

Zack Jack Spica

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Education

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| 2015 | Ph.D. - Geophysics , Universidad Nacional Autónoma de México, with highest honors and the congratulations of the jury. |
| 2011 | M.Sc. - Earth Sciences , Université Libre de Bruxelles, with speciality in fluid geochemistry and geodynamics and with honors. |
| 2009 | BSc. - Earth Sciences , Université Libre de Bruxelles. |

Position held

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| Jan. 2020 - Pres. | Assistant professor , Department of Earth and Environmental Sciences, University of Michigan. |
| May - Dec. 2019 | Project researcher , Earthquake Research Institute, The University of Tokyo. |
| Oct. 15 - Feb. 19 | Postdoctoral researcher , Department of Geophysics, Stanford University. |

Teaching

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| UMICH | Lecturer , The Physical World (EARTH 130), W20, F20, W21. |
| Stanford | Lecturer , Earthquakes and Volcanoes (GEOPHY 90), F18. |
| Stanford | Lecturer , Earthquake Seismology (GEOPHY 287), W17. |
| UNAM | Teaching assistant , Geodynamics, W13, F12. |

Awards and recognitions

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| 2016 | Medal <i>Alfonso Caso</i> (outstanding Ph.D. thesis), Universidad Nacional Autónoma de México, Posgrado en Ciencias de la Tierra. |
| 2011 | <i>Officer de l'Ordre du Phlogistic</i> by the organization <i>Le Cercle des Sciences</i> of the Faculty of Sciences, Université Libre de Bruxelles, Belgium. Acknowledged for an outstanding commitment and the help provided to the organization and services offered to the Faculty of Sciences during the studies. |
| 2008 | <i>Chevalier de l'Ordre du Phlogistic</i> by the organization <i>Le Cercle des Sciences</i> of the Faculty of Sciences, Université Libre de Bruxelles, Belgium. Acknowledged for the commitment and the help provided to the organization and services offered to the Faculty of Sciences during the studies. |

Grants

- 2020 | **Zack Spica** and Corentin Caudron, Quantifying underwater volcano degassing using novel seismo-acoustic approaches, Thomas Jefferson Fund. \$20,000 equally shared between the French and the American institutions.
- 2020 | **Zack Spica**, The Seismic Response of Mexico City Using Fiber-Optic Seismology, NSF, Estimated Amount: \$490,000, Award #2022716.
- 2017 | Gregory Beroza and **Zack Spica**, Regionalized Crustal Attenuation for the Continental US Using Ambient Seismic Field, USGS Annual Earthquake Hazards Grant program, #2018-0110.
- 2017 | Gregory Beroza, **Zack Spica** and Mathieu Perton, Assessing the Deep Geometry of the Los Angeles Basin Using Full Horizontal-to-Vertical Spectral Ratio Inversion, Southern California Earthquake Center (SCEC), Award #17031.

Service to the scientific community

- 2020 | Primary Convener at the AGU Fall Meeting: Ambient Noise Seismology.
- 2020 | Topical Editor for Solid Earth (EGU) - Special Issue: Fibre-optic sensing in Earth sciences.
- 2020 | Convener at the EGU General Assembly: Geophysical Joint Inversion & Advances in fibre-optic technologies for geophysical applications.
- 2019 | Convener at the AGU Fall Meeting: Ambient Field Seismology.
- 2018 | Primary Convener at the AGU Fall Meeting: Ambient Field Seismology: Theoretical and Methodological Innovations.
- 2018 | Convener at the AGU Fall Meeting: Site Characterization Using Single Station and Array methods.
- 2017 | Primary Convener at the AGU Fall Meeting: Ambient Field Seismology: Theoretical and Methodological Innovations.
- 2016 | Convener at the AGU Fall Meeting: Reliability of the Green's Function Extracted from Ambient Noise.

