Khachik Sargsyan

CONTACT INFORMATION

Sandia National Laboratories
Combustion Research Facility
P.O. Box 969, MS 9051
Livermore, CA 94551

Mobile: (734) 730-7454
Work: (925) 294-4885
E-mail: ksargsy@sandia.gov
Web: https://www.ksargsyan.net

GENERAL

- Applied mathematician with research experience in uncertainty quantification, machine learning, statistical analysis and numerical methods, applied to biochemistry, statistical physics, population dynamics, fluid dynamics, climate science.

EDUCATION

University of Michigan, Ann Arbor, MI, USA

- Ph.D., Applied Mathematics, August, 2007.

  Thesis: "Mean First Passage Times in the Near-Continuum Limit of Birth-Death Processes".

Moscow Institute of Physics and Technology, Moscow, Russian Federation

- B.S., Applied Physics and Mathematics, June, 2001.

PROFESSIONAL EXPERIENCE

Sandia National Laboratories, Livermore, CA, USA

- *Principal Member of Technical Staff* **2015 - present**
  Member or lead of research projects on uncertainty quantification and machine learning applied to computational models of complex physical phenomena.
- *Senior Member of Technical Staff* **2010 - 2015**
- *Postdoctoral Fellow* **2007 - 2010**

University of Michigan, Ann Arbor, MI, USA

- *Graduate Student Research Assistant* **2003 - 2006**
  Supported by NSF and Michigan Center for Theoretical Physics. Member of the 3-year NSF research project group "Fronts, Fluctuations and Growth".

Moscow Institute of Physics and Technology, Moscow, Russian Federation

- *Research Assistant* **1999 - 2002**
  Institute for Computer Aided Design of RAS and Institute for System Programming of RAS.

SUMMARY

- Over 70 publications in peer-reviewed academic journals
- Over 100 research presentations in academic conferences and workshops
- Mentoring over 10 graduate students and postdoctoral fellows
- Estimated ∼300K lines of scientific programming in Python, C/C++, Matlab, Mathematica
- Teaching and tutoring experience of a wide range of undergraduate and graduate level math and engineering classes
- As a high-schooler, participated in International Math Olympiad in 1996 (Honorable mention) and 1997 (Bronze medal)
- Fluent in English, Russian, Armenian. Reading knowledge of French.

Selected Publications

[full list available via Google Scholar]

- K. Sargsyan, X. Huan, H. Najm. "Embedded Model Error Representation for Bayesian Model Calibration", *International Journal of Uncertainty QUantification*, 9:4, pp. 365–394, 2018.
- K. Sargsyan, "Surrogate Models for Uncertainty Propagation and Sensitivity Analysis", "Forward Problems" section of UQ Handbook, Springer, 2017.
- K. Sargsyan, H. N. Najm, R. Ghanem, "On the Statistical Calibration of Physical Models", *International Journal for Chemical Kinetics*, 47:4, pp. 246–276, 2015.
- K. Sargsyan, F. Rizzi, P. Mycek, C. Safta, K. Morris, H. N. Najm, O. Le Maître, O. Knio, B. Debusschere, "Fault Resilient Domain Decomposition Preconditioner for PDEs", *SIAM Journal on Scientific Computing*, 37:5, pp. 2317–2345, 2015.
- K. Sargsyan, C. Safta, H. N. Najm, B. Debusschere, D. Ricciuto, P. Thornton, "Dimensionality Reduction for Complex Models via Bayesian Compressive Sensing", *International Journal of Uncertainty Quantification*, 4:1, pp.63–93, 2014.
- K. Sargsyan, C. Safta, B. Debusschere, H. Najm, "Multiparameter Spectral Representation of Noise-Induced Competence in Bacillus Subtilis", *IEEE/ACM Trans. Comp. Biol. and Bioinf.*, 9:6, pp. 1709–1723, 2012.
- K. Sargsyan, C. Safta, B. Debusschere and H. N. Najm, "Uncertainty Quantification given Discontinuous Model Response and a Limited Number of Model Runs". *SIAM Journal on Scientific Computing* 34:1, pp. 44–64, 2012.
- K. Sargsyan, B. Debusschere, H. N. Najm and O. Le Maître, "Spectral Representation and Reduced Order Modeling of the Dynamics of Stochastic Reaction Networks via Adaptive Data Partitioning". *SIAM Journal on Scientific Computing*, 31, pp.4395-4421, 2010.
- K. Sargsyan, B. Debusschere, H. N. Najm and Y. Marzouk, "Bayesian Inference of Spectral Expansions for Predictability Assessment in Stochastic Reaction Networks". *Journal of Computational and Theoretical Nanoscience*, 6:10, 2009.

Academic Activities

- Editorial Board: Journal of Discrete & Continuous Dynamical Systems – S (DCDS-S) and Journal of Machine Learning for Modeling and Computing (JMLMC).
- Invited referee for *Physics Letters A, Journal of Computational Physics, Journal of Physical Chemistry, Journal of Guidance, Control, and Dynamics, Mathematical Biosciences, Multiscale Modeling and Simulation, Physica D, The European Physical Journal B, SIAM Journal on Scientific Computing, Computational Geosciences, AIChE Journal.*
- Organized several sessions at recognized national and international conferences, such as SIAM UQ, SIAM CS&E, SIAM AN, AGU, ISBA, USNCCM, with over 100 speakers total.
- Major contributor to the UQTk, a Python/C++ software kit for uncertainty quantification, `sandia.gov/UQToolkit`
- Land Modeling UQ lead in "Energy Exascale Earth System Model", E3SM, `e3sm.org`.
- Member of the FASTMath SciDAC institute, focused on applied math algorithms, tools, and software for HPC applications, `fastmath-scidac.llnl.gov`.