Alan Poulos

Update: July, 2025

Education

2019–2023 **Ph.D. in Structural Engineering**, *Stanford University*, USA

2013–2014 **M.Sc. in Structural Engineering**, *Pontificia Universidad Católica de Chile*, Chile

2008–2013 **Civil Engineer**, *Pontificia Universidad Católica de Chile*, Chile

Experience

2024–Present **Research Civil Engineer**, *United States Geological Survey (USGS)*, USA
Mendenhall Postdoctoral Fellow.

2023 **Lecturer**, *Stanford University*, USA
Course: Performance-Based Earthquake Engineering.

2021–2023 **Teaching Assistant**, *Stanford University*, USA
Course: Performance-Based Earthquake Engineering.

2017–2019 **Research Engineer**, *Sirve S.A.*, Chile, Research & Development
Development of seismic hazard, risk, and resilience assessment tools for buildings.

2014–2017 **Research Assistant**, *Research Center for Integrated Disaster Risk Management (CIGIDEN)*, Chile
Research in seismic hazard and risk assessment of single structures and spatially distributed infrastructure.

2013 **Intern**, *Sirve S.A.*, Chile, (2 months)
Design of seismic isolation systems for hospitals and residential buildings.

2009–2013 **Teaching Assistant**, *Pontificia Universidad Católica de Chile*, Chile
Courses: Calculus I, Calculus II, Calculus III, Mathematical Methods Applied to Engineering, Statics, Hydraulic Engineering, Solid Mechanics, Structural Analysis I, Structural Analysis II, Earthquake Engineering, and Seismic Protection Systems.

Awards

2024 **Mendenhall Research Fellowship**, *United States Geological Survey (USGS)*

2021 **EERI/FEMA NEHRP Graduate Fellowship**, *Earthquake Engineering Research Institute*

2020 **Nancy Grant Chamberlain Fellowship**, *Stanford University*

2019 **Beca Chile**, *National Agency for Research and Development (ANID)*

2014 **Marcos Orrego Puelma Award**, *Institute of Engineers of Chile*

2013 **Department of Structural and Geotechnical Engineering Award**, *Pontificia Universidad Católica de Chile*

Skills

Languages Native English and Spanish speaker

Programming Python, Matlab, C++

apoulos@alumni.stanford.edu • *ajpoulos.github.io* • *alanpoulos*
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Professional Service

Journal Reviewer
- Earthquake Spectra
- Earthquake Engineering & Structural Dynamics
- Nature Communications
- Physica A: Statistical Mechanics and its Applications
- Travel Behaviour and Society
- International Journal of Critical Infrastructure Protection
- International Journal of Disaster Risk Reduction
- Natural Hazards Review
- Reliability Engineering & System Safety

Journal Publications

[28] **Poulos, A.**, & Miranda, E. (2025). Accounting for ground motion directionality and building orientations in urban seismic risk analysis. *Earthquake Spectra*, 41(2), 1780-1800. doi:10.1177/87552930251315751

[27] Bantis, J., Heresi, P., **Poulos, A.**, & Miranda, E. (2025). Framework for regional seismic risk assessments of groups of tall buildings. *Earthquake Engineering & Structural Dynamics*, 54(3), 833-850. doi:10.1002/eqe.4283

[26] Girmay, N., **Poulos, A.**, & Miranda, E. (2025). Evaluation of directionality in physics-based ground motion simulations of strike-slip earthquakes. *Earthquake Spectra*, 41(1), 436-456. doi:10.1177/87552930241270555

[25] **Poulos, A.**, & Miranda, E. (2024). Directionality characteristics of horizontal response spectra from the 2022 M_w 6.9 Chihshang, Taiwan earthquake. *Earthquake Spectra*, 40(3), 1683-1696. doi:10.1177/87552930241247478

[24] Rosero-Velásquez, H., Monsalve, M., Gómez Zapata, J. C., Ferrario, E., **Poulos, A.**, de la Llera, J. C., & Straub, D. (2024). Risk-informed representative earthquake scenarios for Valparaíso and Viña del Mar, Chile. *Natural Hazards and Earth System Sciences*, 24, 2667-2687. doi:10.5194/nhess-24-2667-2024

