ARGHYA CHATTERJEE

📞 +88-01943753798   ✉ arghyame20buet@gmail.com

🅖 Google Scholar   🌐 https://arghyachatterjee.github.io

▶ YouTube Channel   ⚙ https://github.com/ArghyaChatterjee

A robotics and machine learning researcher experienced in applying Deep Learning, Edge & Cloud Computing in Computer Vision for Object Detection, Segmentation & Localization, Advanced Perception based SLAM for Localization, Mapping, Metric & Semantic understanding of the environment, Control theory & Deep Reinforcement Learning for risk aware autonomous robotic exploration in perceptually degraded environments and Swarm Intelligence for multi-robot collaboration & rapid exploration in outer space to help take better decision for humans.

EDUCATION

- **Bangladesh University of Engineering and Technology, Dhaka, Bangladesh**
  Degree: BSc. in Mechanical Engineering   Feb 2015 - Sept 2019
  CGPA: 3.14/4.00
- **Khulna Public College, Khulna, Bangladesh**
  Degree: HSC in Science   Jul 2012 - Aug 2014
  GPA: 5.00/5.00   *Class Position: 1st/60*
- **Khulna Bidyut Kendra Secondary School, Khulna, Bangladesh**
  Degree: SSC in Science   Jan 2010 - May 2012
  GPA: 5.00/5.00   *Class Position: 1st/60*

RESEARCH & PROJECT EXPERIENCE

- **Team Member, Team CoSTAR of NASA JPL**
  DARPA organized SubT Challenge   Jul 2020 – Present
  Perception Team Leader: Dr. Benjamin Morrell (NASA JPL)   California, USA
  Topic: Advanced perception based multi-robot SLAM algorithms efficiency, accuracy & robustness testing along with object detection & localization capability analysis for robots like Spot, Husky & Roller-copter with NeBula autonomy setup (built by Team CoSTAR) mounted.
- **Team Supervisor & Educator, STEMX 365**
  JAXA (& NASA) org. Kibo-Astrobee ISS Robot Programming Challenge   Jan 2020 – Present
  International Project Coordinator: Mizanul H. Chowdhury (MIT)   Tokyo, Japan
  Topic: Autonomously operate Astrobee (A free flying robot) inside ISS avoiding obstacles with 3D perception, following way points and detecting QR & AR Tag.
- **Research Assistant at Mars Rover Lab (MRL), BUET**
  Project Researcher, Advisor & Instructor for URC, ERC & KRPC   Oct 2019 – Sept 2020
  Supervisor: Dr. Md. Ashiqur Rahman (BUET)   Dhaka, Bangladesh
  Topic: Autonomous Navigation Based on GPS, SLAM & Object Detection and Plan Path accordingly for Safe Exploration of Rovers on Rough Terrains, Caves and Mineral Ores of Earth and Mars.
- **Software Team Leader & Member, Team Interplanetar**
  ESA organized ERC & Mars Society organized URC   Jun 2017 – Sep 2019
  Supervisor: Dr. Md. Ashiqur Rahman (BUET)   Dhaka, Bangladesh
  Topic: GPS Based Autonomous Mars Rover Navigation & On-board Object Detection for URC and Way-point Based Autonomous Mars Rover Navigation & On-board AR Tag Detection for ERC.
- **Researcher & Collaborator at Department of ME, BUET**
  Undergraduate Thesis   Mar 2018 – Apr 2019
  Supervisors: Dr. Maglub Al Nur (BUET) and Dr. Muhammad Abir (MIT)   Dhaka, Bangladesh
  Topic: Computational Investigation on Pool Boiling IR Images for Segmentation of Dry Spots Automatically and Evaluating Performance of Traditional Image Processing and Deep Neural Networks in Quantifying Dry Area Segments.
- **Team Leader, Team Octatron**
  Undergraduate Project   Mar 2017 - Feb 2018
  Supervisors: Dr. M.A. Rashid Sarkar and Musanna Galib (BUET)   Dhaka, Bangladesh
  Topic: Fire and Flood Fighter Octocopter (UAV) for Extinguishing Fire in Fire Affected Buildings and Areas, and Distributing Flood Reliefs to people in Flood Affected Zones.

