MOROKOT SAKAL

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Sangkat Kilometer 6, Khan Russey Keo, Phnom Penh, Cambodia
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EDUCATION

Tohoku University Sendai, Japan
M. Eng., Aerospace Engineering Apr 2018 – Mar 2020
Advisor: Prof. Toshinori Kuwahara
Thesis: System Integration of Science Handling Unit of Microsatellite RISESAT based on Plug-and-Play Technology
GPA: 3.33/4.00

Tohoku University Sendai, Japan
B. Eng., Mechanical Engineering Apr 2016 – Mar 2018
GPA: 2.90/4.00

National Institute of Technology, Ibaraki College Ibaraki, Japan
A. Eng., Mechanical Engineering Apr 2013 – Mar 2016
GPA: 3.76/4.00

RESEARCH EXPERIENCE

Generative AI for Early-Stage CubeSat Design Feb 2024 – Present
- Conducting research to assess how generative AI can support software development for early-stage CubeSat design in resource-limited environments.
- Evaluating the impact of generative AI on development time, error minimization, and overall software quality compared to a baseline CubeSat design developed without AI assistance.
- Accepted for presentation at the Small Satellite Conference, Aug 2024.

Starlink for ASEAN Jan – Sep 2022
- Investigated the potential of Starlink satellite constellation to enhance connectivity and support sustainable development goals in ASEAN member states.
- Developed a two-dimensional framework assessing readiness and usefulness of Starlink adoption, based on three quantitative factors for each ASEAN member state.
- Published in *Space Policy* (May 2023) and presented at the 73rd International Astronautical Congress (IAC) in Paris, France (Aug 2022)

1U CubeSat Project: Apsara-1 Phnom Penh, Cambodia
Project Coordinator Dec 2020 – Jul 2021
- Led the concept design phase of 1U CubeSat **Apsara-1**
- Designed the communication subsystem, structure subsystem, and ground segment.
- Co-authored the Apsara-1 CubeSat design specification for the 6th round of KiboCube launch opportunity.

Space Robotics Laboratory, Tohoku University Sendai, Japan
Satellite Embedded Software Engineer Apr 2018 – Mar 2020
- Designed, developed, and tested the onboard software of the Science Handling Unit of **RISESAT**: a 50-kg class Earth-observation microsatellite, launched in January 2019.
- Designed, developed, and tested the onboard software of the Satellite Central Unit of **IHI-SAT**: a 3U CubeSat for demonstrating the AIS receiver technology, launched in January 2022.

EMPLOYMENT HISTORY

American University of Phnom Penh (AUPP) Phnom Penh, Cambodia
Lecturer Jun 2021 – Present
- Lecturer in the School of Digital Technologies.

AUPP High School - Foxcroft Academy (AUPPHS-FA) Phnom Penh, Cambodia
Adjunct Lecturer Jun 2021 – Present
- Teacher of Robotics class, lab manager of AUPPHS MakerSpace.

Ministry of Post and Telecommunication of Cambodia (MPTC) Phnom Penh, Cambodia
Technical Advisor Jun 2021 – Aug 2022
- Conduct research on satellite applications for Cambodia in cooperation with the Satellite Policy Department.

Research and Innovation Center, Institute of Technology of Cambodia Phnom Penh, Cambodia
Researcher Apr 2020 – May 2021
- Leader of Satellite Research Group at the Dynamics and Control Laboratory (DCLab)

Paragon International University (Paragon IU) Phnom Penh, Cambodia
Adjunct Lecturer Nov 2020 – Apr 2021
- Lecturer for the Physics-I.

GRANTS & AWARDS

Travel Fund for International Conference May 2024
- Conference: The 38th Annual Small Satellite Conference, Utah, USA
- Funding Source: Capacity Building Research and Development (CBRD) Fund of the Ministry of Post and Telecommunications
- Award amount: **5,950 USD**

Travel Fund for International Robotics Competition Oct 2023
- Competition: World Robotics Olympiad (WRO) 2023, Future Innovator, Senior Category, Panama City, Panama
- Funding Source: Capacity Building Research and Development (CBRD) Fund of the Ministry of Post and Telecommunications
- Award amount: **26,253 USD**

Travel Fund for International Robotics Competition Nov 2022
- Competition: World Robotics Olympiad (WRO) 2022, Future Innovator, Senior Category, Dortmund, Germany
- Funding Source: Capacity Building Research and Development (CBRD) Fund of the Ministry of Post and Telecommunications and the WRO Association
- Award amount: **10,360 USD + 1,695 USD**

