

Muhammad Fadhil Ginting

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EDUCATION

- 2018 -Now **Master of Science in Robotics, System, and Control** - ETH ZÜRICH
GPA: 5.60/6.00 (3.73/4.00) | Advisor: Dr. Ali Agha (JPL), Dr. Juan Nieto, Prof. Roland Siegwart
Thesis: Active Information Acquisition for Resource-constrained Navigation
- 2013 -2017 **Bachelor of Science in Electrical Engineering** - BANDUNG INSTITUTE OF TECHNOLOGY
GPA: 3.94/4.00, Ranked 1/130 | Advisor: Prof. Bambang Riyanto Trilaksono
Thesis: Guidance System Design and Implementation for Autonomous Underwater Glider

RESEARCH AND WORK EXPERIENCE

- SEP 2019 NASA JET PROPULSION LABORATORY(JPL), Pasadena, CA, USA
- NOW *Visiting Robotics Researcher, JPL Team CoSTAR for the DARPA Subterranean Challenge*
Developing novel technologies on multi-robot autonomy, large-scale perception, and system integration for rapid underground exploration in extreme environments.
Supervisor: Dr. Ali-akbar Agha-mohammadi
- MAR 2019 ETH JUNIORS, Zürich, Switzerland
- SEP 2019 *Magic Leap Mixed Reality Developer*
Led a project for one of the world's leading dental company pioneering innovative Mixed Reality solutions to assist dentist works.
- JUN 2019 ETH ZÜRICH, Zürich, Switzerland
- AUG 2019 *Graduate Research Student, Autonomous System Laboratory(ASL)*
Developed a learning-based method for visual place recognition using high-level landmarks.
Supervisor: Dr. Cesar Cadena
- MAY 2017 BANDUNG INSTITUTE OF TECHNOLOGY, Bandung, Indonesia
- AUG 2018 *Robotics Engineer, Advanced Robotics Research Laboratory*
Developed navigation and guidance system for an Autonomous Underwater Glider, and conducted sea testing.
Supervisor: Prof. Bambang Riyanto Trilaksono
- JAN 2017 LABTEK INDIE, Bandung, Indonesia
- APR 2017 *Software Developer Intern*
Developed an efficient shopping system for convenience stores with mobile apps.
- JUN 2016 CERN, Geneva, Switzerland
-AUG 2016 *Summer Intern, CERN Summer Student Programme 2016*
Devised a controlled high voltage module for Micro Pattern Gas Detectors(MPGD) and presented the result to the International MPGD Collaboration meeting.
Supervisor: Dr. Leszek Ropelewski

PUBLICATIONS

Under Review

1. Muhammad Fadhil Ginting, Kyohei Otsu, Jeffrey A. Edlund, Jay Gao, and Ali-akbar Agha-Mohammadi, **"CHORD: Distributed Data-sharing via Hybrid ROS 1 and 2 for Multi-robot Exploration of Large-scale Complex Environments,"** Under review for the *IEEE Robotics and Automation Letters (RA-L)*, 2021. [\[Paper\]](#), [\[Video\]](#).

Published

1. Muhammad Fadhil Ginting*, Amanda Bouman*, Nikhilesh Alatur*, Matteo Palieri, David D. Fan, Thomas Touma, Torkom Pailevanian, Sung-Kyun Kim, Kyohei Otsu, Joel Burdick, and Ali-akbar Agha-Mohammadi, **"Autonomous Spot: Long-range Autonomous Exploration of Extreme Environments with Legged Locomotion,"** *IEEE International Conference on Intelligent Robots and Systems (IROS)*, Las Vegas, NV, 2020. **Best Paper Award on Safety, Security, and Rescue Robotics.** [\[Paper\]](#), [\[Video\]](#).
2. Marcel Kaufmann, Tiago Stegun Vaquero, Gustavo J. Correa, Kyohei Otsu, Muhammad Fadhil Ginting, Giovanni Beltrame, and Ali-akbar Agha-Mohammadi, **"Copilot MIKE: An Autonomous Assistant for Multi-Robot Operations in Cave Exploration,"** *IEEE Aerospace Conference*, Big Sky, MT, 2021.