[23] Oneto, A., Lorca, A., Ferrario, E., **Poulos, A.**, de la Llera, J. C., & Negrete-Pincetic, M. (2024). Data-driven optimization for seismic-resilient power network planning. *Computers & Operations Research*, 166, 106628. doi:10.1016/j.cor.2024.106628

[22] Girmay, N., Miranda, E., & **Poulos, A.** (2024). Orientation and intensity of maximum response spectral ordinates during the December 20, 2022 M_w 6.4 Ferndale, California earthquake. *Soil Dynamics and Earthquake Engineering*, 176. doi:10.1016/j.soildyn.2023.108323

[21] Girmay, N., **Poulos, A.**, & Miranda, E. (2024). Directionality and polarization of response spectral ordinates in the 2023 Kahramanmaras, Türkiye earthquake doublet. *Earthquake Spectra*, 40(1), 486-504. doi:10.1177/87552930231203989

[20] **Poulos, A.**, & Miranda, E. (2023). Modification of ground-motion models to estimate orientation-dependent horizontal response spectra in strike-slip earthquakes. *Bulletin of the Seismological Society of America*, 113(6), 2718-2729. doi:10.1785/0120230084

[19] **Poulos, A.**, & Miranda, E. (2023). Effect of style of faulting on the orientation of maximum horizontal earthquake response spectra. *Bulletin of the Seismological Society of America*, 113(5), 2092-2105. doi:10.1785/0120230001

[18] **Poulos, A.**, & Miranda, E. (2023). Damping-dependent correlations between response spectral ordinates. *Earthquake Engineering & Structural Dynamics*, 52(4), 1078-1090. doi:10.1002/eqe.3803

[17] **Poulos, A.**, & Miranda, E. (2022). Probabilistic characterization of the directionality of horizontal earthquake response spectra. *Earthquake Engineering & Structural Dynamics*, 51(9), 2077-2090. doi:10.1002/eqe.3654

[16] **Poulos, A.**, Miranda, E., & Baker, J. W. (2022). Evaluation of earthquake response spectra directionality using stochastic simulations. *Bulletin of the Seismological Society of America*, 112(1), 307-315. doi:10.1785/0120210101

[15] **Poulos, A.**, & Miranda, E. (2022). Proposal of orientation-independent measure of intensity for earthquake-resistant design. *Earthquake Spectra*, 38(1), 235–253. doi:10.1177/87552930211038240

[14] Silva-Lopez, R., Bhattacharjee, G., **Poulos, A.**, & Baker, J. W. (2022). Commuter welfare-based probabilistic seismic risk assessment of regional road networks. *Reliability Engineering & System Safety*, 227, 108730. doi:10.1016/j.ress.2022.108730

[13] Silva-Lopez, R., Baker, J. W., & **Poulos, A.** (2022). Deep learning-based retrofitting and seismic risk assessment of road networks. *Journal of Computing in Civil Engineering*, 36(2), 04021038. doi:10.1061/(ASCE)CP.1943-5487.0001006

[12] Allen, E., Chamorro, A., **Poulos, A.**, Castro, S., de la Llera, J. C., Echaveguren, T. (2022). Sensitivity analysis and uncertainty quantification of a seismic risk model for road networks. *Computer-Aided Civil and Infrastructure Engineering*, 37(4), 516-530. doi:10.1111/mice.12748

[11] Ferrario, E., **Poulos, A.**, Castro, S., de la Llera, J. C., & Lorca, A. (2022). Predictive capacity of topological measures in evaluating seismic risk and resilience of electric power networks. *Reliability Engineering & System Safety*, 217, 108040. doi:10.1016/j.ress.2021.108040

[10] **Poulos, A.**, & Miranda, E. (2021). Relations between MaxRotD50 and some horizontal components of ground motion intensity used in practice. *Bulletin of the Seismological Society of America*, 111(4), 2167-2176. doi:10.1785/0120200364

