ANOOP J. KIRAN

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EDUCATION

Brown University, Providence, RI Sept 2022 - Present
Ph.D. in Engineering; Concentration: Fluids & Thermal Sciences, Minor area: Computer Science (Robotics)
National Science Foundation Graduate Research Fellow

University at Buffalo, The State University of New York, NY May 2022
Bachelor of Science in Aerospace Engineering *Summa cum laude*; *GPA: 4.0/4.0*
Barry Goldwater Scholar, U.S. Congress & DoD National Defense Education Programs
Ronald McNair Scholar, U.S. Department of Education

ACHIEVEMENTS

(*indicates achievements at the national level, § at the state level, and † at the university level)

AIAA Student Paper Competition: Best Paper Runner-up - Graduate category*, *AIAA Region-I Conference*	Apr 2023
20 Twenties Award - Class of 2022*, *AIAA & Aviation Week Network*	Nov 2022
Brown University Graduate Fellowship†, *Graduate School, Brown University*	Aug 2022
Dean's Undergraduate Achievement Award†, *Univ. at Buffalo School of Engineering & Applied Sciences*	May 2022
Lester Gerhardt Experiential Learning Award†, *Univ. at Buffalo School of Engineering & Applied Sciences*	May 2022
National Science Foundation (NSF) Graduate Research Fellowship*	Apr 2022
State University of New York (SUNY) Chancellor's Award for Student Excellence§	Mar 2022
J. Scott Fleming Merit Award†, *University at Buffalo Alumni Association*	Mar 2022
NASA Space Grant Fellowship* - Advisor: Dr. John Crassidis, *University at Buffalo*	Feb 2022
AIAA YPSE Mid-Atlantic Section Conference: Top Research presentation - Undergraduate category*	Feb 2022
DoD Science, Mathematics, and Research for Transformation (SMART) Scholarship*	Feb 2022
AIAA Undergraduate Conference Award* - *AIAA Guidance, Navigation & Control Technical Committee*	Nov 2021
Undergraduate Researcher Award†, *Univ. at Buffalo Mechanical and Aerospace Engineering*	Apr 2021
Barry M. Goldwater Scholarship*, *U.S. Congress & DoD National Defense Education Programs*	Mar 2021
Zed Factor Fellowship Finalist*	Feb 2021
2020 Leaders in Excellence†, *University at Buffalo School of Engineering and Applied Sciences*	Nov 2020
Yong H. Lee Scholarship†, *University at Buffalo Mechanical and Aerospace Engineering*	Nov 2020
Walmart Foundation Full-tuition Scholarship*, *Sam Walton & Walmart Foundation*	Aug 2020
Margaret and Glenn Tome Scholarship†, *Community Foundation for Greater Buffalo*	July 2020
SWE Collegiate Research Competition Undergraduate Finalist†	Dec 2019
Gustav and Grete Zimmer Research Scholarship†, *Univ. at Buffalo Mechanical and Aerospace Engineering*	Nov 2019
International Scholar Laureate, Engineering and Technology Delegate* - *Phi Theta Kappa*	Jan 2019
NY Scholarship for Academic Excellence§, *NYS Higher Education Services Corp.*	Aug 2018
STEM Incentive Program Award§, *NYS Higher Education Services Corp.*	Aug 2018
President's Education Award*, *U.S. Department of Education*	June 2018
Certificate of Merit for Academic Achievement and Community Involvement§, *NY State Assembly*	May 2018

ENGINEERING EXPERIENCE

***Graduate Research Assistant,* Brown University School of Engineering, RI** Sept 2022 – Present
Breuer lab & Automatic Coordination of Teams (ACT) lab: Advised by Dr. Kenny Breuer, and Dr. Nora Ayanian
Project**:** Downwash induced flow physics and autonomy of quadrotors for close proximity flight

***Perception and Machine Learning Intern,* Draper, MA** May 2023 - Aug 2023
Strategic Systems Engineering & Weapon Concepts Architecture (GAB1) group - Graduate Student Internship

- Implemented detection intelligence and machine vision for miniature target recognition for low SWaP (size, weight and power) deployment on autonomous systems
- Trained convolutional neural networks using TensorFlow for autonomous detection and sorting of various classes of interest to the stakeholders
- Developed Python scripts to tune hyperparameters for optimal training outcomes as part of Machine Learning

***Spacecraft Mechanical Engineering Intern,* NASA Jet Propulsion Laboratory (JPL), CA** June 2022 - Aug 2022
Mechanical Structures & Articulation (352C) group - Graduate Student Internship

