SAURABH PRABHU, Ph.D.
Post-doctoral Research Fellow, Clemson University
127 Lowry Hall, Clemson University, Clemson, SC 29634
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EDUCATION

Clemson University	Ph.D. in Civil Engineering	August 2011 – December 2015
Clemson University	M.S. in Civil Engineering	January 2010 - August 2011
VJTI, Mumbai University	B.Tech. in Civil Engineering	August 2005 - May 2009

PROFESSIONAL EXPERIENCE

Risk Engineering and Systems Analysis Center, Clemson	Post-doctoral Research Fellow	January 2016-present
Clemson University	Graduate Research Assistant	May 2010-December 2015
K. Raheja Corp.	Engineering Intern	May 2008-August 2008

PRODUCTS

Peer-reviewed publications (in print)

1. Hu, X., **Prabhu, S.**, Atamturktur, S., and Cogan, S. (accepted 2016), "Mechanistically-Informed Damage Detection using Dynamic Measurements: Extended Constitutive Relation Error," *Mechanical Systems and Signal Processing*.
2. **Prabhu, S.**, and Atamturktur, S., (accepted 2016), "A Falsification-based Inverse Analysis Approach: Investigating the Cracks in Granite Slabs at Fort Sumter through Computer Modeling," *APT Bulletin: The Journal of Preservation Technology*.
3. Atamturktur, S., Farajpour, I., **Prabhu, S.** and Haydock, A. (2015), "Adaptively Weighted Support Vector Regression: Prognostic Application to a Historic Masonry Fort," *Journal of Performance of Constructed Facilities (ASCE)*, Vol. 29, No. 2.
4. **Prabhu, S.** and Atamturktur, S., (2015), "A Review on Prognostic Evaluation of Historic Masonry Structures: Present Challenges and Future Direction," *The Masonry Society Journal*.
5. **Prabhu, S.**, Atamturktur, S., Brosnan, D., Dorrance, R., and Messier, P. (2014), "Foundation Settlement Analysis of Fort Sumter National Monument: Model Development and Predictive Assessment," *Engineering Structures (Elsevier)*, Vol. 65, pp. 1-12.
6. Atamturktur, S., **Prabhu, S.** (2013), "Simulation Based Structural Analysis of Fort Sumter considering Foundation Settlement," *Structures Magazine*, May, pp. 26-29.
7. **Prabhu, S.** and Atamturktur, S., (2013), "Selection of Optimal Sensor Locations Based on Modified Effective Independence Method: Case Study on a Gothic Revival Cathedral," *Journal of Architectural Engineering (ASCE)*, Vol. 19, No. 4, pp.288-301.
8. **Prabhu, S.** and Atamturktur, S., (2013), "Feature Assimilation for Vibration Based Damage Detection," *Journal of Nondestructive Testing and Evaluation (ASTM)*, Vol. 41, No. 1, pp. 1-11.

Peer-reviewed publications (in review/preparation)

9. **Prabhu, S.,** Ehrett, C., Brown, A., Javanbarg, M., Atamturktur, S., (in preparation 2016), "Uncertainty Quantification in Fault Tree Analysis: An Application for Business Interruption due to Seismic Hazard," *Reliability Engineering and System Safety*.
10. Bi, S., **Prabhu, S.**, Cogan, S., Atamturktur, S., (in review, 2016), "A Comparative Study on Distance Metrics with Varying Levels of Statistical Information in Model Calibration and Validation," *AIAA Journal*.
11. **Prabhu, S.**, Atamturktur, S. and Cogan, S. (in review, 2016), "Model Assessment in Scientific Computing: Considering Robustness to Uncertainty in Input Parameters." *Engineering Computations*.
12. Hester, J., **Prabhu, S.**, Atamturktur, S. and Sorber, J., (in review, 2016), "Preservation of Fort Sumter National Monument using Wireless Sensors," *IEEE Embedded Systems Letters*.

13. **Prabhu, S.** and Atamturktur, S. (in review, 2015), "Assessment of Strength Degradation due to Damage using a Load Path based Approach," *Journal of Structural Engineering.*

Peer-reviewed conference papers

1. **Prabhu, S.**, Atamturktur, S., (2015), "Model Validation in Scientific Computing: Considering Robustness to Non-Probabilistic Uncertainty in the Input Parameters," IMAC XXXIII A Conference and Exposition on Structural Dynamics, February 2-5, Orlando, FL, USA.
2. Atamturktur, S., **Prabhu, S.**, & Dorrance, R. (2013), "Structural Assessment of Fort Sumter Masonry Coastal Fortification Subject to Foundation Settlements," In Topics in Dynamics of Civil Structures, Volume 4: Proceedings of the 31st IMAC, A Conference on Structural Dynamics, Proceedings of the Society for Experimental Mechanics Series 39, pp. 471-483.
3. Atamturktur, S., **Prabhu, S.**, Roche, G. (2014), "Predictive modeling of large scale historic masonry monuments: uncertainty quantification and model validation," Proceedings of the 9th International Conference on Structural Dynamics, EURODYN, Porto, Portugal, 30 June - 2 July 2014.
4. **Prabhu, S.**, Supler, J., & Atamturktur, S. (2011), "Feature Assimilation in Structural Health Monitoring Applications," In Civil Engineering Topics, Volume 4: Proceedings of the 29th IMAC, A Conference on Structural Dynamics, Proceedings of the Society for Experimental Mechanics Series 7, pp. 285-295.

