

# Ryota Fuse

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Research Assistant  
ABE Space Science Laboratory  
Department of Aerospace Engineering  
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## Education

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### **M.S. in Aerospace Engineering (Mach 2019)**

Department of Aerospace Engineering, Nihon University, Japan

Advisor: Associate Prof. Shinsuke Abe

Master Thesis:

*Experimental Study of Lunar Impact Flash using Hypervelocity Impact Facility*

### **B.S. in Aerospace Engineering (March 2017)**

Department of Aerospace Engineering, Nihon University, Japan

Advisor: Associate Prof. Shinsuke Abe

Bachelor Thesis:

*Observation of Lunar Impact Flash by Deep-Space 6U-class Spacecraft EQUULEUS*

## Professional Experience

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### **Assistant Researcher at ISAS/JAXA**

ISAS/JAXA, working on MMX<sup>\*1</sup> project (April 2019-present)

ISAS/JAXA, working on EQUULEUS<sup>\*2</sup> project (April 2016-present)

### **Graduate Research Assistant (April 2019-present)**

Planetary Science, Prof. in charge: Associate Prof. S. Abe

### **Graduate Teaching Assistant (April 2017-March 2019)**

Aerospace Engineering Experiment, Prof. in charge: Associate Prof. S. Abe

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<sup>\*1</sup> MMX: Martian Moons eXploration

<sup>\*2</sup> EQUULEUS: Equilibrium Lunar-Earth point 6U Spacecraft

## Projects

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### MMX (2019-present), PI: Prof. S. Kameda

- working on *onboard camera system developments*, *TENGOO*<sup>\*3</sup> and *OROCHI*<sup>\*4</sup>
- JAXA's mission to explore Martian moons (Phobos and Deimos) with sample return in 2024
- TENGOO is a telescopic camera (narrow angle) for observing the detailed terrain on the surface of the Martian moon
- OROCHI is a wide angle camera to observe the topography and material compositions on the Martian moon surface (multiple wavelengths system)

### APPROACH<sup>\*5</sup> WG (2018), PI: Associate Prof. S. Tanaka

- worked on *an onboard camera system design*
- JAXA's mission Working Group to clarify origin and evolution of the Moon by Penetrator (concept study phase)
- one of science missions, space-based observation of lunar impact flashes by an onboard camera from lunar low orbit

### EQUULEUS (2016-present), PI: Prof. R. Funase

- working on *an onboard camera system development*, *DELPHINUS*<sup>\*6</sup>
- JAXA's CubeSat mission to explore cis-lunar space with low energy transfer, one of 13 CubeSat payloads on NASA's SLS-EM1 in 2020
- one of 3 science missions, space-based observation of lunar impact flashes by "DELPHINUS" from Earth-Moon Lagrangian L2 point

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\*3 TENGOO: TElescopic Nadir imager for GeOmOrphology

\*4 OROCHI: Optical RadiOmeter composed of CHromatic Imagers

\*5 APPROACH: Advanced Penetrator Probe for a Challenge of Hard-landing

\*6 DELPHINUS: DEtection camera for Lunar impact PHenometa IN 6U Spacecraft

## Honors & Awards

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### **Student Session Finalist(2017): Individual honor**

In 31st International Symposium on Space Technology and Science

Title: “*The Study of the Space-Based Observation of Lunar Impact Flashes*”

### **Outstanding Presentation Award(2017): Group award**

In 61st Nihon University College of Science and Technology Academic Workshop

Title: “*Performance Test of DELPHINUS onboard Small Deep-space CubeSat*”

(in Japanese)

### **Outstanding Presentation Award(2016): Individual award**

In 60th Nihon University College of Science and Technology Academic Workshop

Title: “*Observing Lunar Impact Flash using DELPHINUS onboard EQUULEUS*”

(in Japanese)

## Journal Publication

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1. **R. Fuse**, S. Abe, M. Yanagisawa, R. Funase and H. Yano, “Space-based Observation of Lunar Impact Flashes,” *Transactions of the Japan Society for Aeronautical and Space Sciences*. (in press)

