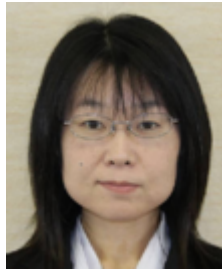Division of Information and Systems
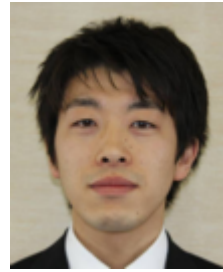
Space and Planetary Informatics Laboratory

Hirohide Demura
Professor

Yoshiko Ogawa
Associate Professor

Kohei Kitazato
Associate Professor

Chikatoshi Honda
Associate Professor

Refereed academic journal

[chonda-311-017-01:2017] M.; Kouyama T.; Tatsumi E.; Kameda S.; Honda R.; Sawada H.; Ogawa N.; Morota T.; Honda C.; Sakatani N.; Hayakawa M.; Yokota Y.; Yamamoto Y.; Sugita S. Suzuki, H.; Yamada. Initial inflight calibration for Hayabusa2 optical navigation camera (ONC) for science observations of asteroid Ryugu. *Icarus*, 2018.

Hayabusa2, the first sample return mission to a C-type asteroid was launched by the Japan Aerospace Exploration Agency (JAXA) on December 3, 2014 and will arrive at the asteroid in the middle of 2018 to collect samples from its surface, which may contain both hydrated minerals and organics. The optical navigation camera (ONC) system on board the Hayabusa2 consists of three individual framing CCD cameras, ONC-T for a telescopic nadir view, ONC-W1 for a wide-angle nadir view, and ONC-W2 for a wide-angle slant view will be used to observe the surface of Ryugu. The cameras will be used to measure the global asteroid shape, local morphologies, and visible spectroscopic properties. Thus, image data obtained by ONC will provide essential information to select landing (sampling) sites on the asteroid. This study reports the results of initial inflight calibration based on observations of Earth, Mars, Moon, and stars to verify and characterize the optical performance of the ONC, such as flat-field sensitivity, spectral sensitivity, point-spread function (PSF), distortion, and stray light of ONC-T, and distortion for ONC-W1 and W2. We found some potential problems that may influence our science observations. This includes changes in sensitivity of flat fields for all bands from those that were measured in the pre-flight calibration and existence of a stray light that arises under certain conditions of spacecraft attitude with respect to the sun. The countermeasures for these problems were evaluated by using data obtained during initial in-flight calibration.

[chonda-311-017-02:2017] H.; Takamatsu T.; Cho Y.; Yasuda T.; Yamada M.; Sawada H.; Honda R.; Morota T.; Honda C.; Sato M.; Okumura Y.; Shibasaki K.; Ikezawa S.; Sugita S. Kameda, S.; Suzuki. Preflight Calibration Test Results for Optical Navigation Camera Telescope (ONC-T) Onboard the Hayabusa2 Spacecraft. *Space Science Reviews*, 2017.

The optical navigation camera telescope (ONC-T) is a telescopic framing camera with seven colors onboard the Hayabusa2 spacecraft launched on December 3, 2014. The main objectives of this instrument are to optically navigate the spacecraft to asteroid Ryugu and to conduct multi-band mapping the asteroid.

We conducted performance tests of the instrument before its installation on the spacecraft. We evaluated the dark current and bias level, obtained data on the dependency of the dark current on the temperature of the charge-coupled device (CCD). The bias level depends strongly on the temperature of the electronics package but only weakly on the CCD temperature. The dark-reference data, which is obtained simultaneously with observation data, can be used for estimation of the dark current and bias level. A long front hood is used for ONC-T to reduce the stray light at the expense of flatness in the peripheral area of the field of view (FOV). The central area in FOV has a flat sensitivity, and the limb darkening has been measured with an integrating sphere. The ONC-T has a wheel with seven bandpass filters and a panchromatic glass window. We measured the spectral sensitivity using an integrating sphere and obtained the sensitivity of all the pixels. We also measured the point-spread function using a star simulator. Measurement results indicate that the full width at half maximum is less than two pixels for all the bandpass filters and in the temperature range expected in the mission phase except for short periods of time during touchdowns.