Publications

Journal articles

20. **Spica Z.**, Nishida K., Akuhara T., Pétrélis F., Shinohara M., Yamada Y., Marine Sediment Characterized by Ocean-Bottom Fiber-Optic Seismology, *Geophysical Research Letters*, 2020, doi: 10.1029/2020GL088360.
19. Bahavar M., **Spica Z.**, Sánchez-Sesma F. J., Trabant C., Zandieh A., Toro G., Horizontal-to-Vertical Spectral Ratio (HVSR) IRIS Station Toolbox, *Seismological Research Letters*, 2020, doi: 10.1785/0220200047.
18. **Spica Z.**, Perton M., Martin E., Beroza G., Biondi B., Urban Seismic Site Characterization by Fiber-Optic Seismology, *Journal of Geophysical Research (Solid Earth)*, 2020, doi: 10.1029/2019JB018656.
17. Thomas A. M., **Spica Z.**, Bodmer M., Schulz W. H., Roering J. R., Using a dense seismic array to determine resonances and structure of the Two Towers earthflow in Northern California, *Seismological Research Letter*, 2020, doi: 10.1785/0220190206.
16. Perton M., **Spica Z.**, Clayton R. W., Beroza G., Shear Wave Structure of a Transect of the Los Angeles Basin From Multimode Surface Waves and H/V Spectral Ratio Analysis, *Geophysical Journal International*, 2020, doi: 10.1093/gji/ggz458.
15. Lellouch A., Yuan S., **Spica Z.**, Ellsworth W. and Biondi B., Seismic velocity estimation using passive downhole distribute acoustic sensing records: examples from the San Andreas Fault Observatory at Depth, *Journal of Geophysical Research: Solid Earth*, 2019, doi:10.1029/2019JB017533.
14. **Spica Z.**, Perton M., Nakata N., Liu X., Beroza G., Shallow V_s imaging of the Groningen area from joint inversion of multi-mode surface waves and H/V spectral ratio, *Seismological Research Letter*, 2018, doi:10.1785/0220180060.
13. **Spica Z.**, Nakata N., Liu X., Campman X., Zijian T., Beroza G., Ambient Seismic Field Analysis at Groningen Gas Field: an overview from the surface to reservoir depth, *Seismological Research Letter*, 2018, doi:10.1785/0220170256.
12. Pritchard M. E., de Silva S. L., Michelfelder G., Zandt G., McNutt S. R., Gottsmann J., West M. E., Blundy J., Christensen D. H., Finnegan N. J., Minaya E., Sparks R. S. J., Sunagua M., Unsworth M. J., Comeau M. J., del Potro R., Diez M., Farrell A., Henderson S. T., Jay J. A., Naranjo J. A., McFarlin H., Muir D., Perkins J. P., Wilder A., Ward K. M., **Spica Z.**, Legrand D., PLUTONS: Investigating the Relationship Between Pluton Growth and Volcanism in the central Andes, *Geosphere*, 2018, doi:10.1130/GES01578.1.

11. Melgar D., Pérez-Campos X., Ramirez-Guzman L., **Spica Z.**, Castro V. H., Hammond W. C., Cabral-Cano E., Bend Faulting at the Edge of a Flat Slab During the 2017 M w 7.1 Puebla-Morelos, Mexico Earthquake, *Geophysical Research Letters*, 2018, doi:10.1002/2017GL076895.
10. **Spica Z.**, Perton M., Nakata N., Liu X., Beroza G., Site Characterization at Groningen Gas Field Area Through Joint Surface-Borehole H/V Analysis, *Geophysical Journal International*, 2017, doi:10.1093/gji/ggx426.
9. **Spica Z.**, Perton M., Beroza G., Lateral Heterogeneity Imaged by Small-Aperture *ScS* Retrieval from the Ambient Seismic Field, *Geophysical Research Letters*, 2017, doi:10.1002/2017GL073230.
8. Perton M., **Spica Z.**, Caudron C., Inversion of the horizontal to vertical spectral ratio in presence of strong lateral heterogeneity, *Geophysical Journal International*, 2017. doi:10.1093/gji/ggx458
7. **Spica Z.**, Perton M., Legrand D., Anatomy of the Colima Volcano magmatic system, Mexico, *Earth and Planetary Science Letters*, 459, 1-13, 2017, doi:10.1016/j.epsl.2016.11.010.
6. **Spica Z.**, Perton M., Calò M., Legrand D., Córdoba-Montiel F. and Iglesias A., 3-D shear wave velocity model of Mexico and South US: bridging seismic networks with ambient noise cross-correlations (C^1) and correlation of coda of correlations (C^3), *Geophysical Journal International*, 206(3),1795-1813, 2016. doi:10.1093/gji/ggw240.
5. **Spica Z.**, Caudron C., Perton M., Lecocq T., Camelbeeck T., Legrand D., Piña-Flores J., Iglesias A., Syahbana D. K., Velocity models and site effects at Kawah Ijen volcano and Ijen caldera (Indonesia) determined from ambient noise cross-correlations and directional energy density spectral ratios, *Journal of Volcanology and Geothermal Research*, 302, 173-189, 2015, doi:10.1016/j.jvolgeores.2015.06.016.
4. **Spica Z.**, Legrand D., Iglesias A., Dahm T., Walter T., Heimann, S., Froger J-L., Rémy D., West J., Pardo M., Hydrothermal and magmatic reservoirs of the Lazufre volcanic area revealed from a high-resolution seismic noise tomography, *Earth and Planetary Science Letters*, 421, 27-38, 2015, doi:10.1016/j.epsl.2015.03.042.
3. **Spica Z.**, Cruz-Atienza V., Reyes-Alfaro G., Legrand D., Iglesias A., Crustal Imaging of Western-Michoacan and the Jalisco Block, Mexico, from Ambient Seismic Noise, *Journal of Volcanology and Geothermal Research*, 289, 193-201, 2014, doi:10.1016/j.jvolgeores.2014.11.005.
2. Córdoba-Montiel F., Iglesias A., Singh S.K., **Spica Z.**, Legrand D., Tomography of Rayleigh wave group velocity for Eastern Mexico and the Isthmus of Tehuantepec, *Boletín de la Sociedad Geológica Mexicana*, 66.3, 441-457, 2014.
1. UNAM Seismology Group, Ometepec-Pinotepa Nacional, Mexico Earthquake of 20 March 2012 (Mw7.5): A preliminary report, *Geofísica Internacional*, 52.2, 173-196, 2013, doi:10.1016/S0016-7169(13)71471-5.

