn University (sub-contractor); Auburn PI: Dr. Imon Chakraborty; **$45,524** (AU)/$150,000 (total); Duration: 02/12/2021 – 08/11/2021
11. ***Vy 400 – A Revolutionary Dual-Use AAM VTOL Designed for Simplified Vehicle Operations***– Air Force Agility Prime Phase I STTR proposal, Award #FA864921P0081, Transcend Air (prime contractor) and Auburn University (sub-contractor); Auburn PI: Dr. Imon Chakraborty; Phase 1, **$49,860** (AU)/$150,000 (total); Duration: 12/14/2020 – 02/15/2025; Phase 2, **$300,713**/750,000
12. ***Active Landing Gear for Advanced Air Mobility: Delivering a Safe, Simple, and Virtually Silent Aircraft without the Runway***– Air Force Agility Prime Phase I STTR proposal, Award #FA864951P0226, Metro Hop (prime contractor) and Auburn University (sub-contractor); Auburn PI: Dr. Imon Chakraborty; **$45,364** (AU)/$150,000 (total); Duration: 03/01/2021 – 08/01/2021

**Auburn University (internally) funded**

1. ***Collaborative Flight Data Driven General Aviation Safety Research*** – Auburn University 2019 Intramural Grants Program (IGP); PI: Dr. Imon Chakraborty, Co-I: Dr. Steve Swartz (AU Dept. of Aviation); **$50,000**, End date: 03/31/2023
2. ***Energy-Based Aero-Propulsive Approach to Flight Vehicle Sizing*** – Auburn University 2019 Intramural Grants Program (IGP); PI: Dr. Roy J. Hartfield, Jr., Co-I: Dr. Imon Chakraborty; $20,000; Duration: 2 year (concluded)

## PUBLICATIONS

**Journal / encyclopedia articles:**

1. Chakraborty, I. and Comer, A., ***"Explicit Model Following Trajectory Control System for a Transitioning Urban Air Mobility Aircraft,"*** Proceedings of the Institution of Mechanical Engineers, Part G: Journal of Aerospace Engineering (accepted for publication, Jan 7, 2025)
2. Comer, A. and Chakraborty, I., ***"Optimizing Explicit Model-Following Trajectory Control Laws for a Vectored Thrust Configuration,"*** Journal of the American Helicopter Society (accepted for publication, Nov 4, 2024)
3. Comer, A. and Chakraborty, I., ***"Full Envelope Flight Control System Design and Optimization for a Tilt-Wing Aircraft,"*** Journal of the American Helicopter Society Fast-track Article, March 13, 2024, DOI: 10.4050/JAHS.69.032003
4. Comer, A. and Chakraborty, I., ***"Total Energy-Based Control Architecture Design and Optimization for a Lift-Plus-Cruise Aircraft,"*** AIAA Journal of Guidance, Control, and Dynamics Article in Advance, March 31, 2024, DOI: 10.2514/1.G007605
5. Chakraborty, I., Comer, A., Bhandari, R., Putra, S.H., Mishra, A.A., Schaller, R., Sizoo, D., and McGuire, R., ***"Piloted Simulation-Based Assessment of Simplified Vehicle Operations for Urban Air Mobility,"*** AIAA Journal of Aerospace Information Systems, Article in Advance, Jan 17, 2024, DOI: 10.2514/1.I011249
6. Bhandari, R., Mishra, A.A., and Chakraborty, I., ***"Genetic Algorithm Optimization of Lift-Plus-Cruise VTOL Aircraft with Electrified Propulsion,"*** AIAA Journal of Aircraft, Article in Advance, Jan 18, 2024, DOI: 10.2514/1.C037343

