

Alice-Agnes Gabriel

ASSOCIATE PROFESSOR
SCRIPPS INSTITUTION OF OCEANOGRAPHY, UC SAN DIEGO, LA JOLLA, CA, USA
GUEST PROFESSOR
LUDWIG-MAXIMILIANS-UNIVERSITÄT (LMU) MÜNCHEN, MUNICH, GERMANY

I am a seismologist combining simulations, routinely utilizing the largest supercomputers worldwide, with data-driven techniques and theoretical analysis to tackle one of the grand challenges of seismology: uncovering the physical mechanisms relevant to understanding earthquakes. My group's research bridges space-time scales as well as disciplines within Geophysics, Computer Science and Applied Mathematics. We aim to harness the full breadth of Earth observations integrated with novel modeling approaches and study a range of geophysical problems with multi-physics character such as earthquake-tsunami interaction.

Education

- 2022 **Habilitation**, LMU Munich, Germany.
- 2013 **Dr. Sci.** (PhD), Swiss Seismological Service, ETH Zurich, Switzerland.
Advisors: J.-P. Ampuero (CALTECH), P.M. Mai (KAUST), L.-A. Dalguer & D. Giardini (ETH)
- 2008 **Diplom** (MSc), *Physics*, Technical University Dresden, Germany.
- 2006 **Certificate of Proficiency**, *Geophysics, Geology*, University of Auckland, New Zealand.
- 2004 **Vordiplom** (BSc), *Physics*, Technical University Dresden, Germany.

Professional Appointments

- 2022 – **Associate Professor**, *Geophysics*, Scripps Institution of Oceanography, UC San Diego, La Jolla, CA.
- 2022 – **Guest Professor**, LMU Munich, Germany.
- 2021-2022 **Professor** (W2), *Earthquake Physics*, LMU Munich, Germany.
- 2014 – 2021 **Assistant Professor** (akadem. Rat a.Z.), *Seismology/Geophysics*, LMU Munich, Germany.
(26 months maternity leave: 10/2014–02/2016 and 05/2016–02/2017)
- 2012 – 2014 **Postdoctoral Researcher**, *Seismology/Geophysics*, LMU Munich, Germany.

Selected Awards and Honors

- 2023 **James B. Macelwane Medal & AGU Fellow**, *American Geophysical Union (AGU)*.
- 2022 **C.F. Gauss Lecturer**, *German Geophysical Society (DGG)*.
- 2020 **Charles F. Richter Early Career Award**, *Seismological Society of America (SSA)*.
- 2020 **Ada Lovelace Award for HPC**, *Partnership for Advanced Computing in Europe (PRACE)*.
- 2019 **ERC Starting Grant Awardee**, *European Research Commission (ERC)*.
- 2018 **Appointment to the Center of Advanced Studies, Young Center**, LMU Munich.
- 2018, 2022 **Student Cluster Competition Reproducibility Challenge**, *SC Conference*, Uphoff et al., 2017 and Krenz et al., 2022 were selected for real-time, non-stop, 48-hour undergraduate student competitions.
- 2017 **Best Paper Award**, *SC Conference*, prestigious prize for application driven HPC, for Uphoff et al., 2017.
- 2014 **PRACE Award**, *International Supercomputing Conference (ISC)*, for Breuer et al., 2014.
- 2014 **Best Poster Award & Best Visualisation Awards**, PASC Meeting, Zurich; Volkswagen Foundation Extreme Events Meeting, Hannover.
- 2012 **Outstanding Student Paper Award**, *AGU Fall Meeting*, San Francisco, CA.
- 2012, 2013 **Travel Grants**, ECGS Workshop, Luxembourg; EMFCSC Workshop, Erice, Italy.
- 2008 **Wilhelm and Else Heraeus Foundation Travel Grant**, German Physical Society.
- 2007 **ELISA Mentoring Scholarship**, TU Dresden Excellency of Women in Science Promotion Program.
- 2006 **DAAD Study Abroad Scholarship**, German Academic Exchange Service, University of Auckland, NZ.

Selected Scientific Community Services

- EGU **European Geosciences Union**, 2022–27 Elected President, Seismology Division.
- SCEC **Statewide California Earthquake Center**, 2024– PC Co-Chair & ExComm; 2022– Co-Lead Community Engagement MA3; 2021– Research Computing and CyberInfrastructure Committee.
- SZ4D **Subduction Zones in 4 Dimensions**, 2022– Operations Planning Committee & Modeling Collaboratory Working group; 2020–22 Faulting and Earthquake Cycle Working group member.
- MCS-RCN **Modeling Collaboratory for Subduction**, 2020–22, Steering Committee.
- CIG **Computational Infrastructure for Geodynamics**, 2020–, Executive Committee, 2021–23 Chair of EC.
- AGU **American Geophysical Union**, 2024, AGU Bowie Medal Committee; 2021, Fall Meeting Program Committee, Seismology Division.
- PRACE **European Supercomputer Resources** 2020–2024, Scientific Steering Committee.

