



American Academy of Mechanics

2017 AAM Fellow Nomination

Marc Mignolet

Citation: Significant contributions to the modeling and understanding of the behavior of uncertain structures, in particular of mistuned bladed disks, and for the formulation, development, and extensive validation of non-intrusive reduced order models of structures in the nonlinear geometric regime.

First Nominator: Pol Spanos

Email: spanos@rice.edu

Signature:

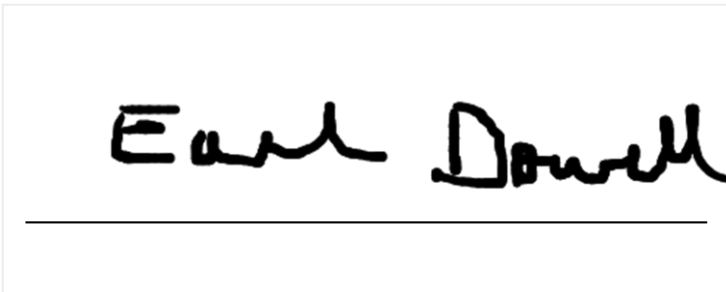


Second Nominator: Earl Dowell

Email: earl.dowell@duke.edu

Confirm: Yes

Signature:



MARC P. MIGNOLET

EDUCATION

Engineer Université de Liège, Belgium, July 1983.
Ph. D. Rice University, May 1987.

POSITIONS HELD

1987-present Arizona State University, Faculties of Mechanical and Aerospace Engineering,
Assistant Professor (1987-1993), Associate Professor (1993-2000), Professor (2000-
Present), Graduate Chair (2012-Present).

AREA OF TEACHING AND RESEARCH

Dynamics, Structural Dynamics, Vibrations, Random Vibrations

AWARDS

Fulton Faculty Exemplar, ASU Fulton Schools of Engineering
Fellow, American Society of Mechanical Engineers
Associate Fellow, American Institute of Aeronautics and Astronautics
Member, American Academy of Mechanics, Member
Member, American Society of Civil Engineers and Society for Experimental Mechanics

REPRESENTATIVE PUBLICATIONS

1) Uncertainty Modeling and Propagation

- Richter, L.A., and Mignolet, M.P., "Stochastic Modeling of Uncertain Mass Characteristics in Rigid Body Dynamics," *Mechanical Systems and Signal Processing*, Vol. 87, pp. 43-53, 2017.
- Murthy, R., Choi, B.K., Wang X.Q., Sipperley M.C., Mignolet, M.P., and Soize, C., "Maximum Entropy Modeling of Discrete Uncertain Properties with Application to Friction," *Probabilistic Engineering Mechanics*, Vol. 44, pp. 128-137, 2016.
- Wang, Y., Wang, X.Q., Mignolet, M.P., Yang, S., Chen, P.C., "Modeling of Uncertain Spectra Through Stochastic Autoregressive Systems," *Mechanical Systems and Signal Processing*, Vol. 70-71, pp. 506-526, 2016.
- Mignolet, M.P., Song, P., and Wang, X.Q., "A Stochastic Iwan-Type Model for Joint Behavior Variability Modeling," *Journal of Sound and Vibration*, Vol. 349, pp. 289-298, 2015.
- Mignolet, M.P., and Soize, C., "Stochastic Reduced Order Models for Uncertain Geometrically Nonlinear Dynamical Systems," *Computer Methods in Applied Mechanics and Engineering*, Vol. 197, 2008, pp. 3951-3963.
- Avalos, J., Richter, L.A., Wang, X.Q., Murthy, R., and Mignolet, M.P., "Stochastic Modal Models Of Slender Uncertain Curved Beams Preloaded Through Clamping," *Journal of Sound and Vibration*, Vol. 334, pp. 363-376, 2015.
- Murthy, R., Mignolet, M.P., and El-Shafei, A., "Nonparametric Stochastic Modeling of Structural Uncertainty in Rotordynamic Systems: Part I - Formulation, and Part II - Applications" *Journal of Engineering for Gas Turbines and Power*, Vol. 132, 2010.
- Murthy, R., Tomei, J., Wang, X.Q., Mignolet, M.P., and El-Shafei, A., "Nonparametric Stochastic Modeling of Structural Uncertainty in Rotordynamics: Unbalance and Balancing Aspects," *Journal of Engineering for Gas Turbines and Power*, Vol. 136, No. 6, pp. 062506-1 - 062506-12, 2014.
- Attard, T.L., and Mignolet, M.P., "Random Plastic Analysis Using a Constitutive Model to Predict the Evolutionary Stress-Related Responses and Time Passages to Failure," *Journal of Engineering Mechanics*, Vol. 134, No. 10, pp. 881-891, 2008.

