Zeyad M. Manaa

Academic Belt Road, King Fahd University for Petroleum and Minerals, Dhahran, 31261, Saudi Arabia
(+966) 566-707-476, LinkedIn, GitHub, Scholar
https://zmanaa.github.io/

He learned to win without feeling like a god and to lose without feeling like trash.

Education

Eindhoven University of Technology *Starting May, 2025; Eindhoven, NL*
PhD. in Mechanical Engineering, Dynamics and Control Group

King Fahd University for Petroleum & Minerals (KFUPM) *2022 – 2024; Dhahran, SA*
M.Sc. in Aerospace Engineering[1]
Thesis[2]:"Data-driven Approaches for Modeling an Control in Flight Dynamics Applications – On Linear and Nonlinear Methods"

University of Science and Technology at Zewail City (UST-ZC) *2017 - 2022; Giza, EG*
B.S. in Aerospace Engineering
Thesis: "Development of the software package for the attitude determination and control algorithm of a cube satellite"

Interests

Data-driven modeling and control of dynamical systems and system identification – Nonlinear and optimal control theory for flight dynamics – Event-triggered control – Secure control

Refereed publications

Journal Papers

[1] Novel Airfoil for Improved Supersonic Performance with Convex Optimization Approach
Zeyad M. Manaa, Naef A. A. Qassem
The International Journal of Numerical Methods for Heat and Fluid Flow, 2024

Conference Proceedings

[2] Data-driven Discovery of The Quadrotor Equations of Motion Via Sparse Identification of Nonlinear Dynamics
Zeyad M. Manaa, Mohamed R. Elbalshy, Ayman M. Abdallah
AIAA SCITECH 2024 Forum, AIAA (p. 1308)

[3] Koopman-LQR Controller for Quadrotor UAVs from Data
Zeyad M. Manaa, Ayman M. Abdallah, Mohamed A. Abido, Syed S. A. Ali
IEEE SM 2024

[4] Optimum Configuration for Hovering N-Quadrotors Carrying a Slung Payload
Mohssen M., Pansy Elkhodary, Meral Badr, Mohammed Sayegh, **Zeyad M. Manaa**, Ayman M. Abdallah
AIAA SCITECH 2025 Forum

[5] Design and Analysis of the Effect of Trimmable Vertical Stabilizers for Enhanced Aircraft Maneuverability and Directional Stability
Shaik Zaidaan, Najwa Z. B. Taufik, Eman Mahmoud, **Zeyad M. Manaa**, Ayman M. Abdallah, Ghulam Abro, Mohd Taib
IEEE Conference on Systems, Process, and Control (ICSPC) 2024

Preprints

[6] SINDy-CBF: Data-Driven Identification and Safe Control of Planar Quadrotor
Mohamed R. Elbalshy, **Zeyad M. Manaa**, Ayman M. Abdallah, Md Ismail
ICCAD, 20255 Accepted.

[7] Koopman-Based Event-Triggered Control from Data
Zeyad M. Manaa, Ayman M. Abdallah, Mohamed Ismail, Sami El-Ferik
Submitted to journal.

[1] Recieved the Outstanding Graduate Student Award for introducing a new research direction for the Aerospace Engineering Department and the Interdisc. Res. Ctr. for Aviation & Space Expl.

[2] This work is conducted with the Interdisc. Res. Ctr. for Aviation Space Expl. under research grant INAE 2401. For outcomes see e.g., [2, 3, 6].

[8] Evaluation of Deep Learning-based Quadrotor UAV Detection and Tracking Methods
Mohssen E. Elshaar*, **Zeyad M. Manaa***, Mohammed R. Elbalshy*, Abdul Jabbar Siddiqui, abd Ayman M. Abdallah
Submitted to journal

Patents

[9] Efficient Airfoil for Improved Supersonic Performance for Fighters
Naef A. A. Qassem, **Zeyad M. Manaa**
Patent ID. 550544US. Status: filed

Research experience

Interdiscip. Res. Cent. for Aviation & Space Explor. *Jan 2025 – May 2025; Dhahran, SA*
Research Assistant
- Developing algorithms for antil-drone systems using GNC inspired swarm methods.