7. Chakraborty, I., Mishra, A.A., van Dommelen, D., and Anemaat, W.A., ***"Design and Sizing of a Ducted Fan Lift-Plus-Cruise Aircraft with Electrified Propulsion,"*** AIAA Journal of Aircraft, Article in Advance, Dec 1, 2022, DOI: 10.2514/1.C036811
8. Chakraborty, I. and Mishra, A.A., ***"Sizing and Analysis of a Lift-Plus-Cruise VTOL Aircraft with Electrified Propulsion Systems,"*** AIAA Journal of Aircraft, Article in Advance, Nov 1, 2022, DOI: 10.2514/1.C037044
9. Chakraborty, I. and Mishra, A.A., ***"Sizing and Analysis of a Tilt-Wing Aircraft with All-Electric and Hybrid-Electric Propulsion,"*** AIAA Journal of Aircraft, Article in Advance, August 15, 2022, DOI: 10.2514/1.C036813
10. Chakraborty, I. and Mishra, A.A., ***"A Generalized Energy-Based Flight Vehicle Sizing and Performance Analysis Methodology,"*** AIAA Journal of Aircraft, Vol. 58, No. 4, July-Aug 2021, DOI: 10.2514/1.C036101
11. Chakraborty, I. and Mavris, D.N., ***"Assessing Impact of Epistemic and Technological Uncertainty on Aircraft Subsystem Architectures,"*** AIAA Journal of Aircraft, Vol. 54, No. 4, 1388-1406, 2017, http://arc.aiaa.org/doi/abs/10.2514/1.C034007
12. Chakraborty, I. and Mavris, D.N., ***"Integrated Assessment of Aircraft and Novel Subsystem Architectures in Early Design,"*** *AIAA Journal of Aircraft,* Vol. 54, No. 4, 1268-1282, 2017, http://arc.aiaa.org/doi/pdf/10.2514/1.C033976
13. Chakraborty, I., Mavris, D.N., Emeneth, M., and Schneegans, A., ***"An Integrated Approach to Vehicle and Subsystem Sizing and Analysis for Novel Subsystem Architectures,"*** Proc IMechE Part G: J Aerospace Engineering, 2016, Vol. 230(3), pp. 496–514
14. Chakraborty, I., Mavris, D.N., Emeneth, M., and Schneegans, A., ***"A Methodology for Vehicle and Mission Level Comparison of More Electric Aircraft Subsystem Solutions - Application to the Flight Control Actuation System,"*** Proc IMechE Part G: J Aerospace Engineering, 2015, Vol. 229(6), pp. 1088–1102
15. Chakraborty, I., Nam, T., Gross, J.R., Mavris, D.N., Schetz, J.A., and Kapania, R.K., ***"A Comparative Assessment of Strut-Braced and Truss-Braced Wing Configurations using Multidisciplinary Design Optimization,"*** AIAA Journal of Aircraft, Vol. 52, No. 6, pp. 2009-2020, Nov-Dec 2015
16. Puranik, T., Harrison, E., Chakraborty, I., Mavris, D., ***"Aircraft Performance Model Calibration and Validation for General Aviation Safety Analysis,"*** AIAA Journal of Aircraft, Vol. 57, No. 4, July–August 2020
17. Cai, Y., Gao, Z., Chakraborty, I., Briceno, S., and Mavris, D.N., ***"Parametric Approach to Assessing Performance of High-Lift Device Active Flow Control Architectures,"*** Aerospace 2017, 4(1), 6 (ISSN 2226-4310), Special Issue: Aircraft Design, http://www.mdpi.com/2226-4310/4/1/6/
18. Mavris, D.N., Chakraborty, I., Garcia, E., Perullo, C.A., and Trawick, D.R., ***"On-board Energy Management,"*** Encyclopedia of Aerospace Engineering, John Wiley & Sons, Ltd, DOI: 10.1002/9780470686652.eae1029, Dec 19, 2015
19. Garmendia, D.C., Chakraborty, I., and Mavris, D.N., ***"Method for Evaluating Electrically Actuated Hybrid Wing–Body Control Surface Layouts,"*** AIAA Journal of Aircraft, Vol. 52, No. 6, pp. 1780-1790, Nov-Dec 2015

20. Garmendia, D.C., Chakraborty, I., and Mavris, D.N., ***"Multidisciplinary Approach to Assessing Actuation Power of a Hybrid Wing Body,"*** AIAA Journal of Aircraft, Vol. 53, No. 4, pp. 900-913, July-Aug 2016
21. Cai, Y., Gao, Z., Chakraborty, I., Briceno, S., and Mavris, D., ***"System-Level Assessment of Active Flow Control for Commercial Aircraft High-Lift Devices,"*** AIAA Journal of Aircraft, https://arc.aiaa.org/doi/pdf/10.2514/1.C034401
22. Rajaram, D., Cai, Y., Chakraborty, I., and Mavris, D., ***"Integrated Sizing and Multi-Objective Optimization of Aircraft and Subsystem Architectures in Early Design,"*** AIAA Journal of Aircraft, https://arc.aiaa.org/doi/pdf/10.2514/1.C034661