Conference Sessions	2013–24, EGU General Assembly ; 2011,2014,2019,2021–23, AGU Fall Meeting ; 2019–23, SIAM-GS Conference ; 2022–24, SSA Annual Meeting ; 2022, SCEC Annual Meeting ; 2019,2021, PASC Meeting .
2019, 2024	Scientific Committee and Co-Chair , NMEM workshop, Smolenice, Slovakia.
2020	International Advisory Committee , COMPSAFE Conference, Kobe, Japan.
2019–2021	Domain Co-Chair Program Committee Solid Earth Dynamics , PASC Conferences.
2015–2019	Gender and Equal Opportunities Representative , Horizon2020 "ExaHyPE" project.
Scientific Editing	2018–, Journal of Geophysical Research–Solid Earth , Associate & Handling Editor; 2020–, Seismica , Task Force & Editorial Board; 2021, Guest Editor, Frontiers special issue "High-Performance Computing in Solid Earth Geohazards: Progresses, Achievements and Challenges for a Safer World", all women editors.
Peer Reviewer	Journals: , Ann. Geophys., BSSA, Comput. Geosci., EPSL, G ³ , Geology, GJI, GRL, JGR, Nature, Nat. Geosc., Int. J. Numer. Anal. Methods Geomech., Tectonophysics, Pure Appl. Geophys., Mathematics, Proc. Royal Soc. A, Sci. Rep., Sci. Adv., Grants: NSF, German Research Foundation (DFG), NERC, French National Research Agency, KAUST CRG, EO Singapore, Barcelona Supercomputing Centre, ETH Zurich.

Funding, only current grants are listed

2023-2028	NSF OAC#2311208 "An extensible software framework for earthquake simulations (Quakeworx)", <i>co-PI, SIO</i> .
2023-2028	NSF EAR#2311208 "Cascadia Region Earthquake Science Center (CRESCENT)", <i>Senior Personnel, SIO</i> .
2023-2027	EuroHPC #101093038 "Centre of Excellence for Exascale in Solid Earth (ChEESE-2P)", <i>PI, LMU</i> .
2023-2027	Horizon Europe #101072699 " TREAD : Data and processes in seismic hazard" Marie Skłodowska-Curie Innovative Training Network (ITN), <i>PI, LMU</i> .
2022-2024	TACC, NSF OAC#2139536 "Leadership-Class Computing Facility: Characteristic Science Application", <i>PI</i> .
2022-2025	Horizon Europe #101058518 " Geo-INQUIRE : Geosphere INfrastructures for QUESIONS into Integrated REsearch", <i>PI, LMU</i> .
2022-2025	Horizon Europe #101058129 " DT-Geo : A Digital Twin for GEOphysical extremes", <i>PI, LMU</i> .
2022-2026	DeepNL "PhysMmax: Maximum induced earthquake magnitude in the Groningen Gas Field", <i>Co-PI, LMU</i> .
2022-2024	NASA #80NSSC22K0507 "Inferring source processes of earthquakes from acoustic-gravity wave impacts on the atmosphere", <i>PI, SIO</i> .
2021-2026	NSF #EAR-2121666 FRES " MTMOD : Toward an integrated modelling framework for physics-based estimates of megathrust rupture potential", <i>PI, SIO</i> .
2021-2025	EU Horizon 2020 #955515 " SPIN : Seismological Parameters and Instrumentation" Marie Skłodowska-Curie Innovative Training Network (ITN), <i>Co-PI, LMU</i> .
2020-2024	Bavarian State Ministry for Education and Culture " GAB -Geothermal Alliance Bavaria", <i>Co-PI, LMU</i> .
2019–2024	EU Horizon 2020 #852992 " TEAR - Truly Extended Earthquake Rupture (ERC Starting Grant)", (<i>Sole PI</i>). HPC >150 million CPU hours at supercomputing centers worldwide.
past grants, as PI and Co-PI	EU Horizon 2020 #671698, #823844; DFG #GA-2465/2-1, #GA-2465/3-1; Volkswagen Foundation #88479; SCEC #13061, #14111, #15091, #16056, #17075, #20046, #21112, #21010, #22135, #22043, #22162, #23121; KAUST CRG #ORS-2016-CRG5-3027 #ORS-2017-CRG6-3389.02; KONWHIR "NewWave"; BaCaTec #A4.