- Performed comprehensive bolted joint structural analyses for the 2028 Mars Sample Retriever Lander (SRL) test fixture
- Led mesh convergence study for improvements to novel spacecraft deployable cup-cone separation interfaces
- Orchestrated flight system Assembly, Test, and Launch Operations (ATLO) for the Europa Clipper mission
- Prepared technical documentation for assembly and integration of flight hardware and ground support equipments

***Structures Technology Engineering Intern,* The Boeing Company, WA** May 2021 - Aug 2021
Advanced Structural Analysis group, Boeing Research and Technology (BR&T)

- Partnered with lead engineering liaisons to improve stress analysis on projectile impacting fuselage for Boeing 767 models, resulting in successful task completion at half the proposed timeline
- Programmed Python scripts to facilitate to automate processing and conjoint analyses in Abaqus CAE software
- Led the preliminary RxWing sealant peel-off predictive model study with design engineers & material scientists
- Performed FEA evaluations on the B747-8 tail cone nozzle components for various pressure and forming conditions
- Utilized non-linear, transient, dynamic analysis tool - LS-DYNA to enforce safety on airplane modeling

Undergraduate Research Assistant Nov 2020 - June 2022
University at Buffalo Dynamics & Robotics in Flow and Teams (DRiFT) lab
Project: Numerical study of unsteady aerodynamics for transverse gust encounter, advised by Dr. Francis Lagor

- Developed, meshed, and post processed Computational Fluid Dynamics (CFD) models for convergent solutions on flow physics of aerial vehicles
- Performed literature review & facilitate discussions with Univ. of Maryland to validate experimental tow tank results
- Collaborated with graduate students to model different gust profiles for aerodynamic flow-field analysis
- Presented project updates at weekly meetings with Principal Investigator (PI) and lab members

***Project Instrumentation Scientist,* NASA L'SPACE Mission Concept Academy** Aug 2020 - Dec 2020
Project: Lucy Student Pipeline Accelerator & Competency Enabler (L'SPACE) - Lander for Saturn's moon, Enceladus

- Designed validation plan and mechanical verification system for each science instrument in payload
- Developed Failure Mode & Effect analysis to determine possible failures for design and product processes
- Directed and delegated team roles and tasks to subsystems and team members to ensure deadlines are met
- Created efficient manufacturing processes including estimation time, resources/labor needs, and outsourcing
- Spearheaded customized sampling and data acquisition mechanisms considering distribution, task duration, critical paths, and craft mission schedule for the mission

***Mechanical Engineering Intern,* GKN Aerospace, TX** May 2020 - Aug 2020

- Analyzed cost reduction on Trent XWB & JAS39 Gripen engine components and deduced reasonable estimates on different aspects of product lifecycle performance
- Contributed to productivity comparisons for turbomachinery analysis on the Boeing 777X-GE9X engine
- Performed trajectory planning using MATLAB to simulate the lander mechanism for varying flying conditions

Undergraduate Research Assistant – Guidance, Navigation & Control (GN&C) & Structures Nov 2018 - July 2020
University at Buffalo Nanosatellite Research Laboratory (UBNL)
Project: 3U Satellite funded by UNP (University Nanosatellite program) to measure the orbital radio frequency noise environment across commonly used nanosatellite frequency bands, advised by Dr. John Crassidis

- Performed GN&C for models, scripting algorithms on attitude estimation, orbital dynamics, and sensor calibrations
- Designed, assembled, and updated the CAD model of satellite – LinkSat funded by the AFRL and NASA
- Conducted steady-state and transient FEA using ANSYS for components in operating temperature range throughout orbit
- Presented progress at weekly meetings and communicated with other system leads for satellite revisions
- Scripted formal control interface documents, mass budget, BOM, design documents and drawings

Undergraduate Research Assistant Oct 2018 - Sept 2020
University at Buffalo Intelligent Dynamic Energy and Sensing Systems (IDEAS) lab
NSF research project in collaboration with Texas A and M University, advised by Dr. Amin Karami
Project: Flow control and separation delay in morphing wing aircraft using traveling wave actuation

- Developed wind tunnel models and processed data in low-speed setup at the University at Buffalo

- Collaborated cross-functionally with design, development, and test groups to validate the R&D approach
- Presented research work at 3 national conferences and documented technical reports
- Employed aerodynamic analysis tools to optimize traveling wave surface morphing, increasing lift by 4.7% and decreasing drag by 9.2%

