

# Guy O. Beale, Ph.D.

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## Summary of Qualifications:

- Ph.D. in Electrical Engineering with an emphasis in Control Systems.
- 25 years experience as a faculty member teaching and conducting research in various areas of control theory. Supervised more than 20 M.S. and Ph.D. theses in controls and digital simulation. Supervised the scholarly papers for numerous non-thesis M.S. students in controls.
- 20 years experience in the design of control and estimation algorithms for underwater vehicles, including the development of a robust reconfigurable control system to provide fault tolerant control for a vehicle experiencing stern and bow plane jams.
- 10 years of industrial experience involved in the design of automated manufacturing processes and high-precision non-destructive testing systems for the naval reactors program.
- Experienced in the real-time implementation of digital control systems, application of control and estimation theory, and digital simulation of surface ships and submarines.
- More than 70 journal and conference papers in controls and digital simulation. Coauthor of the text *Digital Simulation of Dynamic Systems: A Control Theory Approach*, Prentice Hall, 1994.

## Education:

Ph.D. Electrical Engineering	University of Virginia, Charlottesville, VA May 1977 “Optimal Aircraft Simulator Development by Adaptive Random Search Optimization,” Advisor – Gerald Cook
M.S. Physics	Lynchburg College, Lynchburg, VA August 1974
B.S. Electrical Engineering	Virginia Polytechnic Institute, Blacksburg, VA December 1967

## Professional Experience:

11/2011–Present	ECE Assessment Coordinator George Mason University Coordinating department efforts for ABET accreditation of two undergraduate degree programs.
4/2008-11/2015	Casual Employee Computer Sciences Corporation Providing engineering support for the Naval Surface Warfare Center, Carderock (MD) Division

- 9/1986–6/2006 Associate Professor of Electrical and Computer Engineering  
George Mason University, Fairfax, VA  
◆ Teaching undergraduate signals and systems, and a variety of undergraduate and graduate controls courses.  
◆ Research in robust control design, maneuvering control for underwater vehicles, and stabilization of microwave heating processes.
- 9/1981–8/1986 Assistant Professor of Electrical Engineering  
Vanderbilt University, Nashville, TN  
◆ Graduate and undergraduate teaching in control theory and analog and digital electronics.  
◆ Research in design methodology for digital autopilots, expert systems for simulation design and diagnostics of electronic systems, and adaptive algorithms for real-time simulation.
- 3/1981–8/1981 The Babcock & Wilcox Company  
Nuclear Power Generation Division, Lynchburg, VA  
Project management for engineering modifications to power plant subsystems.
- 2/1971–3/1981 The Babcock & Wilcox Company  
Naval Nuclear Fuel Division, Lynchburg, VA  
Engineering and engineering supervision for the development of automated manufacturing processes and high precision computer-based inspection systems.
- 6/1968–6/1970 U.S. Army, Reserve Officer on Active Duty  
U.S. Army Natick Laboratories, Massachusetts (8/68–8/69)  
U.S. Army Support Command Headquarters, Cam Ranh Bay, Republic of Vietnam (10/69–6/70)

## Research Grants Awarded:

1. Principal Investigator, “Robust Reconfigurable Control,” Naval Surface Warfare Center, Carderock Division.  
Grant Period: 1/1/2005–12/31/2005 Total Costs: \$64,304 AY Offset: 15%
2. Principal Investigator, “Fault-Tolerant Behavior Through Robust Reconfigurable Control,” Naval Surface Warfare Center, Carderock Division.  
Grant Period: 1/1/2004–12/31/2004 Total Costs: \$72,297 AY Offset: 15%
3. Principal Investigator, “Robust Reconfigurable Control Algorithms for Underwater Vehicles,” Naval Surface Warfare Center, Carderock Division.  
Grant Period: 1/1/2003–12/31/2003 Total Costs: \$58,665 AY Offset: 10%
4. Principal Investigator, “Development of Algorithms for Robust Reconfigurable Control,” Naval Surface Warfare Center, Carderock Division.  
Grant Period: 1/1/2002–12/31/2002 Total Costs: \$50,357
5. Principal Investigator, “Advanced Automatic Control and Estimation Algorithms,” Naval Surface Warfare Center, Carderock Division.  
Grant Period: 1/18/2001–12/31/2001 Total Costs: \$39,936
6. Principal Investigator, “Development of Robust and Reconfigurable Control Systems,” Naval Surface Warfare Center, Carderock Division.  
Grant Period: 1/1/2000–12/31/2000 Costs: \$40,000 AY Offset: 25%