Mentoring, primary adviser

11 PostDocs	Bar Oryan (SIO Green Scholar, 2024-), Mathilde Marchandon (2022-), Casper Pranger (2020-), Thomas Ulrich (2020-), Anthony Jourdon (2022-24), James Biemiller (SIO Green Scholar, 2021–22), Carsten Uphoff (2020–21), Bo Li (2019–22), Duo Li (2018–23), Kenneth C. Duru (2016–19), Elizabeth H. Madden (2015–18).
13 PhD students	Fabian Kutschera (SIO, 2023–), Rachel Trepani (LMU, 2023–), Jonatan Glehman (SIO, 2022–), John Rekoske (SIO, 2021–), Jeremy Wong (SIO, 2021–, co-adv. with W. Fan), Jeena Yun (SIO, 2021–, co-adv. with Y. Fialko), Nico Schliwa (2021–), Zihua Niu (2021–, AGU 2023 OSPA recipient), S. Aniko Wirp (2019–), Nicolas J. Hayek (2019–), Taufiqurrahman (grad. 2023), Thomas Ulrich (grad. 2020), Stephanie Wollherr (grad. 2018).
16 MSc. students	Fabian Kutschera (2023), Hongyi Su (2023), Amrit Bal (SIO, 2021), Nico Schliwa (2021, SSA 2021 Student Presentation Award recipient), Andrea Perez (2019), Tomy Gunawan (2018), Mitchel Williams (2018), Magdalena Perleth (2018), Yongki Andita Aiman (2018), Kilian Gessele (2018), On Ki Angel Ling (2018), Ashim Rijal (2017), Mirjam Weingärtner (2016), Sujania Talavera Soza (2016), Amaryllis Nerger (2014), Behnam Tang Eysh , (2014).
12 BSc. students	Anna Fröhlich (2022), Moritz Urban (2022), David Lehr Campos (2022), Gizem Yildirim (2021), Sophia Gahr (2021), Janina Moser (2021), Fabian Kutschera (2020), Thomas Obermaier (2020), Nico Schliwa (2019), Sandra Forn dran (2019), Thiemo Bühler (2019), Fabian Risch (2018).

Peer-reviewed Publications

*undergraduate/graduate student, ⁺post-doctoral scholar (co-)advised in the context of the publication.

≈2575 citations, h-index 26, Google Scholar profile: [FmMjT24AAAAAJ](https://scholar.google.com/citations?user=FmMjT24AAAAAJ). List ordered by date of acceptance.