Reports

1. Structural Analysis of Fort Sumter National Monument (2015), Prepared for: US Department of the Interior, National Park Service.
2. Hydrographic Survey, Wave Load Analysis and Foundation Analysis of Fort Sumter (2015), Prepared for: US Department of the Interior, National Park Service.
3. Structural Prognosis for the Effective Management of Nation's Cultural Heritage (2014), Prepared for: US Department of the Interior, National Park Service.
4. Structural Health Monitoring of Nation's Cultural Heritage (2011), Prepared for: US Department of the Interior, National Park Service.

Master's thesis

Structural Health Monitoring of Historic Masonry Monuments

Abstract: Structural Health Monitoring (SHM) is a well-accepted diagnostic technique being used to evaluate modern structures. This method involves monitoring the vibration response of a structure to detect changes in its structural state. The primary intention of this thesis is to address two practical and technical difficulties encountered in deploying SHM on historic masonry monuments: (i) the selection of suitable low dimensional vibration response features that are highly sensitive to the presence and extent of damage, while having low sensitivity to extraneous noise and (ii) the selection of optimal sensor locations for efficient system identification applied to Gothic Cathedrals. Both of the features of this thesis achieve reduction in the size of the raw data to be analyzed leading to reduced computational as well as monetary effort. Compression of the raw vibration response data acquired from the vibration tests on structures is vital from the standpoint of faster real time monitoring of historic structures.

The thesis first illustrates the concepts of feature assimilation and noise sensitivity on an arch-like structure using both numerical and experimental analysis. The next study is focused on finding optimal sensor locations for vibration testing of Gothic Cathedrals. A modified version of the Effective Independence Method is used for this purpose.

Doctoral Dissertation

Robust Model Development for Evaluation of Existing Structures

Abstract: Development of computational structural models involves several sources of uncertainty related to lack of information on the material properties, boundary conditions, loads, etc. that are inevitable and cannot be ignored. The robustness of a computational model is the degree of uncertainty under which the model can produce predictions within required error tolerances. Here, the concept of satisfying boundary is introduced that encompasses the model predictions under uncertainty that meet prescribed error tolerances. Using the

satisfying boundary, the usability of models can be evaluated via analysis of trade-off between parametric uncertainty, error tolerance and the probability of satisfying the error tolerance. Decisions regarding allocation of resources for additional experiments to reduce uncertainty, relaxation of error tolerances, or the required reliability of the models can thus be arrived at using such a trade-off. To demonstrate the versatility of the satisfying boundary approach, the model's usefulness is assessed in two modeling situations. First, robustness assessment of a non-linear model, developed via calibration to experimental data, is performed to quantify its robustness to remaining uncertainty in the calibrated parameters at increasing load levels. In the second situation, a novel redundancy measure based on load paths is introduced that is useful in prediction of the remaining load-carrying capacity of the structure after damage is identified. The robustness of this redundancy measure is assessed under uncertainty in the identified damage, thus simulating experimental uncertainty.

SOFTWARE AND PROGRAMMING SKILLS

Operating Systems: Windows, Mac, Linux
Scientific Computing: ANSYS, MATLAB, Python, Portable Batch System, modeFRONTIER.
Other: AutoCAD, MathCAD, MS Excel, B&K Pulse, LaTeX.

AWARDS AND HONORS

Best paper of Model Validation & Uncertainty Quantification at SEM International Modal Analysis Conference XXXIII, Orlando, FL.	2015
Clemson Graduate Student Government Professional Enrichment Grant.	2013, 2014
Carolinas Concrete Masonry Association Russell H. Brown Fellowship.	2012

SYNERGISTIC ACTIVITIES

Presenter, International Modal Analysis Conference	2011, 2013, 2015
Attendee, ASCE Structures Congress	2013, 2014
Mentor, Creative Inquiry at Clemson University	2010, 2012
Guest Lecturer, TL Hanna High School, Anderson, SC	2011

Reviewer for ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems, American Concrete Association Journal, Journal of Sound and Vibration, Journal of Performance of Constructed Facilities, International Journal for Mechanics of Advanced Materials and Structures, Structures and Buildings, Study of Civil Engineering and Architecture, The Masonry Society, Natural Hazards, The Open Construction and Building Technology Journal.