- **Researcher & Technical Leader, Team Out of the Box**
  Microsoft BD Internship Project   Jan 2017 - May 2017
  Supervisors: Sonia B. Kabir and Ashikur Rahman (Microsoft)   Dhaka, Bangladesh
  Topic: Earlier Screening of Particular Disability in Children Through Mobile Application Using Microsoft Products like Azure Cloud Platform and Bing Maps Server.
- **Team Leader, Team Igniters**
  Undergraduate Project   Jul 2016 - Feb 2017
  Supervisors: Dr. M.A. Rashid Sarkar and Dr. A. B. M. Alim Al Islam (BUET)   Dhaka, Bangladesh
  Topic: Hand Wearable Solar Powered Obstacle Detection and Safe Navigation Device for Blind People in Low Cost.

TEACHING EXPERIENCE

- **BUET Mars Rover Robotics Team**   Oct 2020 - Present
  Teaching Assistant at Mars Rover Lab (MRL), BUET   *Dhaka, Bangladesh*
- **JAXA org. Kibo Astrobee ISS Robot Prog. Challenge**   Jan 2020 - Present
  Educator & Instructor of Teams from Bangladesh, STEMX 365   *Dhaka, Bangladesh*
- **National Space Carnival & Camp**   Sep 2019 - Jun 2020
  Instructor & Academic Coordinator for Workshops & Camps   *Dhaka, Bangladesh*
- **Bangladesh Astronomical Society**   Mar 2017 – Apr 2019
  Instructor for Workshops & Seminars   *Dhaka, Bangladesh*

PROFESSIONAL EXPERIENCE

- **Bangladesh Astronomy Research Collaboration (BARC)**   Jan 2020 – Present
  Advisor & Fellow Member   Dhaka, Bangladesh
  Activities: Give advice on research activities & how the organization should operate.
- **Youthprenuer Network (A Social Welfare Organization)**   Jun 2019 – Jun 2020
  Head of STEM Education & Development   Dhaka, Bangladesh
  Activities: Instructed, Organized and Lead Projects, Workshops, Olympiads and Camps in Educational Institutions to Promote STEM Education in Bangladesh.
- **American Astronomical Society**   Apr 2018 - Mar 2020
  Country Collaborator & Member   Dhaka, Bangladesh
  Activities: Celebrated International Astronomical Events in Bangladesh and Reported to Proper AAS Authority for Publishing on their Magazines.

PUBLICATIONS

- Matteo Palieri, Benjamin Morrell, Abhishek Thakur, Kamak Ebadi, Jeremy Nash, **Arghya Chatterjee**, Christoforos Kanellakis, Luca Carlone, Cataldo Guaragnella, Ali-akbar Agha-mohammadi, "LOCUS: A Multi-Sensor Lidar-Centric Solution for High-Precision Odometry and 3D Mapping in Real-Time," IEEE Robotics & Automation Letters Journal, 2020, vol: 6/2, pp. 421-428.
- **Arghya Chatterjee**, M. Galib and M. A. R. Sarkar, "Application of Arduino in designing modern electromechanical laboratory," 2017 IEEE International Conference on Power, Control, Signals and Instrumentation Engineering (ICPCSI), Chennai, 2017, pp. 222-225.
- **Arghya Chatterjee**, S. Dutta, P. Sarkar and A. B. M. A. A. Islam, "Obstacle Detector for Blind People with Low Cost (Poster Presentation)," Proceedings of 2017 International Conference on Networking, Systems and Security (NSysS), Dhaka, 2017.

INTERNSHIPS & TRAININGS

- **Microsoft Bangladesh Limited**   Jan 2017 - May 2017
  Internship Project: Disabling Disability through Microsoft Products   *Dhaka, Bangladesh*
- **Khulna Power Company Limited**   Oct 2018 – Oct 2018
  Training: Power Plant Visit & Industrial Attachment (3 weeks)   *Khulna, Bangladesh*