Book chapters

1. Legrand D., Singh S.K., Scolamacchia T., Espíndola J.M., Lermo J., Jiménez Z., **Spica Z.**, Valenzuela R. W., Valdés-González C., Strong Volcano-Tectonic feed-back interactions revealed by the seismicity before and after the 1982 El Chichón eruptive events, *Active Volcanoes of Chiapas (México): El Chichón and Tacaná, VOLCANOES OF THE WORLD, Chapter 7*, Book Serie: Springer-Verlag Berlin Heidelberg, 97-114, 2015, doi:10.1007/978-3-642-25890-9_5.

Expanded Abstracts

4. Huot F., Martin E., **Spica Z.**, Biondi B. (2019, October). Distributed Acoustic Sensing (DAS) for large-scale urban monitoring and seismic hazard mitigation using preexisting telecommunication infrastructure. In SEG 2019 Workshop: Geophysics for Smart City Development, Beijing, China, 29-31 July 2019 (pp. 1-1). Society of Exploration Geophysicists. doi:10.1190/smct-2019-01.1.
3. Lellouch, A., Yuan, S., **Spica, Z.**, Biondi, B., Ellsworth, W. L., Velocity analysis and moveout-based event detection using downhole DAS records. In SEG Technical Program Expanded Abstracts 2019 (pp. 989-993). Society of Exploration Geophysicists, 2019, doi:10.1190/segam2019-3214849.1.
2. Lellouch, A., **Spica Z.**, Biondi B., Ellsworth W., Using Vertical DAS Arrays for Continuous Monitoring of Induced Seismicity. In 81st EAGE Conference and Exhibition 2019 Workshop Programme, vol. 2019, no. 1, pp. 1-5. European Association of Geoscientists & Engineers, 2019. doi:10.3997/2214-4609.201902004.
1. Lellouch A., Yuan S., **Spica Z.**, Biondi B., Ellsworth W., A moveout-based method for the detection of weak seismic events using downhole DAS arrays, In 81st EAGE Conference and Exhibition 2019, vol. 2019, no. 1, pp. 1-5. European Association of Geoscientists & Engineers, 2019, doi:10.3997/2214-4609.201901242.

Invited conference talks

5. **Spica Z.** *et al.*, Ocean-bottom shallow velocity structure inferred with DAS, SCIWS2 AGU Workshop on Distributed Acoustic Sensing (remote - Youtube), 2020.
4. **Spica Z.** *et al.*, Distributed acoustic sensing for seismic monitoring in challenging environments, EGU General Assembly, Vienna (remote), 2020.
3. **Spica Z.**, Martin E., Perton M., Biondi B., Beroza G., Extracting Geotechnical Information in an Urban Environment Using Distributed Acoustic Sensing and a Free-floating Fiber-optic Cable, AOGS meeting, Singapore, 2019.
2. **Spica Z.**, Perton M., Beroza G., The power of higher-order cross-correlations (C^3) to image the Earth from the crust to the core, Cargèse Passive Imaging School, June 2017.
1. **Spica Z.**, Iglesias A., Perton M., Legrand D., Ambient Noise Tomography of the Mexican Republic using higher order-correlations, 2nd AXA-UNAM Workshop, Universidad Nacional Autónoma de México, Facultad de Ingeniería, 2015.

