

**Shawn E. Gano, Ph.D.**

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**WORK EXPERIENCE**

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- Granted access to Sensitive Compartmented Information (SCI) by the U.S. Government
- Cleared DoD Top Secret
- Successful completion of government polygraph examination in April 2006
- Completion of Single Scope Background Investigation (SSBI) in June 2005

**Lockheed Martin Corporation, (Johnson Space Center) Houston, TX****2009-**

Staff Systems Engineer (Level IV) within the Enterprise Integration Group of the Information Systems & Global Services Business Unit (IS&GS).

Located on-site as a trusted agent for NASA on the Facilities Development and Operations Contract (FDOC). Worked alongside the Mission Control Center System (MCCS) Chief Engineer on system level project tasks and integration of 17 subsystems. Book manager for the Constellation MCCS Architecture Description Document using model based system engineering approaches. Helped prepare for and execute the MCCS Preliminary Design Review.

**Lockheed Martin Corporation, Valley Forge, PA / Houston, TX****2005-8**

Senior Systems Engineer (level III) within the Enterprise Integration Group of the Information Systems & Global Services Business Unit (IS&GS).

- *NASA Constellation Mission Control Center System (Cx MCCS)*, 2007-8: Developed an CONOPS Simulation for the Mission Operations Directorate (MOD). Project included developing an integrated architecture for the MCCS with interactive HTML output capabilities and discrete event simulations for high valued or technologically risky concepts of operations.
- *Rapid Executable Architecture IR&D*, Jan-Jul 2007: Tech Lead, investigating ways to increase the speed and agility of CONOPS Simulation while decreasing cost.
- *CONOPS Analyzer Mico-Innovation Project*, Oct-Dec 2006: Principle Investigator; Developed the process and an automated tool to aid in performing Monte Carlo analysis, trade space exploration, and design optimization of CONOPS Simulations.
- *Persistent Automation IR&D*, Sept-Dec 2006: Algorithms and research for IMINT and SIGINT aircraft/UAV flight planning.
- *Extended Area Protection and Survivability (EAPS)*, Apr 2006 - Aug 2006: Algorithms and visualization lead. Developed a CONOPS Simulation for defending an airfield from mortar and artillery attacks with LM Missiles and Fire Control.
- *NASA's Crew Exploration Vehicle (Orion)*, Oct 2005 - Mar 2006: Developed a CONOPS Simulation for a CEV-ISS autonomous V-bar rendezvous scenario for a LM Space Systems IR&D. This project included development of an architecture, modeling and performance analysis, and developing dynamic engineering visualizations.

**Applied Research Laboratory, State College, Pennsylvania****2003-4**

Summer internships in which I helped develop a six degrees of freedom (6DoF) torpedo dynamics simulation model. The model included an automated control system with differential game theory to engage its target, a nonlinear propulsion model, a stochastic sonar system, an enhanced homing guidance system, bulk-charge warhead sizing rules, and a virtual reality (VRML) design visualization tool. This complex model was used to help the Navy optimize new torpedo designs.

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## EDUCATION

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- University of Notre Dame, Notre Dame, Indiana*  
**Ph.D. in Aerospace and Mechanical Engineering** **2005**  
Dissertation: *Simulation-Based Design Using Variable Fidelity Optimization*  
Research Topics: Multidisciplinary Optimization, Variable Fidelity Optimization, Simulation-Based Design, Reliability-Based Optimization, and Unmanned Morphing Aircraft
- University of Notre Dame, Notre Dame, Indiana*  
**M.S. in Aerospace Engineering** **2004**  
GPA: 3.795/4.0  
Served as a Teaching Assistant in Advanced Aerodynamics, Aerodynamics I, Orbital Mechanics, and CAD/CAM laboratory
- University of Michigan, Ann Arbor, Michigan*  
**B.S.E. in Aerospace Engineering** **2001**  
Graduated magna cum laude, GPA: 3.61 / 4.00  
Senior design project: multi-aperture Earth imaging satellite for the USAF.
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## HONORS AND AWARDS