LEADERSHIP EXPERIENCE

***Technical Operations Co-lead,* NASA Micro-G NExT Student Design Challenge** Aug 2019 - July 2020
Project: **NASA-2020 Revolutionary Aerospace Systems Concepts – Academic Linkage (RASC-AL) competition (Top 4 universities at national level [Phase-2])**
Micro-gravity Neutral Buoyancy (NBL) Experiment Design Team (Micro-G NExT)

- Proposed a solution to the SAVER challenge, which required a fully autonomous UAV capable of assisting astronauts in distress within a maritime environment
- Piloted the integration of Pi (portable lightweight) camera with TensorFlow software to perform astronaut determination
- Devised feedback control mechanism between software and motor control, changing course for optimal location estimation
- Documented procedures, suggesting improvements to existing design based on structural constraints and testing done at the Neutral Buoyancy Laboratory, NASA Johnson Space Center

***Director of Public Relations,* UB Pilots Association** Apr 2019 - Sept 2020

- Leveraged existing media relationships and cultivate new contacts within business and industry media
- Proven track record designing and executing successful public relations campaigns at both local and university level
- Directed social media team to engage audiences across traditional and new media

***Project Associate,* State University of New York Engineering Science Intramural** Dec 2018 - Mar 2019
Project: **Unmanned Aerial Vehicles Drone Competition at MCC**

- Directed a team of 5 students to design, build and pilot a mini-UAV by meeting all constraints of the test including cost, dimension, and part constraints
- Formulated the project to devise design evolution, electrical, mechanical & software analysis, and selected components to reach required lift and payload
- Presented proposal and research objective to the Engineering Dean's Advisory Council and stakeholders

TEACHING EXPERIENCE

***Academic Tutor,* University at Buffalo Tutoring and Academic Support Services, Buffalo, NY** Jan 2022 – June 2022
Algebra 1 & 2, Trigonometry, Pre-Calculus, Calculus, Physics - Newtonian, Physics - Electricity and Magnetism

- Facilitated problem-solving and critical thinking approach towards challenging coursework topics
- Assisted students with homework, projects, quizzes, test preparation, and other academic tasks
- Attended tutor training sessions to implement proven study skills among students
- Developed student centered test-taking strategies, resulting in significant improvement in student performance for quizzes and exams

***Engineering Teaching Assistant,* University at Buffalo School of Engineering** Jan 2021 – Dec 2021
Engineering Dynamics (Spring 2021) & Dynamic Systems (Fall 2021)

- Graded testing materials for 200+ students and developed comprehensive solutions to questions
- Reviewed lessons and lectures with students on a one-on-one basis and in small groups
- Assisting students with special learning requirements, including disabilities or English as a second language students
- Effectively communicated teachers and parents regarding student's performance

***Math & Physics Tutor,* Rockland Community College, Suffern, NY** Jan 2018 – July 2018
Geometry, Algebra 1 & 2, Trigonometry, Pre-Calculus, Physics - Newtonian, Physics - Electricity and Magnetism

- Providing private instruction to individual and small groups of students to improve academic performance, occupational skills, and as preparation for tests
- Providing feedback to students using positive reinforcement techniques to encourage, motivate, or build confidence in students
- Developing activities and problem sets to work with students and increased interest in higher learning
- Fostering meaningful relationships among students through teamwork community service projects

TECHNICAL SKILLS

Drafting: Siemens NX, SolidWorks, Autodesk - Fusion 360 & Inventor, Creo, PowerPoint Engineering
Machine Shop: Mill, Lathe, Drill Press, Bandsaw
Computer Programs: MagicDraw, LS-DYNA, ANSYS, MATLAB, Python, COMSOL, LabVIEW, LaTeX, MS Office Suite
Quality Engineering: Six Sigma: Green Belt

CONFERENCE PUBLICATIONS

Conceptual Analysis for a Technology Demonstration Mission of the Ion Beam Shepherd. CEAS (Council of European Aerospace Societies) Space Journal, *Springer Vienna*; 2022 July 29. DOI: 10.1007/s12567-022-00464-x

Small Satellites Potential for Greenhouse gas and CO_2 Monitoring. 72nd International Astronautical Congress (IAC): 2021 October 25-29; Dubai, UAE. iafastro.directory/iac/paper/id/66585/summary

CONFERENCE PRESENTATIONS

Anoop Kiran, Xianzhang Xu and Francis Lagor, Ph.D. *Computational Fluid Dynamics (CFD) study of aircraft wing in gust encounter*. Poster presentation at: 2021 Naval Academy Science and Engineering Conference (NASEC); 2021 November 7; Annapolis, MD.

Anoop Kiran, Xianzhang Xu and Francis Lagor, Ph.D. *Numerical simulation of unsteady aerodynamics for a transverse gust encounter*. Oral presentation at: 2021 Goldwater Symposium; 2021 August 7; Virtual.

