

M.O.B. Jihad

Research Intern, CASSA, Independent University, Bangladesh (IUB)

Licensed Amateur Radio Operator (S21MOB) | mobjihad15@gmail.com | mobjihad.com

EDUCATION

B.Sc. in Computer Science and Engineering

Expected: 2027

American International University-Bangladesh (AIUB)

RESEARCH EXPERIENCE

- **Research Intern, CASSA – IUB** Oct 2025 – Present
Radio Galaxy Classifier (RGC) group : deep-learning morphological classification of radio AGN from multi-wavelength imagery.
- **RGC I** (In press, Accepted with minor revision, *Astronomy & Astrophysics*)
Curated and annotated the foundational training catalog, setting the morphological baselines for the primary classifier.
- **RGC II & GAZE Platform** (In Preparation)
Co-author on a study of cluster-environment effects on radio tail bending. Designed and deployed **GAZE** : a custom MERN/TypeScript dashboard on the lab HPC with a multi-reviewer pipeline, multi-survey viewer (DESI, VLASS, FIRST, LoTSS), WCS axes, and contour overlays. Committed to contributing through model training, fine-tuning, and future work.

ASTRONOMICAL SOFTWARE & TECHNICAL SKILLS

- **Astronomy:** Astropy (FITS, coordinates, WCS), multi-wavelength alignment, custom DS9-style visualization; AstroImageJ and Siril; hands-on with VLA FIRST and LOFAR LoTSS data.
- **Radio Interferometry:** Measurement Sets, EveryBeam (LOFAR beams), SynthMS; working knowledge of the RIME, *uv*-coverage, and primary-beam correction.
- **Software & languages:** Python (advanced), TypeScript/JavaScript, C++, Bash, NumPy, Matplotlib; full-stack web (PostgreSQL, MongoDB, Node/Express, React, NextJS, WebSockets).
- **Infrastructure:** Linux, HPC clusters, Apptainer/Docker, Nginx, Git, AWS, Cloudflare.

PROJECTS

- **GAZE** *Full-stack · Astrophysics platform*
General Astronomy Zoo Environment (GAZE) is a web-based annotation platform, in the spirit of Galaxy Zoo, built to produce the labelled training sets that CASSA's machine-learning projects depend on. Replacing a manual PDF-and-spreadsheet workflow, it allows contributors to mark up radio AGN in survey imagery and the intracluster medium (ICM) of their host clusters in *Chandra* X-ray images. Built a from-scratch in-browser FITS viewer (Canvas-rendered multi-wavelength overlays, DS9-style stretches, WCS sky axes, σ -level contours) and a PCA-based engine to measure radio-jet bending angles. Features multi-role review and consensus aggregation, successfully feeding the RGC classifier and MIMIC cluster-mapping pipeline to close the loop between human annotation and automated classification.
Tech Stack: React, TypeScript, Node/Express, MongoDB, Python (Astropy), Canvas, Apptainer, Jest.
- **Kriterion** *Full-stack · Assessment system*
An universal assessment system in production at Independent University, Bangladesh (IUB). Supports proctored quizzes, AI-generated question banks, Report Assesment, Presentation, Attendance, Gradings, live faculty monitoring via WebSockets, and per-attempt anti-cheat forensics, overall course management system. Hardened with domain-restricted Google SSO, JIT enrollment, and comprehensive audit logs. Hosted on an Oracle Cloud VM behind Caddy and Cloudflare.
Tech Stack: Next.js 15, React 19, TypeScript, Express, Drizzle ORM, PostgreSQL, Socket.io, Cloudflare, Docker.
- **AST 100: Our Cosmic History** *Open source · Interactive science*
An open, web-native course communicating 14 billion years of cosmic evolution. Developed purpose-built interactives (sliders, scrubbers, ray-tracers, 3D scenes) grounded in real units and literature values. Designed a shared **FigureFrame** for unified keyboard navigation, fullscreen rendering, and theming. Fast, dependency-light, and MIT/CC BY licensed.
Tech Stack: Astro 6, React 19, Tailwind v4, Three.js, Framer Motion, KaTeX, TypeScript.