Dr. Richard N. Tantaris
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EDUCATION:

Ph.D., Mechanical Engineering, Vanderbilt University, 2004
      Dissertation: "First order controllers: stability, performance, and robustness".
M.E., Electrical Engineering, Tennessee State University, 1997
B.S., Electrical Engineering, Tennessee State University, 1995

SUMMARY:

Academic Experience
- Classes taught: MAE 284L Numerical Methods Lab, MAE 284 Numerical Methods, MAE 463/563 Intermediate Dynamics, MAE 480/580 Aircraft Stability and Control, and MAE 488 Analysis of Engineering Systems at the University of Alabama in Huntsville
- More than 15 years of experience in Control System research including two refereed journal papers and four conference papers
- Created and taught an undergraduate controls lab class including lab work, homework, exams, and design project. Responsible for grading all work, administering exams, and maintaining office hours
- Designed and implemented controllers using LQG and nonlinear adaptive control for multiple systems including a 6 degree-of-freedom, g-limiting, gravity isolation system for NASA space hardware
- Developed and maintained a control system research lab with Matlab/Simulink and dSPACE based hardware in the loop (HIL) simulation
- Designed and constructed several experimental systems including a multivariable slewed beam system to simulate flexible space structures
- Senior member of IEEE, currently serving as Member-At-Large on the executive comittee of the Alabama section

Industry Experience
- Program Manager for a Dynamically Tuned Gyro Electronics module
- Lead System Engineer, Lead Control System Engineer, and Lead Electrical Engineer responsible for overall system integration and test, modeling and control design, integration, test, and performance verification of embedded digital controllers, and general electrical design
- Extensive experience in mathematical modeling and analysis using Matlab/Simulink including control system design, optimal scheduling algorithms, Monte Carlo and sensitivity analysis, model verification, video tracking algorithms, de-roll and image stabilization video processing algorithms, and finite element modeling, navigation with coning and sculling compensation, turbulence modeling, and geo-location algorithms
- Specialize in high accuracy, stabilized, line-of-sight (LOS) control of multi-axis gimbaled pointing systems.
- Test Director responsible for design and execution of performance and MIL-STD-810 environmental qualification testing of flight hardware

RELEVANT EXPERIENCE:

University of Alabama in Huntsville, Mechanical and Aerospace Engineering
Fall – 2016   **Full-time Lecturer**

- MAE 284L, Numerical Methods Lab (Spring 2017, Summer 2017, Fall 2017)
- MAE 284, Numerical Methods (Fall 2017)
- MAE 480/580, Aircraft Stability and Control (Spring 2017, Fall 2017)
- MAE 488, Analysis of Engineering Systems (Summer 2017)

University of Alabama in Huntsville, Mechanical and Aerospace Engineering
Fall – 2016   **Part-time Lecturer**

- MAE 463/563, Intermediate Dynamics
- MAE 480/580, Aircraft Stability and Control

Tennessee State University, Center of Excellence in Engineering
1994 – 2003   **Graduate Research, Lab Supervisor, and Teaching Assistant**

- Developed an algorithm to calculate the complete set of stabilizing first-order controllers for arbitrary order, linear time invariant, continuous and discrete systems with additional constraints on gain/phase margin, H-infinity, and other design constraints (2 journal papers, 4 conference papers)
- Developed an algorithm to create an optimal scheduling algorithm to schedule star observations for a multi-user, multi-task automatic robotic telescope (1 conference paper)
- Graduate assistant - designed and taught an undergraduate controls lab class
- Developed and maintained a control system research lab with Matlab/Simulink and dSPACE based hardware in the loop (HIL) simulation
- Designed and constructed several experimental systems including a multivariable slewed beam system to simulate flexible space structures
- Designed and implemented controllers using LQG and nonlinear adaptive control for systems including a 6 degree-of-freedom, g-limiting, gravity isolation system for NASA space hardware

Raytheon Space and Airborne Systems, El Segundo
2003-2006   **Multidiscipline Engineer**