- 2024 [67] D. Kammer, G. McLaskey, R. Abercrombie, J.-P. Ampuero, C. Cattania, M. Cocco, L. Dal Zilio, G. Dresen, **A.-A. Gabriel**, C. Ke, C. Marone, P.A. Selvadurai, E. Tinti, “**Earthquake energy dissipation in a fracture mechanics framework**”, *Nat. Comms.*, in press, [preprint](#).
- 2024 [66] K. Palgunadi*, **A.-A. Gabriel**, D. Garagash, T. Ulrich⁺, P. M. Mai, “**Rupture Dynamics of Cascading Earthquakes in a Multiscale Fracture Network**”, *J. Geophys. Res.*, 129, e2023JB027578, [doi:10.1029/2023JB027578](https://doi.org/10.1029/2023JB027578), [Eos Editor's Highlight](#).
- 2024 [65] D. Li⁺, **A.-A. Gabriel**, “**Linking 3D long-term slow-slip cycle models with rupture dynamics: the nucleation of the 2014 M_w 7.3 Guerrero, Mexico earthquake**”, *AGU Advances*, 5, e2023AV000979, [doi:10.1029/2023AV000979](https://doi.org/10.1029/2023AV000979), [Eos Editor's Highlight](#).
- 2024 [64] F. Kutschera*, **A.-A. Gabriel**, Sara Aniko Wirp*, Bo Li⁺, Thomas Ulrich⁺, Claudia Abril, Benedikt Halldórsson, “**Linked and fully-coupled 3D earthquake dynamic rupture and tsunami modeling for the Húsavík-Flatey Fault Zone in North Iceland**”, *Solid Earth*, 15, 251–280, [doi:10.5194/se-15-251-2024](https://doi.org/10.5194/se-15-251-2024).
- 2024 [63] Z. Niu*, **A.-A. Gabriel**, L. Seelinger, H. Igel, “**Modeling and Quantifying Parameter Uncertainty of Co-seismic Non-classical Nonlinearity in Rocks**”, *J. Geophys. Res.*, 129, e2023JB027149, [doi:10.1029/2023JB027149](https://doi.org/10.1029/2023JB027149).
- 2023 [62] N. Schliwa*, **A.-A. Gabriel**, “**Equivalent Near-Field Corner-Frequency Analysis of 3D Dynamic Rupture Simulations Reveals Dynamic Source Effects**”, *Seism. Res. Let.*, [doi:10.1785/0220230225](https://doi.org/10.1785/0220230225).
- 2023 [61] J.N. Hayek*, D.A. May, C. Pranger⁺, **A.-A. Gabriel** “**A diffuse interface method for earthquake rupture dynamics based on a phase-field model**”, *J. Geophys. Res.*, 128, e2023JB027143, [doi:10.1029/2023JB027143](https://doi.org/10.1029/2023JB027143).
- 2023 [60] **A.-A. Gabriel**, T. Ulrich⁺, M. Marchandon⁺, J. Biemiller⁺, J. Rekoske*, “**3D dynamic rupture modeling of the February 6, 2023, Kahramanmaraş, Turkey, M_w 7.8 and M_w 7.7 earthquake doublet using early observations**”, *The Seismic Record*, 3 (4), 342–356, [doi:10.1785/0320230028](https://doi.org/10.1785/0320230028).
- 2023 [59] J. Zia, J. Zin, M. Marchandon⁺, T. Ulrich⁺, **A.-A. Gabriel**, W. Fan, P. Shearer, X. Zou, J. Rekoske*, F. Bulut, A. Garagon, Y. Fialko, “**The complex dynamics of the 2023 Kahramanmaraş, Turkey, Mw 7.8-7.7 earthquake doublet**”, *Science*, 381 (6661), 985–990, [doi:10.1126/science.adi0685](https://doi.org/10.1126/science.adi0685).
- 2023 [58] T. Taufiqurrahman*, **A.-A. Gabriel**, D. Li*, T. Ulrich⁺, B. Li*, S. Carena, A. Verdecchia, F. Gallovič, “**Dynamics, interactions and delays of the 2019 Ridgecrest rupture sequence**”, *Nature*, 618, 308–315, [doi:10.1038/s41586-023-05985-x](https://doi.org/10.1038/s41586-023-05985-x).
- 2023 [57] J. Biemiller⁺, **A.-A. Gabriel**, T. Ulrich⁺, “**Dueling dynamics of low-angle normal fault rupture with splay faulting and off-fault damage**”, *Nature Communications*, 14(1), 2352, doi.org/10.1038/s41467-023-37063-1.
- 2023 [56] J. M. Rekoske*, **A.-A. Gabriel**, D.A. May, “**Instantaneous physics-based ground motion maps using reduced-order modeling**”, *J. Geophys. Res.*, 128, e2023JB026975, [doi:10.1029/2023JB026975](https://doi.org/10.1029/2023JB026975).
- 2023 [55] L. Krenz*, S. Wolf*, G. Hillers, **A.-A. Gabriel**, M. Bader, “**Numerical Simulations of Seismoacoustic Nuisance Patterns from an Induced M 1.8 Earthquake in the Helsinki, Southern Finland, Metropolitan Area**”, *BSSA*, 113(4), 1596–1615, [doi:10.1785/0120220225](https://doi.org/10.1785/0120220225).
- 2023 [54] B. Li⁺, **A.-A. Gabriel**, T. Ulrich⁺, C. Abril, B. Halldórsson, “**Dynamic rupture models, fault interaction and ground motion simulations for the segmented Húsavík-Flatey Fault Zone, Northern Iceland**”, *J. Geophys. Res.*, [doi:10.1029/2022JB025886](https://doi.org/10.1029/2022JB025886).
- 2023 [53] A. Folch et al., “**The EU Center of Excellence for Exascale in Solid Earth (ChEESE): Implementation, results, and roadmap for the second phase**”, *Future Generation Computer Systems*, 146, 47–61, [doi:10.1016/j.future.2023.04.006](https://doi.org/10.1016/j.future.2023.04.006).
- 2023 [52] J. Vyas, **A.-A. Gabriel**, T. Ulrich⁺, P.M. Mai, J.-P. Ampuero, “**How does thermal pressurization of pore fluids affect 3D strike-slip earthquake dynamics and ground motions?**”, *BSSA*, 113, 499–523, [doi:10.1785/0120220205](https://doi.org/10.1785/0120220205).
- 2023 [51] L. S. Abrahams, L. Krenz*, E.M. Dunham, **A.-A. Gabriel**, T. Saito, “**Comparison of methods for coupled earthquake and tsunami modeling**”, *Geophys. J. Int.*, 234 (1), 404–426, [doi:10.1093/gji/ggad053](https://doi.org/10.1093/gji/ggad053).
- 2023 [50] C. Uphoff⁺, D.A. May, **A.-A. Gabriel**, “**A discontinuous Galerkin method for sequences of earthquakes and aseismic slip on multiple faults using unstructured curvilinear grids**”, *Geophys. J. Int.*, 233 (1), 586–626, [doi:10.1093/gji/ggac467](https://doi.org/10.1093/gji/ggac467).
- 2023 [49] B. A. Erickson et al., “**Incorporating Full Elastodynamic Effects and Dipping Fault Geometries in Community Code Verification Exercises for Simulations of Earthquake Sequences and Aseismic Slip (SEAS)**”, *BSSA*, 113 (2), 499–523, doi.org/10.1785/0120220066.

