DOYEON KIM

ETH Zürich
Institute of Geophysics
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EDUCATION

2013-2018 **Ph.D.** *Earth and Atmospheric Sciences*, Cornell University
2010-2012 **M.S.** *Civil and Environ. Engineering*, Yonsei University, S. Korea
Sept 2010 **B.A.** *Civil and Environ. Engineering*, Yonsei University, S. Korea

PROFESSIONAL APPOINTMENTS

2021-present Senior Scientist, ETH Zürich
2021-present Visiting Assistant Professor, University of Maryland
2018-2021 Postdoctoral Fellow, University of Maryland
Spring 2018 Postdoctoral Researcher, Cornell University
Summer 2017 Graduate Student Intern, Lawrence Livermore National Lab
2013-2017 Teaching / Research Assistant, Cornell University
2010-2013 Teaching / Research Assistant, GIS & Remote Sensing Lab, Yonsei University
2006-2008 Military Unit Supply Specialist, U.S. Army Humphreys, S. Korea

PUBLICATIONS

*Student/postdoc papers

2022 **Kim, D**., Ceylan, S., Stähler, S. C., Lekic, V., Maguire, G. Zenhausernm J. Clinton, D. Giardini, et al. (2022), Structure along the martian dichotomy constrained by Rayleigh and Love waves and their overtones, ***GRL***, e2022GL101666. https://doi.org/10.1029/2022GL101666

Kim, D., Banerdt, W. B., Ceylan, S., Giardini, D., Lekic, V., Lognonné, P., Beghein, C., Beucler, E., Carrasco, S., Charalambous, C., Clinton, J., Drilleau, M., Durán, C., Golombek, M., Joshi, R., Khan, A., Knapmeyer-Endrun, B., Li, J., Maguire, R., Pike, W. T., Samuel, H., Schimmel, M., Schmerr, N., Stähler, S., Stutzmann, E., Wieczorek, M., Xu, Z., Batov, A., Bozdag, E., Dahmen, N., Davis, P., Gudkova, T., Horleston, A., Huang, Q., Kawamura, T., King, S., McLennan, S., Nimmo, F., Plasman, M., Plesa, A. C., Stepanova, I. E., Weidner, E., Zenhäusern, G., Daubar, I., Fernando, B., Garcia, R., Posiolova, L. V., Panning, M. (2022), Surface waves and crustal structure on Mars, ***Science***, Featured in *Science perspectives.* https://doi.org/10.1126/science.abq7157

Posiolova, L., Lognonné, P., Banerdt, W. B., Clinton, J. F., Collins, G., Kawamura, T., Ceylan, S., Daubar, I., Fernando, B., Froment, M., Giardini, D., Malin, M., Miljkovic, K., Stähler, S. C., Xu, Z., Banks, M. E., Beucler, E., Cantor, B., Charalambous, C., Dahmen, N., Davis, P., Dundas, C., Duran,

C., Euchner, F., Garcia, R., Golombek, M., Horleston, A., Keegan, C., Khan, A., **Kim, D**., et al., (2022), Large hypervelocity impact on Mars co-located by orbital imaging and surface seismic recording, ***Science***, Featured in *Science perspectives*
https://doi.org/10.1126/science.abq7704

Stähler C. S., A. Mittelholz, C. Perrin, T. Kawamura, **D. Kim**, M. Knapmeyer, G. Zenhausern, J. Clinton, D. Giardini, P. Lognonne, W. B. Banerdt (2022), Tectonics of Cerberus Fossae unveiled by marsquake, Mars, ***Nature Astronomy***.
https://www.nature.com/articles/s41550-022-01803-y

Irving, J. C. E., V. Lekic, C. Duran, M. Drilleau, **D. Kim**, A. Rivoldini, A. Khan, H. Samuel, D. Antonangeli, W. B. Banerdt, et al., First observation of core-transiting seismic phases on Mars, ***PNAS***, *in revision.*

