

KADEK HENDRAWAN PALGUNADI

NO H 52.2 Sonneggstrasse 5 \diamond 8092 Zürich, Switzerland

kadek.palgunadi@its.ac.id

EDUCATION

King Abdullah University of Science and Technology (KAUST) *Sep. 2018 - Sep. 2023*

Ph.D in Seismology

Research topic: Earthquake dynamics in multi-scale fracture networks

Institute de Physique du Globe de Paris (IPGP) *2017 - 2018*

M.Sc in Geophysics (*Magna cumlaude 15.81/20*)

Thesis: Improvement of spatio-temporal microseismic monitoring in real-time measurement at Garpenberg Mine, Sweden

Institut Teknologi Bandung (ITB) *2012 - 2016*

B.Sc in Geophysics (*cumlaude 3.80/4.00*)

Final project: Steam and Brine Zone Prediction around Geothermal Reservoir Derived from Delay Time Seismic Tomography and Anisotropy Case Study: "PR" Geothermal Field

RESEARCH INTEREST

Earthquake Physics

Observational Seismology

High Performance Computing

Machine Learning

EXPERIENCE

Postdoctoral *February 2024 - Now*

ETH Zürich, Switzerland

Developing high-frequency seismogram using a hybrid method, combining physics-based ground motion simulation and generative artificial neural network.

Lecturer *January 2024 - Now*

Institut Teknologi Sepuluh Nopember, Indonesia

Teaching, research, and social service.

Graduate Research Internship *January 2018 - June 2018*

Intern at IPGP and Ineris

- Developing a program to detect and locate microseismic events in very high frequency ($> 1\text{kHz}$) band in near real-time as an underground deep mining monitoring system. This program has been implemented in deep mine Garpenberg, Sweden.

PT. LAPI ITB *September 2016 - June 2017*

Research Assistant

- Responsible for developing seismological geothermal software project.
- Deploying seismometer for earthquake aftershock monitoring in North of Sumatra.
- Conducting microtremor survey for hydrocarbon exploration.

SKILLS

Programming and Scripting languages	Python, Fortran, C, C++, Bash, CSS, MATLAB, HTML, GMT, Latex, Pandas, SQL
Seismological data analysis	SAC, pyrocko, Obspy, SEISAN, SIMULPS, PyLith, SeisSol
Languages	Bahasa (mother language), English (fluent), French (intermediate)

AWARDS & ACHIEVEMENTS

2 nd Winner International ARMA Student Research Contest	<i>Fall 2022 - Spring 2023</i>
Dean's Award Physical Science and Engineering Program	<i>Spring 2022</i>
KAUST Fellowship	<i>Fall 2018 - Present</i>
1 st rank at International Master in Geophysics, Université de Paris	<i>Fall 2018</i>
Geophysical Paris Exploration Fellowship	<i>Fall 2017 - Fall 2018</i>
Outstanding academic achievement at FTTM ITB	<i>Fall 2012 - Spring 2016</i>
1 st Winner Seismic Data Interpretation Brawijaya Geophysics Festival	<i>Fall 2015</i>
2 nd Winner at Student Competition Joint Convention Balikpapan, Indonesia	<i>Fall 2015</i>
The best Junior Geophysicist at fieldwork	<i>Spring 2015</i>

GUEST LECTURE AND INVITED SPEAKER

Invited Speaker at International Indonesian Scientist Forum, Online	<i>Fall 2022</i>
Sharing Presentation with Institut Teknologi Bandung	<i>Fall 2022</i>
Sharing Presentation with The National Research and Innovation Agency, Indonesia	<i>Fall 2021</i>
Guest Lecture on Fundamental of Seismic Tomography at Pertamina University	<i>Spring 2021</i>
Sharing Presentation with Institut Teknologi Bandung	<i>Fall 2020</i>
Invited Speaker at International Forum on Pohang Earthquake	<i>Fall 2020</i>

PUBLICATIONS

Articles in refereed journals (in preparation):

1. A. Bergmeister, **K.H. Palgunadi**, A. Bosisio, L. Ermert, M. Koroni, N. Perraudin, S. Dirmeier and M.A. Meier, 2024. High Resolution Seismic Waveform Generation using Denoising Diffusion. arXiv preprint arXiv:2410.19343.
2. **K. H. Palgunadi**, A.-A. Gabriel, D. I. Garagash, T. Ulrich, P. M. Mai, 2025, *Ground Motion Characteristics of Cascading Earthquake in a Multiscale Fracture Network*, (in rev.)
3. **K. H. Palgunadi**, A.-A. Gabriel, E. Tinti, M. Cocco, P. M. Mai, 2025, *Dynamic Rupture Cascade of Microearthquakes ($M_w < 1.5$) Embedded in Fault Zone*, (in prep.)