[9] Espinoza, S., **Poulos, A.**, Rudnick, H., de la Llera, J. C., Panteli, M., & Mancarella, P. (2020). Risk and resilience assessment with component criticality ranking of electric power systems subject to earthquakes. *IEEE Systems Journal*, 14(2), 2837-2848. doi:10.1109/JSYST.2019.2961356

[8] Olivares, C., **Poulos, A.**, & de la Llera, J. C. (2020). Torsion control in structures isolated with the triple friction pendulum system. *Engineering Structures*, 216, 110503. doi:10.1016/j.engstruct.2020.110503

[7] Candia, G., **Poulos, A.**, de la Llera, J. C., Crempien, J., & Macedo, J. (2020). Correlations of spectral accelerations in the Chilean subduction zone. *Earthquake Spectra*, 36(2), 788-805. doi:10.1177/8755293019891723

[6] **Poulos, A.**, Monsalve, M., Zamora, N., & de la Llera, J. C. (2019). An updated recurrence model for Chilean subduction seismicity and statistical validation of its Poisson nature. *Bulletin of the Seismological Society of America*, 109(1), 66-74. doi:10.1785/0120170160

[5] Yang, S., Mavroeidis, G. P., de la Llera, J. C., **Poulos, A.**, Aguirre, P., Rahpeyma, S., Sonnemann, T., & Halldorsson, B. (2019). Empirical site classification of seismological stations in Chile using horizontal-to-vertical spectral ratios determined from recordings of large subduction-zone earthquakes. *Soil Dynamics and Earthquake Engineering*, 125. doi:10.1016/j.soildyn.2019.05.017

[4] Favier, P., **Poulos, A.**, Vásquez, J., Aguirre, P., & de la Llera, J. C. (2019). Seismic risk assessment of an emergency department of a Chilean hospital using a patient-oriented performance model. *Earthquake Spectra*, 35(2), 489-512. doi:10.1193/103017EQS224M

[3] Castro, S., **Poulos, A.**, Herrera, J. C., & de la Llera, J. C. (2019). Modeling the impact of earthquake induced debris on tsunami evacuation times of coastal cities. *Earthquake Spectra*, 35(1), 137-158. doi:10.1193/101917EQS218M

[2] **Poulos, A.**, Tocornal, F., de la Llera, J. C., & Mitrani-Reiser, J. (2018). Validation of an agent-based building evacuation model with a school drill. *Transportation Research Part C: Emerging Technologies*, 97, 82-95. doi:10.1016/j.trc.2018.10.010

[1] **Poulos, A.**, de la Llera, J. C., & Mitrani-Reiser, J. (2017). Earthquake risk assessment of buildings accounting for human evacuation. *Earthquake Engineering & Structural Dynamics*, 46(4), 561-583. doi:10.1002/eqe.2803

Conference Publications

[26] **Poulos, A.**, & Miranda, E. (2024, July). Influence of faulting style on the directionality of earthquake response spectra. In *18th World Conference on Earthquake Engineering*, Milan, Italy.

[25] **Poulos, A.**, & Miranda, E. (2024, July). Accounting for ground motion directionality in regional seismic risk assessment. In *18th World Conference on Earthquake Engineering*, Milan, Italy.

[24] Girmay, N., **Poulos, A.**, Miranda, E., Bravo-Haro, M., Heresi, P., Davalos, H., & Liapopoulou, M. (2024, July). Ground motion directionality effects in the 2023 Kahramanmaras, Türkiye earthquake sequence. In *18th World Conference on Earthquake Engineering*, Milan, Italy.

[23] Girmay, N., Miranda, E., & **Poulos, A.** (2024, July). Examination of directionality in the M_w 6.4, Ferndale, California earthquake. In *18th World Conference on Earthquake Engineering*, Milan, Italy.

[22] Miranda, E., Bantis, J., Heresi, P., & **Poulos, A.** (2024, July). Novel framework for regional seismic risk assessment. In *18th World Conference on Earthquake Engineering*, Milan, Italy.

