

# Samantha Sabatino

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## EDUCATION

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### Lehigh University

Bethlehem, PA

Doctor of Philosophy, May 2017

Major: Structural Engineering, GPA: 3.87

Dissertation title: *Probabilistic optimal decision making and life-cycle management considering risk, sustainability, and utility: applications to bridges and ships*

### University of Mississippi

Oxford, MS

Master of Science, May 2011

Major: Civil Engineering, GPA: 4.00

Thesis title: *Experimental damage diagnosis of a model three-story spatial frame*

### Vanderbilt University

Nashville, TN

Bachelor of Engineering, May 2009

Majors: Civil Engineering and Mathematics, GPA: 3.74

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## WORK EXPERIENCE

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### Oak Ridge National Laboratory, R&D Associate Staff Member (February 2021-Current)

Knoxville, TN

- Applied reliability- and risk-based computational methodologies to a variety of engineering systems, including nuclear structures and installations, power generation, instrumentation and control, critical infrastructure, and integrated energy systems
- Developed tools to conduct uncertainty analysis of ageing engineering materials and systems, all in a probabilistic and life-cycle context

### University of Texas Arlington, Department of Civil Engineering

Arlington, TX

*Assistant Professor* (September 2017-January 2021), *Associate Director* of the Center for Structural Engineering

Research/Simulation and Pipeline Inspection (January 2019- January 2021)

- Integrated traditional life-cycle engineering and probability concepts with big data analysis to create computational platforms that can handle large amounts of data collected from traditional sensors as well as crowd-sourced information from infrastructure users
- Developed a decision support framework for municipal reinforced concrete sanitary sewers incorporating LIDAR inspection data, probabilistic performance prediction modeling, and reliability-based estimation of residual life
- Established automated algorithms that facilitate performance monitoring of critical infrastructure under various hazards, ensure the resilience and sustainability of engineering systems, and support risk-informed decision making concerning infrastructure management

### Lehigh University, Advanced Technology for Large Structural Systems (ATLSS)

Bethlehem, PA

*Graduate Research Assistant* (August 2011-August 2017)

- Established a novel sustainability performance metric based on multi-attribute utility theory that effectively captures the consequences of structural failure to society, the environment, and the economy while also accounting for the decision maker's risk attitude
- Developed a decision making framework for the optimal lifetime management of highway bridges and networks that maximizes structural performance while simultaneously minimizing life-cycle management (e.g., maintenance) costs
- Conducted research funded by the American Society of Civil Engineers, Federal Highway Administration, National Science Foundation, Office of Naval Research, Pennsylvania Infrastructure Technology Alliance, and U.S. Army Armament Research, Development and Engineering Center

**University of Mississippi**, Multi-Function Dynamics Laboratory Oxford, MS  
*Graduate Research Assistant* (August 2009-May 2011)

- Developed a computational framework incorporating Labview, Mathematica, Matlab, and Star Modal that has the ability to accurately collect sensor data, obtain experimental mode shapes, and derive structural dynamic properties; the capabilities of this computational tool were demonstrated on a three-story spatial frame model structure
- Processed high-speed video via motion analysis software to verify dynamic properties obtained from experiments
- Employed ArcGIS for a special project to investigate bridge deficiencies in each U.S. state

**Vanderbilt University**, McGill Hall Nashville, TN  
*Resident Adviser / Head Resident* (August 2007-May 2009)

- Assisted a floor comprised of 36 young women in areas of conflict resolution, personal counseling, policy enforcement, and diversity via programs that encouraged personal growth and community

**Metropolitan Transit Authority** Nashville, TN  
*Planning Intern* (June 2007-August 2007)

- Utilized Geographic Information Systems to establish public bus routes
- Responded to daily complaints made by bus passengers for proposed changes to transit system

**Analytical Research & Testing Inc.** Somerville, NJ  
*Analytical Laboratory Data Analyst* (Summer 2001-Summer 2006)

- Performed data reporting and statistical analysis for environmental permits and compliance

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## TEACHING EXPERIENCE

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**University of Texas Arlington** Arlington, TX  
*Instructor* for (1) Statics (Fall 2017, Spring 2018, Fall 2019, Spring 2020), (2) Structural Analysis (Fall 2018, Fall 2020), and (3) Structural Reliability (Spring 2019)

- Prepared assignments, exams, and lectures; presented lectures in the classroom and supervised recitation sessions; worked one-on-one with students during office-hours; managed gradebooks and class curriculum; instructed online students
- Teaching evaluation average score: 4.5/5

**Lehigh University** Bethlehem, PA  
*Teaching assistant* for: (1) Fundamentals of Structural Concrete Design (undergraduate), (2) Advanced Structural Concrete Design (graduate), (3) Structural Dynamics (graduate), (4) Design Project (capstone project course for Masters of Engineering students), (5) Reliability of Structural Components and Systems (graduate), (6) Life-cycle of Structural Systems (graduate), (7) Structural Optimization (graduate), and (8) Structural Safety and Risk (graduate).