Travel Fund for International Conference Sep 2022
- Conference: The International Astronautical Congress (IAC) 2023, Paris, France
- Funding Source: Capacity Building Research and Development Fund (CBRD) Fund of the Ministry of Post and Telecommunications
- Award amount: **2,320 USD**

Awards

- SATO YO International Scholarship for Master's Degree — Apr 2018 – Mar 2020
- MEXT Scholarship 2016 for Bachelor's Degree (2-year extension) — Apr 2016 – Mar 2018
- MEXT Scholarship 2012 for Associate's Degree — Apr 2012 – Mar 2016
- Cambodian Government Scholarship — Oct 2010 – Mar 2012

PUBLICATIONS

Journal Papers

2023

(J1) R. Corrado, M. Berthet, and **M. Sakal**, "Starlink for ASEAN: A Changemaker in the Race Toward Sustainable Development?," *Space Policy*, p. 101554, May 2023, doi: 10.1016/j.spacepol.2023.101554.

2021

(J2) P. Srean, **M. Sakal**, M. Berthet, and S. Srang, "Development of Orbital Simulator for Cambodian CubeSat Mission in LEO," *Techno-Science Research Journal*, vol. 9, no. 2, pp. 53-60, 2021.

(J3) D. Soun, **M. Sakal**, S. Hokly, and S. Sarot, "Design and Implementation of the Commercial Off-the-shelf Electrical Power System for the Satellite Training Kit -Demosat," *Techno-Science Research Journal*, vol. 9, no. 1, pp. 55–62, 2021.

(J4) **M. Sakal** et al. "Integration and Orbit Demonstration of Micro-satellite Payload System Based on a Plug-and-Play On-board Computer", *TRANSACTIONS OF THE JAPAN SOCIETY FOR AERONAUTICAL AND SPACE SCIENCES, AEROSPACE TECHNOLOGY JAPAN 19*, no. 5 (2021): 784-793, doi: https://doi.org/10.2322/tastj.19.784

2020

(J5) K. Junichi, T. Kuwahara, S. Fujita, Y. Sato, K. Hanyu, **M. Sakal**, et al. "A High Spatial Resolution Multispectral Sensor on the RISESAT Microsatellite." *TRANSACTIONS OF THE JAPAN SOCIETY FOR AERONAUTICAL AND SPACE SCIENCES, AEROSPACE TECHNOLOGY JAPAN 18*, no. 5 (2020): 186-191, doi: https://doi.org/10.2322/tastj.18.186

2019

(J6) R. Filgas, M. Malich, T. Kuwahara, J. Broulím, M. Holík, **M. Sakal**, et al. "RISEPix—A Timepix based radiation monitor telescope onboard the RISESAT satellite." *Astronomische Nachrichten 340*, no. 7 (2019): 674-680, doi: https://doi.org/10.1002/asna.201913674

Conference Papers

2024

(C1) **M. Sakal.** "Assessment of Generative AI Tools to Enhance Software Development for Early-Stage CubeSat Design in a Resource-Limited Environment", *Small Satellite Conference*, Poster SSC24-P4-08, Utah State University, Utah, USA, August 2024.

2022

(C2) **M. Sakal**, M. Berthet, and R. Corrado. "Starlink for ASEAN: can it be the changemaker in the race toward SDGs?," *73rd International Astronautical Congress (IAC)*, 2022, Paris, France, August 2022.

2021

(C3) M. Berthet, **M. Sakal**, et al. "International Collaboration Towards Cambodia's First Small Satellite Education Program: Lessons Learnt", *Small Satellite Conference*, Paper SSC21-WKI-01, Utah, USA, August 2021.

2020

(C4) M. Berthet, Q. Verspieren, G. Coral, R. Takahashi, N. Funabiki, S. Srang, H. Tim, and **M. Sakal**. "Student-Led Policy and Technical Capacity Building Program: The Road to

Cambodia's First CubeSat," *71st International Astronautical Congress (IAC)*, 2020, France.

(C5) Y. Murata, Y. Sato, **M. Sakal** et al. "Ground Evaluation of the Attitude Control System of 3U-CubeSat IHI-SAT," *2020 IEEE/SICE International Symposium on System Integration (SII) (SII 2020*), Honolulu, USA, 12-15 Jan 2020.

