

Agnimitra Dasgupta

Curriculum Vitae

3620 S Vermont Ave.
Los Angeles, CA 90089
☎ (323) 449-6785
✉ adasgupt@usc.edu
🌐 adasgupta94.github.io
LinkedIn: agnimitra-dasgupta-usc-cee2022



Research Interests

Uncertainty quantification, statistical inference, inverse problems, scientific machine learning

Education

- 2017 - Present **Ph.D. Candidate, Civil Engineering**, *University of Southern California*, Los Angeles, USA.
Advisor: Prof. Erik A Johnson, Vice Dean for Academic Programs, USC
Area: Structural Engineering
- 2017 – 2020 **Master of Science, Electrical Engineering**, *University of Southern California*, Los Angels, USA.
Ming Hsieh Department of Electrical and Computer Engineering
GPA: 4.0/4.0
- 2015 – 2017 **Master of Engineering, Civil Engineering**, *Indian Institute of Science*, Bangalore, India.
Major in Structural Engineering
Advisor: Prof. Debraj Ghosh
Master's Thesis: Reduced order modeling in uncertainty quantification of dynamical systems
GPA: 8.0/8.0
- 2011 – 2015 **Bachelor of Engineering, Civil Engineering**, *Jadavpur University*, Kolkata, India.
GPA: 9.26/10

Research Experience

- Fall 2017 – Present **Graduate Research Assistant**, *Sonny Astani Department of Civil & Environmental Engineering*.
University of Southern California, Los Angeles, USA
 - CSD&E: Collaborative Research: A New Framework for Computational Model Validation, **National Science Foundation** (CMMI 16-63667/16-62992)
 - Working on characterization of spatial heterogeneity in material specimens using a novel probabilistic hybrid framework composed of model falsification and Bayesian model selection.
- May 2020 – August 2020 **Givens Associate**, *Laboratory for Applied Mathematics, Numerical Software, and Statistics*, Mathematics and Computer Science Division.
& *Argonne National Laboratory, Lemont, Illinois, USA*
 - Gaussian processes fortomography.
 - Machine Learning for Ptychography
 - **Mentor:** Dr. Zichao 'Wendy' Di, Computational Mathematician
- July 2016 – June 2017 **Research Assistant**, *Department of Civil Engineering*.
Indian Institute of Science, Bangalore, India
 - Reduced order modeling of linear time-varying dynamical systems for efficient reliability estimation.
- May 2014 – June 2014 **Summer Intern**, *Reactor Safety Division*.
Bhabha Atomic Research Centre, Mumbai, India
 - Modelling the behavior of 'bonds' between concrete and rebar subject to elevated temperatures.

Journal

- A. Dasgupta and D. Ghosh, **Failure Probability Estimation of Linear Time Varying Systems by Progressive Refinement of Reduced Order Models**, *SIAM/ASA Journal on Uncertainty Quantification*, Volume 7, Issue 3, Pages 1007–1028, 2019. [[link](#)]
- A. Dasgupta, C. Graziani and Z. W. Di, **Simultaneous Reconstruction and Uncertainty Quantification for Tomography**, *submitted*. [[arXiv](#)]
- A. Dasgupta, E. A. Johnson and S. F. Wojtkiewicz, **A new perspective on model falsification as a binary classifier under preparation**.
- A. Dasgupta and E. A. Johnson **A Bayesian interpretation for model falsification with applications to parameter inference and model selection of dynamical systems** *under preparation*.
- A. Dasgupta, E. A. Johnson and S. F. Wojtkiewicz, **Hybrid Bayesian approaches for the inference of spatially varying constitutive parameters of linear isotropic materials from noisy response data** *under preparation*.

