Stanford

# Søren Henri Taverniers

Physical Science Research Scientist

Mechanical Engineering

## Bio

### ACADEMIC APPOINTMENTS

- Physical Science Research Scientist, Mechanical Engineering

### HONORS AND AWARDS

- Nomination for the Chancellor's Dissertation Medal, Department of Mechanical and Aerospace Engineering, University of California San Diego (2017)

### PROFESSIONAL EDUCATION

- Doctor of Philosophy, University of California San Diego , Engineering Physics (2016)
- Master of Science, University of California San Diego , Engineering Physics (2012)
- Master of Science, Catholic University of Leuven (KU Leuven) , Physics (specialization in Nuclear and Radiation Physics) (2006)

### LINKS

- Google Scholar Profile: https://scholar.google.com/citations?user=evd0C28AAAAJ&hl=en

## Research & Scholarship

### CURRENT RESEARCH AND SCHOLARLY INTERESTS

Design and implementation of novel statistical algorithms based on the Multilevel Monte Carlo method to accelerate the quantification of uncertainty in quantities of interest for multiphase systems such as reactive granular media and subsurface flows.

Development of neural-network based surrogate approaches to enable data-driven sensitivity analysis and uncertainty quantification for multiscale systems such as energy storage systems, and accelerate the design process of such devices.

## Publications

### PUBLICATIONS

- **A Finite Element Method to Compute the Damping Rate and Frequency of Oscillating Fluids Inside Microfluidic Nozzles** *INTERNATIONAL JOURNAL FOR NUMERICAL METHODS IN FLUIDS*
  Taverniers, S., Korneev, S., Somarakis, C., Behandish, M., Lew, A. J.
  2025
- **Two-way coupled Cloud-In-Cell modeling of non-isothermal particle-laden flows: A Subgrid Particle-Averaged Reynolds Stress-Equivalent (SPARSE) formulation** *JOURNAL OF COMPUTATIONAL PHYSICS*
  Taverniers, S., Udaykumar, H. S., Jacobs, G. B.
  2019; 390: 595–618

- **Impact of parametric uncertainty on estimation of the energy deposition into an irradiated brain tumor** *JOURNAL OF COMPUTATIONAL PHYSICS*
  Taverniers, S., Tartakovsky, D. M.
  2017; 348: 139–50
- **A tightly-coupled domain-decomposition approach for highly nonlinear stochastic multiphysics systems** *JOURNAL OF COMPUTATIONAL PHYSICS*
  Taverniers, S., Tartakovsky, D. M.
  2017; 330: 884-901
- **Conservative tightly-coupled simulations of stochastic multiscale systems** *JOURNAL OF COMPUTATIONAL PHYSICS*
  Taverniers, S., Pigarov, A. Y., Tartakovsky, D. M.
  2016; 313: 400-414
- **Physics-based statistical learning approach to mesoscopic model selection** *PHYSICAL REVIEW E*
  Taverniers, S., Haut, T. S., Barros, K., Alexander, F. J., Lookman, T.
  2015; 92 (5): 053301
- **Noise propagation in hybrid models of nonlinear systems: The Ginzburg-Landau equation** *JOURNAL OF COMPUTATIONAL PHYSICS*
  Taverniers, S., Alexander, F. J., Tartakovsky, D. M.
  2014; 262: 313-324