**Conference papers:**

1. Mishra, A.A., Harper, M.E., and Chakraborty, I., ***"Uncertainty Quantification in the Conceptual Design of Hybrid-Electric General Aviation Aircraft,"*** AIAA AVIATION Forum and Exposition 2025, Las Vegas, NV, July 21-25, 2025 (to appear)
2. Chakraborty, I., Bhandari, R., and Cornelius, J.K., ***"Design Optimization of a VTOL Configuration for Mars and Titan using the PEACE Framework,"*** AIAA AVIATION Forum and Exposition 2025, Las Vegas, NV, July 21-25, 2025 (to appear)
3. Mishra, A.A., Kunwar, B., McCormick, H.C., and Chakraborty, I., ***"Integrating Strip-Theory Aerodynamics into Conceptual Design of Variable Geometry Swing-Wing Aircraft,"*** AIAA AVIATION Forum and Exposition 2025, Las Vegas, NV, July 21-25, 2025 (to appear)
4. Bhandari, R., Putra, S.H., Davis, B.M., and Chakraborty, I., ***"Sizing and Optimization of a Subscale VTOL Aircraft with COTS Components using the PEACE Framework,"*** AIAA AVIATION Forum and Exposition 2025, Las Vegas, NV, July 21-25, 2025 (to appear)
5. Davis, B.M., McCormick. H.C., Putra, S.H., and Chakraborty, I., ***"Multi-Objective Design Optimization of a Liquid Hydrogen Blended Wing Body Aircraft Concept,"*** AIAA AVIATION Forum and Exposition 2025, Las Vegas, NV, July 21-25, 2025 (to appear)
6. Chakraborty, I. and Bhandari, R., ***"Design Optimization of a Hybrid-Electric Single Main Rotor NOTAR Helicopter using the PEACE Framework,"*** AIAA AVIATION Forum and Exposition 2025, Las Vegas, NV, July 21-25, 2025 (to appear)
7. Chakraborty, I., Kunwar, B., and Schmidt, P, ***"A Maneuver Control System Enabling Simplified Vehicle Operations and Tactical Maneuvering for a Tilt-Wing Aircraft,***" VFS Forum 81, Virginia Beach, VA, May 20-22, 2025 (to appear)
8. Comer, A.M., Mishra, A.A., and Chakraborty, I., ***"Extension of a Full Envelope Flight Control System to CTOL/STOL Capabilities on an Urban Air Mobility Vectored-Thrust VTOL Vehicle,"*** AIAA SCITECH 2025, Orlando, FL, Jan 6-10, 2025, AIAA-2025-0658
9. Kunwar, B., Comer, A.M., Putra, S.H., Davis, B., McCormick, C., and Chakraborty, I., ***"Developing Flight Simulation Model for a Lift-Plus-Cruise Subscale Vehicle: Mass Properties, Propulsion, and System Identification,"*** AIAA SCITECH 2025, Orlando, FL, Jan 6-10, 2025, AIAA-2025-0739
10. Bhandari, R. and Chakraborty, I., ***"Sizing and Optimization of Multiple eVTOL Configurations for Urban Air Mobility Applications,"*** AIAA SCITECH 2025, Orlando, FL, Jan 6-10, 2025, AIAA-2025-1434
11. Harper, M.E., Mishra, A.A., Kunwar, B., and Chakraborty, I., ***"Towards and Automated Methodology for Simulation Model Calibration to Manufacturer and Flight Test Performance Data,"*** AIAA SCITECH 2025, Orlando, FL, Jan 6-10, 2025, AIAA-2025-1567
12. Putra, S.H., Davis, B., Holman, R., McCormick, C., and Chakraborty, I., ***"Comparing Mass Properties and Manufacturability of 3D-Printed and Balsa Subscale Lift-Plus-Cruise Aircraft Designs,"*** AIAA SCITECH 2025, Orlando, FL, Jan 6-10, 2025, AIAA-2025-1822