**University of Mississippi** Oxford, MS  
*Teaching assistant* for: (1) Statics (undergraduate level course) and (2) Mechanics of Materials (undergraduate level course)

**Vanderbilt University** Nashville, TN  
*Teaching assistant/grader* for Engineering Economics (undergraduate level course)

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## HONORS

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- Lehigh University's P.C. Rossin Doctoral Fellow, 2014
- Lehigh University's Teacher Development Certificate: levels I and II, 2014
- Lehigh University's Gibson graduate Fellowship recipient, 2012 (full tuition support/stipend for 2nd year Ph.D. studies)
- Lehigh University's University Fellowship recipient, 2011 (full tuition support/stipend for 1st year Ph.D. studies)
- University of Mississippi's Graduate Engineering Student Achievement Award, 2011
- NASA/Mississippi Space Grant Consortium's Graduate Research Fellowship recipient, 2010 (full tuition support/stipend for 2nd year of M.S. studies)
- Sat for and passed the Fundamentals of Engineering Examination, 2009
- Member of Vanderbilt's ASCE Steel Bridge Team, 2008
- El Paso Corporation Excellence in Engineering Scholarship recipient, 2008 (half tuition support for 4th year of undergraduate studies)

## PROFESSIONAL SOCIETIES AND SERVICE

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- Member of Chi Epsilon (Civil Engineering Honors Society), American Society of Civil Engineers (ASCE), Tau Beta Phi (Vanderbilt Chapter), and Phi Kappa Phi (University of Mississippi)
- Member of the International Association for Bridge Maintenance and Safety (IABMAS)
- Member of the International Association for Life-Cycle Civil Engineering (IALCCE)
- Member of the ASCE / SEI Task Group 1 on Life-Cycle Performance of Structural Systems
- Member of the Earthquake Engineering Research Institute (EERI)
- Member of the Fritz Engineering Research Society (FERS)
- Faculty advisor for UTA's Student Steel Bridge Team, August 2018-Current

## PUBLICATIONS

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### Refereed journal articles

- Sabatino, S.** and Ervin, E.K. (2015). Comparison of damage diagnosis algorithms on a spatial frame using vibration data. *Advances in Structural Engineering*, Sage, 18(5), 739-757. doi:10.1260/1369-4332.18.5.739
- Sabatino, S.**, Frangopol, D.M., and Dong, Y. (2015). Life cycle utility-informed maintenance planning based on lifetime functions: Optimum balancing of cost, failure consequences and performance benefit. *Structure and Infrastructure Engineering*, Taylor & Francis, 1-18. doi: 10.1080/15732479.2015.1064968
- Sabatino, S.**, Frangopol, D.M., and Dong, Y. (2015). Sustainability-informed maintenance optimization of highway bridges considering multi-attribute utility and risk attitude. *Engineering Structures*, Elsevier, 102, 310-321. doi: 10.1016/j.engstruct.2015.07.030
- Sabatino, S.** and Frangopol, D.M. (2017). Decision making framework for optimal SHM planning of ship structures considering availability and utility. *Ocean Engineering*, Elsevier, 135, 194-206. doi: 10.1016/j.oceaneng.2017.02.030
- Dong, Y., Frangopol, D.M., and **Sabatino, S.** (2015). Optimizing bridge network retrofit planning based on cost-benefit evaluation and multi-attribute utility associated with sustainability. *Earthquake Spectra*, the Earthquake Engineering Research Institute (EERI), 31(4), 2255-2280. doi: 10.1193/012214EQS015M
- Dong, Y., Frangopol, D.M., and **Sabatino, S.** (2016). A decision support system for mission-based ship routing considering multiple performance criteria. *Reliability Engineering & System Safety*, Elsevier, 150, 190-201. doi: 10.1016/j.res.2016.02.002
- Frangopol, D.M., Dong, Y., and **Sabatino, S.** (2017). Bridge life-cycle performance and cost: analysis, prediction, optimization and decision making. *Structure and Infrastructure Engineering*, Taylor & Francis, 13(10), 1239-1257. doi: 10.1080/15732479.2016.1267772

### Conference articles

- Sabatino, S.** and Ervin, E.K. (2011). Experimental damage diagnosis of a model three-story spatial frame. *Mid-South Area Engineering & Sciences Conference*, Memphis, Tennessee, May 3, 2011.
- Sabatino, S.** and Ervin, E.K. (2012). Experimental damage diagnosis of a model three-story spatial frame, *The 30th International Modal Analysis Conference (IMAC)*, Jacksonville, Florida, January 30 – February 2, 2012.
- Sabatino, S.** and Frangopol, D.M. (2016). Treating system reliability, redundancy, risk, and sustainability as performance-based design and assessment requirements in a life-cycle context, *The 7th Probabilistic Mechanics and Reliability Conference (PMC 2016)*, Nashville, Tennessee, May 22-26, 2016.
- Sabatino, S.** and Frangopol, D.M. (2016). Life-cycle sustainability of highway bridges, *The 8th International Conference on Bridge Maintenance, Safety and Management (IABMAS 2016)*, Foz do Iguaçu, Brazil, June 26-30, 2016.
- Sabatino, S.** and Frangopol, D.M. (2016). Structural health monitoring planning of ship structures in a life-cycle perspective, *The 5th International Conference on Life-Cycle Civil Engineering (IALCCE 2016)*, Delft, Netherlands, October 16-19, 2016.