Articles in refereed journals:

1. B. Li, **K.H. Palgunadi**, B. Wu, C. Suhendi, Y. Zhou, A. Ghosh and P.M. Mai, 2025. Rupture dynamics and velocity structure effects on ground motion during the 2023 Türkiye earthquake doublet. *Communications Earth Environment*, 6(1), p.228.
2. **K.H. Palgunadi**, A.V.H. Simanjuntak, R.V. Ry, Daryono, M.R., Widiyantoro, S., D.D. Warningsana, A. Triahandini, F. Syaifuddin, A.S. Ahmadiyah, A.M.M. Sirait and W. Suryanto, 2025.

Geometrically Complex, Relatively Weak, and Subcritically Stressed Lembang Fault May Lead to a Magnitude 7.0 Earthquake. *Journal of Engineering and Technological Sciences*, 57(1), pp.129-144.

3. A.V. Simanjuntak, **K.H. Palgunadi**, P. Supendi, U. Muksin, E. Gunawan, S. Widiyantoro, N. Rawlinson, M.R. Daryono, D. Daryono, D. Karnawati and N.R. Hanifa, 2024. The western extension of the Balantak Fault revealed by the 2021 earthquake cascade in the central arm of Sulawesi, Indonesia. *Geoscience Letters*, 11(1), p.35.
4. Z. Zulfakriza, A.D. Nugraha, N. Heryandoko, R.V. Ry, F. Muttaqy, A. Andika, M.F. Azhari, A.S. Putra, **K.H. Palgunadi**, P.R. Cummins and P. Supendi, 2024. Seismic source analysis of the destructive earthquake November 21, 2022, Mw 5.6 Cianjur (Indonesia) from relocated aftershock. *Scientific Reports*, 14(1), p.12142.
5. A.-A. Gabriel, D. Garagash, **K. H. Palgunadi**, P. M. Mai, 2023, *Fault-size dependent fracture energy explains multi-scale seismicity and cascading earthquakes*, *Science*, 385(6707), eadj9587.
6. **K. H. Palgunadi**, A.-A. Gabriel, D. I. Garagash, T. Ulrich, P. M. Mai, 2023, *Rupture Dynamics of Cascading Earthquakes in a Multiscale Fracture Network Dynamics*, *Journal of Geophysical Research: Solid Earth*, 129(3), e2023JB027578.
7. P. Supendi, T. Winder, N. Rawlinson, C. A. Bacon, **K. H. Palgunadi**, A. V. H. Simanjuntak, A. Kurniawan, S. Widiyantoro, A. D. Nugraha, H. A. Shiddiqi, S. P. Adi, D. Karnawati, G. I. Marliyani, I. Imran, and J. Jatnika, 2023, *A conjugate fault revealed by the destructive Mw 5.6 (November 21, 2022) Cianjur earthquake, West Java, Indonesia*, *Journal of Asian Earth Sciences*: 105830.
8. A.V.H. Simanjuntak, **K.H. Palgunadi**, P. Supendi, D.Daryono, T.A.Prakoso, and U. Muksin, 2023, *New Insight on the Active Fault System in the Halmahera Volcanic Arc, Indonesia, Derived from the 2022 Tobelo Earthquakes*, *Seismological Research Letter*, XX, 1–9, doi:10.1785/0220230006.
9. P.M. Mai, T. Aspiotis, T. A. Aquib, E. V. Cano, D. Castro-Cruz, A. Espindola-Carmona, B. Li, X. Li, J. Liu, R. Matrau, A. Nobile, **K. H. Palgunadi**, M. Ribot, L. Parisi, C. Suhendi, Y. Tang, B. Yalcin, U. Avşar, Y. Klinger, and S. Jónsson, 2023, *The destructive earthquake doublet of February 6, 2023, in south-central Türkiye and northwestern Syria: initial observations and analyses*, *The Seismic Record* 2023; 3 (2): 105–115. doi: <https://doi.org/10.1785/0320230007>.
10. P. Supendi, N. Rawlinson, S. Prayitno, D. Sianipar, A. Simanjuntak, S. Widiyantoro, **K. H. Palgunadi**, A. Kurniawan, H. A. Shiddiqi, A. D. Nugraha, D. P. Sahara, D. Daryono, R. Triyono, S. P. Adi, D. Karnawati, G. Daniarsyad, S. Ahadi, I. Fatchurochman, S. D. Anugrah, N. Heryandoko, A. Sudrajat, 2023, *A previously unidentified fault revealed by the February 25, 2022 (Mw 6.1) Pasaman Earthquake, West Sumatra, Indonesia*, *Physics of the Earth and Planetary Interiors*, 334, 106973, <https://doi.org/10.1016/j.pepi.2022.106973>
11. P. Supendi, N. Rawlinson, B.S. Prayitno, S. Widiyantoro, A. Simanjuntak, **K. H. Palgunadi**, A. Kurniawan, G.I. Marliyani, A.D. Nugraha, D. Daryono, and S.D. Anugrah, 2022. *The Kalaotoa Fault: A Newly Identified Fault that Generated the M w 7.3 Flores Sea Earthquake*, *The Seismic Record*, 2(3), pp.176-185.
12. P. Supendi, D. Sianipar, S. Widiyantoro, N. Rawlinson, B.S. Prayitno, M.T. Gunawan, M. Sadly, D. Karnawati, A.D. Nugraha, **K. H. Palgunadi**, and F. Muttaqy, 2022. *Analysis of the April 10, 2021 (Mw 6.1) destructive intra-slab earthquake, East Java, Indonesia*, *Physics of the Earth and Planetary Interiors*, 326, p.106866.
13. P. Supendi, S. Widiyantoro, N. Rawlinson, A. Wibowo, P. Priyobudi, **K. H. Palgunadi**, A. D. Nugraha, I. Imran, G. I. Marliyani, D. Daryono, and B. S. Prayitno, 2022. *Analysis of the 2021*