- 2022 [48] T. Taufiqurrahman*, **A.-A. Gabriel**, T. Ulrich⁺, L. Valentová, F. Gallovič, “**Broadband dynamic rupture modeling with fractal fault roughness, frictional heterogeneity, viscoelasticity and topography: The 2016 Mw 6.2 Amatrice, Italy earthquake**”, *Geophys. Res. Lett.*, 127, e2022JB024300, doi:10.1785/0220220266.
- 2022 [47] Y. Ben-Zion, G.C. Beroza, M. Bohnhoff, **A.-A. Gabriel**, P.M. Mai, “**A Grand Challenge International Infrastructure for Earthquake Science**”, *Seis. Res. Lett.*, 93 (6), 2967–2968, doi:10.1029/2022GL098872.
- 2022 [46] I. van Zelst*, L. Rannabauer*, **A.-A. Gabriel**, Y. van Dinther, “**Earthquake rupture on multiple splay faults and its effect on tsunamis**”, *J. Geophys. Res.*, 127, e2022JB024300, doi:10.1029/2022JB024300.
- 2022 [45] J. Biemiller⁺, **A.-A. Gabriel**, T. Ulrich⁺, “**The Dynamics of Unlikely Slip: 3D Modeling of Low-angle Normal Fault Rupture at the Mai’iu Fault, Papua New Guinea**”, *G3*, e2021GC010298, doi:10.1029/2021GC010298.
- 2022 [44] C. Pranger⁺, P. Sanan, D.A. May, L. le Pourhiet, **A.-A. Gabriel**, “**Rate and State Friction as a Spatially Regularized Transient Viscous Flow Law**”, *J. Geophys. Res.*, 127, e2021JB023511, doi:10.1029/2021JB023511.
- 2022 [43] A. Babbeyko et al., “**Towards the new Thematic Core Service Tsunami within the EPOS Research Infrastructure**”, *Annals of Geophys.*, 65(2), DM213, doi:10.4401/ag-8762.
- 2022 [42] E.H. Madden⁺, T. Ulrich⁺, **A.-A. Gabriel**, “**The state of pore fluid pressure and 3D megathrust earthquake dynamics**”, *J. Geophys. Res.*, 127, 4, doi:10.1029/2021JB023382.
- 2022 [41] J. Jiang et al., “**Community-Driven Code Comparisons for Three-Dimensional Dynamic Modeling of Sequences of Earthquakes and Aseismic Slip (SEAS)**”, *J. Geophys. Res.*, e2021JB023519, doi:10.1029/2021JB023519.
- 2022 [40] B. Li⁺, B. Wu, H. Bao, D. Oglesby, A. Ghosh, **A.-A. Gabriel**, L. Meng, R. Chu, “**Rupture heterogeneity and directivity effects in back-projection analysis**”, *J. Geophys. Res.*, 127, 3, doi:10.1029/2021JB022663.
- 2022 [39] T. Ulrich⁺, **A.-A. Gabriel** and E.H. Madden*, “**Stress, rigidity and sediment strength control megathrust earthquake and tsunami dynamics**”, *Nature Geoscience*, 15, 67-73, doi:10.1038/s41561-021-00863-5.
- 2022 [38] S. Wolf*, M. Galis, C. Uphoff⁺, **A.-A. Gabriel**, P. Moczo, D. Gregor, M. Bader, “**An Efficient ADER-DG Local Time Stepping Scheme for 3D HPC Simulation of Seismic Waves in Poroelastic Media**”, *J. Comp. Phys.*, 110886, doi:10.1016/j.jcp.2021.110886.
- 2022 [37] K. Duru⁺, L. Rannabauer*, **A.-A. Gabriel**, O. K. A. Ling*, H. Igel, and M. Bader, “**A stable discontinuous Galerkin method for linear elastodynamics in 3D geometrically complex media using physics based numerical fluxes**”, *Comput. Methods Appl. Mech. Eng.*, doi:10.1016/j.cma.2021.114386.
- 2021 [36] E. Tinti, Casarotti, E., T. Ulrich⁺, D. Li⁺, Taufiqurrahman*, **A.-A. Gabriel**, “**Constraining families of dynamic models using geological, geodetic and strong ground motion data: the Mw 6.5, October 30th, 2016, Norcia earthquake, Italy**”, *Earth Planet. Sci. Lett.*, 576, 117237, doi:10.1016/j.epsl.2021.117237.
- 2021 [35] M. Ramos*, Y. Huang, T. Ulrich⁺, D. Li⁺, **A.-A. Gabriel** and A. Thomas, “**Assessing Margin-Wide Rupture Behaviors along the Cascadia Megathrust with 3-D Dynamic Rupture Simulations**”, *J. Geophys. Res.*, 126, e2021JB022005, doi:10.1029/2021JB022005.
- 2021 [34] L. Krenz*, C. Uphoff*, T. Ulrich⁺, **A.-A. Gabriel**, L. Abrahams, E. Dunham, M. Bader, “**3D Acoustic-Elastic Coupling with Gravity: The Dynamics of the 2018 Palu, Sulawesi Earthquake and Tsunami**”, SC’21: International Conference for High Performance Computing, Networking, Storage and Analysis, doi.org/10.1145/3458817.3476173.
- 2021 [33] A. Perez-Silva*, D. Li⁺, **A.-A. Gabriel** and Y. Kaneko, “**3D modeling of long-term slow slip events along the flat-slab segment in the Guerrero Seismic Gap, Mexico**”, *Geophys. Res. Lett.*, 48 (13), doi:10.1029/2021GL092968.
- 2021 [32] K. Duru⁺, L. Rannabauer*, **A.-A. Gabriel** and H. Igel, “**A new discontinuous Galerkin spectral element method for elastic waves with physically motivated numerical fluxes**”, *J. Sci. Comp* 88, 51, doi:10.1007/s10915-021-01565-1.
- 2021 [31] S.A. Wirp*, **A.-A. Gabriel**, E.H. Madden⁺, M. Schmeller*, I. van Zelst*, L. Krenz*, Y. van Dinther, and L. Rannabauer* (2020), “**3D linked subduction, dynamic rupture, tsunami and inundation modeling: dynamic effects of supershear and tsunami earthquakes, hypocenter location and shallow fault slip**”, *Frontiers in Earth Science, Geohazards and Georisks*, doi:10.3389/feart.2021.626844.
- 2021 [30] **A.-A. Gabriel**, D. Li*, S. Chiochetti, M. Tavelli, I. Peshkov, R. Evgeniy, and M. Dumbser, “**A unified first order hyperbolic model for nonlinear dynamic rupture processes in diffuse fracture zones**”, invited contribution, *Phil. Trans. R. Soc. A*, 379 (2196), 20200130, doi:10.1098/rsta.2020.0130.
- 2021 [29] E. H. Madden⁺, M. Bader, J. Behrens, Y. van Dinther, **A.-A. Gabriel**, L. Rannabauer*, T. Ulrich⁺, S. Vater, I. van Zelst*, “**Linked 3D modeling of megathrust earthquake-tsunami events: from subduction to tsunami run-up**”, *Geophys. J. Int.*, 224(1), 487–516, doi:10.1093/gji/ggaa484.
- 2021 [28] S. Yuan, K. Gessele*, **A.-A. Gabriel**, D. A. May, H. Igel, “**Seismic source tracking with six degree-of-freedom ground motion observations**”, *J. Geophys. Res.*, 126, e2020JB021112, doi:10.1029/2020JB021112.
- 2020 [27] M. Tavelli, S. Chiochetti, E. Romenski, **A.-A. Gabriel**, M. Dumbser, “**Space-time adaptive ADER discontinuous Galerkin schemes for nonlinear hyperelasticity with material failure**”, *J. Comp. Phys.*, 422, 109758, doi:10.1016/j.jcp.2020.109758.