Conferences

(Keys : [†] mentees, * equal contribution)

- A. Dasgupta and Z.W. Di, **Uncertainty quantification for ptychography using normalizing flows**, *Workshop on Machine Learning and the Physical Sciences, 35th Annual Conference on Neural Information Processing Systems (NeurIPS)*, virtual event, December 2021.
- A. Kannan[†], A. Dasgupta, E. A. Johnson and S. F. Wojtkiewicz, **Investigation of bounds on sample size for reliable model falsification**, *SIAM Conference on Computational Science and Engineering*, virtual event, March 2021.
- A. Dasgupta, E. A. Johnson and S. F. Wojtkiewicz, **Deep learning of surrogate models from un-falsified physics**, *SIAM Conference on Computational Science and Engineering*, virtual event, March 2021.
- A. Dasgupta, E. A. Johnson and S. F. Wojtkiewicz, **Characterization of spatial heterogeneity in material properties using a probabilistic hybrid approach**, *ASCE Engineering Mechanics Institute Conference*, Caltech, Pasadena, CA, June 2019.
- A. Dasgupta, S. De, K. Teferra, E. A. Johnson, S. F. Wojtkiewicz and L. Graham-Brady, **Probabilistic validation of material models**, *ASCE Engineering Mechanics Institute Conference*, MIT, Cambridge, MA, May 2018.
- S. De, T. Yu, A. Dasgupta, E. A. Johnson and S. F. Wojtkiewicz, **Probabilistic model validation of a full-scale four-story base-isolated building**, *ASCE Engineering Mechanics Institute Conference*, MIT, Cambridge, MA, May 2018.
- A. Dasgupta*, S. De*, E. A. Johnson and S. F. Wojtkiewicz, **Probabilistic model validation of large-scale systems using reduced order models**, *SIAM Conference on Uncertainty Quantification*, Orange County, USA, April 2018.
- A. Dasgupta and D. Ghosh, **Progressively refining reduced order models for estimating failure probabilities of dynamical systems**, *SIAM Conference on Uncertainty Quantification*, Orange County, USA, April 2018.

Professional Experience

- Fall 2017 **Graduate Teaching Assistant**, Sonny Astani Department of Civil & Environmental Engineering, USC.
- Fall 2019 ○ CE529a Finite Element Analysis – Lead lab sessions introducing ABAQUS and helped students with their final project which involved FE analysis using Matlab and ABAQUS.
- Fall 2021 ○ CE402 Numerical Methods in Engineering – Lead discussion sessions to help students with coding numerical techniques on Matlab and Python.
- Spring 2019 ○ CE458 Theory of Structures- II – Lead lab sessions introducing SAP2000 and helped students with their final project which involved the modelling and analysis of a multistorey building.
- Spring 2018 ○ CE458 Theory of Structures- II – Lead lab sessions introducing SAP2000 and helped students with their final project which involved the modelling and analysis of a multistorey building.
- Summer 2018 **Graduate Research Mentor**, Viterbi Summer Institute Program, USC.
○ Mentored 4 incoming undergraduate students, providing them insight into on-going research in the Department.
- Summer 2020 **Graduate Research Mentor**, Viterbi Summer Research Program, USC.
○ Mentored 2 students on research about the statistical nature of model falsification.

Selected Honors & Awards

- 2020 : **Provost Fellow Travel Award** of \$1500 to attend SIAM UQ 20. Award declined due to COVID-19.
- 2017-2021: **Provost PhD Fellowship**, University of Southern California, Los Angeles
- 2018 : **Prof. N S Lakshmana Rao Medal** for best M. E. student in Civil Engineering, IISc Bangalore.
- 2015-2017: **2-year scholarship** for graduate study, Ministry of Human Resource & Development, India.
- 2015 : **University Medal** (and 4 other medals) for standing First at the Bachelor of Civil Engineering, Jadavpur University.

Invited Talks

- A. Dasgupta, **A hybrid probabilistic approach to characterizing material heterogeneity**, USC WiSE STEM Bytes Seminar, June, 2021. [[link](#)]

Relevant Coursework

- **Dynamics & Control** : Dynamical systems theory, nonlinear dynamics, linear control systems, structural dynamics.
- **Applied Math & Statistics**: Uncertainty quantification, probability models, estimation theory, optimization methods, neural & fuzzy systems, pattern recognition, machine learning, deep learning.
- **Mechanics** : Solid mechanics, theory of plasticity, mechanics of structural concrete, finite element analysis.

Skillsets

- **Programming Languages**: Python, MATLAB; **Finite Element packages**: ABAQUS, SAP2000, FEAP, FENICS; **Frameworks**: PyTorch, Keras, Tensorflow, Scikit-Learn