[chonda-311-017-03:2017] Kohei; Abe Masanao; Ohtake Makiko; Arai Takehiko; Arai Tomoko; Hirata Naru; Hiroi Takahiro; Honda Chikatoshi; Imae Naoya; Komatsu Mutsumi; Matsunaga Tsuneo; Matsuoka Moe; Matsuura Shuji; Nakamura Tomoki; Nakato Aiko; Nakauchi Yusuke; Osawa Takahito; Senshu Hiroki; Takagi Yasuhiko; Tsumura Kohji; Takato Naruhisa; Watanabe Sei-ichiro; Barucci Maria Antonietta; Palomba Ernesto; Ozaki Masanobu Iwata, Takahiro; Kitazato. NIRS3: The Near Infrared Spectrometer on Hayabusa2. *Space Science Reviews*, 2017.

NIRS3: The Near Infrared Spectrometer is installed on the Hayabusa2 spacecraft to observe the target C-type asteroid 162173 Ryugu at near infrared wavelengths of 1.8 to 3.2 um. It aims to obtain reflectance spectra in order to detect absorption bands of hydrated and hydroxide minerals in the 3 um-band. We adopted a linear-image sensor with indium arsenide (InAs) photo diodes and a cooling system with a passive radiator to achieve an optics temperature of 188 K (-85degC), which enables to retaining sufficient sensitivity and noise level in the 3 um wavelength region. We conducted ground performance tests for the NIRS3 flight model (FM) to confirm its baseline specifications. The results imply that the properties such as the signal-to-noise ratio (SNR) conform to scientific requirements to determine the degree of aqueous alteration, such as CM or CI chondrite, and the stage of thermal metamorphism on the asteroid

surface.

[kitazato-311-017-01:2017] T. Okada, T. Fukuhara, S. Tanaka, M. Taguchi, T. Imamura, T. Arai, H. Senshu, Y. Ogawa, H. Demura, K. Kitazato, R. Nakamura, T. Kouyama, T. Sekiguchi, S. Hasegawa, T. Matsunaga, T. Wada, J. Takita, N. Sakatani, Y. Horikawa, K. Endo, J. Helbert, T. G. Mueller, and A. Hagermann. Thermal Infrared Imaging Experiments of C-Type Asteroid 162173 Ryugu on Hayabusa2. *Space Science Reviews*, 208(1-4):255–286, 2017.

[kitazato-311-017-02:2017] T. Iwata, K. Kitazato, M. Abe, M. Ohtake, T. Arai, T. Arai, N. Hirata, T. Hiroi, C. Honda, N. Imae, M. Komatsu, T. Matsunaga, M. Matsuoka, S. Matsuura, T. Nakamura, A. Nakato, Y. Nakauchi, T. Osawa, H. Senshu, Y. Takagi, K. Tsumura, N. Takato, S. Watanabe, M. A. Barucci, E. Palomba, and M. Ozaki. NIRS3: The Near Infrared Spectrometer on Hayabusa2. *Space Science Reviews*, 208(1-4):317–337, 2017.

[kitazato-311-017-03:2017] M. Matsuoka, T. Nakamura, T. Osawa, T. Iwata, K. Kitazato, M. Abe, Y. Nakauchi, T. Arai, M. Komatsu, T. Hiroi, N. Imae, A. Yamaguchi, and H. Kojima. An evaluation method of reflectance spectra to be obtained by Hayabusa2 Near-Infrared Spectrometer (NIRS3) based on laboratory measurements of carbonaceous chondrites. *Earth, Planets and Space*, 69(1):1–12, 2017.

[yoshiko-311-017-01:2017] T. Nakamura S. Tanaka H. Demura Y. Ogawa N. Sakatani Y. Horikawa H. Senshu T. Fukuhara T. Okada Arai, T. Thermal Imaging Performance of TIR Onboard the Hayabusa2 Spacecraft. *Space Science Reviews*, 208:239–254, July 2017.

The thermal infrared imager (TIR) is a thermal infrared camera onboard the Hayabusa2 spacecraft. TIR will perform thermography of a C-type asteroid, 162173 Ryugu (1999 JU3), and estimate its surface physical properties, through remote in-situ observations in 2018 and 2019.

[yoshiko-311-017-02:2017] T. Fukuhara S. Tanaka M. Taguchi T. Imamura T. Arai H. Senshu Y. Ogawa H. Demura K. Kitazato R. Nakamura T. Kouyama T. Sekiguchi S. Hasegawa T. Matsunaga T. Wada J. Takita N. Sakatani Y. Horikawa K. Endo J. Helbert T. G. Muller A. Hagermann Okada, T. Thermal Infrared Imaging Experiments of C-Type Asteroid 162173 Ryugu on Hayabusa2. *Space Science Reviews*, 208:255–286, July 2017.