2019

(C6) H. Tomio, **M. Sakal** et al. "Lessons Learned from Integrating the Dual-band Optical Transient Camera to Microsatellite RISESAT," *Proceedings of the 12th IAA Symposium on Small Satellites for Earth Observation*, Berlin, Germany, 06-10 May 2019.

(C7) H. Tomio, T. Kuwahara, S. Fujita, Y. Sato, **M. Sakal**, et al. "Assembly and integration of optical downlink terminal VSOTA on microsatellite RISESAT." *In International Conference on Space Optics—ICSO 2018*, vol. 11180, p. 111805Z. International Society for Optics and Photonics, 2019.

SKILLS

Programming: Python, C, C++, Matlab
Engineering Tools: Soldering, Git, 3D Printing, Linux, Solidworks.
Hardware: Arduino, microbit, PIC Microcontroller

Languages: Khmer (native), English (professional), and Japanese (professional).

CERTIFICATION & PROFESSIONAL DEVELOPMENT

Google Project Management Specialization, Google on Coursera — Jan 2023
Spacecraft Dynamics and Control Specialization, University of Colorado Boulder on Coursera — Mar 2022
Fundamentals of Reinforcement Learning, University of Alberta on Coursera — Dec 2023
Generative AI for Everyone, DeepLearning.AI — Dec 2023

TEACHING EXPERIENCE

Hours of teaching: 1080 hours
Number of classes: 17 classes
Number of students: 555 students

American University of Phnom Penh (AUPP)
- ITM350 - Project Management — Jan 2023 - Present
- ITEC101 - Introduction to Information Technology — Aug 2021 – Present

AUPP High School - Foxcroft Academy (AUPPHS-FA)
- Robotics — Aug 2021 – Present

Paragon International University — Nov 2020 – Apr 2021
- Physics I – Mechanics

Institute of Technology of Cambodia — Aug 2020 – Feb 2021
- Using Git/GitHub for Version Control
- Basic of Circuitry/Arduino

Talks

1. KAXA Space Engineering Webinar 2023 – Space Activities of Cambodia, September 2023.
2. Science Museum Space Seminar Season 2 – Lessons Learned from Coordinating a Small Satellite Project in Cambodia, January 2023.
3. AUPP Pro Insight – Introduction Small Satellites and Their Applications, March 2022.
4. AUPP ICT Summer Short Courses – Introduction to Robotics, August 2021.

MENTORING EXPERIENCE

World Robotics Olympiad 2024 Mentor Mar 2024 – Present

- Mentored two high school robotics teams to participate in the national round of the World Robotics Olympiad 2024, Future Innovator Senior and Future Engineer, in Phnom Penh, Cambodia.

Robot Soccer Challenge 2023 Coach Nov 2023 – Dec 2023

- Coached a high school robotics team to participate in the Robotics Cambodia 2023, Robot Soccer Category in Phnom Penh, Cambodia. The team won **1st place**.

World Robotics Olympiad 2023 Coach Jul 2023 – Nov 2023

- Coached a high school robotics team to participate in the World Robotics Olympiad 2023, Future Innovator Senior Category, national round in Phnom Penh, Cambodia, and the international final in Panama City, Panama. The team won **1st place** in the national round and received the "**Start-up Idea Award**" in the international final.

World Robotics Olympiad 2022 Coach Mar 2022 – Nov 2022

- Coached a high school robotics team to participate in the World Robotics Olympiad 2022, Future Innovator Senior Category, national round in Phnom Penh, Cambodia, and the international final in Dortmund, Germany. The team won **3rd place** in the national round.

International Space Challenge 2022 Mentor Aug 2021 – Feb 2022

- Recruited a team of four students from different universities. The team won the "**Distinction Award**" for the proposal of the 12U CubeSat named "Reahou-Sat".

Cambodia Robotics Competition 2021 Mentor May 2020 – Jun 2021

- Mentored a university robotics team to participate in national and international robotics competitions. The team won **1st place** in the national Robotics competition in 2021 and received the "**Best Design Award**" at the ABU International Robotics Competition 2021.

OTHER ACTIVITIES

Volunteer

Kampuchea Aerospace Exploration Aspiration (KAXA) Jul 2022 – Sep 2023

- Director overseeing operations and strategic direction.
- Lead planning and organization of Space Engineering Webinar.

REFEREES

Available Upon Request