- 2020 [26] K. Palgunadi*, **A.-A. Gabriel**, T. Ulrich, J. A. Lopez-Comino, P. M. Mai, “**Dynamic fault interaction during a fluid-injection induced earthquake: The 2017 Mw5.5 Pohang event**”, *BSSA*, 110 (5), 2328–2349, doi:10.1785/0120200106.
- 2020 [25] S. Wolf*, **A.-A. Gabriel**, M. Bader, “**Optimisation and Local Time Stepping of an ADER-DG Scheme for Fully Anisotropic Wave Propagation in Complex Geometries**”, *Computational Science–ICCS 2020, Lecture Notes in Computer Science*, vol. 12139, edited by Krzhizhanovskaya V. et al., doi:10.1007/978-3-030-50420-5-3.
- 2020 [24] J. Premus*, F. Gallovic, L. Hanyk, **A.-A. Gabriel**, “**FD3D-TSN: A fast and simple code for dynamic rupture simulations with GPU acceleration**”, *Seismo. Res. Lett.*, 91(5), 2881–2889, doi:10.1785/0220190374.
- 2020 [23] R. Lacassin, M. Deves, S. Hicks, J.-P. Ampuero, R. Bossu, L. Bruhat, D. Wibisono, L. Fallou, E. Fielding, **A.-A. Gabriel**, J. Gurney, J. Krippner, A. Lomax, M. Ma’rufin Sudibyo, A. Pamumpuni, J. Patton, H. Robinson, M. Tingay, S. Valkaniotis, “**Rapid collaborative knowledge building via Twitter after significant geohazard events**”, *Geosc. Comm. Disc.*, 3, 129–146, doi:10.5194/gc-2019-23.
- 2020 [22] K. Duru⁺, L. Rannabauer*, **A.-A. Gabriel**, G. Kreiss and M. Bader, “**A stable discontinuous Galerkin method for the perfectly matched layer for elastodynamics in first order form**”, *Numer. Math.* 146, 729–782, doi:10.1007/s00211-020-01160-w.
- 2020 [21] A. Reinartz, D. E. Charrier, M. Bader, L. Bovard, M. Dumbser, K. Duru⁺, F. Fambri, **A.-A. Gabriel**, J.-M. Gallard, S. Koeppel, L. Krenz, L. Rannabauer, L. Rezzolla, P. Samfass, M. Tavelli, T. Weinzierl, “**ExaHyPE: An Engine for Parallel Dynamically Adaptive Simulations of Wave Problems**”, *Comp. Phys. Comm.*, 254, 107251, doi:10.1016/j.cpc.2020.107251.
- 2019 [20] T. Ulrich*, S. Vater, E. H. Madden⁺, J. Behrens, Y. van Dinther, I. van Zelst*, E. J. Fielding, C. Liang, and **A.-A. Gabriel**, “**Coupled, Physics-based Modelling Reveals Earthquake Displacements are Critical to the 2018 Palu, Sulawesi Tsunami**”, *Pure and Applied Geophysics*, doi:10.1007/s00024-019-02290-5.
- 2019 [19] I. van Zelst*, S. Wollherr*, **A.-A. Gabriel**, E. H. Madden⁺, and Y. van Dinther, “**Modeling Megathrust Earthquakes Across Scales: One-way Coupling From Geodynamics and Seismic Cycles to Dynamic Rupture**”, *J. Geophys. Res.*, 124, doi:10.1029/2019JB017539.
- 2019 [18] F. Gallovic, L. Valentova, J.-P. Ampuero, and **A.-A. Gabriel**, “**Bayesian Dynamic Finite-Fault Inversion: 1. Method and Synthetic Test**”, *J. Geophys. Res.*, 124, 6949–6969, doi:10.1029/2019JB017510.
- 2019 [17] F. Gallovic, L. Valentova, J.-P. Ampuero, and **A.-A. Gabriel**, “**Bayesian Dynamic Finite-Fault Inversion: 2. Application to the 2016 Mw6.2 Amatrice, Italy, Earthquake**”, *J. Geophys. Res.*, 124, 6970–6988, doi:10.1029/2019JB017512.
- 2019 [16] T. Ulrich*, **A.-A. Gabriel**, J.-P. Ampuero and W. Xu, “**Dynamic viability of the 2016 Mw 7.8 Kaikoura earthquake cascade on weak crustal faults**”, *Nature Comms.*, 10(1213), doi:10.1038/s41467-019-09125-w.
- 2019 [15] S. Wollherr*, **A.-A. Gabriel** and P. M. Mai, “**Landers 1992 ‘reloaded’: Integrative dynamic earthquake rupture modeling**”, *J. Geophys. Res.*, 124, 6666–6702 doi:10.1029/2018JB016355.
- 2019 [14] C. Happ, F. Scheipl, **A.-A. Gabriel** and S. Greven, “**A General Framework for Multivariate Functional Principal Component Analysis of Amplitude and Phase Variation**”, *Stat*, 8(1), e220, doi:10.1002/sta4.220.
- 2019 [13] K. Duru⁺, **A.-A. Gabriel** and G. Kreiss, “**On energy stable discontinuous Galerkin spectral element approximations of the perfectly matched layer for the wave equation**”, *Comput. Methods Appl. Mech. Eng.*, 350, 898–937, doi:10.1016/j.cma.2019.02.036.
- 2018 [12] S. Wollherr*, **A.-A. Gabriel** and C. Uphoff*, “**Off-fault plasticity in three-dimensional dynamic rupture simulations using a modal Discontinuous Galerkin method on unstructured meshes: Implementation, verification, and application**”, *Geophys. J. Int.*, 214(3), 1556–1584, doi:10.1093/gji/ggy213.
- 2018 [11] R. Harris, M. Barall, B. Aagaard, S. Ma, D. Roten, K. Olsen, B. Duan, D. Liu, B. Luo, K. Bai, J.-P. Ampuero, Y. Kaneko, **A.-A. Gabriel**, K. Duru*, T. Ulrich*, S. Wollherr*, Z. Shi, E. Dunham, S. Bydlon, Z. Zhang, X. Chen, S.N. Somala, C. Pelties, J. Tago, V.M. Cruz-Atienza, J. Kozdon, E. Daub, K. Aslam, Y. Kase, K. Withers, L. Dalguer, “**A suite of exercises for verifying dynamic earthquake rupture codes**”, *Seis. Res. Lett.*, 89 (3), 1146–1162, doi:10.1785/0220170222.
- 2018 [10] A. Bauer*, F. Scheipl, H. Küchenhoff, **A.-A. Gabriel**, “**An introduction to semiparametric function-on-scalar regression**”, *Statistical Modelling*, 18(3–4), 346–364, doi: 10.1177/1471082X17748034.
- 2017 [9] C. Uphoff*, S. Rettenberger, M. Bader, S. Wollherr*, T. Ulrich*, E. M. Madden⁺ and **A.-A. Gabriel**, “**Extreme scale multi-physics simulations of the tsunamigenic 2004 Sumatra megathrust earthquake**”, *SC17 Best Paper Award*, *Proceedings of International Conference for High Performance Computing, Networking, Storage and Analysis*. doi: 10.1145/3126908.3126948.
- 2016 [8] S. Rettenberger, O. Meister, M. Bader and **A.-A. Gabriel**, “**ASAGI - A Parallel Server for Adaptive Geoinformation**”, *Proceedings of the Exascale Applications and Software Conference 2016 (EASC '16)*, p. 2:1–2:9. ACM, September 2016, doi: 10.1145/2938615.2938618.