Ceylan, S., Clinton, J. F., Giardini, D., Stähler, S.C., Horleston, A., Böse, M., Charalmbous, C., Dahmen, N. L., van Driel, M., Duran, C., Kawamura, T., Khan, A., **Kim, D**., et al., (2022), The marsquake catalogue from InSight, sols 0-1011, ***PEPI***.
https://doi.org/10.1016/j.pepi.2022.106943

*Huang, Q., N. Schmerr, S. D. King, **D. Kim**, et al., (2022), Seismic detection of the Martian mantle transition zone by InSight, ***PNAS***.
https://doi.org/10.1073/pnas.2204474119

*Dahmen, N. L., J. F. Clinton, M. Meier, S. Stähler, S. Ceylan, **D. Kim**, et al. MarsQuakeNet: A More Complete Marsquake Catalogue Obtained by Deep Learning Techniques. ***JGR***, e2022JE007503.
https://doi.org/10.1029/2022JE007503

*Duran, C., Khan, A., Ceylan, S., Charalambous, C., **Kim, D**., Giardini, D., et al., Observation of a core-diffracted P-wave and implications for the lower-mantle structure of Mars, ***GRL***, e2022GL100887.
https://doi.org/10.1029/2022GL100887

Li, J., Beghein, C., Davis, P., Wieczorek, M. A., Mclennan, S. M., **Kim, D**., et al., Crustal Structure constraints from the detection of the SsPp Phase on Mars, ***Earth and Space Science***, e2022EA002416.
https://doi.org/10.1029/2022EA002416

Panning, M. P., W. B. Banerdt, C. Beghein, S. Carrasco, S. Ceylan, J. F. Clinton, P. Davis, M. Drilleau, D. Giardini, A. Khan, B. Knapmeyer-Endrun, **D. Kim**, J. Li, P. Lognonne, S. C. Stähler, et al. (2022) Locating the largest event observed on Mars with multi-orbit surface waves, ***GRL***, e2022GL101270. https://doi.org/10.1029/2022GL101270

Kawamura, T., J. F. Clinton, G. Zenhausern, S. Ceylan, A. C. Horleston, N. L. Dahmen, C. Duran, **D. Kim**, et al., Largest Marsquake Ever Detected by InSight: S1222a, ***GRL***, e2022GL101543.
https://doi.org/10.1029/2022GL101543

Wieczorek, M. A., Broquet, A., McLennan, S. M., Rivoldini, A., Golombek, M., Antonangeli, D., Beghein, C., Giardini, D., Gudkova, Gyalay S., Johnson, C. L., Joshi, R., **Kim, D**., ... & Banerdt, W. B. (2022), InSight

constraints on the global character of the Martian crust. ***JGR***, https://doi.org/10.1029/2022JE007298

Horleston, A. C., Clinton, J. F., Ceylan, S., Giardini, D., Charalambous, C., Irving, J. C., Lognonné, P., Stähler, S.C., Zenhäusern, G., Dahmen, N. L., Duran, C., Kawamura, T., Khan, A., **Kim, D**., ...& Banerdt, W. B. (2022), The Far Side of Mars: Two Distant Marsquakes Detected by InSight. ***The Seismic Record***, 2(2), 88-99. https://doi.org/10.1785/0320220007

2021 Karakostas, F., N. Schmerr, R. Maguire, Q. Huang, **D. Kim**, V. Lekic, L. Margerin, C. Nunn, S. Menina, T. Kawamura, P. Lognonné, D. Giardini, and W. B. Banerdt (2021), Scattering attenuation of the Martian interior through coda wave analysis, ***BSSA***, *Special Issue on Mars seismology,* https://doi.org/10.1785/0120210253

Kim, D., V. Lekic, J. Irving, N. Schmerr, B. Knapmeyer-Endrun, R. Joshi, M. Panning, B. Tauzin, F. Karakostas, R. Maguire, Q. Huang, A. Khan, D. Giardini, M. A. Wieczorek, P. Lognonné, W. B. Banerdt, (2021), Improving subsurface constraints on Earth and Mars with PPs receiver functions, ***JGR***, https://doi.org/10.1029/2021JE006983