Summary of Achievement

The thermal infrared imager TIR onboard Hayabusa2 has been developed to investigate thermo-physical properties of C-type, near-Earth asteroid 162173 Ryugu. TIR is one of the remote science instruments on Hayabusa2 designed to understand the nature of a volatile-rich solar system small body, but it also has significant mission objectives to provide information on surface physical properties and conditions for sampling site selection as well as the assessment of safe landing operations.

Refereed proceedings of an academic conference

[chonda-311-017-04:2017] T. Kouyama S. Kameda Y. Yokota S. Sakatani H. Suzuki M. Yamada H. Sawada R. Honda C. Honda T. Morota K. Ogawa M. Hayakawa K. Yoshioka N. Ogawa N. Tanabe H. Kamiyoshihara Y. Iijima ONC Team S. Sugita, E. Tatsumi. Pre-Arrival Scientific Calibration of the Hayabusa2 Multi-Band Visible Camera. In *49th Lunar and Planetary Science Conference*, 2018.

Introduction: JAXAs Hayabusa2 is planned to bring back samples to Earth from one of the C-type asteroids, which are widely believed to contain water and organics, important ingredients for life. When the spacecraft arrives at the target asteroid Ryugu, it will start detailed observations on its surface for both understanding its geologic history and selecting sampling sites.

[chonda-311-017-05:2017] C. Honda M. Ohtake M. Hareyama, Y. Ishihara. Preliminary Unsupervised Classification of the Mercurys Surface Using Multi-band Reflectance Data Obtained by MESSENGER/MDIS. In *49th Lunar and Planetary Science Conference*, 2018.

Introduction: The final goal of our study is to create a global geologic map of Mercury to approach Mercurian crustal evolution. For that purpose, we decide geological unit of Mercury's surface by using automatic classification methods for different physical quantities such as reflectance spectrum, element concentration, and elevation acquired by US Mercury Explorer MESSENGER.

[yoshiko-311-017-03:2017] Ogawa Y. Hirata N. Demura H. Narusawa M. Hayashi Y. Kato, H. Application of Deep Learning for Automatic Detection of Lunar Swirls by Combining Data from Multi-Band Imager and DEM. In *49th Lunar and Planetary Science Conference*, page 1869, March 2018.

This study challenges automatic identification of lunar swirls by deep learning. We conducted evaluations.

[yoshiko-311-017-04:2017] Fukuhara T. Tanaka S. Taguchi M. Arai T. Senshu H. Sakatani N. Ogawa Y. Demura H. Kitazato K. Kouyama T. Sekiguchi T. Hasegawa S. Matsunaga T. Wada T. Imamura T. Takita J. Shimaki Y. Kyoda H. Aoki Y. Helbert J. Mueller T. G. Hagermann A. Okada, T. Thermal Infrared Imager TIR on Hayabusa2 and Its Preparation for Asteroid Proximity Phase Operations Around 162173 Ryugu. In *48th Lunar and Planetary Science Conference*, page 1403, March 2018.

Thermal infrared imager on Hayabusa2 is to investigate thermo-physical properties of 162173 Ryugu. Its in-flight performance and observation plan are presented.

Unrefeered proceedings of an academic conference

[chonda-311-017-06:2017] M. Yamada S. Kameda H. Suzuki T. Kouyama R. Honda H. Sawada N. Ogawa K. Ogawa T. Morota C. Honda N. Sakatani M. Hayakawa Y. Yokota Y. Yamamoto S. Sugita N. Tanabe, E. Tatsumi. Multi-band image analysis of Itokawa and optical properties analysis of Hayabusa2/ONC-T. In *JpGU-AGU Joint Meeting 2017*, 2017.

Aerospace Exploration Agency, 8. Kobe Univ., 9. Nagoya Univ., 10. Univ. of Aizu Hayabusa2 is planned to bring samples from Ryugu back to the earth. Choosing sampling sites on Ryugu is very important. Sampling fresh materials not affected by space weathering very much is important for obtaining information on early evolution of the Solar System, because space weathering may overwrite record from the long past. In order to understand where on small asteroid we can find fresh materials, we analyzed the data taken by AMICA/Hayabusa. In addition, we analyzed optical characteristic, especially the point spread function (PSF), of the multi-band visible camera (ONC-T) of Hayabusa2 in order to carry out the same spectral analysis of space weathering.

