

Robert F. Guratzsch

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137 Five Oaks Drive, Nashville, TN 37217, USA

<http://people.vanderbilt.edu/~robert.f.guratzsch>

Objective: Apply my skills as a Structural Engineer with expertise in Systems Health Monitoring and Risk Management to complex systems such as Next Generation Flight Vehicles.

Education: Vanderbilt University, Nashville, TN
Ph.D., **Civil Engineering (Risk & Reliability)**, May 2007, Available January 2007

Vanderbilt University, Nashville, TN
Master of Science, **Civil Engineering**, August 2005, GPA: 3.65/4.00

Rose-Hulman Institute of Technology, Terre Haute, IN
Bachelor of Science, **Civil Engineering**, May 2002, GPA: 3.93/4.00

Washington High School, Washington, IN
Magna Cum Laude, May 1998, GPA: 3.875/4.00

Skills

- Extensive understanding of statistical and reliability methods for risk analysis
- Intricate knowledge of state identification and model validation tools
- Fluent in German, some Spanish, some Portuguese
- OSHA certified (10-hour Occupational Safety & Health Training in Construction Safety & Health)
- Knowledge of Microsoft Windows & Office XP, Linux, Matlab, Maple, Mathematica, Borland C++, SSH Secure Shell Client, ANSYS, Patran/Nastran, & AutoCAD

Experience: *Vanderbilt University*, Nashville, TN
Graduate Student Researcher **August 2002-Present**

- Developed a Sensor Placement Optimization under Uncertainty Methodology for Structural Health Monitoring Systems of Next Generation Flight Vehicles
- Studied Random Processes/Fields Generation/Discretization for Uncertainty Inclusion in Probabilistic Finite Element Simulations
- Presented Cutting-Edge Research Results at National and International Conferences as well as in Respected International Publications
- Participated in Studies on System Dynamics, Composites, Linear & Nonlinear Optimization, Advanced Reliability Methods, Signal Analysis, and Finite Element Methods

Air Force Research Laboratory, Dayton, OH

Summer Researcher **Summer 2004**

- Studied Damage Detection Algorithms for Structural Health Monitoring Systems
- Utilized High Performance Parallel Computing Systems for Finite Element simulations
- Applied different Feature Extraction methodologies for System Identification purposes
- Participated in Short Course on *Diagnosis & Prognosis in Structural Systems*

Gilbert Southern Corp. (A Kiewit Company), Miami, FL

Assistant Project Engineer **Summer 2002**

- Prepared daily cost analysis reports, scheduling logs and monthly cost reports
- Performed Maintenance-of-Traffic duties such as MOT logs and MOT inspections
- Assembled take-offs and contracts for work to be subcontracted to outside companies
- Communicated daily progress between Gilbert Southern Corp. and Florida D.O.T

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Cives Steel Company, Wolcott, IN

Intern

Summer 2001

- Fabricated steel members using high-tech fabrication equipment as well as simple torching, grinding, and welding tools
- Observed all parts of steel fabrication process beginning with receiving of materials, to shop fabrication, paint shop methods, and shipping yard procedures
- Audited engineered connection designs and shop drawings

United Forming, Inc., Austell, GA

Engineering Intern

Summer 2000

- Prepared field drawings from structural & architectural drawings & specifications
- Designed concrete shoring & forms for multi-storied parking garages and office & residential structures
- Communicated critical information between field personnel & corporate engineer

Midwestern Engineers, Inc., Loogootee, IN

Intern

Summer 1999

- Modeled hydraulic designs for city/rural water systems using Cybernet software
- Performed necessary drafting on current projects and record drawings
- Surveyed residential sites for pre-engineering purposes

Activities: ASCE (American Society of Civil Engineers) – Student Member (1998-present)
Five Oaks Homeowners Association – President (2003-present)
SAA (Rose-Hulman Student Alumni Association) – Vice President (2000 – 2002)
Triangle Fraternity – Alumnus

Honors IGERT Fellow 2002-present
IBM Fellowship Recipient 2002-present
Graduated *Magna cum Laude* & 1st in Class from Rose-Hulman Institute of Technology
CE News' Star Student Program 2001 – Top 10 CE Students in the Nation
Recipient of Bernard "Bernie" Vonderschmitt endowed scholarship fund 1999-2002

Publications: *Conference Proceedings*

Guratzsch, R.F. and S. Mahadevan, "Health Monitoring System Design under Uncertainty for Hot Aerospace Structures." Proceedings to *Earth & Space 2004: 9th ASCE Aerospace Division International Conference on Engineering, Construction and Operations in Challenging Environments*. Houston, TX, March 7-10, 2004.