Kim, D., P. Davis, V. Lekic, R. Maguire, N. Compaire, M. Schimmel, E. Stutzmann, J.C.E. Irving, P. Lognonné, J.-R. Scholz, J. Clinton, G. Zenhausern, N. Dahmen, M. Panning, R. F. Garicia, K. Hurst, B. Knapmeyer-Endrun, F. Nimmo, W. T. Pike, L. Pou, N. Schimerr, S. C. Stähler, B. Tauzin, R. Widmer-Schnidrig, W. B. Banerdt (2021), Potential pitfalls in the analysis and structural interpretation of Mars' seismic data from InSight, ***BSSA***, *Special Issue on Mars seismology,* https://doi.org/10.1785/0120210123

Stähler, S., A. Khan, W. B. Banerdt, P. Lognonné, D. Giardini, S. Ceylan, M. Drilleau, A. C. Duran, R. F. Garcia, Q. Huang, **D. Kim**, V. Lekic, H. Samuel, M. Schimmel, N. Schmerr, D. Sollberger, E. Stutzmann, Z. Xu, D. Antonangeli, C. Charalambous, P. Davis, J. C. E. Irving, T. Kawamura, M. Knapmeyer, R. Maguire, A. G. Marusiak, M. P. Panning, C. Perrin, A-C. Plesa, A. Rivoldini, C. Schmelzbach, G. Zenhausern, E. Beucler, J. Clinton, N. Dahmen, M. van Driel, T. Gudkova, A. Horelston, W. T. Pike, M. Plasman, S. E. Smrekar (2021), Seismic detection of the Martian core, ***Science,*** Featured in *Science Cover and perspectives. AAAS Newcomb Cleveland Prize winning article in 2023* https://doi.org/10.1126/science.abi7730

Knapmeyer-Endrun, B., M. P. Panning, F. Bissig, R. Joshi, A. Khan, **D. Kim**, V. Lekic, B. Tauzin, S. Tharimena, M. Plasman, N. Compaire, R. F. Garcia, L. Margerin, M. Schimmel, E. Stutzmann, N. C. Schmerr, E. Bozdag, A-C. Plesa, M. A. Wieczorek, A. Broquet, D. Antonangeli, S. M. McLennan, H. Samuel, C. Michaut, L. Pan, S. E. Smrekar, C. L. Johnson, N. Brinkman, A. Mittelholz, A. Rivoldini, P. M. Davis, P. Lognonné, B. Pinot, J-R. Scholz, S. C. Stahler, M. Knapmeyer, M. van Driel, D. Giardini, and W. B. Banerdt (2021), Crustal thickness and layering of Mars from InSight seismic data, ***Science***, Featured in *Science Cover and perspectives.* https://doi.org/10.1126/science.abf8966.

Khan, A., S. Ceylan, M. van Driel, D. Giardini, P. Lognonné, H. Samuel, N. C. Schmerr, S. C. Stahler, A. C. Duran, Q. Huang, **D. Kim**, C. Charalambous, J. F. Clinton, P. M. Davis, M. Drilleau, F. Karakostas, V. Lekic, R. R. Maguire, C. Michaut, M. P. Panning, W. T. Pike, B. Pinot, M. Plasman, J-R. Scholz, R. Widmer-Schniddrig, T. Spohn, S. E. Smrekar, and W. B. Banerdt (2021), Imaging the upper mantle structure of Mars with InSight seismic data, ***Science***, Featured in *Science Cover and perspectives.* https://doi.org/10.1126/science.abf2966

Schimmel, M., E. Stutzmann, P. Lognonné, N. Compaire, P. Davis, M. Drilleau, R. Garcia, **D. Kim**, B. Knapmeyer-Endrun, V. Lekic, L. Margerin, M. Panning, N. Schmerr, J-R. Scholz, A. Spiga, B. Tauzin, and W. B. Banerdt (2021), Seismic Noise Autocorrelations on Mars. ***Earth and Space Science***, https://doi.org/10.1029/2021EA001755

