

JOSIMAR ALVES DA SILVA JR

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EDUCATION

Massachusetts Institute of Technology Cambridge, MA
Ph.D. in Geophysics 09/2020

Thesis title: Multiphase flow and fault poromechanics: Understanding earthquake triggering and seismic hazard.

Faculty Advisor: Prof. Ruben Juanes

University of Sao Paulo Sao Paulo, Brazil
Bachelor in Geophysics 2008

PROFESSIONAL EXPERIENCE

Postdoctoral Associate, Harvard University, Cambridge, MA 09/2020 to Present

Research Assistant, MIT, Cambridge, MA 09/2014 to 09/2020

Geophysicist, Schlumberger, Houston, TX and Rio de Janeiro, Brazil 01/2009 to 07/2014

TEACHING EXPERIENCE AND TRAINING

Training

Kaufman Teaching Certificate Program MIT Teaching & Learning Laboratory, 2017

- Hands-on training in designing courses, constructing syllabi, teaching inclusively, and mentoring students

Teaching Assistant

- Computer Programming for Scientific and Engineering Applications MIT, 2016 and 2019
 - Led discussion section, explained difficult material to students and presented material to class
 - Led and organized dedicated laboratory class focusing on hands-on projects
 - Assisted undergraduate students with homework, in-class exercises and class final project
 - Designed and created homework, in-class projects and laboratory programming exercises

PUBLICATIONS

Peer-reviewed articles accepted:

1. **Silva, J. A.**, Byrne, H., Plesch, A., Juanes, R., & Shaw, J. H. (2021). Revisiting the classical experiment in earthquake control at the Rangely oil field, Colorado, 1970, using a coupled flow and geomechanical model. *Bulletin of the Seismological Society of America* 2021.
2. Byrne, H., **Silva, J. A.**, Plesch, A., Juanes, R., & Shaw, J. H. (2020). The groundbreaking experiment in earthquake control at Rangely, Colorado, revisited. *Geophysical Research Letters*, 47, e2020GL088257.
3. **Silva, J. A.**, Kang, P. K., Yang, Z., Cueto-Felgueroso, L., & Juanes, R. (2019a). Impact of confining stress on capillary pressure behavior during drainage through rough fractures. *Geophysical Research Letters*, 46, 7424–7436.

4. **Silva, J. A.**, Poliannikov, O. V., Fehler, M., & Turpening, R. (2018a). Modeling scattering and intrinsic attenuation of crosswell seismic data in the Michigan Basin. *Geophysics*, 83(3), WC15–WC27.
5. Sayers, C. M., Guo, S., & **Silva, J. A.** (2015a). Sensitivity of the elastic anisotropy and seismic reflection amplitude of the Eagle Ford Shale to the presence of kerogen. *Geophysical Prospecting*, 63(1), 151–165.
6. Narhari, S. R., Al-Qadeeri, B., Dashti, Q., **Silva, J. A.**, Dasgupta, S., Hannan, A., ... Sayers, C. M. (2015b). Application of prestack orthotropic AVAz inversion for fracture characterization of a deep carbonate reservoir in northern Kuwait. *The Leading Edge*, 35, 1488–1493.
7. Leiceaga, G. G., **Silva, J. A.**, Artola, F., Marquez, E., & Vanzeler, J. (2010). Enhanced density estimation from prestack inversion of multicomponent seismic data. *The Leading Edge*, 29, 1220–1226.

In preparation:

1. **Silva, J. A.**, Salo, L., Patterson, J. E., & Juanes, R. (2020). Assessment of induced seismicity hazard associated with large-scale CO₂ injection in a Gulf of Mexico reservoir using coupled flow and geomechanics.
2. **Silva, J. A.** & Juanes, R. (2020). Modeling induced seismicity due to 1 MtCO₂ injection at the Illinois Basin Decatur Project (IBDP) using coupled flow and geomechanics.
3. **Silva, J. A.**, Frank, W. B., Campillo, M., & Juanes, R. Crustal deformation and fault geometry control slow slip occurrence: the Guerrero Gap, Mexico.

CONFERENCE PARTICIPATION

Invited talks:

1. **Silva, J. A.**, Rokrok, M. K., Damico, J. R., Nori, N., Fehler, M., Jiang, J., Frailey, S., Juanes, R. (2020). Development of Workflow Using Geologically Constrained Coupled Flow and Geomechanics Simulations to Predict Pressure and Stress at Known Microseismicity Localities Induced by CO₂ Injection: Validation Using the Illinois Basin Decatur Project Dataset. Abstract MR026-08 presented at 2020 Fall Meeting, AGU, Online Everywhere, 1-17 Dec.
2. **Silva, J. A.**, Salo, L., Patterson, J. E., & Juanes, R. (2019b). Modeling CO₂ Storage in a Gulf of Mexico Reservoir Using Coupled Flow and Geomechanics. Abstract MR13A-02 presented at 2019 Fall Meeting, AGU, San Francisco, CA, 9-13 Dec.
3. **Silva, J. A.**, Byrne, H., Plesch, A., Shaw, J., Juanes, R. (2018b). Revisiting the Classical Earthquake Experiment in the Rangely Oil Field, Colorado, 1970: Insights from Coupled Flow and Geomechanical Modeling. Abstract S22A-05 presented at 2018 Fall Meeting, AGU, Washington, DC, 10-14 Dec.
4. **Silva, J. A.** (2018), Investigating Injection Induced Seismicity from Numerical Simulations and Experiments in Realistic Geological Settings. *Flow and Transport in Permeable Media*, Gordon Research Seminar, Newry, ME, USA, July 7-8, 2018.
5. **Silva, J. A.**, Frank, W., Castineira, D., Jha, B., Campillo, M., Juanes, R. (2016a). Coupled Flow and Geomechanics Modeling of Slow Earthquakes: Application to Slow Slip Events (SSE) in the Guerrero Gap, Mexico. Abstract S43D-05 presented at 2016 Fall Meeting, AGU, San Francisco, CA, 12-16 Dec.
6. **Silva, J. A.**, Poliannikov, O., & Fehler, M. (2016b). Modeling scattering of crosswell seismic waves using radiative transfer theory. In *SEG Technical Program Expanded Abstracts 2016* (pp. 3865–3870). Society of Exploration Geophysicists.