- Sabatino, S.** and Frangopol, D.M. (2017). Optimum utility-informed SHM planning of ship structures considering uniform and non-uniform monitoring time intervals, *The 12th International Conference on Structural Safety & Reliability (ICOSSAR 2017)*, Vienna, Austria, August 6-10, 2017.
- Sabatino, S.** and Frangopol, D.M. (2017). Decision support system for optimum lifetime sustainability-based maintenance planning of highway bridges, *International Conference on Sustainable Infrastructure (ICSI 2017)*, New York, New York, October 26-28, 2017.
- Sabatino, S.** and Frangopol, D.M. (2018). Optimum lifetime inspection and maintenance planning for bridges considering utility, *The 9th International Conference on Bridge Maintenance, Safety and Management (IABMAS 2018)*, Melbourne, Australia, June 9-13, 2018.
- Dong, Y., Frangopol, D.M., and **Sabatino, S.** (2014). Risk-informed decision making for bridges under mainshock and aftershocks seismic sequence, *The 7th International Conference on Bridge Maintenance, Safety and Management (IABMAS 2014)*, Shanghai, China, July 7-11, 2014.
- Dong, Y., Frangopol, D.M., and **Sabatino, S.** (2014). Sustainability-based pre-earthquake probabilistic retrofit optimization of highway bridges considering risk attitudes, *The 7th International Conference on Bridge Maintenance, Safety and Management (IABMAS 2014)*, Shanghai, China, July 7-11, 2014.
- Dong, Y., Frangopol, D.M., and **Sabatino, S.** (2014). Risk-informed decision making for disaster recovery incorporating sustainability and resilience, *The 3rd International Conference on Urban Disaster Reduction (3ICUDR 2014)*, Boulder, Colorado, September 28-October 1, 2014.
- Dong, Y., Frangopol, D.M., and **Sabatino, S.** (2014). Sustainability-based bi-objective optimization for seismic retrofit of bridge networks considering risk attitudes, *The 4th International Conference on Life-Cycle Civil Engineering (IALCCE 2014)*, Tokyo, Japan, November 16-19, 2014.
- Eghbalifarkoosh, V. and **Sabatino, S.** (2019). Service life prediction of SFRC corbels subjected to chloride-induced corrosion, *The 13th International Conference on Applications of Statistics and Probability in Civil Engineering (ICASP 2019)*, Seoul, South Korea, May 26-30, 2019.
- Eghbalifarkoosh, V. and **Sabatino, S.** (2019). Influence of effective depth and initial chloride concentration on the load carrying capacity of steel fiber reinforced concrete corbels subjected to chloride-induced corrosion, *International Conference on Sustainable Infrastructure (ICSI 2019)*, Los Angeles, California, November 6-9, 2019.
- Frangopol, D.M., **Sabatino, S.**, and Dong, Y. (2015). Life-cycle management of infrastructure systems considerations reliability, risk, and sustainability, *Engineering Mechanics Institute Conference 2015 (EMI 2015)*, Stanford, USA, June 16-19, 2015.
- Frangopol, D.M., **Sabatino, S.**, and Soliman, M. (2015). Maintenance and safety of deteriorating systems: a life-cycle perspective, *The 2nd International Conference on Performance-based and Life-cycle Structural Engineering (PLSE 2015)*, Brisbane, Australia, December 9-11, 2015.
- Frangopol, D.M., **Sabatino, S.**, and Dong, Y. (2016). Life-cycle performance-based assessment and management of civil infrastructure considering reliability, redundancy, risk, sustainability, and utility, *The 6th Asian-Pacific Symposium on Structural Reliability and its Applications (APSSRA 6)*, Shanghai, China, May 28-30, 2016.
- Frangopol, D.M., **Sabatino, S.**, and Dong, Y. (2016). Bridge life-cycle performance and cost: analysis, prediction, optimization and decision making, *The 8th International Conference on Bridge Maintenance, Safety and Management (IABMAS 2016)*, Foz do Iguaçu, Brazil, June 26-30, 2016.
- Frangopol, D.M. and **Sabatino, S.** (2016). Risk-informed decision making for sustainable infrastructure, *The 5th International Symposium on Reliability Engineering and Risk Management (ISRERM 2016)*, Seoul, South Korea, August 17-20, 2016.
- Frangopol, D.M. and **Sabatino, S.** (2016). The role of structural reliability, risk, and utility-based performance indicators in informed decision making for sustainable infrastructure, *International Symposium on Sustainability and Resiliency of Infrastructure (ISSRI 2016)*, Taipei, Taiwan, November 9-12, 2016.