Compaire, N., L. Margerin, R. F. Garcia, B. Pinot, M. Calvet, G. Orhand-Mainsant, **D. Kim** et al., (2021), Autocorrelation of the ground vibration recorded by the SEIS-InSight seismometer on Mars, ***JGR***, https://doi.org/10.1029/2020JE006498

2020 **Kim, D.,** V. Lekic, B. Menard, D. Baron, and M. Taghizadeh-Popp (2020), Sequencing Seismograms: A panoptic view of scattering in core-mantle boundary region, ***Science***, Featured in *Science perspectives* & *IRIS member highlights.* https://doi.org/10.1126/science.aba8972

Brown**,** L., and **D. Kim** (2020), Extensive sills in the crust from deep seismic reflection profiling seismic data, ***Geosciences***, 10(11), 449, *Special Issue: Future advances in basin modeling: suggestions from current observations, analyses, and simulations.* https://doi.org/10.3390/geosciences10110449

2019 **Kim, D.,** and V. Lekic (2019), Groundwater variations from autocorrelation and receiver functions, ***GRL***, *Selected as Editors' Highlights in EOS & Science Highlights by IRIS.* https://doi.org/10.1029/2019GL084719

Kim, D., K. Keranen, G. Abers, and L.D. Brown (2019), Enhanced resolution of the subducting plate interface in Central Alaska from autcorrelation of local earthquake coda, ***JGR***, https://doi.org/10.1029/2018JB016167

Kim, D., and L. D. Brown (2019), From trash to treasure: 3D basement imaging with "excess" data from oil and gas exploration, ***AAPG Bulletin***, https://doi.org/10.1306/12191817420

2018 **Kim, D.,** L. D. Brown, K. Arnason, O. Gudmundsson, K. Agustsson, O. G. Flovenz (2018), Magma "bright spots" mapped beneath Krafla, Iceland, using RVSP imaging of reflected waves from microearthquakes, ***J. Volcanology and Geotherm. Res***., Special Issue: Reykjanes, Iceland. https://doi.org/10.1016/j.jvolgeores.2018.04.022

2017 **Kim, D**., L. D. Brown, K. Arnason, K. Agustsson, and H. Blanck (2017), Magma reflection imaging in Krafla, Iceland, using microearthquake sources, ***JGR***, https://doi.org/10.1002/2016JB013809

2016 Quiros, D. A., L. D. Brown, and **D. Kim** (2016), Seismic interferometry of railroad induced ground motions: body and surface wave imaging, ***GJI***, 205(1), 301-313. https://doi.org/10.1093/gji/ggw033

PUBLICATIONS (*in review / in internal review*)

2022 Knapmeyer, M., Stähler, S. C., Plesa, A.-C., Ceylan, S., Charalambous, C., Clinton, J., Dahmen, N., Duran, C., Horleston, A., Kawamura, T., **Kim, D**., et al., The global seismic moment rate of Mars after Event S1222a, ***GRL****, under review.*

Maguire, R., Lekic, V., **Kim, D**., Huang Q., Schmerr, N., Li, J., Beghein, C., Karakostas, F., Stähler, S., Lognonné, P., Banerdt, W. B., Seismic evidence of thrust faulting in southern Elysium Planitia, Mars, *in internal review.*

Kim, D., Stähler, S. C., et al., Obtaining average crustal and uppermost mantle properties for planetary models of Mars, *in internal review.*

CONFERENCE ABSTRACTS (*selected)*

*Student/postdoc abstracts

2023 **Kim, D**., et al., Obtaining average crustal and uppermost mantle properties for planetary models of Mars, *LPSC.*

Kim, D., et al., The Marsquake Service since the InSight mission to Mars, *EGU General Assembly.*

Kim, D., et al., Crustal structure observed by the InSight mission to Mars, *EGU General Assembly (Invited).*

*Dahmen, N., et al., Denoising InSight's marsquake recordings with deep learning, *EGU General Assembly.*