3. Muhammad Fadhil Ginting, Thomas Touma, Jeffrey A. Edlund, and Ali-akbar Agha-mohammadi, “**Deployable Mesh Network for Enabling Reliable Communication from within Subsurface Voids to the Planetary Surface**,” *American Geophysical Union (AGU)*, San Francisco, CA, 2020. [\[Poster\]](#)
4. Thomas Touma, Jennifer G. Blank, Muhammad Fadhil Ginting, Christopher Patterson, and Ali-akbar Agha-mohammadi, “**Mars Dogs: Biomimetic Robots for the Exploration of Mars, from its Rugged Surface to its Hidden Caves**,” *American Geophysical Union (AGU)*, San Francisco, CA, 2020.
5. “**Active Information Acquisition for Resource-constrained Navigation in Unknown Environment**”, M.Sc. Thesis, Department of Mechanical and Process Engineering, ETH Zürich, October 2020. [\[Thesis\]](#).
6. Tri W. Oktaviana Putri, Muhammad Fadhil Ginting, Bambang Riyanto Trilaksono, Egi M. Idris Hidayat, and M. Faisal Sagala, “**Hardware In the Loop Simulation Development of Guidance System for Autonomous Underwater Glider**,” *IEEE International Conference on Electrical Engineering and Informatics (ICEEI)*, Langkawi, Malaysia, 2017. [\[Paper\]](#).
7. “**Guidance System Implementation and Hardware in the Loop Simulation for Autonomous Underwater Glider**”, B.Sc. Thesis, Department of Electrical Engineering, Bandung Institute of Technology, July 2017.

AWARDS AND HONORS

2020	DARPA SUBTERRANEAN CHALLENGE URBAN CIRCUIT - 1 st Place
2020	IEEE/RSJ IROS - Best Paper Award on Safety, Security, and Rescue Robotics
2020	NASA JET PROPULSION LABORATORY - Research Affiliate STAR Award
2020	CALIFORNIA STATE UNIVERSITY NORTHRIDGE - Autonomy Research Fellowship
2019	NASA JET PROPULSION LABORATORY - Visiting Student Research Fellowship
2018	INDONESIA MINISTRY OF FINANCE - Awardee of LPDP Education Scholarship (Full Scholarship)
2017	BANDUNG INSTITUTE OF TECHNOLOGY - Valedictorian of Dept. of Electrical Engineering
2017	McKINSEY YOUNG LEADER FOR INDONESIA 2016 - Top 10 graduates
2016	BANDUNG INSTITUTE OF TECHNOLOGY - Dept. of Electrical Engineering Outstanding Student Award
2015	ABU ROBOCON (ASIA PACIFIC BROADCASTING UNION ROBOT CONTEST) - 2 nd Runner Up

PROJECT EXPERIENCE

Mars Dogs - NASA Innovative Advanced Concepts (NIAC)	SUMMER 2020 - NOW
Robotics Aerial Mobility Group	NASA JPL
<ul style="list-style-type: none"> Designing a visionary mission concept to explore the Martian surface and subsurface and studying the feasibility and challenges to deploy a legged-robot team on Mars. Submitted for NIAC Phase 1 Proposal. 	
Autonomy Integration on Legged Robots	WINTER 2019
Robotics Aerial Mobility Group	NASA JPL
<ul style="list-style-type: none"> Integrated JPL's autonomy framework with Boston Dynamics Spot robots, developed the software interfaces and tested the integrated system on the field. 	
LIDAR-based Robot Calibration	WINTER 2019
Robotics Aerial Mobility Group	NASA JPL
<ul style="list-style-type: none"> Developed a LIDAR-based method to calibrate robot pose with a fiducial gate for the pose initialization in the DARPA Subterranean Challenge. 	
Distributed Multi-robot Data-sharing with Hybrid ROS 1 and 2	FALL 2019
Robotics Aerial Mobility Group	NASA JPL
<ul style="list-style-type: none"> Developed a reliable multi-robot communication system with hybrid ROS 1 and 2 and evaluated the performance in multi-robot operations in large-scale complex environments. 	
Robust Visual Scene Representation for Place Recognition	SPRING 2019
Autonomous System Lab (ASL), directed by Prof. Roland Siegwart	ETH Zürich
<ul style="list-style-type: none"> Designed a learning-based method to perform visual localization and mapping using text-based landmarks and to leverage high-level descriptors for place recognition. 	
Multi-Camera Deep Tracking and Mapping (DeepTAM)	SPRING 2019
Computer Vision and Geometry Group (CVG), directed by Prof. Marc Pollefeys	ETH Zürich
<ul style="list-style-type: none"> Developed Deep Tracking and Mapping (DeepTAM) pipeline to leverage multi-camera setup, and evaluated the approach in challenging environment. 	
Eye Gaze Estimation with Convolutional Neural Network	SPRING 2019
Machine Perception Course, taught by Prof. Otmar Hilliges	ETH Zürich
<ul style="list-style-type: none"> Designed Convolutional Neural Network (CNN) model to estimate eye gaze in challenging real-world settings. 	

