

# ARGHYA CHATTERJEE

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🌐 <https://arghyachatterjee.github.io>

A machine learning researcher experienced in applying Deep Learning, Edge & Cloud Computing for Computer Vision (CV) related applications, Advanced Perception (CV & LIDAR) based SLAM for semantic awareness of the environment, Multi-agent collaboration for autonomous robotic exploration in perceptually degraded environments and Swarm Intelligence for rapid & effective exploration of 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: 1<sup>st</sup>/60
- **Khulna Bidyut Kendra Secondary School, Khulna, Bangladesh**  
Degree: SSC in Science Jan 2010 - May 2012  
GPA: 5.00/5.00  
Class Position: 1<sup>st</sup>/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 special 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.
- **Graduate Research Assistant at Mars Rover Lab, BUET**  
Project Researcher, Advisor & Instructor for URC, ERC & KRPC Oct 2019 – Present  
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 - Mar 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

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- **STEMX 365 for JAXA Kibo Astrobee ISS RPC** Jan 2020 - Present  
Educator & Instructor of Teams from Bangladesh Dhaka, Bangladesh
- **BUET Mars Rover Robotics Team** Sep 2019 - Present  
Instructor at Model & Project Lab (Mars Rover Lab), BUET 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

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- **Bangladesh Astronomy Research Collaboration (BARC)** Jan 2020 - Present  
Advisor & Fellow Member Dhaka, Bangladesh  
Activities: Give advice on research activities & how the organization should operate.
- **Youthpreneur 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

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- Matteo Palieri, Benjamin Morrell, Abhishek Thakur, Kamak Ebadi, Jeremy Nash, **Arghya Chatterjee**, Christoforos Kanellakis, Luca Carlone, Cataldo Guaragnella, Ali-akbar Aghamohammadi, "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.

## INTERSHIPS & TRAININGS

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- **Microsoft Bangladesh Limited** Jan 2017 - Mar 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

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- **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, Docker, MIPAR, Solidworks, Ansys, PLC, Blender, Unity & UE 4, Verge3D, Carla Simulator, Microsoft Airsim, OpenPose3D, Meshroom, Meshlab, CloudCompare, 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 D435i RGBD & L515 Lidar Camera, ZED 3D Camera, Nvidia Jetson & Intel NUC Boards, Arduino & Raspberry PI Boards, PX4, Ardupilot, VESC, BLDC motor, Nvidia AMD GTX Boards & Oculus Rift S VR Headset.
- **Technology:** Computer Vision, Image Proc., ML, DL, DRL, Object Detection & Recognition, Image Segmentation, Pose Tracking, SLAM, Photogrammetry, 3D Printing, AR, VR & MR, Game Dev, Web Dev, Video Editing, GPU, Edge & Cloud Computing.
- **Language:** Bangla, English & Hindi.
- **Others:** Astronomy, Creative Arts, Singing, Harmonium & Guitar Playing, Organizing, Show Hosting, Volunteering, Swimming, Cycling, Playing Cricket, Football & Badminton.

## AWARDS, HONORS & SCHOLARSHIPS

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- **Gold Medalist from Duke of Edinburgh International Foundation** Dec 2019  
Awarded for Outstanding Extra-curricular & Service to the Society London, UK
- **2<sup>nd</sup> in Asia & 16<sup>th</sup> Internationally in European Mars Rover Challenge** Sep 2019  
European Space Foundation (ESF) & European Space Agency (ESA) Kielce, PL
- **Finalist in IEEE SS12 International Project Competition & Maker Fair** Jul 2017  
SS12: Age of Innovation and Maker Fair 2017 Hyderabad, IN
- **1<sup>st</sup> in National Project Show Competition (Senior Category)** May 2017  
EEE Day, BUET Dhaka, BD
- **3<sup>rd</sup> in Inter University Project Show Competition** Apr 2017  
Mechanical Festival, BUET Dhaka, BD
- **1<sup>st</sup> in National Poster Presentation Competition** Mar 2017  
Robolution, MIST Dhaka, BD
- **2<sup>nd</sup> in Inter University Project Show Competition** Nov 2016  
CSE Day, BUET Dhaka, BD
- **1<sup>st</sup> in All Classes in Primary, Junior, Secondary & H. Secondary** 2002-2014  
Elizabeth Primary Sc., Khulna BKS Sc., Khulna Pub. Cl. Khulna, BD
- **Govt. Board Scholarship in Primary, Junior, Secondary & H. Secondary** 2006-2014  
Education Board of Bangladesh Govt., Jessore Khulna, BD
- **Olympiad Achievements:**
  - 1<sup>st</sup> in Reg. R. of Science Olympiad'14
  - 3<sup>rd</sup> in Reg. & 10<sup>th</sup> in Nat. R. of Astro-Olympiad'13
  - 1<sup>st</sup> in Reg. R. of Zoology Olympiad'14
  - 3<sup>rd</sup> in Reg. R. of Math Olympiad'14