SKILL SETS

- **Prg. Language:** Python, C++, C#, C, R, Arduino, Java, Java S, HTML, PHP, CSS, & LATEX.
- **Framework & OS:** ROS, OpenCV, PCL, Nvidia Isaac SDK, Keras, TensorFlow, PyTorch, Caffe, CUDA, OpenGL, Kubernetes, .NET, Django, Linux, Mac, Windows & Android.
- **Software & Tool:** Git, Github, Gitlab, Docker, MIPAR, Solidworks, Ansys, PLC, Blender, Unity & UE 4, Verge3D, Carla Simulator, Microsoft Airsim, Deeplab, OpenPose3D, Meshroom, Meshlab, CloudCompare, Open3D, OpenDroneMap, OpenSpace, Photoshop, Kdenlive & MS Office Family.
- **IDE, Compiler & Text Editor:** CodeBlocks, Microsoft Visual Studio, MATLAB, Atom, Jupiter Notebook, PyCharm, Android Studio, Nodejs, IntelliJ IDEA,VS Code & Notepad++.
- **Cloud Platform:** AWS Compute, AWS RoboMaker & Storage, GCP, Google Colab.
- **Hardware:** GPS (RTK), IMU, VLP-16 (3D) & RPLidar (2D) LIDAR, Intel Realsense D200 & 400 series RGBD & L515 Lidar Camera, ZED 3D Camera, Microsoft Kinect Camera, Nvidia Jetson & Intel NUC Boards, Arduino & Raspberry PI Boards, Pixhawk, Ardupilot, VESC, BLDC motor, Nvidia AMD GTX Boards & Oculus Rift S VR Headset.
- **Robotic Platforms:** Husky (custom developed autonomy setup mounted) from Clearpath Robotics, Spot (custom developed autonomy setup mounted) from Boston Dynamics, ANYmal from ANYbotics, Astrobee from NASA, Mongol-E v4 (custom developed robot with arm) from Team Interplanetar, Octacopter (custom developed UAV) from Team Octatron.
- **Technology:** Computer Vision, Image Proc., ML, DL, DRL, Object Detection & Localization, Image Segmentation, Action Recognition, Pose Tracking, SLAM, Path Planning, Control, Photogrammetry, 3D Printing, AR, VR & MR, Game Dev, Web Dev, Video Editing, GPU, Edge & Cloud Computing.
- **Language Proficiency:** Bangla, English & Hindi.

AWARDS, HONORS & SCHOLARSHIPS

- **Special Grant from ICT Division (Ministry) of Bangladesh** — Feb 2020
  Awarded to BUET Mars Rover Lab (MRL) for outstanding performance in robotics — *Dhaka, BD*
- **Gold Medalist from Duke of Edinburgh International Foundation** — Dec 2019
  Awarded for Outstanding Extra-curricular & Service to the Society — *London, UK*
- **2nd in Asia & 16th Internationally in European Mars Rover Challenge** — Sep 2019
  Organized by European Space Foundation (ESF) & European Space Agency (ESA) — *Kielce, Poland*
- **Special Fund & Grant from BUET Alumni Association Trust** — Jul 2019
  Awarded to Team Interplanetar of BUET MRL for competition & robotics research — *Dhaka, BD*
- **Finalist in IEEE SS12 International Project Competition & Maker Fair** — Jul 2017
  Organized at SS12: Age of Innovation and Maker Fair 2017 — *Hyderabad, India*
- **1st in National Project Show Competition (Senior Category)** — May 2017
  Organized at EEE Day, BUET — *Dhaka, BD*
- **3rd in Inter University Project Show Competition** — Apr 2017
  Organized at Mechanical Festival, BUET — *Dhaka, BD*
- **1st in National Poster Presentation Competition** — Mar 2017
  Organized at Robolution, MIST — *Dhaka, BD*
- **2nd in Inter University Project Show Competition** — Nov 2016
  Organized at CSE Day, BUET — *Dhaka, BD*
- **1st in All Classes** (2002 - 2014)
  - *Primary at Elizabeth M Primary School (2002-2006)* • *Junior at Khulna BKS School (2006-2009)*
  - *Secondary at Khulna BKS School (2009-2012)* • *H. S. at Khulna Public College (2013-2014)*
- **Govt. Merit Scholarship from Education Board of Bangladesh** (2006 - 2019)
  - *Primary Scholarship (2006-2009)* • *Junior Scholarship (2010-2012)*
  - *Secondary Scholarship (2013-2014)* • *H. Secondary Scholarship (2015-2019)*
- **Olympiad Achievements**
  - *1 st in Reg. R. of Science Olympiad'14* • *1 st in Reg. R. of Zoology Olympiad'14*
  - *3 rd in Reg. & 10 th in Nat. R. of Astro-Olympiad'13* • *3 rd in Reg. R. of Math Olympiad'14*

CERTIFICATIONS (COURSERA)

- **Machine Learning** by Stanford University, Feb 2018.

