

Curriculum Vitae

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Education

Seoul National University (Seoul, South Korea) – Ph.D. in Astronomy 2017.09-2024.02

- Supervisor: **Prof. Myungshin Im** (GPA 3.8/4.3)

Chungnam National University (Daejeon, South Korea) – B.S. in Astronomy 2013.03-2017.02

- Dual Major: Physics (GPA 4.3/4.5)

Research Interests

Observational Astronomer looking for the transient in Gravitational-wave Multi-messenger era

- Gravitational-wave Optical Follow-up Observation Strategy and Development of Data Reduction Pipeline
- The Diversity and Physics of Kilonova as an Optical Counterpart of Gravitational Wave and Gamma-ray Burst
- Machine Learning in Astronomy: Real/Bogus Classification, Kilonova classification with Photometric SED

Awards

- **Winner of poster prizes at GPPAW Melbourne (\$1,000 AUD) - OzGrav 2022.12.09 ([Webpage](#))**

Participation of Observation Proposal as CI

- Im, M., ..., Paek, G. S. H., et al. 2018B, 2020A, 2022B, 2023A, 2023B, Gemini (Flamingos2, GNIRS, NIRI, GMOS South/North), Queue + Rapid ToO: *Optical/NIR Follow-up Observational Study of Gravitational Wave Sources, and Long-term Optical/NIR Monitoring of Gravitational-wave Sources*
- Im, M., ..., Paek, G. S. H., et al. 2020-10-01 to 2023-09-30, 2024-01-01 to 2026-12-31, KMTNet, ToO: *Multi-Messenger Astronomy with KMTNet*
- Im, M., ..., Paek, G. S. H., et al. 2020-10-01 to 2023-09-30, Wide-Field Survey: *KMTNet Synoptic Survey of Southern Sky (KS4)*
- Im, M., ..., Paek, G. S. H., et al. 2020B, BOAO ToO: *Gamma-Ray Burst Optical Afterglows, and Follow-up observation of energetic transients*
- Im, M., ..., Paek, G. S. H., et al. 2019A, UKIRT ToO: *Follow-up Observation of Energetic Transients and UKIRT Multi-Messenger Astronomy*

Publications

First Author Publications ([Link to ADS Library](#))

1. **Paek, G. S. H.**, et al., submitted in ApJS: *Gravitational-wave Electromagnetic Counterpart Korean Observatory (GECKO): GECKO Follow-up Observation of GW190425*

Upcoming Publications

1. D. A. Kann., ..., **Paek, G. S. H.**, et al. in preparation, A&A: *Fires in the Deep: The Luminosity Distribution of Early-Time Gamma-ray Burst Afterglows in the Light of the Gamow Explorer Sensitivity Requirements*
2. Taak, Donggeun, Uhm Z. Lucas, **Paek, G. S. H.**, and Im, M., et al. in preparation, Nature Astronomy: *Multi-wavelength analysis on the early afterglow of the extremely bright GRB 221009A*
3. **Paek, G. S. H.**, Im, M., and Kim, J. H. in preparation, ApJ: *Kilonova Identification with a single epoch SED of 7-Dimensional Telescope in Observing Run 4*

Refereed Publications ([Link to ADS Library](#))

1. Yang, Y., Troja, E., ..., **Paek, G. S. H.**, submitted in Nature: *A lanthanide-rich kilonova in the aftermath of a long gamma-ray burst*
2. Becerra, R. L., ..., **Paek, G. S. H.**, et al. 2023, submitted in MNRAS: *Deciphering the unusual stellar progenitor of GRB-210704A*
3. Gu, Lim, Im, M., **Paek, G. S. H.**, et al. 2023, ApJ, 949, 33: *The Early Light Curve of a Type Ia Supernova 2021hpr in NGC 3147: Progenitor Constraints with the Companion Interaction Model*
4. Masterson, Megan, ..., **Paek, G. S. H.**, et al. 2023, ApJL, 945, 34: *Unusual Hard X-Ray Flares Caught in NICER Monitoring of the Binary Supermassive Black Hole Candidate AT2019cuk/Tick Tock/SDSS J1430+2303*