## CERTIFICATIONS

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- **Machine Learning** by Stanford University on Coursera, Feb 2018.
- **Deep Learning Specialization** (5 course) by DeepLearning.ai on Coursera, Sept 2018.
- **Control of Mobile Robots** by Georgia Institute of Technology on Coursera. May 2020.
- **Image & Video Processing** by Duke University on Coursera, Nov 2018.
- **Intro to Satellite Communications** by Institut Mines – Télécom on Coursera, May 2019.

- **Wireless Communications for Everybody** by Yonsei University on Coursera, Dec 2018.
- **AstroTech** by University of Edinburgh on Coursera, Dec 2019.
- A Course on **Nuclear Power Eng.** by Institute of Nuclear Power Engineering, BUET, Apr 2018.

## LEADERSHIPS

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| ● <b>Head</b> of STEM Education & Development | <i>Youthpreneur Network</i>           |
| ● Software <b>Team Lead</b>                   | <i>Team Interplanetary, BUET</i>      |
| ● <b>Technical Lead</b> of Internship Project | <i>Microsoft BD</i>                   |
| ● <b>President</b> (Senior Rover Mate)        | <i>BUET Rover Scout Group</i>         |
| ● <b>President</b>                            | <i>Satyen Bose Science Club, BUET</i> |
| ● <b>Team Lead</b> for Development & Planning | <i>ESAB, BUET Unit</i>                |

## VOLUNTEERING

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

## SEMINARS & WORKSHOPS

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- **International Youth Leadership Summit-2016** org. by BYLC.
- 4<sup>th</sup> 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

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| ● Institute of Electrical and Electronics Eng. ( <b>IEEE</b> ) | ● American Astronomical Society ( <b>AAS</b> ) |
| ● American Nuclear Society ( <b>ANS</b> )                      | ● IEEE Robotics and Automation Society         |
| ● Bangladesh Astronomy Research Collaboration                  | ● BYLC Graduate Network ( <b>BGN</b> )         |

## REFERENCES

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| <ul style="list-style-type: none"> <li>● <b>Dr. Benjamin Morrell</b><br/>Perception Team Leader, Team CoSTAR<br/>Ex. Post Doc. Researcher, JPL, Caltech .<br/>Robotics Technologist, NASA JPL .<br/>Email: benjamin.morrell@jpl.nasa.gov</li> </ul> | <ul style="list-style-type: none"> <li>● <b>Dr. Muhammad Abir</b><br/>Thesis Co-Supervisor<br/>Ex. Post Doc. Researcher, Dept. of NSE, MIT.<br/>Imaging Specialist, Phoenix Nuclear Labs.<br/>Email: miabir@mit.edu</li> </ul> |
| <ul style="list-style-type: none"> <li>● <b>Dr. Md. Ashiqur Rahman</b><br/>Project Supervisor<br/>Professor, Dept. of Mech. Eng., BUET.<br/>Email: ashiquurrahman@me.buet.ac.bd</li> </ul>  | <ul style="list-style-type: none"> <li>● <b>Mizanul H. Chowdhury</b><br/>Project Supervisor<br/>Arch. &amp; Admin of ZR, Space Systems Lab, MIT.<br/>Email: mizanul@mit.edu</li> </ul>   |