

MOH HASBI ALFARIZI

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Fresh graduate in Mathematics from Universitas Gadjah Mada, with research experience at Institute of Science Tokyo (YSEP) and Polymath Jr. 2025. I am also working with machine learning models and artificial intelligence projects. During my studies, I led large teams: as vice chairman of a national mathematics competition with 4,000+ participants, and as education coordinator during community service on a remote island.

Education

Institute of Science Tokyo (formerly Tokyo Tech) - Japan

Apr 2026 - Aug 2026

Young Science and Engineering Researchers Program (YSEP) - Research Student of Purkait's Laboratory

- Learning the modular forms of the congruence subgroup and their connection to the Hecke operators under the supervision of Professor Yuichiro Taguchi and Associate Professor Dr. Soma Purkait.

Universitas Gadjah Mada (UGM) - Indonesia

Aug 2022 - Aug 2026

Bachelor's Degree in Mathematics (GPA: 3.77/4.00)

Thesis Title: Prime-Detecting Quasimodular Forms and Some of Their Congruence Properties.

- Lecturer Assistant of the Calculus I Course.
- Lecturer Assistant of the Advanced Calculus Course.
- Lecturer Assistant of the Introduction to Real Analysis Course.
- Lecturer Assistant of the Multivariable Calculus Course.
- Practicum Assistant of the Introduction to Numerical Analysis Course.
- Practicum Assistant of the Computational Mathematics Course.
- Practicum Assistant of the Numerical Linear Algebra.

Selected Projects

ScholarRAG: Cited Question Answering over Scientific Papers - Personal Project

2026

Built a retrieval-augmented question answering system over 200 arXiv papers that answers with verified quotes and refuses when the papers lack the answer (BM25 and dense retrieval, cross-encoder reranking, Gemini), reaching 92% acceptable answers with none incorrect and refusing 20/20 near-miss questions.

Integer Partitions Detect the Primes - Polymath Jr. 2025

2025

Learning a method for detecting prime numbers and analyzing congruences within MacMahon's partition function under the supervision of Dr. William Craig of the United States Naval Academy.

AnoDe: Anomaly Detection Platform for Manufacturing - Course Project, Machine Learning

2025

Engineered an automated anomaly detection platform that dynamically selects optimal ML models (e.g., PatchCore, CSAD) to identify both visual and logical defects in manufacturing accurately.

Breast Cancer Classification with LDA/QDA - Course Project, Intro to Mathematical Modelling

2024

Compared and validated Linear and Quadratic Discriminant Analysis models to accurately classify breast cancer cells from a public dataset.

Open Jackson Queueing Network in a Hospital System - Course Project, Queueing Theory

2024

Developed a mathematical model of hospital patient flow using the Open Jackson network to derive equations for analyzing and improving operational efficiency.

Stability Analysis of Belousov-Zhabotinsky Reaction - Course Project, Dynamical System

2024

Applied dynamical systems principles to analyze the stability and bifurcation of the Oregonator model, predicting the behavior of an oscillating chemical reaction.

Generalization of an m-ary Partition Function - Course Project, Intro to Integer Partitions

2023

Extended a classic Putnam Competition problem by developing a generalized framework for m-ary integer partitions using generating functions.

Selected Achievements

Silver Medalist of Mathematical Analysis and Geometry Day XVI (MaG-D XVI) - Indonesia

2025

Achieved Silver Medal (Individually) in Mathematical Analysis and Geometry Day XVI (MaG-D XVI) 2025 held at Institut Teknologi Bandung (ITB).

Delegation for Statistics Infographic Competition Satria Data 2024 - Indonesia

2024

Delegation of the Universitas Gadjah Mada for Statistics Infographic Competition (SIC) Satria Data 2024 held by Pusat Prestasi Nasional (Puspresnas).

Delegation for Statistics Essay Competition Satria Data 2024 - Indonesia

2024

Delegation of the Universitas Gadjah Mada for Statistics Essay Competition (SEC) Satria Data 2024 held by Pusat Prestasi Nasional (Puspresnas).

Silver Medalist of Calculus Paper Competition - Indonesia

2023

Achieved Silver Medal (as a team) of the Calculus Paper Competition at SNAMA (Simposium Nasional Analisis Matematika dan Aplikasinya) 2023 held at the Universitas Sebelas Maret, Indonesia.

Selected Volunteer Experiences

Talaud Island Community Service - KKN-PPM UGM

Jun 2025 - Aug 2025

Coordinator of the Educational Sector

- Coordinated and executed approximately 25 educational programs aimed at addressing local educational challenges at Talaud Island, North Sulawesi, Indonesia.
- Led teaching initiatives for elementary to high school students and provided training workshops for local teachers to enhance pedagogical skills.
- Authored and presented a policy brief to the Talaud Islands' local government, outlining key educational problems and proposing data-informed solutions for systemic improvement.

LMNas 35 & Semnastika 16 UGM - Himatika UGM

Feb 2024 - Nov 2024

Vice Chairman

- Achieved participation of 4,000+ students nationwide in the competition.
- Successfully managed 100+ committee members, ensuring smooth event execution.
- Oversaw 4 key divisions (Creative, Events, Problem Creator, and Business Fund), resulting in almost zero major operational issues.
- Achieving a 175% increase in Instagram followers, a million total views on Social Media such as Instagram and TikTok content, a high-quality short-list competition problem made by a national and international maths medallist, and adding approximately 50 million IDR from business funds.

Matriks 2023 UGM - Himatika UGM

Jul 2023 - Jan 2024

Vice Chairman

- Led 70+ committee members, streamlining workflows to meet 100% of project deadlines.
- Co-created detailed job descriptions and timelines, reducing miscommunication by 28%.
- Supervised 3 divisions (Creative, Medical-Consumption, and Business Fund), contributing to a 100% target funding.

Organizational Experiences

Himatika UGM (UGM Math Student Association) - Indonesia

Feb 2023 - Dec 2023

Staff of the Human Resource Development

- Performed bonding activities for all members.
- Provided training and development for freshmen.
- Collected administrative data of members.
- Conducted evaluations for organizations and members.

Science Study Community FMIPA UGM - Indonesia

Nov 2022 - Jan 2024

Staff of the Community Development

- Conducting visits to the assisted villages and carrying out village development with sustainable programs.
- Conducting internal training to prepare themselves to go into the community.
- Have a discussion to find new insights related to service in partner villages.

Skills and Others

- **Languages:** Bahasa Indonesia (Native); English (TOEFL ITP® 567 Overall); Japanese (basic).
- **Soft Skills:** Teaching, Leadership, Team Building, Problem Solving, Decision Making, Public Speaking, Interpersonal Skills, Critical Thinking.
- **Hard Skills:** Mathematical Modeling, Machine Learning Models, LaTeX, Microsoft Office, Figma, Capcut, Canva, Python, C++.