- 2014 [7] A. Heinecke, A. Breuer, S. Rettenberger, M. Bader, **A.-A. Gabriel**, C. Pelties, A. Bode, W. Barth, X.-K. Liao, K. Vaidyanathan, M. Smelyanskiy and P. Dubey, “**Petascale High Order Dynamic Rupture Earthquake Simulations on Heterogeneous Supercomputers**”, *ACM Gordon Bell Prize Finalist*, SC14 Proceedings of the International Conference for High Performance Computing, Networking, Storage and Analysis, 3–14. doi: [10.1109/SC.2014.6](https://doi.org/10.1109/SC.2014.6).
- 2014 [6] A. Breuer, A. Heinecke, S. Rettenberger, M. Bader, **A.-A. Gabriel** and C. Pelties, “**Sustained Petascale Performance of Seismic Simulations with SeisSol on SuperMUC**”, *PRACE ISC Award 2014*, International Supercomputing Conference (ISC) Proceedings, 8488, 1–18. doi: [10.1007/978-3-319-07518-1_1](https://doi.org/10.1007/978-3-319-07518-1_1).
- 2014 [5] C. Pelties, **A.-A. Gabriel**, and J.-P. Ampuero, “**Verification of an ADER-DG method for complex dynamic rupture problems**”, *Geosci. Model Dev.*, 7, 847–866, doi:[10.5194/gmd-7-847-2014](https://doi.org/10.5194/gmd-7-847-2014); *Geosci. Model Dev. Disc.*, 6(4): 5981–6034, doi:[10.5194/gmdd-6-5981-2013](https://doi.org/10.5194/gmdd-6-5981-2013).
- 2013 [4] **A.-A. Gabriel**, J.-P. Ampuero, L. A. Dalguer and P. M. Mai, “**Source Properties of Dynamic Rupture Pulses with Off-Fault Plasticity**”, *J. Geophys. Res.*, 118(B8), doi: [10.1002/jgrb.50213](https://doi.org/10.1002/jgrb.50213).
- 2012 [3] **A.-A. Gabriel**, J.-P. Ampuero, L. A. Dalguer and P. M. Mai, “**The transition of dynamic rupture modes in elastic media**”, *J. Geophys. Res.*, 117(B9), 01480227, doi:[10.1029/2012JB009468](https://doi.org/10.1029/2012JB009468).
- 2011 [2] R. A. Harris, M. Barall, D. J. Andrews, B. Duan, S. Ma, E. M. Dunham, **A.-A. Gabriel**, Y. Kaneko, Y. Kase, B. T. Aagaard, D. D. Oglesby, J.-P. Ampuero, T. C. Hanks, and N. Abrahamson, “**Verifying a computational method for predicting extreme ground motion**”, *Seis.Res. Let.*, 82(5), 638-644, doi: [10.1785/gssrl.82.5.638](https://doi.org/10.1785/gssrl.82.5.638).
- 2009 [1] M. Posselt and **A.-A. Gabriel**, “**Atomistic simulation of amorphous germanium and its solid phase epitaxial recrystallization**”, *Phys. Rev. B* 80, 045202, doi: [10.1103/PhysRevB.80.045202](https://doi.org/10.1103/PhysRevB.80.045202).