Semangko Bay Earthquake Sequence in Southern Sumatra, Indonesia, Using Broadband Seismic Network Data, Seismological Research Letters, doi: <https://doi.org/10.1785/0220210304>

14. P. Supendi, M. Ramdhan, D. Sianipar, A. Wibowo, M. T. Gunawan, S. Rohadi, N. F. Riama, B. S. Prayitno, J. Murjaya, D. Karnawati, I. Meilano, N. Rawlinson, S. Widiyantoro, A. D. Nugraha, G. I. Marliyani, **K. H. Palgunadi**, E. M. Elsera, 2021, *Foreshock–mainshock–aftershock sequence analysis of the 14 January 2021 (Mw 6.2) Mamuju–Majene (West Sulawesi, Indonesia) earthquake*, Earth, Planets and Space 73, 106, doi: <https://doi.org/10.1186/s40623-021-01436-x>
15. **K. H. Palgunadi**, A.-A. Gabriel, T. Ulrich, J. À. Lòpez-Comino, and P. M. Mai, 2020, *Dynamic Fault Interaction during a Fluid-Injection-Induced Earthquake: The 2017 Mw 5.5 Pohang Event*, Bulletin of the Seismological Society of America, doi: 10.1785/0120200106
16. J. L. Kinscher, F. De Santis, N. Poiata, P. Bernard, **K. H. Palgunadi**, and I. Contrucci, 2020, *Seismic repeaters linked to weak rock-mass creep in deep excavation mining*, Geophysical Journal International, Volume 222, Issue 1, Pages 110–131, doi: 10.1093/gji/ggaa150
17. **K. H. Palgunadi**, N. Poiata, J. Kinscher, P. Bernard, F. De Santis, and I. Contrucci, 2019, *Methodology for Full Waveform Near Real-Time Automatic Detection and Localization of Microseismic Events Using High (8 kHz) Sampling Rate Records in Mines: Application to the Garpenberg Mine (Sweden)*, Seismological Research Letters ; 91 (1): 399–414. doi: 10.1785/0220190074
18. P. Supendi, A. D. Nugraha, S. Widiyantoro, C. I. Abdullah, N. T. Puspito, **K. H. Palgunadi**, D. Daryono, and S. H. Wiyono, 2019, *Hypocenter relocation of the aftershocks of the Mw 7.5 Palu earthquake (September 28, 2018) and swarm earthquakes of Mamasa, Sulawesi, Indonesia, using the BMKG network data*, Geoscience Letters 6, 18, doi: 10.1186/s40562-019-0148-9
19. A. R. Gusman, P. Supendi, A. D. Nugraha, W. Power, H. Latief, H. Sunendar, S. Widiyantoro, D. Daryono S. H. Wiyono, A. Hakim, A. Muhari, X. Wang, D. Burbidge, **K. H. Palgunadi**, I. Hamling, and M. R. Daryono, 2019, *Source model for the tsunami inside Palu Bay following the 2018 Palu earthquake, Indonesia*, Geophysical Research Letters, 46, 8721– 8730. doi: 10.1029/2019GL082717
20. Z. Zulfakriza, A. D. Nugraha, M. Ridwan, **K. H Palgunadi**, M. Umar, M. Muzli, K. Erbas, and D. Daryono, 2018, *Temporary Seismic Stations Installation and Building Damage Assessment of December 7th, 2016 Earthquake in Pidie Jaya, Aceh, Indonesia*, Jurnal Geofisika, 16(1), 15-20. doi:10.36435/jgf.v16i1.50