13. Mishra, A.A., Comer, A.M., and Chakraborty, I., ***"AMS-Based Integration of Flight Dynamics and Control in a Vectored Thrust UAM Vehicle Design,"*** AIAA SCITECH 2025, Orlando, FL, Jan 6-10, 2025, AIAA-2025-2349
14. Davis, B., Bhandari, R., and Chakraborty, I., ***"Development and Testing of a Hybrid Electric Propulsion Architecture for Subscale eVTOL,"*** AIAA SCITECH 2025, Orlando, FL, Jan 6-10, 2025, AIAA-2025-2707
15. Comer, A. and Chakraborty, I., ***"Explicit Model Following Trajectory Control System for Multiple Vertical Takeoff and Landing Configurations,"*** 34th International Congress of the Aeronautical Sciences (ICAS 2024), Florence, Italy, September 9-13, 2024, ICAS-2024-1166
16. Mishra, A.A., Kunwar, B., and Chakraborty, I., ***"Integrated Sizing of an Electrified Tilt-Wing Aircraft for Vertical and Conventional Takeoff and Landing,"*** 34th International Congress of the Aeronautical Sciences (ICAS 2024), Florence, Italy, September 9-13, 2024, ICAS-2024-1170
17. Mishra, A.A. and Chakraborty, I., ***"Flight Dynamics and Control Integration in Conceptual Design of an Advanced Air Mobility VTOL Aircraft,"*** AIAA AVIATION 2024, Las Vegas, NV, Jul 29 – Aug 2, 2024, AIAA-2024-4050
18. Comer, A., Chakraborty, I., Putra, S.H., Bhandari, R., Kunwar, B., and Davis, B., ***"Flight Testing of a Simplified Vehicle Operations Flight Control System on a Subscale Lift-Plus-Cruise Unmanned Air Vehicle,"*** AIAA AVIATION 2024, Las Vegas, NV, Jul 29 – Aug 2, 2024, AIAA-2024-4563
19. Kunwar, B., Mishra, A.A., and Chakraborty, I., ***"Sizing and Analysis of Canard-Wing Aircraft With Jet Propulsion,"*** AIAA AVIATION 2024, Las Vegas, NV, Jul 29 – Aug 2, 2024, AIAA-2024-3752
20. Chakraborty, I. and Comer, A., ***"Optimizing Explicit Model-Following Trajectory Control Laws for a Vectored Thrust Configuration,"*** VFS Forum 80, Montreal, Canada, May 7-9, 2024, F-0080-2024-1277
21. Comer, A., Chakraborty, I., Kovryzhenko, Y., Taheri, E., Putra, S.H., Bhandari, R., and Kunwar, B., ***"Flight Testing of Explicit Model-Following Trajectory Control System for Lift-Plus-Cruise and Tilt-Wing Configurations,"*** VFS Forum 80, Montreal, Canada, May 7-9, 2024, F-0080-2024-1306
22. Comer, A., Bhandari, R., Putra, S.H., and Chakraborty, I., ***"Design, Control Law Development, and Flight Testing of a Subscale Lift-Plus-Cruise Aircraft,"*** AIAA SCITECH 2024, Orlando, FL, Jan 8-12, 2024, AIAA-2024-2644
23. Chakraborty, I. and McDonald, R.A., ***"Electrified Lift-Plus Cruise Aircraft Sizing with Varying Battery Modeling Assumptions,"*** AIAA SCITECH 2024, Orlando, FL, Jan 8-12, 2024, AIAA-2024-2314
24. Mishra, A.A. and Chakraborty, I., ***"Integrating Stability and Control Considerations into the Sizing of an Advanced Air Mobility VTOL Aircraft,"*** AIAA SCITECH 2024, Orlando, FL, Jan 8-12, 2024, AIAA-2024-2316
25. Bhandari, R., Putra, S.H., and Chakraborty, I., ***"Integrated Vehicle and Subsystems Sizing and Optimization for Advanced Air Mobility Aircraft,"*** AIAA SCITECH 2024, Orlando, FL, Jan 8-12, 2024, AIAA-2024-1085
26. Kunwar, B., Mishra, A.A., Bhandari, R., and Chakraborty, I., ***"Sizing and Analysis of an Advanced Air Mobility Aircraft Using Parametric Aero-Propulsive Model,"*** AIAA AVIATION 2023, San Diego, CA, June 12-16, 2023, AIAA-2023-3662

27. Zafi, N.A. and Chakraborty, I., ***"Physics-Based Lifting Surface Weight Estimation for Conceptual Design of Lift-Plus-Cruise Vertical Takeoff and Landing Aircraft,"*** AIAA AVIATION 2023, San Diego, CA, June 12-16, 2023, AIAA-2023-3663
28. Putra, S.H. and Chakraborty, I., ***"Integrated Vehicle and Subsystems Sizing for Electrified Urban Air Mobility Aircraft,"*** AIAA AVIATION 2023, San Diego, CA, June 12-16, 2023, AIAA-2023-3664
29. Comer, A.M., Mishra, A.A., and Chakraborty, I., ***"Total Energy Flight Control Architecture Optimization for a Tilt-Wing Aircraft,"*** AIAA AVIATION 2023, San Diego, CA, June 12-16, 2023, AIAA-2023-4510
30. Bhandari, R., Mishra, A.A., and Chakraborty, I., ***"Genetic Algorithm Optimization of Lift-Plus-Cruise VTOL Aircraft with Electrified Propulsion,"*** AIAA SCITECH 2023, National Harbor, MD, Jan 23-27, 2023, AIAA-2023-0398
31. Comer, A. and Chakraborty, I., ***"Total Energy Flight Control Architecture Optimization for a Lift-Plus-Cruise Aircraft,"*** AIAA SCITECH 2023, National Harbor, MD, Jan 23-27, 2023, AIAA-2023-0399
32. Chakraborty, I., Comer, A., Bhandari, R., Putra, S.H., Mishra, A.A., Schaller, R., Sizoo, D., and McGuire, R., ***"Flight Simulation Based Assessment of Simplified Vehicle Operations for Urban Air Mobility,"*** AIAA SCITECH 2023, National Harbor, MD, Jan 23-27, 2023, AIAA-2023-0400
33. Chakraborty, I. and Mishra, A.A., **"Sizing and Analysis of a Lift-Plus-Cruise VTOL Aircraft with Electrified Propulsion Systems,"** AIAA AVIATION 2022 Forum, Chicago, IL and virtual, June 27 – July 1, 2022, AIAA-2022-3513
34. Chakraborty, I., Miller, N.S., and Mishra, A.A., ***"Sizing and Analysis of a Tilt-Wing Aircraft with All-Electric and Hybrid-Electric Propulsion Systems,"*** AIAA SCITECH 2022 Forum, January 3-7, 2022, San Diego, CA & online, AIAA-2022-1515
35. Chakraborty, I., Mishra, A.A., Miller, N.S., van Dommelen, D., and Anemaat, W.A., ***"Design and Sizing of a Dual-Purpose Hybrid-Electric Ducted Fan Lift-Plus-Cruise Aircraft,"*** AIAA SCITECH 2022 Forum, January 3-7, 2022, San Diego, CA & online, AIAA-2022-1516
36. Chakraborty, I. and Mishra, A.A., ***"A Generalized Energy-Based Vehicle Sizing and Performance Analysis Methodology,"*** AIAA SCITECH 2021 Forum (virtual event), January 11-15 & 19-21, 2021, AIAA-2021-1721
37. Chakraborty, I., Mishra, A.A., Comer, A., and Leonard, C., ***"Total Energy Based Flight Control System Design for a Lift-Plus-Cruise Urban Air Mobility Concept,"*** AIAA SCITECH 2021 Forum (virtual event), January 11-15 & 19-21, 2021, AIAA-2021-1899
38. Chakraborty, I., Leonard, C., Comer, A., Mishra, A., and Dewey, J., ***"A Reconfigurable Flight Simulation Framework aimed at Novel Flight Vehicle Concepts,"*** AIAA AVIATION 2020 Forum (virtual event), June 15-19, 2020, AIAA-2020-3190
39. Comer, A., Swartz, S., and Chakraborty, I., ***"Data-Driven General Aviation Aircraft Performance Modeling and Safety Research,"*** AIAA AVIATION 2020 Forum (virtual event), June 15-19, 2020, AIAA-2020-3097
40. Bosarge, J., Watson, T., Chaplin, S., Heath, J., and Chakraborty, I., ***"A Simulation-Based Structural Loads Assessment Framework – Application to Symmetric Maneuvering Conditions,"*** AIAA AVIATION 2020 Forum (virtual event), June 15-19, 2020, AIAA-2020-3199