7. **Silva, J. A.**, & Sayers, C. M. (2015d). AVAZ interpretation using anisotropic rock physics. In SEG Technical Program Expanded Abstracts 2015 (pp. 310-315). Society of Exploration Geophysicists

Poster presentations:

1. **Silva, J. A.**, J., Wolfe, F. D., Huprikar, A., Plesch, A., Juanes, R. H., Shaw, J. H. (2021, 08). New initiative to examine the impacts of oil and gas operations on fault stability and earthquake processes in the Los Angeles basin, CA. Poster Presentation at 2021 SCEC Annual Meeting.
2. **Silva, J. A.**, Byrne, H., Plesch, A., Shaw, J., Juanes, R. (2019c). Revisiting the classical earthquake experiment in the Rangely oil Field, Colorado, 1970: insights from coupled flow and geomechanical modeling. Abstract 9376 presented at 2019 SCEC Annual Meeting, Palm Springs, CA, 7-11 Sept.
3. **Silva, J. A.**, Frank, W., Campillo, M., Juanes, R. (2017). Nucleation and arrest of slow slip earthquakes: mechanisms and nonlinear simulations using realistic fault geometries and heterogeneous medium properties. Abstract S41C-0791 presented at 2017 Fall Meeting, AGU, New Orleans, LA, 11-15 Dec.
4. **Silva, J. A.**, Kang, P. K., Yang, Z., Cueto-Felgueroso, L., & Juanes, R. (2015c). Impact of normal stress on multiphase flow through rough fractures. Abstract H51L-1549 presented at 2015 Fall Meeting, AGU, San Francisco, CA, 7-11 Dec.

Conference proceedings:

1. Bachrach, R., Sayers, C. M., Dasgupta, S., & **Silva, J. A.** (2014a). Seismic reservoir characterization for unconventional reservoirs using orthorhombic AVAZ attributes and stochastic rock physics modeling. In SEG Technical Program Expanded Abstracts 2014 (pp. 2408–2412). Society of Exploration Geophysicists.
2. Bachrach, R., Sayers, C. M., Dasgupta, S., **Silva, J. A.**, & Volterrani, S. (2014b). Recent advances in the characterization of unconventional reservoirs with wide-azimuth seismic data. In SEG Technical Program Expanded Abstracts 2014 (pp. 4432–4443). Society of Exploration Geophysicists.
3. Narhari, S. R., Al-Qadeeri, B., Kidambi, V., Dashti, Q., **Silva, J. A.**, Dasgupta, S., ... Wagner, C. (2014). A case study of prestack orthotropic AVAZ inversion for fracture characterization of a tight deep carbonate reservoir of Kuwait. In SEG Technical Program Expanded Abstracts 2014 (pp. 325–329). Society of Exploration Geophysicists.
4. **Silva, J. A.**, Garcia, G., Farroco, V., Abreu, E. d., & Damasceno, A. (2011a). Joint estimation of reservoir saturation and porosity from seismic inversion using stochastic rock physics simulation and Bayesian inversion. In 12th International Congress of the Brazilian Geophysical Society & EXPOGEF, Rio de Janeiro, Brazil, 15-18 August 2011 (pp. 1327–1330). Brazilian Geophysical Society.
5. Damasceno, A., Abreu, E. d., Farroco, V., & **Silva, J. A.** (2011b). Reducing pitfall risk using seismic inversion and rock physics analysis. In 12th International Congress of the Brazilian Geophysical Society & EXPOGEF, Rio de Janeiro, Brazil, 15-18 August 2011 (pp. 1584–1588). Brazilian Geophysical Society.

SERVICE EXPERIENCE

President, MIT Mining, Oil, and Gas Club

2018 to 2019

- Managed relationship with industry and academic sponsor companies
- Engaged, fostered and actively sought the recruitment of new club officers among both undergraduate and graduate students

- Successfully assisted club leadership transition to next generation of students

Vice-President, MIT Mining, Oil, and Gas Club

2017 to 2018

- Oversaw club budget, led sponsored activities, safeguarded club financial stability
- Helped manage relationships between club, alumni members, and sponsors
- Assisted sponsor companies to organize on campus recruiting activities

Officer, MIT Mining, Oil, and Gas Club

2015 to 2017

- Created networking activities for club members (undergraduate and graduate students) and sponsor companies
- Organized seminars to foster discussion and knowledge-sharing related to energy operations
- Engaged and nurtured relationships with speakers from industry and academia