[21] Silva-Lopez, R., Bhattacharjee, G., & **Poulos, A.** (2024, July). Probabilistically accounting for business interruption and bridge damage in road network performance. In *18th World Conference on Earthquake Engineering*, Milan, Italy.

[20] Muñoz, J. P., de la Llera, J. C., Castro, S., Alberto, Y., **Poulos, A.**, & Arróspide, F. (2024, July). Seismic risk sensitivity analysis of a large drinking water distribution network in central Chile. In *18th World Conference on Earthquake Engineering*, Milan, Italy.

[19] Miranda, E., & **Poulos, A.** (2023, September). Recent research on directionality of earthquake ground motions. In *Society for Earthquake and Civil Engineering Dynamics (SECED) 2023 Conference*, Cambridge, UK.

[18] **Poulos, A.**, & Miranda, E. (2022, June). New orientation-independent measure of horizontal ground motion intensity that accounts for directionality in earthquake-resistant design. In *12th National Conference on Earthquake Engineering*, Salt Lake City, UT.

[17] Muñoz, J. P., de la Llera, J. C., **Poulos, A.**, Vásquez, J., & Rossetto, T. (2021, September). A calibrated simplified model for plane and regular R/C moment resisting frames. In *17th World Conference on Earthquake Engineering*, Sendai, Japan.

[16] Castro, S., Arróspide, F., **Poulos, A.**, Alberto, Y., & de la Llera, J. C. (2021, September). Construction and risk evaluation of a water distribution network under seismic hazard in central Chile. In *17th World Conference on Earthquake Engineering*, Sendai, Japan.

[15] de la Llera, J. C., Monsalve, M., Ferrario, E., Allen, E., Chamorro, A., Castro, S., Alberto, Y., Arróspide, F., **Poulos, A.**, Candia, G., & Aguirre, P. (2021, September). Earthquake response sensitivity of complex infrastructure networks. In *17th World Conference on Earthquake Engineering*, Sendai, Japan.

[14] Monsalve, M., Ferrario, E., Alberto, Y., Arróspide, F., Castro, S., **Poulos, A.**, & de la Llera, J.C. (2020, November). Evaluating network reduction strategies for consistent risk assessment of critical infrastructures. In *Proceedings of the 30th European Safety and Reliability Conference*, Venice, Italy. doi:10.3850/978-981-14-8593-0_5115-cd

[13] Ferrario, E., Monsalve, M., **Poulos, A.**, de la Llera, J.C., & Sansavini, G. (2020, November). Representation and modeling of the Chilean electric power network for seismic resilience analysis. In *Proceedings of the 30th European Safety and Reliability Conference*, Venice, Italy. doi:10.3850/978-981-14-8593-0_5107-cd

[12] Ferrario, E., **Poulos, A.**, de la Llera, J.C., Lorca, A., Oneto, A., & Magnere, C. (2019, September). Representation and modeling of the Chilean electric power network for seismic resilience analysis. In *Proceedings of the 29th European Safety and Reliability Conference*, Hannover, Germany. doi:10.3850/978-981-11-2724-3_0558-cd

[11] Castro, S., **Poulos, A.**, Urrutia, A., Herrera, J. C., Cienfuegos, R., & de la Llera, J.C. (2018, June). Impact of earthquake magnitude on the estimation of tsunami evacuation casualties. In *Proceedings of the 11th National Conference on Earthquake Engineering*, Los Angeles, CA.

[10] **Poulos, A.**, Monsalve, M., Zamora, N., & de la Llera, J. C. (2018, June). Statistical assumptions of mainshock sequences and their validity under different magnitude ranges. In *16th European Conference on Earthquake Engineering*, Thessaloniki, Greece.