41. Chakraborty, I., Comer, A., and Dewey, J., ***"A Simulation-Based Aircraft-Centric Assessment of the Circular/Endless Runway Concept,"*** AIAA SCITECH 2020 Forum, Orlando, FL, January 6-10, 2020, AIAA-2020-1401
42. Chakraborty, I., Ahuja, V., and Hartfield, R., ***"Aero-Propulsive Analysis and Flight Simulation for Early Design of Advanced Air Vehicle Concepts,"*** Asia Pacific International Symposium on Aerospace Technology (APISAT), Gold Coast, Australia, Dec 4-6, 2019
43. Chakraborty, I., Ahuja, V., Comer, A., and Mulekar, O., ***"Development of a Modeling, Flight Simulation, and Control Analysis Capability for Novel Vehicle Configurations,"*** AIAA AVIATION 2019 Forum, Dallas, TX, June 17-21, 2019, AIAA-2019-3112
44. Chakraborty, I., Ahuja, V., and Hartfield, R.J., ***"Energy-Based Sizing and Mission Performance Analysis Approach for Novel Flight Vehicle Concepts,"*** AIAA AVIATION 2019 Forum, Dallas, TX, June 17-21, 2019, AIAA-2019-2801
45. Chakraborty, I., ***"Design Overview of the Hexa-Chakra Electric Vertical Takeoff and Landing Personal Air Vehicle,"*** AIAA Science and Technology Forum and Exposition (SCITECH) 2019, San Diego, CA, January 7-11, 2019, AIAA-2019-0554
46. Ahuja, V., Hartfield, R., Chakraborty, I., ***"Gust Response Analysis for Early Design of Advanced Air Vehicle Concepts,"*** Asia Pacific International Symposium on Aerospace Technology (APISAT), Gold Coast, Australia, Dec 4-6, 2019
47. Hartfield, R.J., Ahuja, V., and Chakraborty, I., ***"Aero-Propulsive Analysis for Contemporary Conceptual Design,"*** AIAA AVIATION 2019 Forum, Dallas, TX, June 17-21, 2019, AIAA-2019-3019
48. Xie, J., Briceno, S., Mavris, D.N., and Chakraborty, I., ***"Development of a Certification Module for Early Aircraft Design,"*** AIAA AVIATION 2019 Forum, Dallas, TX, June 17-21, 2019, AIAA-2019-3576
49. Cinar, G., Cai, Y., Chakraborty, I., and Mavris, D., ***"Sizing and Optimization of Novel General Aviation Vehicles and Propulsion System Architectures,"*** AIAA AVIATION 2018, Atlanta, GA, June 25-29, 2018, AIAA-2018-3974
50. Puranik, T., Harrison, E., Min, S., Chakraborty, I., and Mavris, D., ***"A Framework for General Aviation Aircraft Performance Model Calibration and Validation,"*** AIAA AVIATION 2018 Conference, Atlanta, GA, June 25-29, 2018, AIAA-2018-3191
51. Sarojini, D., Duca, R., Solano, H., Chakraborty, I., Briceno, S., and Mavris, D., ***"Framework to Assess Effects of Structural Flexibility on Dynamic Loads Developed in Maneuvering Aircraft,"*** AIAA AVIATION 2018 Conference, Atlanta, GA, June 25-29, 2018, AIAA-2018-4147
52. Bendarkar, M., Chakraborty, I., Garcia, E., Mavris, D., ***"Rapid Assessment of Power Requirements and Optimization of Thermal Ice Protection Systems,"*** AIAA AVIATION 2018 Conference, Atlanta, GA, June 25-29, 2018, AIAA-2018-4136
53. Cai, Y., Chakraborty, I., and Mavris, D., ***"Integrated Sizing and Performance Analysis for Novel Aircraft Concepts and Subsystems,"*** AIAA SCITECH Forum and Exposition 2018, Kissimmee, FL, January 8-12, 2018, AIAA-2018-1741
54. Shi, M., Chakraborty, I., Tai, J., and Mavris, D., ***"Integrated Gas Turbine and Environmental Control System Pack Sizing and Analysis,"*** AIAA SCITECH Forum and Exposition 2018, Kissimmee, FL, January 8-12, 2018, AIAA-2018-1748

