

# Mostafa Lotfy

+1(857) 390-4997 | [mostafamlotfy12@gmail.com](mailto:mostafamlotfy12@gmail.com) | [github.com/mostafa12d](https://github.com/mostafa12d) | [mostafalotfy.com](https://mostafalotfy.com) | [linkedin.com/in/mostafamlotfy/](https://linkedin.com/in/mostafamlotfy/)

## EDUCATION

|                                                                                                                                           |                                     |
|-------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| <b>Northeastern University</b><br><i>Master of Science in Robotics; Electrical &amp; Computer Engineering Concentration; GPA: 3.8/4.0</i> | Sep 2024 – Aug 2026<br>Boston, MA   |
| <b>The American University in Cairo</b><br><i>Bachelor of Science in Computer Engineering; Minor in Mathematics; GPA: 3.72/4.0</i>        | Sep 2019 – Jun 2024<br>Cairo, Egypt |
| <b>Study Abroad: University of Edinburgh, Scotland, UK</b>                                                                                | Sep 2022 – Dec 2022                 |

## EXPERIENCE

|                                                                                                                                  |                                  |
|----------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| <b>Teaching Assistant, Robotics Sensing &amp; Navigation (EECE 5554)</b><br><i>Northeastern University, Prof. Hanumant Singh</i> | Sep 2026 – Present<br>Boston, MA |
|----------------------------------------------------------------------------------------------------------------------------------|----------------------------------|

- Taught GPS/RTK, IMU characterization and dead reckoning, camera calibration, LiDAR, and SLAM labs in ROS2/Python

|                                                                                                   |                                  |
|---------------------------------------------------------------------------------------------------|----------------------------------|
| <b>Graduate Research Assistant</b><br><i>Northeastern University, Prof. Seth Hutchinson's Lab</i> | May 2026 – Present<br>Boston, MA |
|---------------------------------------------------------------------------------------------------|----------------------------------|

- Designed an online estimator for unknown articulated objects, pairing a physics-grounded recurrent basis with an exact Kalman filter that infers mechanics from proprioception; cut 0.5 s prediction error 650–3300× on unseen objects.
- Trained end-to-end through a differentiable Kalman filter on randomized MuJoCo objects; recovered held-out mass to a median 7% and friction to 1–3% of ground truth without ever training on true parameters.
- Built the closed loop on a 7-DOF KUKA iiwa (screw-axis estimation, impedance control, evidence-driven probing); a 0.3 s tug identifies object mass mid-task without slowing it.

|                                                                                                   |                                   |
|---------------------------------------------------------------------------------------------------|-----------------------------------|
| <b>Perception &amp; Control Researcher</b><br><i>Northeastern University, Silicon Synapse Lab</i> | Nov 2024 – May 2026<br>Boston, MA |
|---------------------------------------------------------------------------------------------------|-----------------------------------|

- Extended closed-loop hover of a bio-inspired flapping robot from ~3s to ~90s and cut position error ~50% by fusing ORB-SLAM3 pose with IMU through a custom C++ EKF into a real-time PID loop
- Derived the EKF's reduced-order model of elastic coupling and deformation between mechanically linked bodies; cut sensor latency ~62% via multithreaded, hardware-synchronized IMU–camera drivers
- Replaced hardware test cycles with simulation-in-the-loop validation by building a MuJoCo model of the robot's compliant elements, elastic coupling, and aerodynamics

|                                                     |                                      |
|-----------------------------------------------------|--------------------------------------|
| <b>Applied Scientist</b><br><i>Know Center GmbH</i> | Jun 2024 – Dec 2024<br>Graz, Austria |
|-----------------------------------------------------|--------------------------------------|

- Built a Dockerized cloud communication framework for heterogeneous robot platforms (quadruped, drone, humanoid), achieving ~30ms teleoperation latency and real-time multi-camera video streaming
- Programmed a VR teleoperation system mapping head orientation to pan-tilt camera control on a quadruped robot, cutting task completion time by ~31% and wall contacts by ~54% over joystick camera control (within-subject study, N=17)

|                                             |                                     |
|---------------------------------------------|-------------------------------------|
| <b>R&amp;D Intern</b><br><i>Siemens EDA</i> | Sep 2023 – May 2024<br>Cairo, Egypt |
|---------------------------------------------|-------------------------------------|

- Developed an SDK in C++/Python to automate communication layer generation for digital twin platforms, reducing integration time by ~40% and enabling deployment of 5+ robotics scenarios without manual reconfiguration
- Assembled and programmed a PX4-based drone with a high-fidelity AirSim/Unreal Engine digital twin, achieving <35ms bidirectional latency and >90% communication uptime across 30+ hardware-in-the-loop flight validation tests

## PUBLICATIONS

- **M. Lotfy**, R. Laha, S. Hutchinson, "Do Your Best, Estimate The Rest: Online Mechanics Identification for Adaptive Articulated-Object Manipulation" (*In preparation, RA-L*)
- **M. Lotfy**, B. Gupta, T. Liu, A. Salagame, M. Ramezani, A. Ramezani, "A Coupled-Body EKF for Visual Inertial State Estimation Enabling Closed-Loop Control of Morphing Wing Aerial Robots." (*Submitted, RA-L*)
- A. Zaman, **M. Lotfy**, N. ElSayed, O. Prentner, M. Ellethy, M. Mahmoudi, E. Veas, "Effects of Locomotion and Viewpoint Control on Immersive Robot Telepresence for Navigation and Inspection." (*Submitted, TVCG*)
- Y. Abuzied, ..., **M. Lotfy**, et al., "Cyberscape: Generative AI Framework for Multi-Robot Mission Planning." (*IEEE SWC 2026*)

## SKILLS

**Languages:** Python, C, C++, C#, Rust, JavaScript, Verilog, MATLAB, Embedded C

**Frameworks & Software:** Pytorch, Keras, OpenCV, Docker, Git, LangChain, Linux, TCP/IP

**Simulation and Modeling:** MuJoCo, Unreal Engine, Unity, Airsim, Gazebo, IsaacSim, Simulink, SolidWorks, Abaqus FEA