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- 2008 Author of the Year, Lockheed Martin Enterprise Integration Celebration of Excellence **2008**
  - Lockheed Martin Spot Award for commitment and contributions to the NASA/JSC/MOD Programs **2007**
  - Lockheed Martin Spot Award for professionalism, commitment, and outstanding contributions to OMEGA Consulting Services **2007**
  - Lockheed Martin Spot Award for delivering a successful product to the ISC2 team under tight time constraints and for helping to "keep the program sold" **2007**
  - Lockheed Martin Spot Award for outstanding effort contributing to Mission Success on the Extended Area Protection and Survivability project **2006**
  - Outstanding Graduate Student Teacher Award for Excellence in Teaching given by the Kaneb Center for Teaching and Learning at the University of Notre Dame **2005**
  - American Institute of Aeronautics and Astronautics Learn to Fly Scholarship **2003**
  - AIAA Foundation Student Paper Conference 2003 third place award for best paper and presentation **2003**
  - Landes Class Prize for Technical Communication, University of Michigan **1999**
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## RELATED EXPERIENCE

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- Licensed Private Pilot with 80+ hours in a Cessna 172SP
- Technician Class FCC licensed amateur radio operator, call sign KB3OJE
- Certified open water SCUBA diver
- Phytoplankton Monitoring Network Volunteer for the National Oceanic and Atmospheric Administration (NOAA)
- JSatTrak open source application creator and developer. JSatTrak performs spacecraft trajectory calculations and displays results using various 2D and 3D graphical displays. Homepage: <http://www.gano.name/shawn/JSatTrak/>
- Developed two iPhone applications in the Apple App Store: Hot Air, Phyto
- Programming Languages: Java, C, C++, C#, Objective C, HTML, MATLAB, Fortran, PHP

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- Operating Systems Experience: Unix, Linux, Windows, Mac OS X
  - Satellite Tool Kit (STK) experience including advanced training with maneuver targeting module Astrogator
  - DoDAF and SysML training and experience using Model Based System Engineering Tools such as Rhapsody, System Architect, and DOORS
  - CAD/CAM/CAE Software: Pro/Engineer, AutoCAD
  - CFD experience using state of the art NASA codes, both structured and unstructured solvers in 2D and 3D, including: geometry creation, grid generation, flow solving, and post processing of results
  - BP Physics Challenge Day Mentor - Helped high school physics students with hands on experiments and analysis. (2008-9)
  - Pennsylvania Regional Science Fair (Montgomery County) Judge in Engineering (2006)
  - Indiana Regional Science Fair Judge in Engineering, Earth and Space Sciences (2002-5)
  - Other hobbies: Astronomy, Photography, Woodworking, Model Rocketry, Basketball, Water Skiing
  - Graduate level course in computer security. Topics covered included cryptography, database security, and network security (Fall 2003)

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#### MEMBERSHIPS

- American Institute of Aeronautics and Astronautics
- Aircraft Owners and Pilots Association

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#### PUBLICATIONS AND PAPERS

- Gano, S.E., Hunnicutt, R.K., Nelson, J.D., Dockal, R.J., 2008, *Improving the Constellation Mission Control Center System Design Using Integrated Executable Architectures and Visualization*, Proceedings of the ESA/EUMETSAT/AIAA SpaceOps 2008 Symposium, AIAA-2008-3505, Heidelberg, Germany, May 12-16.
- Gano, S.E., Kim, H., Brown, D.E., 2006, *Comparison of Three Surrogate Modeling Techniques: Datascape, Kriging, and Second Order Regression*, Proceedings of the 11th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference, AIAA-2006-7048, Portsmouth, Virginia, Sept 6-8.
- Gano, S.E., Renaud, J.E., Martin, J.D., Simpson, T.W., 2006, *Update Strategies for Kriging Models for Use in Variable Fidelity Optimization*, Structural and Multidisciplinary Optimization, Springer-Verlag, Vol. 32, No. 4, pp. 287-298.
- Gano, S.E., Agarwal, H., Renaud, J.E., Tovar, A., 2006, *Reliability Based Design Using Variable Fidelity Optimization*, Structure and Infrastructure Engineering - Special Issue on Uncertainty Quantification and Design Under Uncertainty of Aerospace Systems, Vol. 2, Nos. 3-4, pp. 247-260.
- Renaud, J.E., Gano, S.E., 2006, *Book Review: Numerical Optimization - Theoretical and Practical Aspects*, IEEE Transactions on Automatic Control, Vol. 51, No. 3, pp. 541.
- Gano, S.E., Sanders, B., Renaud, J.E., 2005, *Hybrid Variable Fidelity Optimization Using a Kriging-Based Scaling Function*, AIAA Journal, Vol. 43, No. 11, pp. 2422-2433.
- Tovar, A., Gano, S.E., Mason, J.J., Renaud, J.E., 2005, *Optimum Design of an Interbody Implant for Lumbar Spine Fixation*, Elsevier Advances in Engineering Software, Vol. 36, No. 9, pp. 634-642.
- Gano, S.E., Agarwal, H., Renaud, J.E., Tovar, A., 2005, *Reliability Based Design Using Variable Fidelity Optimization*, Proceedings of the 1st AIAA Multidisciplinary Design Optimization Specialist Conference, AIAA-2005-2135, Austin, Texas, April 18 - 21.
- Gano, S.E., Renaud, J.E., Martin, J.D., Simpson, T.W., 2005, *Update Strategies for Kriging Models for Use in Variable Fidelity Optimization*, Proceedings of the 1st AIAA Multidisciplinary Design Optimization Specialist Conference, AIAA-2005-2057, Austin, Texas, April 18 - 21.
- Patel, N.M., Gano, S.E., Pérez, V.M., Renaud, J.E., Martin, J.D., 2005, *Application of an Interior*