55. Shi, M., Chakraborty, I., Cai, Y., Tai, J., and Mavris, D., ***"Mission-Level Study of Integrated Gas Turbine and Environmental Control System Architectures,"*** AIAA SCITECH Forum and Exposition 2018, Kissimmee, FL, Jan 8-12, 2018, AIAA-2018-1751
56. Duca, R., Sarojini, D., Chakraborty, I., Briceno, S., and Mavris, D., ***"Effects of Epistemic Uncertainty on Structural Loads During Dynamic Maneuvers,"*** AIAA SCITECH Forum and Exposition 2018, Kissimmee, FL, Jan 8-12, 2018, AIAA-2018-0767
57. Rajaram, D., Cai, Y., Puranik, T., Chakraborty, I., and Mavris, D.N., ***"Integrated Sizing and Multi-objective Optimization of Aircraft and Subsystem Architectures in Early Design,"*** AIAA AVIATION 2017 Forum, Denver, CO, June 5-9, 2017, AIAA-2017-3067
58. Goron, G., Duca, R., Sarojini, D., Shah, S., Chakraborty, I., Briceno, S., and Mavris, D.N***., "A Simulation-based Framework for Structural Loads Assessment during Dynamic Maneuvers,"*** AIAA AVIATION 2017 Conference, Denver, CO, June 5-9, 2017 (AIAA-2017-3767)
59. Cai, Y., Gao, Z., Chakraborty, I., Briceno, S., and Mavris, D.N., ***"Integrated Assessment of Active Flow Control Architectures for Commercial Aircraft,"*** AIAA SCITECH 2017 Conference, Grapevine TX, Jan 9-13, 2017, AIAA-2017-1627
60. Chakraborty, I. and Mavris, D.N., ***"Assessing Impact of Epistemic and Technological Uncertainty on Aircraft Subsystem Architectures,"*** AIAA Aviation 2016 Conference, Washington D.C., June 13-17, 2016, AIAA-2016-3145
61. Chakraborty, I. and Mavris, D.N., ***"Heuristic Definition, Evaluation, and Impact Decomposition of Aircraft Subsystem Architectures,"*** AIAA Aviation 2016 Conference, Washington D.C., June 13-17, 2016, AIAA-2016-3144
62. Chakraborty, I. and Mavris, D.N., ***"Integrated Assessment of Aircraft and Novel Subsystem Architectures in Early Design,"*** AIAA SciTech 2016 Conference, San Diego, CA, January 4-8, 2016, AIAA-2016-0215
63. Ozcan, M.F., Chakraborty, I., Tai, J.C., and Mavris, D.N., ***"Gas Turbine Transient Response to Subsystem Architecture Secondary Power Off-takes,"*** AIAA Propulsion and Energy 2016, Salt Lake City, UT, July 25-27, 2016, AIAA-2016-4639
64. Ozcan, M.F., Chakraborty, I., and Mavris, D.N., ***"Impact of Subsystem Secondary Power Requirements on Gas Turbine Sizing and Performance,"*** AIAA Aviation 2016 Conference, Washington D.C., June 13-17, 2016, AIAA-2016-3146
65. Hiller, B., Cai, Y., Karagoz, E., Wilhelms, C., Chakraborty, I., Briceno, S., Collins, K., and Mavris, D.N., ***"Framework for Assessing Impact of Active Flow Control Technologies for Commercial Aircraft,"*** AIAA Aviation 2016 Conference, Washington D.C., June 13-17, 2016, AIAA-2016-3283
66. Craisse, J., Kruger, S., Kim, Y.J., Chakraborty, I., Briceno, S.I., Li, Y., Garcia, E., and Mavris, D.N., ***"Creation of a Decision-Support Methodology for Selecting More-Electric Aircraft Subsystem Technologies,"*** 10th Annual IEEE International Systems Conference (IEEE SysCon 2016), Orlando, FL, 2016
67. Chakraborty, I., Ozcan, M.F., and Mavris, D.N., ***"Effect of Power Off-takes for Major Aircraft Subsystems on Aircraft Performance in More Electric Aircraft Architectures,"*** AIAA Aviation 2015 Conference, Dallas, TX, June 22-26, 2015, AIAA-2015-3287