2022 *Dahmen, N., et al., A Deep Catalogue of Marsquakes, *AGU Fall Meeting.*

*Huang, Q., et al., Seismic detection of a deep mantle discontinuity within Mars by InSight, *AGU Fall Meeting.*

*Coonan, J., *Wike, L., et al., Synthetic Modeling of Multi-offset GPR and seismic data for void and buried rock detection on the Moon, *AGU Fall Meeting*

Kim, D., et al., Crustal structure of Mars from the first observation of surface waves, *AGU Fall meeting.*

2021 *Wike, L., et al., Seismic analogs for the detection of subsurface lunar and martian void spaces, *AGU Fall Meeting.*

Kim, D., et al., Sequencing core diffracting seismic phases: implications for mega-ULVZ properties, *AGU Fall meeting (Invited).*

Kim, D., et al., Towards a quantitative understanding of the relationship between properties of seismic waveforms and the underlying scattering media, *AGU Fall meeting.*

Mundl-Petermeier, A., et al., Geochemical and geophysical implications for the source of ocean island basalts, *AGU Fall meeting.*

Finlayson, V., et al., Tungsten-182 variability in ocean island basalts from combined geochemical and geophysical perspective, *AGU Fall meeting.*

2020 *Wike, L., et al., Seismic analogs for the detection of subsurface lunar and martian void spaces, *AGU Fall Meeting.*

*Pearson, K., et al., Toward understanding anomalously low aftershock productivity, *AGU Fall meeting.*

Kim, D., et al., Panoptic view of scattering in the core-mantle boundary region of the Pacific, *AGU Fall meeting (Invited).*

Kim, D., et al., Towards joint inversion of geophysical datasets in planetary analog studies, *AGU Fall meeting.*

INVITED TALKS

Upcoming*

2023* Planetary Seismology, *EGU General Assembly 2023*

2023* Invited lecture, Institute for Geology and Mineralogy, *University of Cologne*

2022 Department Colloquium, Department of Urban and Environmental Engineering, *Ulsan National Institute of Science and Technology, Korea*

Department Colloquium, Earth and Planetary Sciences, *Rutgers University*

2021 Exploring multi-scale mantle dynamics with computational methods, *AGU Fall Meeting*

Artificial Intelligence in Seismology, *International Forum on Pohang Earthquake*, POSCO International Center, Republic of Korea

Seismology and Geodynamics Seminar, Institute of Geophysics, ETH

The Geological Society of Washington, March meeting

2020 Potomac Geophysical Society, December meeting

Multi-disciplinary InSights on Mantle Heterogeneity from Geochemistry, Imaging, Modeling, and Experiments, *AGU Fall Meeting.*

Geology department colloquium, *University of Maryland*.

Geoscience and Machine Learning Seminar, *Zhejiang University*.

UK Geophysics & Tectonics Seminar, hosted by *University of Kentucky*.

2019 Global Seismographic Network (GSN) Design Goals SIG Presentations, 2019 IRIS Design Goals Working Group, *AGU Fall Meeting.*

TEACHING EXPERIENCE

Upcoming*

Spring 2023* *Lecturer,* ETH
Seismic Wave I

Spring 2022 *Lecturer,* ETH
Seismic Wave I

Spring 2021 Co-*Lecturer,* University of Maryland
Introduction to Seismology

Fall 2017 *Teaching Assistant,* Cornell University
Analysis of Sustainable Energy Systems

Spring 2016 *Teaching Assistant,* Cornell University
Introduction to Seismology

2013-2014 *Teaching Assistant,* Cornell University
Calculus for Engineers
Calculus II

2010-2012 *Teaching Assistant,* Yonsei University
Basic surveying and practice

FIELDWORK EXPERIENCE

Winter 2016	*Rhyolite Magma Dynamics NSF IES project,* Laguna del Maule, Chile Shallow lacustrine reflection profiling/Service broadband seismic stations
Fall 2016	*Pawnee Nodal Experiment*, Pawnee, OK Deployment of Nodal instruments
Spring 2016	*Cornell Wind Seismic Project,* Syracuse, NY Deployment of PASSCAL broadband seismic stations
Winter 2015	*Cornell Earth Source Heating Project,* Ithaca, NY Deployment of PASSCAL broadband seismic stations
Winter 2014	*NSF East African Rift Project,* Ethiopia, Africa Deployment/Service PASSCAL broadband seismic stations
Spring 2014	*Railraod Cultural Noise Experiment,* Belen, NM Deployment of PASSCAL TEXAN recorders