[9] Espinoza, S., **Poulos, A.**, Rudnick, H., de la Llera, J. C., Panteli, M., Mancarella, P., Sacaan, R., Navarro, A., & Moreno, R. (2017, July). Seismic resilience assessment and adaptation of the Northern Chilean power system. In *IEEE Power & Energy Society General Meeting*, Chicago, IL. doi:10.1109/pesgm.2017.8274288

[8] **Poulos, A.**, Espinoza, S., de la Llera, J. C., & Rudnick, H. (2017, January). Seismic risk assessment of spatially distributed electric power systems. In *16th World Conference on Earthquake Engineering*, Santiago, Chile.

[7] **Poulos, A.**, Castro, S., de la Llera, J. C., & Mitrani-Reiser, J. (2017, January). Seismic risk assessment of human evacuation in buildings. In *16th World Conference on Earthquake Engineering*, Santiago, Chile.

[6] Favier, P., Rivera, F., **Poulos, A.**, Vásquez J., de la Llera J. C., & Mitrani-Reiser, J. (2017, January). Impact on Chilean hospitals following the 2015 Illapel earthquake. In *16th World Conference on Earthquake Engineering*, Santiago, Chile.

[5] Rivera, F., Jünemann, R., Candia, G., Favier, P., Fernández, C., Chacón, M., Hube, M., Chamorro, A., Aguirre, P., de la Llera, J. C., & **Poulos, A.** (2017, January). Reconnaissance observations by CIGIDEN after the 2015 Illapel, Chile earthquake and tsunami. In *16th World Conference on Earthquake Engineering*, Santiago, Chile.

[4] Favier, P., **Poulos, A.**, Vásquez J., & de la Llera, J. C. (2016, September). Seismic risk assessment of a hospital's emergency department. In *Proceedings of the 6th International Disaster and Risk Conference: Integrative Risk Management - Towards Resilient Cities* (pp. 199-202), Davos, Switzerland.

[3] **Poulos, A.**, Favier, P., Vásquez J., & de la Llera, J. C. (2015, November). Scenario-based seismic performance assessment of a Chilean hospital. In *Proceedings of the 10th Pacific Conference on Earthquake Engineering*, Sydney, Australia.

[2] de la Llera, J. C., Mitrani-Reiser, J., Rivera, F., Fortuño, C., Jünemann, R., **Poulos, A.**, & Vásquez J. (2015, November). The 2010 Chile earthquake: a five-year reflection. In *Proceedings of the 10th Pacific Conference on Earthquake Engineering*, Sydney, Australia.

[1] de la Llera, J. C., Vásquez, J., **Poulos, A.**, & Favier, P. (2015, March). Trends in research and design of structures with seismic protection systems. In *11th Chilean Conference of Seismology and Earthquake Engineering*, Santiago, Chile.

Other Presentations

[6] **Poulos, A.** (2025, June). Ground motion directionality and its impact on seismic hazard and risk assessment. In *Engineering Brown Bag Presentations*, Geologic Hazards Science Center, U.S. Geological Survey, Golden, CO.

[5] **Poulos, A.** (2025, June). Advancing ground motion directionality characterization for seismic hazard and risk analysis. In *Earthquake Science Center Seminar*, U.S. Geological Survey, Moffett Field, CA.

[4] **Poulos, A.**, Hirakawa, E., Parker, G. A., & Baltay, A. (2025, April). Orientation dependence of probabilistic seismic hazard results from physics-based simulations. In *SSA 2025 Annual Meeting*, Baltimore, MD. doi:10.1785/0220250104

[3] **Poulos, A.** (2025, January). Ground motion directionality in the 2024 M7.0 Cape Mendocino earthquake. In *2025 Northern California Earthquake Hazards Workshop*, U.S. Geological Survey, virtual from Moffett Field, CA.

[2] **Poulos, A.** (2018, July). Seismic risk and resilience of electric power systems. In Seminar of *Seismic risk and resilience of interdependent systems and networks*, Research Center for Integrated Disaster Risk Management (CIGIDEN), Santiago, Chile.

[1] **Poulos, A.** (2014, September). Análisis de riesgo de sistemas físicos y sociales [Risk analysis of physical and social systems]. In *Vulnerability and Risk Workshop*, Research Center for Integrated Disaster Risk Management (CIGIDEN), Santiago, Chile.