68. Chakraborty, I., LeVine, M.J., Hassan, M., and Mavris, D.N., ***"Assessing Taxiing Trade Spaces from Aircraft, Airport, and Airline Perspectives,"*** AIAA Aviation 2015 Conference, Dallas, TX, June 22-26, 2015, AIAA-2015-2386

69. Chakraborty, I., Lozano, B.G., and Mavris, D.N., ***"Pilot-Friendliness Considerations for Personal Air Vehicle Flight Control Systems,"*** AIAA Aviation 2015 Conference, Dallas, TX, June 22-26, 2015, AIAA-2015-2852

70. Garmendia, D., Chakraborty, I., and Mavris, D. N., ***"Uncertainty Quantification for the Actuation Power Requirements of a Hybrid Wing Body Configuration with Electrically Actuated Flight Control Surfaces,"*** AIAA Science and Technology Forum and Exposition (SciTech) 2015, Kissimmee, FL, Jan 5-9, 2015, AIAA 2015-1683

71. Ingram, C., Dendinger, T., Inclan, E., Charront, Y., Handschuh, K., Chakraborty, I., Garcia, E., and Mavris, D.N., ***"Integrating Subsystem Sizing into the More Electric Aircraft Conceptual Design Phase,"*** AIAA Science and Technology Forum and Exposition (SciTech) 2015, Kissimmee, FL, Jan 5-9, 2015, AIAA 2015-1682

72. Chakraborty, I., Trawick, D., Mavris, D.N., Emeneth, M., and Schneegans, A., ***"A Requirements-driven Methodology for Integrating Subsystem Architecture Sizing and Analysis into the Conceptual Aircraft Design Phase,"*** AIAA Aviation 2014 Conference, Atlanta, GA, June 16-20, 2014, AIAA-2014-3012

73. Chakraborty, I., Lozano, B.G., Nam, T., and Mavris, D.N., ***"A Preliminary Study of High Lift System Design and Actuation for a Personal Air Vehicle Concept,"*** AIAA Aviation 2014 Conference, Atlanta, GA, June 16-20, 2014, AIAA-2014-2855

74. Chakraborty, I., Gross, J.R., Nam, T., Perullo, C., and Mavris, D.N., ***"Analysis of the Effect of Cruise Speed on Fuel Efficiency and Cost for a Truss-Braced Wing Concept,"*** AIAA Aviation 2014 Forum, Atlanta, GA, June 16-20, 2014, AIAA-2014-2424

75. Chakraborty, I., Mavris, D.N., Emeneth, M., and Schneegans, A., ***"A System and Mission Level Analysis of Electrically Actuated Flight Control Surfaces using Pacelab SysArc,"*** AIAA Science and Technology Forum and Exposition (SciTech) 2014, National Harbor, Maryland, Jan 13-17, 2014, AIAA-2014-0381

76. Garmendia, D., Chakraborty, I., Trawick, D., Mavris, D.N., ***"Assessment of Electrically Actuated Redundant Control Surface Layouts for a Hybrid Wing Body Concept,"*** AIAA Aviation 2014 Conference, Atlanta, GA, AIAA-2014-2428

77. Nam, T., Chakraborty, I., Gross, J.R., Mavris, D.N., Schetz, J.A., and Kapania, R.K., ***"Multidisciplinary Design Optimization of a Truss Braced Wing Concept,"*** AIAA Aviation 2014 Conference, Atlanta, GA, June 16-20, 2014, AIAA-2014-2423

78. Chakraborty, I., Jackson, D., Trawick, D., and Mavris, D.N., ***"Development of a Sizing and Analysis Tool for Electrohydrostatic and Electromechanical Actuators for the More Electric Aircraft,"*** AIAA Aviation 2013 Conference, Los Angeles, California, August 12-14, 2013, AIAA-2013-4282

79. Hegde, C., Chakraborty, I., Trawick, D., Choi, H., Mendez-Ramos, E., and Mavris, D.N., ***"A Surrogate Model Based Constrained Optimization Architecture for the Optimal Design of Electrohydrostatic Actuators for Aircraft Flight Control Surfaces,"*** 51st AIAA Aerospace Sciences Meeting Including The New Horizons Forum and Aerospace Exposition, Grapevine, TX, January 7-10, 2013, AIAA-2013-0470

