Stanford

# Joseph Bakarji

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## Research & Scholarship

### CURRENT RESEARCH AND SCHOLARLY INTERESTS

I work on multiscale stochastic modeling of granular materials. I introduce randomness in deterministic equations to account for subscale physics and microstructural heterogeneity. The problem is tackled using various uncertainty quantification techniques such as Multilevel Monte Carlo, the PDF method and moments equations. Furthermore, I develop stochastic differential equations that address the chaotic nature of granular systems.

## Publications

### PUBLICATIONS

- **Microstructural heterogeneity drives reaction initiation in granular materials** *APPLIED PHYSICS LETTERS*
  Bakarji, J., Tartakovsky, D. M.
  2019; 114 (25)
- **Agent-Based Socio-Hydrological Hybrid Modeling for Water Resource Management** *WATER RESOURCES MANAGEMENT*
  Bakarji, J., O'Malley, D., Vesselinov, V. V.
  2017; 31 (12): 3881–98
- **On the use of reverse Brownian motion to accelerate hybrid simulations** *JOURNAL OF COMPUTATIONAL PHYSICS*
  Bakarji, J., Tartakovsky, D. M.
  2017; 334: 68-80
- **A Reduced-Order Model of a Microfluidic Transistor** *ASME 2013 International Mechanical Engineering Congress and Exposition*
  Bakarji, J., Keniar, K., Cheikh, M., Lakkis, I.
  2013