Articles in non-refereed conference journals, abstracts, posters:

1. **K. H. Palgunadi**, A.-A. Gabriel, E. Tinti, M. Cocco, P. M. Mai, 2023, *Cascading Rupture Characteristics on Deca-Scale Earthquake Through 3D Dynamic Rupture Simulations*, presented at the 2023 FEAR-Annual-Meeting, 29 March - 31 March 2023, Rome, Italy. (Poster)
2. **K. H. Palgunadi**, J. C. Vyas, A.-A. Gabriel, E. Tinti, M. Cocco, P. M. Mai, 2023, *Investigation of Cascading Earthquake Rupture in Deca-Scale Earthquake Experiment Using Dynamic Simulation*, presented at the 2023 ACES, 28 February - 4 March 2023, Blenheim, New Zealand. (Poster)
3. **K. H. Palgunadi**, A. A. Gabriel, D. Garagash, T. Ulrich and P. M. Mai, 2022, *How Does A Cascading Earthquake in A Multi-Scale Fracture Network Affect Ground Motion*, presented at the 2022 SEACG, 9-10 August 2022, Bandung, Indonesia, SEACG-19. (Oral Presentation)
4. **K. H. Palgunadi**, A. A. Gabriel, D. Garagash, T. Ulrich and P. M. Mai, 2022, *Cascading Earthquake Rupture During Fluid Injection Scenarios in A Multi-Scale Fracture Network*, presented at

the 2022 SEG/SPE Injection Induced Seismicity Workshop: A Decade of Learnings, 7-9 June 2022, Austin, Texas, USA. (Poster)