KFUPM, Space and Aviation Electronics Lab *Jan 2023 – Dec 2023; Dhahran, SA*
Research Assistant
- Researching Koopman operator to globally linearize nonlinear dynamics
- Developing data-driven event-triggered control frameworks

NUST, Aerial Robotics Lab *Jun 2022 – Aug 2022; Islamabad, Pak.*
Research Intern
- Developed an autonomous control system for a quadrotor UAV using Tello and COEX Clover devices with ROS

Egyptian Space Agency, ADCS Lab *Aug 2021 – Jul 2022; Cairo, EG*
Research Intern
- Conducted the bachelor's thesis research under co-supervision of the Egyptian Space Agency and University of Science and Technology at Zewail City on spacecraft attitude determination and control subsystem
- Developed the software of the attitude determination and control algorithm of a cube satellite which decreased the detumbling time of the cube satellite
- Studied and implemented the space environment as a means of Earth's Magnetic Field (IGRF Model), Earth's gravitational field (using Spherical Harmonics) as well as modeling the space disturbances

Internships

EgyptAir Maintenance and Engineering *Jun. 2022 – Aug. 2022; Cairo, Egypt*
Maintenance Engineering Intern [hands-off]

Cairo University *Aug. 2021 – Jul. 2022; Cairo, Egypt*
Undergraduate Visiting Student – Space Systems Technology Laboratory

Teaching

Courses Taught

[1] **AE 426**; Fall 2023: Introduction to Flight Mechanics (Undergraduate Course)

[2] **AE 315**; Fall 2023: Systems and Control (Undergraduate Lab); overall evaluation: **9.56**/10.0

Teaching Assistantships

[3] **AE 540**; Spring 2024, Spring 2025: Flight Dynamics and Control I (Graduate Course)

Teaching-related Activities

[4] **AE 350 – CIE 350**; Summer 2023: Monitored undergraduate students' cooperative work in Aerospace Engineering and Control & Instrumentation Engineering Departments

[5] **AE 399 – CIE 399**; Summer 2023: Oversaw undergraduate students' summer internships workflow in Aerospace Engineering and Control & Instrumentation Engineering Departments

Talks

Koopman Meets LQR for Quadcopters using Data *Sep. 2024; Ontario, Canada*
Host: IEEE @ OntarioTech.

Data-driven Modeling and Control in Aerospace Applications *Mar. 2024; Dhahran, KSA*
Host: KIKX @ KFUPM. (Approximately 50 attendees).

Data-driven Discovery of Quadrotors Equations of Motion Via SINDy *Jan. 2024; FL, USA*
Host: AIAA

On POD and DMD for aerodynamics application *May 2023; Dhahran, KSA*
Host: Aerospace Department, KFUPM.

Convex optimization for thin airfoil design using linear flow theory *Mar. 2023; Dhahran, KSA*
Host: Aerospace Department, KFUPM.

Awards

Outstanding Graduate Student Award *Interdisc. Res. Ctr. for Aviation & Space Expl., 2025*
Mohammad Al-Aqeel Grant for Graduate Students *KFUPM, 2023*
Graduate Intl. Research Assistance Scholarship *KFUPM, 2023*
Research Intern Scholarship for Intl. Students *NUST, 2022*
Future Work is Digital Scholarship *Ministry of Comm. and Info. Tech., 2022*
Smart City Hackathon: 1st Place Award in global finals *DAN & Global Project Partners, 2019*
Undergraduate Fellowship *UST-ZC, 2017*

Skills

Programming: Python (*Advanced*), MATLAB (*Advanced*), C++ (*Intermediate*), Julia (*Basic*)
Hardware: Quanser 3DOF hover system, CUAV autopilots, Raspberry Pi, Pixhawk
Frameworks: Pytorch, OpenCV, Sci-Kit, cvx/cvxpy, ArduPilot (Multi-copter), ROS
Other skills: GIT, SolidWorks, ANSYS, Mathematica, bash-scripting, LaTeX
Languages: Arabic (Native), English (C1, IELTS: 7 [*test date: Dec, 2021*])

Services

Reviewer:
Conferences: IEEE SMILE 2024, IEEE eSmarTA, 2024 - 2025, AIAA SCITECH, 2024 – 2025
Journals: European Journal of Control, 2025.

Leadership experience

Media Committee Head, Euroavia Zewail City Egypt, 2020
Managed a team of 10 people for the Euroavia Egypt student branch
Media Committee Head, Zewail City Science Festival Egypt, 2019
Managed a team of 15 people for the Zewail City Science Festival mega event