[chonda-311-017-07:2017] H. Demura N. Hirata C. Honda S. Kamata Y. Karouji J. Kimura M. Morota H. Nagaoka R. Nakamura S. Yamamoto Y. Yokota M. Ohtake M. Hareyama, Y. Ishihara. Global classification map of lunar absorption spectra and new impression of lunar crust formation. In *JpGU-AGU Joint Meeting 2017*, 2017.

This report presents the global classification map of lunar absorption spectra by unsupervised classification methods and new impression of lunar crust formation based on the map.

[chonda-311-017-08:2017] C. Honda M. Ohtake SLIM MBC team K. Saiki, H. Shiraishi. Design and development of Multi-band Camera proposed for SLIM mission. In *JpGU-AGU Joint Meeting 2017*, 2017.

Smart Lander for Investigating Moon (SLIM) is being planned by Japan Aerospace Exploration Agency (JAXA). SLIM aims to research and demonstrate the engineering key issues related to the smart landing on the gravitational planets.

[chonda-311-017-09:2017] C. Honda Y. Yasuda. Improvement of the extraction method of lunar secondary crater using the Voronoi tessellation. In *JpGU-AGU Joint Meeting 2017*, 2017.

One of the estimation methods of formation age of planet surface is the crater chronology. Generally, craters are increasingly formed on the planet surface at random over time. From this perspective, the crater chronology utilizes the crater number density to estimate the formation age of planet surface. When we utilize the crater chronology, we should exclude secondary craters. Secondary craters are formed by ejecta thrown out from primary crater produced by the impact object from interplanetary space.

[chonda-311-017-10:2017] C. Honda T. Sato. Positive openness map for visual inspection of fault scarp associated with lunar wrinkle ridges. In *JpGU-AGU Joint Meeting 2017*, 2017.

Wrinkle ridges are topographic features observed often in plains of the moon. Both edges of wrinkle ridge have scarps related to the fault slip in the subsurface. According to a hypothesis of the origin of wrinkle ridges (e.g., Suppe et al., 1983), the scarps are defined as fore-limb and back-limb, and the fore-limb which has abrupt slope compared with back-limb corresponds to a fault scarp. These fault scarps are formed by horizontal pressure related to tectonic deformation of subsurface of the moon. The spatial distribution and their scale of fault scarps with wrinkle ridges lead us to understand the evolution of the lunar subsurface.

[chonda-311-017-11:2017] C. Honda R. Ito, R. Nakamura. Automatic detection of lunar sub-km craters via deep learning. In *JpGU-AGU Joint Meeting 2017*, 2017.

Crater chronology is a method that estimates generated age on surface of a body from size-frequency distribution (SFD) of impact craters. Coordinates and diameter are needed for computing SFD, and measurement accuracy of crater information is factored into the estimation accuracy of crater chronology. So, highly accurate crater information is important for discussing evolution process of the lunar surface.

[kitazato-311-017-04:2017] T. Inasawa, K. Kitazato, N. Hirata, and H. Demura. Cluster analysis of near-infrared reflectance spectra of asteroid Itokawa. In *American Astronomical Society, DPS meeting 49*, number 110.03. AAS, October 2017.

[kitazato-311-017-05:2017] K. Kitazato, N. Hirata, H. Demura, T. Inasawa, M. Abe, Y. Yamamoto, A. Miura, and J. Kawaguchi. Thermally induced rock breakdown on asteroid Itokawa. In *American Astronomical Society, DPS meeting 49*, number 204.10. AAS, October 2017.

[kitazato-311-017-06:2017] D. Takir, C. A. Hibbitts, L. Le Corre, J. P. Emery, K. Kitazato, S. Sugita, and Y. Nakauchi. Hayabusa2 NIRS3 Investigation to Characterize and Select Sampling and Landing Sites on Asteroid (25143) Ryugu. In *American Astronomical Society, DPS meeting 49*, number 219.07. AAS, October 2017.

[kitazato-311-017-07:2017] K. Kitazato, S. Nasu, T. Iwata, M. Abe, M. Ohtake, and Hayabusa2 NIRS3 Team. Near-Infrared Spectroscopy of Mars and Jupiter from the NIRS3 Instrument on Hayabusa2. In *48th Lunar and Planetary Science Conference*, number 1964, page 1508. LPI, March 2017.

[yoshiko-311-017-05:2017] Y. Ogawa Y. Hayashi N. Hirata H. Demura T. Matsunaga S. Yamamoto Y. Yokota M. Ohtake Iimura, S. Extension of the lunar Web-GIS GEKKO: Toward statistical analyses of the lunar spectral data. In *JpGU-AGU Joint Meeting 2017*, pages PPS08–P02, May 2017.