2) Mistuning in Bladed Disks

Murthy, R., and Mignolet, M.P., "Decreasing Bladed Disk Response with Dampers on a Few Blades. Part I: Optimization Algorithms and Blade-Only Dampers Applications, and Part II: Nonlinear and Blade- Blade Dampers Applications" *Journal of Turbomachinery*, Accepted for Publication

- Han, Y., and Mignolet, M.P., "A Novel Perturbation-Based Approach for the Accurate Prediction of the Forced Response of Mistuned Bladed Disks," *Journal of Vibration and Acoustics*, Vol. 137, 041008-1-041008-7, Sept. 2015.
- Han, Y., Murthy, R., and Mignolet, M.P., "Optimization of Intentional Mistuning Patterns for the Mitigation of the Effects of Random Mistuning," *Journal of Engineering for Gas Turbines and Power*, Vol. 136, No. 6, pp. 062505-1 - 062505-9, 2014.
- Avalos, J., and Mignolet, M.P., "On Damping Entire Bladed Disks through Dampers on only a few Blades," *Journal of Engineering for Gas Turbines and Power*, Vol. 132, 2010.
- Rivas-Guerra, A.J., and Mignolet, M.P., "Maximum Amplification of Blade Response due to Mistuning: Localization and Mode Shapes Aspects of the Worst Disks," *Journal of Turbomachinery*, Vol. 125, No. 3, pp. 442-454, 2003.
- Rivas-Guerra, A.J., and Mignolet, M.P., "Local/Global Effects of Mistuning on the Forced Response of Bladed Disks," *Journal of Engineering for Gas Turbines and Power*, Vol. 126, No. 1, pp. 131-141, 2004.

3) Nonlinear Reduced Order Modeling for Structures in the Nonlinear Geometric Regime

- Wang, Y., and Mignolet, M.P., "Component-Centric Reduced Order Modeling of the Dynamic Response of Linear Multibay Structures," *Journal of Vibration and Acoustics*, Vol. 139, 041007, 2017.
- Perez, R.A., Wang, X.Q., and Mignolet, M.P., "Prediction of Displacement and Stress Fields of a Notched Panel with Geometric Nonlinearity by Reduced Order Modeling," *Journal of Sound and Vibration*, Vol. 333, pp. 6572-6589, 2014.
- Perez, R.A., Wang, X.Q., and Mignolet, M.P., "Non-Intrusive Structural Dynamic Reduced Order Modeling for Large Deformations: Enhancements for Complex Structures," *Journal of Computational and Nonlinear Dynamics*, Vol. 9, No. 3, pp. 031008-1 - 031008-12, 2014.
- Mignolet, M.P., Przekop, A., Rizzi, S.A, and Spottswood, S.M., "A Review of Indirect/Non-Intrusive Reduced Order Modeling of Nonlinear Geometric Structures," Invited Paper, *Journal of Sound and Vibration*, Vol. 332, No. 10, pp. 2437-2460, 2013.
- Kim, K., Radu, A.G., Wang, X.Q., and Mignolet, M.P., "Nonlinear Reduced Order Modeling of Isotropic and Functionally Graded Plates," *International Journal of Non-Linear Mechanics*, Vol. 49, pp. 100-110, 2013.
- Chaudhary, A., Spottswood, S.M., Wang, X.Q., and Mignolet, M.P., "Estimation of Time to Stationarity in Geometrically Nonlinear Structural Responses," *Journal of Sound and Vibration*, Vol. 331, pp. 4359-4372, 2012.
- Murthy, R., Wang, X.Q., Perez, R., Mignolet, M.P., and Richter, L.A. "Uncertainty-Based Experimental Validation of Nonlinear Reduced Order Models," *Journal of Sound and Vibration*, Vol. 331, pp. 1097-1114, 2012.
- Perez, R., Wang, X.Q., and Mignolet, M.P., "Nonlinear Reduced Order Models for Thermoelastodynamic Response of Isotropic and FGM Panels," *AIAA Journal*, Vol. 49, No. 3, pp. 630-641, 2011.

DISSERTATIONS/THESES SUPERVISION

Advised till graduation 13 Ph.D. students, 29 M.S. (thesis) students, and 17 M.S. (report) students.
Currently 3 Ph.D. students.

SERVICE

Associate Technical Editor, *Journal of Applied Mechanics*, ASME (2003-2006)
Associate Technical Editor, *Journal of Turbomachinery*, ASME (2003-2006).
Associate Technical Editor, *Journal of Engineering for Gas Turbines and Power*, ASME (1999-2006).
Executive Co-Chair, Organizing Committee, Summer Meeting of the ASME Applied Mechanics and Materials Divisions, Scottsdale, Arizona, Jun. 22-24, 2003.
Editorial Board Member, *Probabilistic Engineering Mechanics* (2000 - Present).
International Advisors Member, *Hong Kong Institution of Engineers Transactions* (2004-2009).
Present/past Member of ASME and ASCE Committees (ASME-Mechanics of Jointed Structures, ASME-Uncertainty and Probabilistics, IGTI-Structures and Dynamics, ASCE-Probabilistic Methods).
Session Organizer/Session Chair/Scientific Committee Member for various conferences
Reviewer for a large number of mechanics related journals as well as NSF, AFOSR, NRC