5. D. Garagash, A. A. Gabriel, **K. H. Palgunadi**, and P. M. Mai, 2021, *Scale dependence of fault fracture energy and multi-scale rupture cascades*, presented at the 2021 Fall Meeting, AGU, New Orleans, Louisiana, 13–17 December, S51D-07
6. **K. H. Palgunadi**, A. A. Gabriel, D. Garagash, and P. M. Mai, 2021, *Cascading Earthquake Rupture in A Multi-Scale Fracture Network*, presented at the 2021 Fall Meeting, AGU, New Orleans, Louisiana, 13–17 December, S22A-04. (Poster)
7. P. Supendi, A. D. Nugraha, S. Widiyantoro, C. I. Abdullah, D. Karnawati, **K. H. Palgunadi**, S. Rohadi, M. T. Gunawan, and S. Rosalia, 2021, *Analysis of the Mw 6.5 Ambon Earthquake (September 26, 2019) based on the aftershocks hypocenter relocation*, In IOP Conference Series: Earth and Environmental Science (Vol. 873, No. 1, p. 012001), IOP Publishing.
8. M. Ramdhan, A. Mursityanto, and **K. H. Palgunadi**, 2021, *Analysis of M 5.3 Sumbawa, Indonesia earthquake 2020 and its aftershocks based on hypocenter relocation from BMKG seismic stations*, In IOP Conference Series: Earth and Environmental Science (Vol. 873, No. 1, p. 012070), IOP Publishing.
9. **K. H. Palgunadi**, A.-A Gabriel, D. Garagash, P. M. Mai, 2021, *Cascading earthquakes on a fracture network in a geo-energy reservoir*, presented at the 2021 Annual Meeting, EGU, online, 19 - 30 April, EGU21-16385, doi: <https://doi.org/10.5194/egusphere-egu21-16385>. (Oral Presentation)
10. P. Supendi, A. D. Nugraha, S. Widiyantoro, A. Daryono, **K. H. Palgunadi**, M. D. Mukti, 2020, *Preliminary Results of Hypocenter Relocation Analysis in the Sunda Strait, Indonesia, after the 2018 Anak Krakatau Tsunami*, presented at the 2020 Fall Meeting, AGU, Online, December, 2020AGUFMS039.0014S
11. T. Taufiqurrahman, A.-A Gabriel, B. Li, D. Li, A. S. Wirp, T. Ulrich, **K. H. Palgunadi**, A. Verdecchia, S. Carena, Z. K. Mildon, 2019, *High-resolution integrated dynamic rupture modeling of the 2019 M6. 4 Searles Valley and M7. 1 Ridgecrest earthquakes*, presented at the 2019 Fall Meeting, AGU, San Francisco, California, 7–11 December, S31G-0487
12. **K. H. Palgunadi**, T. Ulrich, A.-A. Gabriel, J. À. Lòpez-Comino, P. M. Mai, 2019, *Dynamic rupture modeling for the largest induced event linked to an Enhanced Geothermal System: the 2017 Mw 5.5 Pohang earthquake*, presented at the 2019 Fall Meeting, AGU, San Francisco, California, 7–11 December, T31E-0336P. (Poster)
13. R. V. Ry, D. P. Sahara, M. Rohaman, C. Suhendi, **K. H. Palgunadi**, S. Widiyantoro, A. D. Nugraha, T. Yudistira, B. S. Prabowo, and B. Mujihardi, 2019, *Implementation of GMSTech—a New Practical Software for Microseismic Data Processing—for Estimating Event Source Parameters*, J. Phys.: Conf. Ser. 1204 012096, doi: 10.1088/1742-6596/1204/1/012096
14. J. Kinscher, **K. H. Palgunadi**, N. Poiata, F. de Santis, P. Bernard, I. Contrucci, and E. Klein, 2019, *Automatic full wave-form based monitoring at the deep Garpenberg metal mine*, presented in 3rd Schatzalp Workshop on Induced Seismicity, Mar 2019, Davos, Switzerland. (ineris-03237763)
15. **K. H. Palgunadi**, N. Poiata, J. Kinscher, P. Bernard, and F. De Santis, 2019, *Automatic full waveform-based monitoring of induced microseismicity at Garpenberg mine, Sweden*, Geophysical Research Abstracts, Vol. 21, p1-1. 1p, presented at the 2019 EGU General Assembly, Vienna, 7–12 April
16. N. Poiata, **K. H. Palgunadi**, J. Kinscher, P. Bernard, F. de Santis, and E. Klein, 2019, *Full waveform-based automatic monitoring of microseismic activity using high sampling rate records*:

application to Garpenberg mine (Sweden), presented at the Japan Geoscience Union Meeting, May 2019, Chiba, Japan. (ineris-03237722)

17. J. Kinscher, **K. H. Palgunadi**, N. Poiata, F. De Santis, P. Bernard, and E. Klein, 2018, *Full waveform, automatic real-time monitoring of high sampling seismic data in a metal mine: detection, location, event classification and seismic repeater matching*, presented at the 2018 Fall Meeting, AGU, San Francisco, California, 10–14 December, S31F-0573K

MEMBERSHIPS

American Geophysical Union (AGU)

European Geosciences Union (EGU)

Himpunan Ahli Geofisika Indonesia (HAGI)

REFERENCES

Dr. Paul Martin Mai (martin.mai@kaust.edu.sa)

Dr. Alice-Agnes Gabriel (algabriel@ucsd.edu)

Dr. Dmitry Garagash (garagash@dal.ca)

Dr. Thomas Finkbeiner (thomas.finkbeiner@kaust.edu.sa)

Dr. Sri Widiyantoro (ilikwidi@gmail.com)