80. Chakraborty, I., Trawick, D., Jackson, D., and Mavris, D.N., ***"Electric Control Surface Actuator Design Optimization and Allocation for the More Electric Aircraft,"*** AIAA Aviation 2013 Conference, Los Angeles, California, August 12-14, 2013, AIAA-2013-4283
81. Chakraborty, I., Trawick, D., Hegde, C., Choi, H., Mendez-Ramos, E., Mavris, D.N., ***"Development of a Modeling and Simulation Environment for Real-time Performance Analysis of Electric Actuators for Maneuvering Flight,"*** 51st AIAA Aerospace Sciences Meeting, Grapevine, TX, January 7-10, 2013, AIAA-2013-0471
82. Chakraborty, I., Tsiotras, P., Sanz Diaz, R., ***"Time-Optimal Vehicle Posture Control to Mitigate Unavoidable Collisions Using Conventional Control Inputs,"*** 2013 American Controls Conference, June 17-19, 2013, Washington D.C., pp. 2165-2170
83. Chakraborty, I., Tsiotras, P., Lu, J., ***"Vehicle Posture Control through Aggressive Maneuvering for Mitigation of T-bone Collisions,"*** 50th IEEE Conference on Decision and Control and European Control Conference (CDC-ECC), December 12-15, 2011, Orlando, FL, CDC.2011.6161241, pp. 3264-3269

**Invited talks / presentations:**

1. Chakraborty, I., ***"Piloted Simulation Based Assessment of Simplified Vehicle Operations for Urban Air Mobility,"*** NASA Engineering and Safety Seminar Webcast series, Mar 8, 2023, https://nescacademy.nasa.gov/video/37eeafc6afd3445999da2d28a32aa73d1d
2. Chakraborty, I., ***"Total Energy Based Flight Control System Architecture for a Lift-Plus-Cruise Urban Air Mobility Aircraft,"*** NASA Engineering and Safety Seminar Webcast series, Mar 1, 2023, https://nescacademy.nasa.gov/video/45c39472219f484a95330348c6721dea1d
3. Chakraborty, I., ***"Sizing and Optimization of a Lift-Plus-Cruise Urban Air Mobility Concept with Electrified Propulsion,"*** NASA Engineering and Safety Seminar Webcast series, Feb 22, 2023, https://nescacademy.nasa.gov/video/ceebcb939e8b474396233d7655b2e54e1d
4. Chakraborty, I., ***"A Research and Development Pipeline for Novel Aircraft and Propulsion Architectures,"*** Department of Aerospace and Ocean Engineering, Virginia Tech, Jan 31, 2023
5. Chakraborty, I., ***"Active Flow Control Architectures for Commercial Aircraft High-Lift Devices,"*** Boeing Education Network (BEN), Ed Wells Partnership, Seattle, WA, August 24, 2017
6. Chakraborty, I., ***"Design Space Exploration and Uncertainty Analysis for Novel Aircraft System Architectures in Early Design,"*** IQPC Conference on More Electric Aircraft – USA, Seattle, WA, August 22-24, 2017
7. Chakraborty, I., ***"Facilitating an Integrated Assessment of the Design Space for Novel Aircraft Systems Architectures,"*** IQPC Conference on More Electric Aircraft - USA, Seattle, WA, August 29-30, 2016
8. Chakraborty, I., ***"Capturing the Impacts of Electric Subsystem Architectures in Early Aircraft Design,"*** Boeing Education Network (BEN), Ed Wells Partnership, Webcast # GEBEN1465, Seattle, WA, July 28, 2016
9. Chakraborty, I. and Emeneth, M., ***"A Systems and Mission Level Analysis of Electric Actuation for Flight Control Surfaces,"*** PACEDays 2013 Conference and User Group Meeting, Berlin, Germany, Nov 18-19, 2013

## ADVISING

**Post-doctoral scholars**

| | | |
|---|---|---|
| Salahudden | | Feb 2022 – Nov 2022 |

**Graduate students**

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|---|---|---|
| Anthony Comer | (MS/PhD) | graduated Dec, 2024 |
| Aashutosh Aman Mishra | (MS/PhD) | 2025 (expected) |
| Rajan Bhandari | (MS/PhD) | 2027 (expected) |
| Bikash Kunwar | (MS/PhD) | 2028 (expected) |
| Stefanus Harris Putra | (MS/PhD) | 2027 (expected) |
| Cole McCormick | (MS/PhD) | 2029 (expected) |
| Benjamin Davis | (MS) | 2025 (expected) |
| Madison Harper | (MS) | 2026 (expected) |
| Nogib Anwar Zafi | (MS) | (May 2022 – Dec 2023) |