[yoshiko-311-017-06:2017] Y. Ogawa M. Ohtake Y. Hayashi N. Hirata H. Demura T. Matsunaga S. Yamamoto Matsubara, Y. Implementation of assortment algorithm for excluding noisy data in the lunar web-GIS: GEKKO. In *JpGU-AGU Joint Meeting 2017*, pages PPS08–P03, May 2017.

Summary of Achievement

[yoshiko-311-017-07:2017] Y. Ogawa Y. Hisada H. Demura S. Miura T. Ozawa
Abe, K. Crustal deformation around Azumayama volcano : InSAR
analysis compared with GNSS data. In *JpGU-AGU Joint Meeting 2017*,
pages STT57–07, May 2017.

[yoshiko-311-017-08:2017] Y. Ogawa H. Demura Nakamura, Y. Detection of phyl-
losilicates around ouflow channels in the northeast of the Hellas basin,
Mars. In *JpGU-AGU Joint Meeting 2017*, pages PPS05–P05, May 2017.

[yoshiko-311-017-09:2017] Y. Ogawa H. Demura Oya, N. Distribution of phyllosil-
icates in relation with topographic features on Utopia Region, Mars. In
JpGU-AGU Joint Meeting 2017, pages PPS05–P06, May 2017.

[yoshiko-311-017-10:2017] T. Dairaku K. Suko T. Takahashi H. Demura Y. Ogawa
T. Arai T. Fukuhara T. Okada S. Tanaka Endo, K. HEAT: Image and
database browser for the thermal imager on Hayabusa2. In *JpGU-AGU
Joint Meeting 2017*, pages PPS02–P22, May 2017.

[yoshiko-311-017-11:2017] T. Fukuhara S. Tanaka M. Taguchi T. Arai H. Sen-
shu Y. Ogawa H. Demura K. Kitazato R. Nakamura T. Kouyama T.
Sekiguchi S. Hasegawa T. Matsunaga T. Wada T. Imamura J. Takita N.
Sakatani Y. Horikawa K. Endo J. Helbert T. G. Mueller A. Hagermann
Okada, T. Detectability Performance of Thermal Infrared Imager TIR
on Hayabusa2. In *JpGU-AGU Joint Meeting 2017*, pages PPS02–P20,
May 2017.

Academic society activities

[yoshiko-311-017-12:2017] Y. Ogawa, 2016.

Member of Diversity Promotion Committee

[yoshiko-311-017-13:2017] Y. Ogawa, 2016.

Member of Foreign Cooperation and Collaboration Technical Committee

[yoshiko-311-017-14:2017] Y. Ogawa, 2016.

Member of Planning Committee

Advisor for undergraduate research and graduate research

[kitazato-311-017-08:2017] Tomoki Inasawa. Master Thesis: Near-infrared reflectance spectral analysis of asteroid Itokawa based on re-estimating trajectory data of Hayabusa spacecraft, University of Aizu, 2018.

Thesis Advisor: K. Kitazato

[kitazato-311-017-09:2017] Yasuhiro Takahashi. Graduation Thesis: Pseudo-fieldwork on asteroids using virtual reality, University of Aizu, 2018.

Thesis Advisor: K. Kitazato

[kitazato-311-017-10:2017] Takefumi Onodera. Graduation Thesis: Investigation of doublet craters on the Moon using spatial statistics, University of Aizu, 2018.

Thesis Advisor: K. Kitazato

[kitazato-311-017-11:2017] Ryuta Nozaki. Graduation Thesis: Search for doublet craters on Mare Moscovience of the Moon, University of Aizu, 2018.

Thesis Advisor: K. Kitazato

[kitazato-311-017-12:2017] Natsuko Mori. Graduation Thesis: Development of space educational VR content on Hayabusa touchdown operation, University of Aizu, 2018.

Thesis Advisor: K. Kitazato

[yoshiko-311-017-15:2017] m5201113 Hiroaki Kato. Master Thesis: Application of Deep Learning for Automatic Detection of Lunar Swirls by Combining Data from Multi-Band Imager and DEM, University of Aizu, March 2018.

Thesis Advisor: Y. Ogawa

[yoshiko-311-017-16:2017] s1220031 Koji Sato. Graduation Thesis: Development of a GIS tool for viewing volcanic and tectonic data in Japan, University of Aizu, March 2018.

