

Somdatta Goswami

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📄 Department of Applied Mathematics, Brown University, 170 Hope Street,
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Work Experience

- 2021, Jan – Present 📌 **Postdoctoral Research Associate**, Department of Applied Mathematics
Brown University, U.S.A.
Advisor: George Em Karniadakis
Deep learning, Physics driven machine learning
- 2013 – 2017 📌 **Assistant Manager**, Tata Consulting Engineers Limited.

Education

- 2017 – 2020 📌 **Ph.D. in Civil Engineering**, Bauhaus University Weimar, Germany
Advisor: Timon Rabczuk
Thesis title: *Phase field modeling of fracture with isogeometric analysis and machine learning methods*
- 2011 – 2013 📌 **M.E. in Structural Engineering**, Indian Institute of Engineering Sciences and
Technology, India.
Advisor: Subrata Chakraborty
- 2007 – 2011 📌 **B.E. in Civil Engineering**, Birla Institute of Technology, India.

Research Publications

- [Google Scholar](#)
- All the codes are available at [Github](#)

Preprints

- 1 Kontolati, K., **Goswami, S.**, Shields, M. D., & Karniadakis, G. E. (2022). *On the influence of over-parameterization in manifold based surrogates and deep neural operators.*
- 2 Bharali, R., **Goswami, S.**, Anitescu, C., & Rabczuk, T. (2021). *A robust monolithic solver for phase-field fracture integrated with fracture energy based arc-length method and under-relaxation.*

Journal Papers

- 1 **Goswami, S.**, Yin, M., Yu, Y., & Karniadakis, G. E. (2022). A physics-informed variational deep-onet for predicting crack path in quasi-brittle materials. *Computer Methods in Applied Mechanics and Engineering*, 391, 114587.
- 2 Lu, L., Meng, X., Cai, S., Mao, Z., **Goswami, S.**, Zhang, Z., & Karniadakis, G. E. (2022). A comprehensive and fair comparison of two neural operators (with practical extensions) based on fair data. *Computer Methods in Applied Mechanics and Engineering*, 393, 114778.
- 3 Chatterjee, T., Chakraborty, S., **Goswami, S.**, Adhikari, S., & Friswell, M. I. (2021). Robust topological designs for extreme metamaterial micro-structures. *Scientific Reports*, 11(1), 1–14.



- 4 **Goswami, S.**, Anitescu, C., Chakraborty, S., & Rabczuk, T. (2020). Transfer learning enhanced physics informed neural network for phase-field modeling of fracture. *Theoretical and Applied Fracture Mechanics*, 106, 102447.
- 5 **Goswami, S.**, Anitescu, C., & Rabczuk, T. (2020a). Adaptive fourth-order phase field analysis for brittle fracture. *Computer Methods in Applied Mechanics and Engineering*, 361, 112808.
- 6 **Goswami, S.**, Anitescu, C., & Rabczuk, T. (2020b). Adaptive fourth-order phase field analysis using deep energy minimization. *Theoretical and Applied Fracture Mechanics*, 102527.
- 7 Samaniego, E., Anitescu, C., **Goswami, S.**, Nguyen-Thanh, V., Guo, H., Hamdia, K., ... Rabczuk, T. (2020). An energy approach to the solution of partial differential equations in computational mechanics via machine learning: Concepts, implementation and applications. *Computer Methods in Applied Mechanics and Engineering*, 362, 112790.
- 8 **Goswami, S.**, Anitescu, C., & Rabczuk, T. (2019). Adaptive phase field analysis with dual hierarchical meshes for brittle fracture. *Engineering Fracture Mechanics*, 218, 106608.
- 9 **Goswami, S.**, Chakraborty, S., Chowdhury, R., & Rabczuk, T. (2019). Threshold shift method for reliability-based design optimization. *Structural and Multidisciplinary Optimization*, 60(5), 2053–2072.
- 10 **Goswami, S.**, Chakraborty, S., & Rabczuk, T. (2019). A surrogate assisted adaptive framework for robust topology optimization. *Computer Methods in Applied Mechanics and Engineering*, 346, 63–84.
- 11 **Goswami, S.**, Ghosh, S., & Chakraborty, S. (2016). Reliability analysis of structures by iterative improved response surface method. *Structural Safety*, 60, 56–66.

Conference Papers

- 1 **Goswami, S.**, & Chakraborty, S. (2014). Adaptive response surface method based efficient monte carlo simulation. In *Vulnerability, Uncertainty, and Risk: Quantification, Mitigation, and Management* (pp. 2043–2052).
- 2 **Goswami, S.**, Chakraborty, S., & Ghosh, S. (2013). Adaptive response surface method in structural response approximation under uncertainty. In *International Conference on Structural Engineering and Mechanics* (pp. 194–202).

Talks and Presentations

Invited Talks

- Dec 2021  **NASA Langley Research Center.**
Physics informed deep learning methods for brittle fracture.
- Nov 2021  **George Washington University.**
Physics informed deep learning methods: a solution to bridge data gap in computational mechanics

Conference Presentations

- Dec 2018  **An efficient framework for fracture analysis of brittle materials**
Structural Engineering Convention 2018

Talks and Presentations (continued)

- **Topology optimization under uncertainty**
Structural Engineering Convention 2018

Awards and Achievements

- 2022 ■ **ALCF Director's Discretionary Allocation Grant for developing and scaling multi-scale fracture codes.**
- 2021 ■ **XSEDE startup grant for developing multi-scale codes.**
CIS210111: Surrogate modeling for multiscale fracture analysis using DeepONets.
- **INSPIRE Faculty Fellowship, Department of Science and Technology, India.**
- 2018 ■ **Best Paper Award in the Reliability and Optimization category at the Structural Engineering Convention 2018, Kolkata, India**
- 2017 ■ **DAAD Fellowship for pursuing Ph.D. at Bauhaus University Weimar, Germany.**
- 2011 ■ **MHRD scholarship for pursuing Master's degree at Indian Institute of Engineering Sciences and Technology, Shibpur, India.**

Professional Services

- Minisymposium Organizer: GACM Colloquium on Computational Mechanics.
- Journal Reviewer: Computer Methods in Applied Mechanics and Engineering, International Journal of Rock Mechanics and Mining Sciences, Engineering with Computers, Defence Technology, International Journal of Impact Engineering, Reliability Engineering and System Safety, International Journal of Computational Methods, Frontiers of Structural and Civil Engineering, Energies.

References

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Dr. Subrata Chakraborty

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