Anoop Kiran and Aaron Estes, Ph.D. *Infrared position sensing for an adaptive treadmill*. Association for Equality and Excellence in Education Conference (AEEE); 2021 August 3; Virtual.

Anoop Kiran and John Crassidis, Ph.D. *Extended Kalman Filter & Fourth order Runge-Kutta (RK-4) method implementation of noise filtration for orbital simulation*. Oral presentation at: 2021 NewSpace Chicago Student Space Congress; 2021 April 29-30; Virtual.

Anoop Kiran and John Crassidis, Ph.D. *Orbital Simulation using an Extended Kalman Filter and Fourth Order Runge-Kutta method*. Oral presentation at: 2020 UCLA Virtual National McNair Conference; 2020 July 29-31; Virtual.

Anoop Kiran, Anthony Olivett and Amin Karami, Ph.D. *Design and Fabrication of morphing wing aircraft*. Oral session presented at: 2020 SUNY Undergraduate Research Conference (SURC); 2020 April 4; Syracuse, NY. *
**abstract accepted on March 6, 2020, conference canceled due to COVID-19.*

Anoop Kiran, Anthony Olivett and Amin Karami, Ph.D. *Flow control and separation delay in morphing wing aircraft using traveling wave actuation*. Lightning talk - Oral Presentation and onsite Technical Poster presented at: 2020 Society of Women Engineers (SWE) Collegiate Research Competition; 2020 March 27-28; Buffalo, NY.

Anoop Kiran, Anthony Olivett and Amin Karami, Ph.D. *Flow control and separation delay in morphing wing aircraft using traveling wave actuation*. Poster session presented at: 2019 FIU McNair Research Conference; 2019 October 17-19; Miami, FL.

Anoop Kiran and Aaron Estes, Ph.D. *Infrared position sensing for an adaptive treadmill*. Poster & Oral presentation at: 25th Annual University at Buffalo Undergraduate Research Conference; 2019 July 18-20; Niagara Falls, NY.

SERVICE

Technical Student Researcher, National Security Innovation Network (NSIN) Mar 2022 – July 2022

- Algorithm development and big data toolbox research to improve existing defense readiness capabilities at the US Army Research Laboratory (ARL)
- Interfaced with Google and Human Research and Engineering directorate to implement SQL database management

Student Ambassador, University at Buffalo School of Engineering and Applied Science (SEAS) June 2021 – Aug 2022

- Represented the department for open house, prospective student info sessions, and annual engineering events
- Exemplified leadership and enthusiasm, encouraging lifelong involvement with the School of Engineering

Student Mentor, Buffalo-area Engineering Awareness for Minorities (BEAM**)** May 2018 – Mar 2022

- Collaborated with 3 executive-level instructors to organize interactive sessions for high school students
- Formulated multiple learning styles collaborating with industry to engage students in activities and lab sessions

Volunteer Income Tax Preparer, Internal Revenue Service (IRS) Mar 2018 – Mar 2022

- Offered free tax filing help to Buffalo natives who generally make $54,000 or less, persons with disabilities and limited English-speaking taxpayers who need assistance in preparing their annual tax returns
- Collaborated with tax aide associates to understand the grassroots of the process of filing taxes accepted by the IRS

PROFESSIONAL MEMBERSHIPS AND ACTIVITIES

Graduate School Diversity Advisory Board, Brown University Apr 2022 - Present
University at Buffalo Office of Fellowships and Scholarships – Mentor & Student Panel Speaker Oct 2022 – Mar 2023
University at Buffalo Engineering Alumni Association - Awards Committee Oct 2022 - Present
American Institute of Aeronautics and Astronautics (AIAA) Aug 2018 - Present
School of Engineering & Applied Sciences (SEAS) ambassador, University at Buffalo June 2021 - May 2022
Future Alumni Leadership Council (FALC) - University at Buffalo Oct 2020 - May 2022
Tau Beta Pi National Engineering Honor Society May 2020 - May 2022

REFERENCES (available upon request):

Dr. Francine Battaglia: Chair, Mechanical and Aerospace Engineering, University at Buffalo
Dr. John Crassidis: Professor, Mechanical and Aerospace Engineering, University at Buffalo
Dr. Bradley Darrall: Assistant Professor of Teaching, Mechanical and Aerospace Engineering, University at Buffalo
Dr. Francis Lagor: Assistant Professor, Mechanical and Aerospace Engineering, University at Buffalo
Dr. Kemper Lewis: Dean, School of Engineering & Applied Sciences, University at Buffalo