Thesis Advisor: Y. Ogawa

[yoshiko-311-017-17:2017] s1220015 Masaki Narusawa. Graduation Thesis: Evaluation of deep learning for identifying lunar swirls, University of Aizu, March 2018.

Thesis Advisor: Y. Ogawa

Summary of Achievement

[yoshiko-311-017-18:2017] s1220163 Kazuya Matsumoto. Graduation Thesis: Seasonal change of water environment in Oze marsh indicated by ALOS/PALSAR data, University of Aizu, March 2018.

Thesis Advisor: Y. Ogawa

Others

[yoshiko-311-017-19:2017] Y. Ogawa. Reviewer of Grants-in-Aid for Scientific Research ¡KAKENHI¿ Research Activity Start-up, 2017.

[yoshiko-311-017-20:2017] Y. Ogawa. Member of satellite data analysis group in Coordinating Committee for Prediction of Volcanic Eruptions created by Japan Meteorological Agency, April 2017.

[yoshiko-311-017-21:2017] Y. Ogawa. Co-I of the Special Collaborative Research (B) funded by Earthquake Institute, the University of Tokyo, Research for crustal deformation by using synthetic aperture radar of new generation, PI: Taku Ozawa (NIED), 2017.

[yoshiko-311-017-22:2017] Y. Ogawa. Cooperation member of the MEXT project: Integrated project of developing the human resources for volcano researches in the Next generation: Development of the new observation technology, 2017.

[yoshiko-311-017-23:2017] Y. Ogawa. The 4th Oze academic research team member, 2017.

[yoshiko-311-017-24:2017] Y. Ogawa. JAXA/ISAS science team members.

[yoshiko-311-017-25:2017] Y. Ogawa. Hayabusa 2 project members.

[yoshiko-311-017-26:2017] Y. Ogawa. Part-time Lecturer at Shibaura Institute of Technology, 2017.

Applied physics: Thermodynamics

Contributions related to syllabus preparation

[chonda-311-017-12:2017] Computational geometry for visual computing 1 Course outline Computational geometry is one of important field of computer science to solve geometric problems. In recent, to solve geometric problem with large data and handle with high-speed processing is required for such as geographic information system (GIS), computational graphics (CG), computer-aided design (CAD), and pattern recognition, robotics, and others. In the class, students learn about computational geometric concepts in the first half section (Chap.1-7), and learn about information visualization on the premise of various concepts / algorithms in the latter part (Chap.8-14). ...

Contribution related to the selection of library or textbook materials

[chonda-311-017-13:2017] Library committee member

Contribution related to toward equipment management, classroom management, building management, and crime or fire prevention.

[yoshiko-311-017-27:2017] Fire prevention manager of 223B and 245

Contribution related to on-campus/off-campus publicity work

[yoshiko-311-017-28:2017] Exhibition of UoA at University Information Fair (Astrology and planetary science major), August 27, 2017 at Tokyo University of Science, Shinjuku-ku, Tokyo

Contribution related to planning administration for research, research conferences, or international research

[yoshiko-311-017-29:2017] LOC of 10th Practical training seminar on the data analysis in planetary missions at UoA, March 5-7, 2018

Other significant contribution toward university planning, management, or administration

Summary of Achievement

[yoshiko-311-017-30:2017] Member of committee for Claim Management

[yoshiko-311-017-31:2017] Member of Harassment Prevention Committee

[yoshiko-311-017-32:2017] Member of committee for Harassment management

Contributions related to regional education

[yoshiko-311-017-33:2017] Committee member of Aizu-Wakamatsu city Disaster Control Council

[yoshiko-311-017-34:2017] On-campus lecture for Sukagawa municipal Nida junior high school students, 1st grade students + teachers, 53 attendees, May, 18, 2017

[yoshiko-311-017-35:2017] Open lecture for public at Aizu IT Aki Forum, October 20, 2017

[yoshiko-311-017-36:2017] Dispatched off-campus lectures at Shizuoka City high school, October 26, 2017, 2nd grade students, 40 attendee

[yoshiko-311-017-37:2017] Preparation for Exhibition of UoA at Fukushima Aerospace Fair, November 23, 2017 Fukushima City

Did you participate in Public Lectures, and/or Open Campus? (Yes or No) If yes, please describe what you did.

[chonda-311-017-14:2017] Off-campus Lectures: 2 Off-Campus Public Lectures by Dispatched Faculty Members: 2 Open Campus (summer / autumn): both

[yoshiko-311-017-38:2017] Preparation of posters for open campus