- Subject Matter Expert on open loop control of stepper motors
- Designed and implemented flight hardware test program
- Designed a new tuning process to meet performance requirements for a challenging stepper motor application without position feedback
- ATFLIR - developed, implemented, and flight tested new tracking algorithms in embedded software to reacquire targets after being obscured by predicting future position based on available data
- ATFLIR - analyzed F/A-18 flight data to diagnose line-of-sight control anomalies
- Implemented strap-down navigation algorithms with coning compensation to propagate star positions based on body rate

Southern Research Institute, Systems Development Department

2006 – November 2015   **Program Manager/Senior Electrical Engineer**

- Program Manager for Dynamically Tuned Gyro Electronics Module
- Test Director on more than five DOD and/or government contractor programs
- Lead System Engineer on Airborne Radiometric Measurement System (ARMS)
- Mechanical/Electrical Engineer and Analyst on multiple DOD and/or government contractor programs
- Developed a novel algorithm to process 3D spatial data (point cloud) to determine attitude (roll, pitch, and yaw) and position (latitude, longitude, and altitude) of a moving object
- Developed image processing tools to measure jitter in high altitude HD video and measure ablation rate in samples undergoing arc-jet testing
- Developed a Matlab/C/DOS interface to various test equipment to automate testing of gyros and other systems

COMPUTER SKILLS:

Programming Languages: Python, Java, C, C++ , ADA, FORTRAN, Cobol, Pascal

Operating Systems: VMS, DOS, UNIX, Windows, VxWorks

Software Applications: Matlab/Simulink, dSPACE, Mathematica, Mentor Graphiscs, System Tool Kit (STK), LaTeX, MS Office (Word, Excel, Front Page, Power Point, Project)

AREAS OF INTEREST:

Engineering education, Line-of-Sight (LOS) control, control systems (nonlinear, modern, parametric/robust, adaptive, anti-windup), system modeling, optics, inertial navigation (strap-down and stable platform), MEMs, finite element analysis, neural networks, fuzzy logic, and robotics (modeling and control design/simulation), vision systems, image processing

PUBLICATIONS:

R. N. Tantaris, "Optimal scheduling of a multi-user, multi-tasking automatic robotic telescope"**,** *Proceedings of the NASA URC Technical Conference*, vol. II, pp. 137-142, Huntsville, Alabama, Feb. 22-25, 1998.

R. N. Tantaris, L. H. Keel, and S. P. Battacharyya, "Stabilization of continuous time systems by first order controllers", *Proceedings of the 10th Mediterranean Conference on Control and Automation*, Lisbon, Portugal, July 9-12, 2002.

R. N. Tantaris, L. H. Keel, and S. P. Battacharyya, "Stabilization of discrete time systems by first order controllers", *Proceedings of the 41st IEEE Conference on Decision and Control*, Las Vegas, Nevada, Dec. 2002.

R. N. Tantaris, L. H. Keel, and S. P. Battacharyya, "Stabilization of discrete time systems by first order systems", *IEEE Transactions on Automatic Control*, vol. 48, No. 5, May, 2003.

R. N. Tantaris, L. H. Keel, and S. P. Battacharyya, "Gain/phase margin design with first order controllers", *Proceedings of the American Control Conference, Denver CO*, June 4-6, 2003.

R. N. Tantaris, L. H. Keel, and S. P. Battacharyya, "Three term controllers: stability, performance, and robustness", *Dynamics of Continuous, Discrete, and Impulsive Systems*, September 2003.

R. N. Tantaris, L. H. Keel, and S. P. Battacharyya, "Stabilization by first order controllers with an H-infinity constraint", *Proceedings of the 42nd IEEE Conference on Decision and Control*, Maui, Hawaii, Dec. 2003.

R. N. Tantaris, L. H. Keel, and S. P. Battacharyya, "H$_\infty$ Design With First-Order Controllers", *IEEE Transactions on Automatic Control*, vol. 51, No. 8, August, 2006.