- **Deep Learning Specialization** (5 course) by Deeplearning.ai, Sept 2018.
- **Modern Robotic**s: Mechanics, Planning & Control Specialization by Northwestern Uni, May 2021.
- **Control of Mobile Robots** by Georgia Institute of Technology, May 2020.
- **Image & Video Processing** by Duke University, Nov 2018.
- **Intro to Satellite Communications** by Institut Mines – Télécom, May 2019.
- **Wireless Communications for Everybody** by Yonsei University, Dec 2018.
- **AstroTech** by University of Edinburgh, Dec 2019.

LEADERSHIPS

- **Head** of STEM Education & Development   *Youthprenuer Network*
- Software **Team Lead**   *Team Interplanetar, BUET*
- **Technical Lead** of Internship Project   *Microsoft BD*
- **President** (Senior Rover Mate)   *BUET Rover Scout Group*
- **President**   *Satyen Bose Science Club, BUET*
- **Team Lead** for Development & Planning   *ESAB, BUET Unit*

VOLUNTEERING

- **Sceptre (Poverty Alleviation Organization)**   Jan 2015 - Present
  Activities: Org. free medical camps & distribute dress & sewing machines to poor people monthly.
- **BUET Rover Scout Group**   Feb 2015 - Apr 2019
  Activities: Volunteered on tree plantation camp & org. flood relief distribution camp monthly.
- **Khulna Bidyut Kendra Secondary School Scout Group**   Jan 2006 - Mar 2012
  Activities: Volunteered on medical camps, tree plantation events & sports day at KBKSS.

WORKSHOPS & SEMINARS

- **International Youth Leadership Summit-2016** org. by BYLC.
- 4 th BIRDS International Workshop on **Demystifying Satellites** org. by BRAC University.
- Seminar on **Zero Robotics** by M.H. Chowdhury of MIT org. by Dept. of Mech. Eng., BUET.
- Seminar on **Space Stories and ISS Experiences** by Astronaut Dr. Tess Caswell of NASA org. by Dept. of Civil Eng., BUET.
- Seminar on **4-fold Resolution Increase in Endoscopic Imaging** by J.M. Kahn of Stanford University org. by Dept. of Biomedical Eng., BUET.
- Workshop on **ML, PCB, Graphic Designing, & Technical Paper Writing** org. by IEEE BDS.
- Workshop on **CFD, Ansys Fluent, Solidworks & 3D Printing** org. by Involute Tech BD.

MEMBERSHIPS

- Institute of Electrical and Electronics Eng. (**IEEE**)
- American Institute of Aero and Astronautics (**AIAA**)
- Bangladesh Astronomy Research Collaboration
- American Astronomical Society (**AAS**)
- IEEE Robotics and Automation Society
- Bangladeshi Researchers Network

REFERENCES

- **Dr. Benjamin Morrell**
  Perception Team Leader, Team CoSTAR
  Ex. Post Doc Researcher, JPL, Caltech .
  Robotics Technologist, NASA JPL .
  Email: benjamin.morrell@jpl.nasa.gov

- **Dr. Md. Ashiqur Rahman**
  Project Supervisor
  Professor, Dept. of Mech. Eng., BUET.
  Email: ashiqurrahman@me.buet.ac.bd

- **Dr. Muhammad Abir**
  Thesis Co-Supervisor
  Ex. Post Doc. Researcher, Dept. of NSE, MIT.
  Imaging Specialist, Phoenix Nuclear Labs.
  Email: miabir@mit.edu

- **Mizanul H. Chowdhury**
  Project Supervisor
  Admin of ZR, Space Systems Lab, MIT.
  Email: mizanul@mit.edu