5. Kim, Joonho, Im, M., **Paek, G. S. H.**, et al. 2021, ApJ, 916, 47K: *GECKO Optical Follow-up Observation of Three Binary Black Hole Merger Events: GW190408_181802, GW190412, and GW190503_185404*
6. Im, M., ..., **Paek, G. S. H.**, et al. 2021, JKAS, 54, 89I: *SomangNet: Small Telescope Network of Korea*
7. Kim, Y., ..., **Paek, G. S. H.**, et al. 2020, ApJ, 904, 111K: *The Infrared Medium-deep Survey. VIII. Quasar Luminosity Function at $z \sim 5$*
8. Shin, S., ..., **Paek, G. S. H.**, et al. 2020, ApJ, 893, 45S: *The Infrared Medium-deep Survey. VII. Faint Quasars at $z \sim 5$ in the ELAIS-N1 Field*
9. Im, M., ..., **Paek, G. S. H.**, et al. 2019, JKAS, 52, 11I: *Intensive Monitoring Survey of Nearby Galaxies (IMSNG) Transient Reports* ([Link to ADS Library](#))
- The Gamma-ray Coordinates Network (GCN) Circulars Archive, 49 in total (22 as first author)

Observational Experience

- Monitoring and Following up **SNe**, and **other transients** (GRB, FBOT, ...)
 - 0.36m Telescope (SBIC STX16803, optical imager) @DeepSkyChile (Chile, USA) – 2 nights in 2020B (remote)
 - 1.0m Telescope (SBIC STX16803, optical imager) @Seoul National University Astronomical Observatory (Seoul, South Korea) - 3 nights in 2019, and 10 nights in 2018
 - 1.5m Telescope (SNUCAMII, optical/NIR imager) @Maidanak Observatory (Tashkent, Uzbekistan) – 6 nights in 2018A
 - 30inch Telescope (Loral Fairchild CCD, optical imager) @McDonald Observatory (Texas, USA) – **38 nights** in 2016B-2020A (Remote and on-site observation)
- Confirmation **Quasar** Candidates
 - 1.8m Telescope (BOES, spectroscopy) @Bohyunsan Optical Astronomy Observatory (Yeongcheon, South Korea) – 4 nights in 2022B
 - 2.1m Telescope (SQUEAN, optical/NIR imager) @McDonald Observatory (Texas, USA) – 10 nights in 2019A

Conferences and Workshops

- “GECKO and 7DT: Gravitational-Wave Optical Follow-up Observation Campaign in Korea” (Invited talk) 69th Workshop on Gravitational Waves and Numerical Relativity; Pohang, South Korea – 2023.06.14
- “GW EM Counterpart Korean Observatories (GECKO) with 7DT and prospects in LVK O4 run” (Invited talk) The 9th KAGRA International Workshop (KIW9); Remote – 2022.06.08
- 2 oral talks and 3 posters in international conferences: GWPAPW, Is-Ko-Space 2023 and IAUS 363
- 7 oral talks and 3 posters in Korean Astronomical Society Meeting, and 6 talks in domestic conferences

Outreach Experience

- 2 Panel Discussions as a Student Research Representative; Ministry of Science and ICT, and The National Science Challenges Support & Network, 2022 ([Webpage](#) and [YouTube link](#))
- “Data Reduction for Astronomical image” (Invited talk) – 2022 KAO Summer Camp; Korea Astronomy Olympiad (KAO), 2022.07.19, 25
- “The Space Miner, Astronomer, looking for the gold!” (Public Talk) – 2021 Science Culture Program Business Matching Day; Ministry of Science and ICT, 2021.11.28
- Student Teaching Assistant at Seoul National University
 - Course: Extraterrestrial Planets and Life (Graduate) 2017B, 2018A, 2020A

Skills and Certifications

- **Programing:** Python (expert)
- **Development of pipeline**
 - Automatic pipeline for the optical/NIR data reduction, photometry, and transient search ([gpPy](#))
 - Automatic real-time GW alert receiver for GW optical follow-up ([GeckoDigester](#))
- **Software**
 - Image Process: **SExtractor**, **HOTPANTS**, Astrometry.net, SWarp, WCSremap, astrocrappy, IRAF, and PyRAF
 - Others: ligo.skymap (GW), healpy (GW), astropy, astroplan, ds9, sklearn (ML), EAZY (phot-z)
- Managers for CentOS, and Ubuntu Research Servers (2022-)
- National Certification: **Engineer Big Data Analysis** ([link](#)), and Advanced Data Analytics Semi-Professional ([link](#)), and the Advanced Science Convergence Lecture Course ([link](#))