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*Point Sequential Approximate Optimization Method to an Autonomous Underwater Vehicle*, 1st AIAA Multidisciplinary Design Optimization Specialist Conference, AIAA-2005-1982, Austin, Texas, April 18 - 21.

- Gano, S.E., Sanders, B., Renaud, J.E., 2004, *Variable Fidelity Optimization Using a Kriging Based Scaling Function*, Proceedings of the 10th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference, AIAA-2004-4460, Albany, NY, Aug 30-Sept 1.
- Gano, S.E., Pérez, V.M., Renaud, J.E., Batill, S.M., Sanders, B., 2004, *Multilevel Variable Fidelity Optimization of a Morphing Unmanned Aerial Vehicle*, Proceedings of the 45th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics & Materials Conference, AIAA 2004-1763, Palm Springs, California, April 19 - 22.
- Patel, N.M., Gano, S.E., Renaud, J.E., Martin, J.D., Yukish, M., 2004, *Simulation Model of an Autonomous Underwater Vehicle for Design Optimization*, Proceedings of the 45th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics & Materials Conference, AIAA 2004-2034, Palm Springs, California April 19 - 22.
- Rusnell, M.T., Gano, S.E., Pérez, V.M., Renaud, J.E., Batill, S.M., 2004, *Morphing UAV Pareto Curve Shift for Enhanced Performance*, Proceedings of the 45th AIAA/ASME/ASCE/ AHS/ASC Structures, Structural Dynamics & Materials Conference, AIAA 2004-1682, Palm Springs, California April 19 - 22.
- Gano, S.E., 2003, *Sensitivity of Optimal Conforming Airfoils To Exterior Shape*, Proceedings of the AIAA Student Conference 2003, Univ. of Kentucky at Paducah, April 4-5.
- Gano, S.E., Renaud, J.E., Batill, S.M., Tovar, A., 2003, *Shape Optimization for Conforming Airfoils*, Proceedings of the 44th AIAA/ASME/ASCE/AHS Structures, Structural Dynamics, and Materials Conference, AIAA 2003-1579, Norfolk, VA, April 7-10.
- Tovar, A., Gano, S.E., Renaud, J.E., Mason, J.J., 2003, *Topology and Shape Optimization of an Interbody Fusion Implant for Lumbar Spine Fixation*, Proceedings of the 29th Design Automation Conference. DETC2003, Chicago, IL, USA, September 2-6.
- Gano, S.E., Renaud, J.E., 2002, *Optimized Unmanned Aerial Vehicle with Wing Morphing for Extended Range and Endurance*, Proceedings of the 9th AIAA/ISSMO Symposium and Exhibit on Multidisciplinary Analysis and Optimization, AIAA 2002-5668, Atlanta, GA, September 4-6.
- Gano, S.E., Hyland, D.C., Kabamba, P.T., et al., 2001, *A Baseline Study of a Low-Cost, High-Resolution, Imaging System Using Wavefront Reconstruction*, Proceedings of the AIAA Space 2001 Conference and Exposition, Albuquerque, NM, August 28-30.
- Gano, S.E., Pérez, V.M., Renaud, 2001, *Development and Verification of a MATLAB Driver for the SNOPT Optimization Software*, Proceedings of the 42nd AIAA/ASME/ASCE/ AHS/ASC Structures, Structural Dynamics, and Materials Conference, AIAA 2001-1620, Seattle, WA, April 16-19.
- Pérez, V.M., Renaud, J.E., Gano, S.E., 2000, *Constructing Variable Fidelity Response Surface Approximations on the Usable Feasible Region*, Proceedings of the 8th AIAA/USAF/ NASA/ISSMO Symposium on Multidisciplinary Analysis and Optimization, AIAA 2000-4888, Long Beach, CA, September 6-8.