GRANTS/AWARDS

Upcoming*	
Mar 2023*	AAAS Newcomb Cleveland Prize
June 2018	SSA 2018 Student Presentation Award
May 2018	Meyer Bender ’29 and Stephen Bender ’58 Memorial Award
Dec 2014-2017	Cornell University Graduate Conference Grant
Dec 2017	Sidney Kaufman Travel Funds, Earth and Atmospheric Sciences
Sept 2016	Graduate Research Travel Grant
2014-2016	Earth Energy IGERT Grant from NSF
Summer 2014	Long Fellowship, Cornell University
Aug 2009	Academy Award, Full Scholarship, Yonsei University
Dec 2008	Army Commendation Medal (ARCOM), U.S. Army Garrison Humphreys

MEDIA COVERAGE

2022	EOS https://eos.org/articles/meteor-impact-could-inform-martian-mysteries The New York Times https://www.nytimes.com/2022/10/27/science/mars-meteorites-impacts-seismic.html Reuters https://www.reuters.com/lifestyle/science/nasas-insight-lander-reveals-details-outermost-layer-mars-2022-10-27/ ETH News https://ethz.ch/de/news-und-veranstaltungen/eth-news/news/2022/10/was-seismische-wellen-ueber-marskruste-verraten.html
2021	Science News by AGU on Mars: https://eos.org/articles/mars-from-the-insight-out UMD Right Now: https://umdrightnow.umd.edu/analysis-of-marsquakes-reveals-red-planets-unexpectedly-large-core The full list for our Mars work is provided here:

https://science.altmetric.com/details/110206812
https://science.altmetric.com/details/110206815
https://science.altmetric.com/details/110206814

2020 The full list for our lowermost mantle work is provided here:
https://www.altmetric.com/details/83859593/news
Science News by AGU on my groundwater monitoring work:
https://eos.org/editor-highlights/remotely-monitoring-groundwater-using-standard-techniques

PROFESSIONAL SERVICE

2021-present	*InSight* Marsquake Service frontline team (https://doi.org/10.12686/a19)
Spring 2020	Panelist for a NASA Grant Review Committee
2020-2021	Session chair for a technical session at SSA
2019-present	Judge for the AGU Outstanding Student Paper Award
2018-present	Reviewer for Journal of Geophysical Research, Geophysical Research Letters, Geophysical Journal of International, Journal of Volcanology and Geothermal Research, Icarus, Earth and Planetary Science Letters, Nature, G-Cubed, NSF Research Proposals

SCIENTIFIC COLLABORATORS

Amir Khan (ETH), Brice Menard (Johns Hopkins University), Brigitte Knapmeyer-Endrun (University of Cologne), Carene Larmat (LANL), Dana Peterson (USGS), Domenico Giardini (ETH), Geoff Abers (Cornell Univ.), Gylfi Hersir (ISOR), John Clinton (ETH), Jessica Irving (Univ. of Bristol), Kade Keranen (Cornell Univ.), Kevin Mayeda (AFTAC), Knutur Arnason (ISOR), Larry Brown (Cornell Univ.), Mark Panning (JPL), Mark Wieczorek (IPGP), Nick Schmerr (Univ. of Maryland), Paul Davis (UCLA), Philippe Lognonne (IPGP), Rebecca Ghent (PSI), Rengin Gok (LLNL), Ross Maguire (Univ. of Illinois), Savas Ceylan (ETH), Simon C. Stähler (ETH), Taka'aki Taira (UC Berkeley), Ved Lekic (Univ. of Maryland), Quancheng Huang (Colorado School of Mines)