Guratzsch, R.F., Mahadevan, S., Pettit, C., and M. Derriso, "Sensor Placement Optimization for SHM Systems Under Uncertainty." Proceedings to *46th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference*. Austin, TX, April 18-21, 2005.

Guratzsch, R.F., and S. Mahadevan, "Sensor Layout Optimization for Structural Health Monitoring Systems." Proceedings to *Air Force Research Laboratory: Integrated Systems Health Management Conference*. Cincinnati, OH, August 8-11, 2005.

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Guratzsch, R.F., and S. Mahadevan, "SHM Sensor Placement Optimization under Uncertainty." Proceedings to *5th International Workshop on Structural Health Monitoring*. Stanford, CA, September 12-14, 2005.

Guratzsch, R.F., and S. Mahadevan, "Sensor Placement for Aerospace Vehicle Health Monitoring System." Proceedings to *Earth & Space 2006: 10th ASCE Aerospace Division International Conference on Engineering, Construction and Operations in Challenging Environments*. Houston, TX, March 5-8, 2006.

Guratzsch, R.F., and S. Mahadevan, "Sensor Placement Design for SHM Under Uncertainty." Proceedings to *Third European Workshop on Structural Health Monitoring*. Granada, Spain, July 5-7, 2006.

Guratzsch, R.F., and S. Mahadevan, "Optimal Sensor Placement Design Under Uncertainty For SHM Systems." Proceedings to *Air Force Research Laboratory: Integrated Systems Health Management Conference*. Cincinnati, OH, August 14-17, 2006.

Guratzsch, R.F., and S. Mahadevan, "Health Monitoring Sensor Placement Optimization Under Uncertainty." Proceedings to *11th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference*. Portsmouth, VA, Sep. 6-8, 2006.

Guratzsch, R.F., and S. Mahadevan, "Probabilistic Optimization of Sensor Placement." Proceedings to *IMAC XXV Conference & Exposition on Structural Dynamics*. Orlando, FL, Feb. 19-22, 2007.

Journal Papers

Guratzsch, R.F., Mahadevan, S., Olson, S., DeSimio, M., and M. Derriso. "Metrics for Validation of Modal Analysis Under Uncertainty." submitted for review to *Journal of Vibration and Control*, February 20, 2006.

Guratzsch, R.F., and S. Mahadevan. "Feature Extraction and Selection Algorithms for Structural Damage Detection." submitted for review to *Structural Control & Health Monitoring*, June 27, 2006.

Guratzsch, R.F., and S. Mahadevan, "Health Monitoring Sensor Placement Optimization Under Uncertainty." submitted for review to *AIAA Journal*, August 14, 2006.

Attendance: 44th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, Norfolk, VA, April 7-10, 2003.

4th International Workshop on Structural Health Monitoring, Stanford, CA, Sep. 15-17, 2003.

Earth & Space 2004: 9th ASCE Aerospace Division International Conference on Engineering, Construction and Operations in Challenging Environments, Houston, TX, March 7-10, 2004.

AFRL's Integrated Systems Health Management Conference, Dayton, OH, Aug. 17-19, 2004.

46th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, Austin, TX, April 18-21, 2005.

AFRL's Integrated Systems Health Management Conference, Cincinnati, OH, Aug. 8-11, 2005.

5th International Workshop on Structural Health Monitoring, Stanford, CA, Sep. 12-14, 2005.

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3rd European Workshop on Structural Health Monitoring, Granada, Spain, July 5-7, 2006.

AFRL's Integrated Systems Health Management Conference, Cincinnati, OH, Aug. 14-17, 2006.

11th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference, Portsmouth, VA, Sep. 6-8, 2006.