## Conference Proceedings

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### **First author**

1. **R. Fuse**, S. Abe, M. Yanagisawa and S. Hasegawa, “Spectroscopic Study using Hypervelocity Impact Experiment toward understanding Lunar Impact Flash Phenomena,” In *Laboratory Experiment of Space Science Symposium 2019*, 23, Sagamihara, Japan, February, 2019.
2. **R. Fuse**, S. Abe, M. Yanagisawa, S. Ikari, H. Yano and R. Funase, “Lunar Impact Flash Science: Ground-based and Space-based Observations,” In *62nd Space Sciences and Technology Conference*, 3B03, Kurume, Japan, October, 2018.
3. **R. Fuse**, S. Abe, M. Yanagisawa and S. Hasegawa, “Lunar Impact Flash Study: Telescopic Observation and Hypervelocity Impact Experiment,” In *The Japanese Society for Planetary Science Fall Meeting 2018*, K1, Asahikawa, Japan, October, 2018.
4. **R. Fuse** and S. Abe, “Observation of Lunar Impact Flashes from Earth Moon Lagrange

- Point,” In *13th Impact Research Meeting*, Hyogo, Japan, November, 2017.
5. **R. Fuse** and S. Abe, “Observation of Lunar Impact Flashes from Earth Moon Lagrange Point,” In *61st Space Sciences and Technology Conference*, 2017-P72, Niigata, Japan, October, 2017.
  6. **R. Fuse**, “The Study of the Space-Based Observation of Lunar Impact Flashes,” In *31st International Symposium on Space Technology and Science*, 2017-s-15-k, Matsuyama, Japan, June, 2017. **Student Session Finalist**
  7. **R. Fuse**, S. Abe, M. Yanagisawa, H. Yano and R. Funase, “Observations of Lunar Impact Flashes and NEOs from Earth-Moon L2 Halo Orbit,” In *5th IAA Planetary Defense Conference*, PDC-17-05-P35, Tokyo, Japan, May, 2017.
  8. **R. Fuse** and S. Abe, “Observing Lunar Impact Flash using DELPHINUS onboard EQUULEUS,” In *60th Nihon University College of Science and Technology Academic Workshop*, K7-80, Tokyo, Japan, December, 2016. **Outstanding Presentation Award**

#### Co-author

1. R. Yamada, T. Kawamura, M. Yanagisawa, S. Abe, T. Fukuhara, K. Onodera, Y. Uchida, S. Kurihara, **R. Fuse**, F. Yoshida, H. Chi, C. Avdellidou, K. Shirai, Y. Ishihara, S. Tanaka, H. Shiraishi and M. Wiczorek “The international observation of lunar impact flashes and application of the results to future lunar seismic experiments,” In *50th Lunar and Planetary Science Conference*, 1770, Texas, USA, March, 2019.
2. K. Miyoshi, R. Funase, S. Ikari, Y. Kawabata, S. Nakajima, S. Nomura, A. Ishikawa, K. Kakihara, R. Takahashi, N. Funabiki, S. Matsushita, K. Yanagida, R. Suzumoto, T. Shibukawa, K. Tomita, M. Fujiwara, D. Mori, Y. Murata, H. Koizumi, J. Asakawa, K. Nishii, A. Hattori, K. Kikuchi, Y. Kobayashi, W. Torii, A. Tomiki, T. Ito, I. Yoshikawa, K. Yoshioka, M. Kuwabara, H. Yano, T. Hirai, S. Abe, **R. Fuse**, N. Ozaki, T. Ikenaga, T. Hashimoto and EQUULEUS project team, “System Design and Development Status of EQUULEUS Onboard SLS EM-1,” In *19th Space Science Symposium*, P-123, Kanagawa, Japan, January, 2019.
3. S. Ikari, M. Fujiwara, H. Kondo, I. Yoshikawa, K. Yoshioka, M. Kuwabara, R. Hikida, S. Arao, S. Abe, M. Yanagisawa, **R. Fuse** Y. Masuda, S. Harima, H. Yano, T. Hirai and R. Funase, “Overview of Scientific Observation Instruments PHOENIX, DELPHINUS and CLOTH in EQUULEUS mission,” In *19th Space Science Symposium*, P-125, Kanagawa, Japan, January, 2019.
4. R. Fukazawa, H. Endo, **R. Fuse** and S. Abe, “Analysis of Ground-based Observation of Lunar Impact Flash and Hypervelocity Impact Experiments,” In *62nd Nihon University College of Science and Technology Academic Workshop*, K7-77, Tokyo, Japan, December, 2018.