Selected other publications

- 2022 **A.-A. Gabriel**, “**Computational Earthquake Physics (Computergestutzte Erdbebenphysik)**”, [cumulative habilitation thesis](#) to obtain the academic degree “doctor habilitatus” (Dr. habil.) in the scientific discipline “Geophysics” submitted to LMU Munich, Germany.
- 2022 Hilley, G. , “**SZ4D Implementation Plan**”, Stanford Digital Repository, doi:[10.25740/hy589fc7561](https://doi.org/10.25740/hy589fc7561).
- 2021 **A.-A. Gabriel**, M. Mohr, B. A. S. Schuberth, “**Geocomputing**”, *Encyclopedia of Mathematical Geosciences*, Earth Sciences Series, ISSN 1388-4360, Springer, Cham, doi:[10.1007/978-3-030-26050-7](https://doi.org/10.1007/978-3-030-26050-7).
- 2021 M. van den Ende, L. Bruhat, G. Funning, **A.-A. Gabriel**, S.P. Hicks, R. Jolivet, T. Lecocq, C. Rowe, “**The Seismica Initiative - Creating a Diamond Open Access community journal for Seismology and Earthquake Science**”, White Paper, EarthArxiv, doi:[10.31223/X5304V](https://doi.org/10.31223/X5304V).
- 2019 N. Lapusta et al., “**Modeling Earthquake Source Processes: from Tectonics to Dynamic Rupture**”, [report to the National Science Foundation](#).
- 2013 **A.-A. Gabriel**, “**Physics of dynamic rupture pulses and macroscopic earthquake source properties in elastic and plastic media**”, Diss. ETH No. 20567, Doctoral dissertation for the degree of Doctor of Sciences ETH Zurich, doi: [10.3929/ethz-a-009761502](https://doi.org/10.3929/ethz-a-009761502).