Drone Formation Estimation Using UWB Measurements

Vision for Robotics Lab (V4RL), directed by Prof. Margarita Chli

- Designed swarm drones formation estimation using the relative distance between drones in a distributed manner.

SPRING 2019

ETH Zürich

TEACHING EXPERIENCE

Autonomy Research Center for STEAHM, CALIFORNIA STATE UNIVERSITY NORTHRIDGE

- **Robotics Senior Design Project**, *Research Mentor* (Fall 2020 - Now)

Department of Electrical Engineering, BANDUNG INSTITUTE OF TECHNOLOGY

- **Electronics Laboratory**, *Lab Coordinator* (Spring 2017)
- **Control Systems**, *Teaching Assistant* (Fall 2016)
- **Microprocessor Systems Laboratory**, *Lab Assistant* (Fall 2016)
- **Electronics**, *Teaching Assistant* (Spring 2016)

SKILLS

Language	ENGLISH (Proficient C1) , GERMAN (Independent B1), INDONESIAN (Native)
Programming	C/C++, Python, MATLAB, Bash(Expert), Java, VHDL, C#, SQL(Proficient)
Software	Systems (Linux, Windows, ROS/ROS 2), Tensorflow, Pytorch, CUDA, OpenCV, PCL, Git, Eigen, LabVIEW, MPI, Eagle, Altium Designer, Visual Studio, Unity, Android Studio
Hardware	NVIDIA Jetson TX2, Intel RealSense, Velodyne LIDAR, Boston Dynamic Spot, FPGA, Beaglebone, Raspberry-Pi, TS-7250 SBC, ARM STM32

SELECTED RESEARCH HIGHLIGHTED IN MEDIA

- Article: “Meet Au-Spot, the AI robot dog that’s training to explore caves on Mars” by Mindy Weisberger, Live Science, 2020.
- Article: “How JPL’s Team CoSTAR Won the DARPA SubT Challenge: Urban Circuit Systems Track” by Edward Terry, IEEE Spectrum, 2020.
- Article: “Robots Autonomously Navigate Underground in DARPA Challenge” by Andrew Good, NASA JPL News, 2020.

PROFESSIONAL AND SOCIAL ACTIVITIES

Organization Experience

- 2020 *Strategic Communication Team Lead*, NASA JPL Team CoSTAR
- 2017 *Project Lead*, Assessment Center Project - McKinsey Young Leader for Indonesia
- 2016 *Chairman*, University Student Robotics Organization
- 2015 *Senior Staff of Character Development Division*, Electrical Engineering Student Association
- 2014 *Head of Media and Communication Division*, University Student Tennis Club
- 2013 *Chairman*, High School Computer Student Community

Professional Membership

- IEEE Robotics and Automation Society, IEEE Student Member.
- The American Geophysical Union (AGU), Student Member.

Volunteer Experience

- Career, graduate study, and scholarship seminars for Indonesian student communities. Four times in 2020.
- Career inspiration class for primary school students in Rusunawa Cakung, Indonesia. March 1, 2018.
- Robotics workshop for senior high school students in SMA Negeri 5 Bandung, Indonesia. January 17, 2017.
- Robotics demo for local kindergarten and primary school students. Six times in 2016.
- Field coordinator for university graduation parade. March 25, 2015.

Leadership Program

- Leadership and Graduate Study Preparation Program by LPDP Scholarship. February 25 - March 3, 2018.
- McKinsey Young Leader for Indonesia Regional Wave 4. October 2016 - May 2017.

Hobbies: Travelling, Surfing, Badminton, Photography.