5. R. Funase, S. Ikari, Y. Kawabata, K. Miyoshi, S. Nomura, S. Matsushita, N. Funabiki, K. Yanagida, A. Ishikawa, K. Kakihara, R. Takahashi, Y. Murata, R. Suzumoto, T. Shibukawa, D. Mori, M. Fujiwara, K. Tomita, H. Koizumi, K. Nishii, Y. Kobayashi, W. Torii, A. Tomiki, T. Ito, I. Yoshikawa, K. Yoshioka, M. Kuwabara, H. Yano, T. Hirai, S. Abe, **R. Fuse**, N. Ozaki, T. Ikenaga, T. Hashimoto and EQUULEUS project team, "Mission Overview and Flight Model Development Status of the Earth-Moon Lagrange Point Exploration CubeSat EQUULEUS," In *62nd Space Sciences and Technology Conference*, 1A03, Kurume, October, 2018.
6. S. Abe, **R. Fuse**, M. Yanagisawa, H. Yano, R. Funase, R. Yamada, T. Kawamura, S. Tanaka, "Exploration of Surface Resources and Internal Structure of Moon applied by using Lunar Impact Flash Observation from Deep Space CubeSat," In *62nd Space Sciences and Technology Conference*, 1D23, Kurume, October, 2018.
7. R. Funase, S. Ikari, Y. Kawabata, S. Nakajima, S. Nomura, K. Kakihara, R. Takahashi, K. Yanagida, S. Matsushita, A. Ishikawa, N. Funabiki, Y. Murata, R. Suzumoto, T. Shibukawa, D. Mori, M. Fujiwara, K. Tomita, H. Koizumi, J. Asakawa, K. Nishii, I. Yoshikawa, K. Yoshioka, T. Hirai, S. Abe, **R. Fuse**, M. Yanagisawa, K. Miyoshi, Y. Kobayashi, A. Tomiki, W. Torii, T. Ito, M. Kuwabara, H. Yano, N. Ozaki, T. Ikenaga and T. Hashimoto, "Flight Model Design and Development Status of the Earth-Moon Lagrange Point Exploration CubeSat EQUULEUS Onboard SLS EM-1," In *32nd annual AIAA/USU Conference on Small Satellites*, SSC18-VII-05, Utah, USA, August, 2018.
8. R. Yamada, M. Yanagisawa, S. Abe, T. Fukuhara, T. Kawamura, K. Onodera, **R. Fuse**, K. Shirai, S. Tanaka, Y. Ishihara, H. Shiraishi, M. Wieczorek, "The lunar impact flash observations among two nations and application of the results to future lunar seismic experiments," In *JpGU2018*, PPS05-09, Chiba, Japan, May, 2018.
9. S. Abe, M. Yanagisawa, H. Yano, R. Funase, S. Ikari, **R. Fuse**, Y. Masuda, R. Shimada, K. Yamamoto and R. Kobayashi, "Development of Lunar Impact Observing Camera DELPHINUS onboard EQUULEUS," In *18th Space Science Symposium*, P-096, Kanagawa, Japan, January, 2018.
10. Y. Masuda, S. Abe, **R. Fuse**, M. Yanagisawa, H. Yano and R. Funase, "Performance Test of DELPHINUS onboard Small Deep-space CubeSat," In *61th Nihon University College of Science and Technology Academic Workshop*, K7-85, Tokyo, Japan, December, 2017. **Outstanding Presentation Award**
11. Y. Masuda, **R. Fuse**, S. Abe, M. Yanagisawa, R. Shimada, S. Ikari, M. Ikura, H. Yano and R. Funase, "Development of Lunar Impact Observing Camera DELPHINUS onboard EQUULEUS," In *The Japanese Society for Planetary Science Fall Meeting 2017*, P63, Osaka, Japan, September, 2017.
12. S. Abe, M. Yanagisawa, H. Yano, R. Funase and **R. Fuse**, "Mining Earth's Mini-

moons near Cislunar Space by 6U Spacecraft,” In *61st Space Sciences and Technology Conference*, 2017-2D16, Niigata, Japan, October, 2017.

13. S. Abe, **R. Fuse**, M. Yanagisawa, H. Yano, R. Funase and DLP team, “Development of Lunar Impact Flash Near-Earth Asteroid Observing Camera DELPHINUS on Deep-space 6U Spacecraft EQUULEUS”, In *2017 Asia-Pacific Regional IAU Meeting*, P1-21, Taipei, Taiwan, July, 2017.
14. S. Abe, M. Yanagisawa, **R. Fuse**, K. Oguri, M. Ikura, H. Yano and R. Funase, “Development of DELPHINUS camera system onboard EQUULEUS,” In *17th Space Science Symposium*, P-025, Kanagawa, Japan, January, 2017.

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