Invited seminars

19. Michigan State University, Computational SeismoLab, December 2020 (remote).
18. Workshop on Fibre Optic Sensing in Geoscience, INGV (Italy), December 2020 (remote and live broadcasted on Youtube)
17. University of Utah, Guy F. Atkinson distinguished lecture series, November 2020 (remote - Youtube).
16. Instituto Geográfico Nacional, Madrid, Spain, July 2020 (remote).
15. Kyoto University, Disaster Prevention Research Institute, November 2019.
14. The University of Tokyo, Earthquake Research Institute, Blue Earth Seminar, November 2019.
13. Tohoku University, Department Seminar, October 2019.
12. The University of Tokyo, Earthquake Research Institute, Department Seminar, July 2019.
11. University of Michigan, Prospective Faculty Seminar, October 2018.
10. Workshop on Future Developments of the Groningen Ground-Motion Model, Schiphol, May 2018.
9. Consulat Général de France à San Francisco, February 2018.
8. Harvard University, BiSEPPS Seminar, February 2018.
7. Utrecht University, the Netherlands, September 2017.
6. Shell Global Solutions International, Amsterdam, September 2017.
5. University of California Santa Cruz, IGPP Seminar, April 2017.
4. US Geological Survey, Menlo Park, November 2016.
3. California Institute of Technology, Seismological Laboratory, November 2016.
2. Universidad Nacional Autónoma de México, Facultad de Ingeniería, May 2016.
1. Universidad Nacional Autónoma de México, Instituto de Geofísica, May 2016.

Recent conference talks

12. Viens L., **Spica Z.**, Akihara T., Yamada T., Nishida K., Shinohara M., Imaging the Japan Trench Subduction Zone Subsurface with an Ocean-Bottom Fiber-Optic Cable, AGU Fall Meeting, oral presentation, remote, 2020.
11. Garza-Giron R., Brodsky E. E., **Spica Z.**, Haney M., Hidden earthquakes unveil the dynamic evolution of a large-scale explosive eruption, EGU General Assembly, oral presentation, remote, 2020
10. Garza-Giron R., Brodsky E., **Spica Z.**, Haney M., Hidden earthquakes as a tool to conduit evolution during an explosive eruption, oral presentation, AGU Fall Meeting, San Francisco, 2019.
9. Lellouch A., **Spica Z.**, Yuan S, Huot F., Biondi B., Distributed acoustic sensing—the future of urban geophysics? oral presentation (invited), AGU Fall Meeting, San Francisco, 2019.

8. Huot F., Martin E., **Spica Z.** and Biondi B., Distributed Acoustic Sensing (DAS) for large-scale urban monitoring and seismic hazard mitigation using preexisting telecommunication infrastructure, oral presentation (invited), SEG Contributions of Geophysics to Smart City and Underground Development Workshop, Beijing, 2019.
7. Lellouch A., Yuan S., **Spica Z.**, Biondi B., Ellsworth W., A velocity-based earthquake detection system using downhole DAS data, oral presentation, AOGS meeting, Singapore, 2019.
6. Ellsworth W., Lellouch A., Yuan S., **Spica Z.**, Biondi B., A velocity-based earthquake detection system using downhole DAS arrays; examples from SAFOD, oral presentation, SSA meeting, Seattle, 2019.
5. Liu X., Beroza G. C., Nakata N., **Spica Z.**, Attenuation Estimation With Uncertainty for Seismic Noise Interferometry: Application to a Dense 3C Array in Groningen, Netherlands, SSA meeting, Seattle, 2019.
4. Lellouch A., Yuan S., **Spica Z.**, Biondi B., Ellsworth W., Velocity analysis and moveout-based event detection using downhole DAS records, SEG Technical Program Expanded Abstracts, 2019.
3. Lellouch A., Yuan S., **Spica Z.**, Biondi B., Ellsworth W., A velocity-based earthquake detection system using downhole DAS arrays; examples from SAFOD, EGU General Assembly, Vienna, 2019.
2. Lellouch A., **Spica Z.**, Biondi B., Ellsworth W., A moveout-based method for the detection of weak seismic events using downhole DAS arrays, 81st EAGE Conference & Exhibition, London, 2019.
1. Lellouch A., **Spica Z.**, Biondi B., Ellsworth W., Using Vertical DAS Arrays for Continuous Monitoring of Induced Seismicity, 81st EAGE Conference & Exhibition, London, UK, 2019.