7. Principal Investigator, "Control Algorithm Development and Evaluation," Naval Surface Warfare Center, Carderock Division.  
Grant Period: 4/1/97–12/31/97    Costs: \$47,416    AY Offset: 50%
8. Principal Investigator, "Use of the Gap Metric for Evaluation of Simultaneous Stabilizability," George Mason University SITE GRA Competition.  
Grant Period: 8/95–5/96    Costs: \$11,500
9. Co-Principal Investigator, "Development of Process Control for Microwave Joining of Ceramics," National Science Foundation.  
Grant Period: 4/92–9/95    Costs: \$179,912
10. Principal Investigator, "VAD Control Algorithm Evaluation and Modification," Naval Surface Warfare Center, Carderock Division.  
Grant Period: 10/94–1/95    Costs: \$24,396    AY Offset: 40%
11. Co-Principal Investigator, "X Window Computer Laboratory for Communication and Control Engineering," National Science Foundation, with matching funds from GMU.  
Grant Period: 7/92–12/93    Costs: \$119,782
12. Co-Principal Investigator, "The Microwave Joining of SiC to SiC Ceramics," Technology Assessment and Transfer, Inc. with matching funds from Virginia Center for Innovative Technology.  
Grant Period: 2/91–6/92    Costs: \$75,000
13. Principal Investigator, "Intelligent Automated Control Design," George Mason University Graduate School Competition.  
Grant Period: 9/90–5/91    Costs: \$6,500
14. Principal Investigator, "Intelligent Automated Control Design," George Mason University Graduate School Competition.  
Grant Period: 9/89–5/90    Costs: \$6,350
15. Principal Investigator, "Knowledge-Based Systems for Test Technologies," Northern Telecom, Inc.  
Grant Period: 1/85–6/86    Costs: \$168,672    AY Offset: 40%
16. Principal Investigator, "Adaptive Control of Integration Operators," Vanderbilt University Research Council.  
Grant Period: 7/85–6/86    Costs: \$1,600
17. Co-Principal Investigator, "Research on Expert System for Data Base Operation of Simulation/Emulation Math Models," NASA Marshall Space Flight Center.  
Grant Period: 12/84–4/86    Costs: \$97,000    AY Offset: 10%
18. Co-Principal Investigator, "A Knowledge-Based System for Expert Diagnosis of Fueling Systems," Gilbarco, Inc.  
Grant Period: 9/83–8/84    Costs: \$19,945    AY Offset: 20%
19. Principal Investigator, "Optimal Discrete Transfer Functions Through Complex Curve Fitting," Vanderbilt University Research Council.  
Grant Period: 7/83–6/84    Costs: \$1,300
20. Co-Principal Investigator, "Digital Autopilot Methodology," US Army Ballistic Missile Defense Advanced Technology Center.  
Grant Period: 5/82–5/83    Costs: \$49,900    AY Offset: 20%

## Graduate Students Supervised:

- Ph.D. Students

1. Gibson, James D., Ph.D., Spring 1997, “A Solution to the Double-D Stabilization Problem”.
2. Kyle, Arthur, M.J., Ph.D., Summer 1995, “Closed-Loop Performance and the Gap Metric”.
3. Arteaga-Bravo, Francisco J., Ph.D., Spring 1995, “Simultaneous Stabilization with Multiple Bounded Domains of Stability”.
4. Ammeen, Edward S., Ph.D., Fall 1994, “A New Simultaneous Stabilization Approach Using an Iterative Combining of System Models for the Design of Robust Control Algorithms”.
5. Polites, Michael E., Ph.D., Spring 1986, “Digital Control Systems with Averaged Measurements”.
6. Hartley, Tom T., Ph.D., Fall 1984, “Parallel Methods for the Real-Time Simulation of Stiff Non-linear Systems”.

- M.S. Students (Thesis Option)

1. Soucacos, Philip, M.S. August 2006, “Fault Recovery in Underwater Vehicles Using Robust Reconfigurable Control”.
2. McLeary, Garry, M.S., January 2006, “ $H_\infty$  Control Design For Near-Zero Speed Submarine Depth Control”.
3. Shahid, Mian Zainularafeen, M.S., January 2004, “Robust Reconfigurable Control for Stern Plane Jams in Underwater Vehicles”.
4. Kim, Joseph H., M.S., Summer 1998, “A Study in Simultaneous Stabilization for Convex Combinations of Linear Systems”.
5. Montanaro, James S., M.S., Fall 1996, “Control of Mechanical Vibration” (scholarly paper).
6. Li, Mengli, M.S., Summer 1994, “A Control System Design and Implementation for Microwave Joining of Ceramics” (scholarly paper).
7. Mason, Wayne C., M.S., Fall 1992, “Performance and Robustness Trade-offs in Linear Quadratic Gaussian Controller Design”.
8. Goodbar, James E., M.S., Summer 1991, “A Model for the Adaptive Control of a Six Degree-of-Freedom Robotic Arm”.
9. Mapes, Brian A., M.S., Summer 1991, “Optimal Mapping of Digital Simulation Computations Using Simulated Annealing Minimization”.
10. Langford, Carl G., M.S., Summer 1989, “Real-Time Digital Simulation of Dynamic Systems on a Pyramid of Processing Elements”.
11. Patino-Siliceo, Omar, M.S., Spring 1987, “Knowledge Representation of Engineering Systems”.
12. Owais, Syed, M.S., Summer 1986, “Failure Detection of Dynamic Systems”.
13. Perry, Stuart D., M.S., Summer 1985, “Evaluation of Parallel Methods for the Simulation of a Stiff Nonlinear System”.
14. Goodman, H. Davis, M.S., Spring 1985, “A Multi-Microprocessor Test-Bed System for the Evaluation of Concurrent Algorithms and Parallel System Configurations”.
15. Woods, G. Hamilton, M.S., Fall 1984, “Digital Simulation of an Autopilot for a Guided Missile System Including Application of Digital Control Methodology”.

## Journal Articles:

1. Kim, J.H. and Beale, G.O., "Fault Detection and Classification in Underwater Vehicles Using the  $T^2$  Statistic," (KoREMA) *Automatika*, 2002 (selected from the 9th Mediterranean Conference on Control and Automation).
2. Gibson, J.D. and Beale, G.O., "A Geometric Solution to the Simultaneous Bounded Domain Stabilization Problem," *International Journal of Control*, 2000, Vol. 73, No. 17, pp. 1536–1547.
3. Beale, G.O. and Arteaga, F.J., "Simultaneous Stabilization with Multiple Bounded Stability Domains," (KoREMA) *Automatika*, 37(1996) 3-4, pp. 91–98, May 1997 (selected from the KoREMA '96 conference as an original scientific paper).
4. Beale, G.O. and Li, M., "Robust Temperature Control for Microwave Heating of Ceramics," *IEEE Transactions on Industrial Electronics*, Vol. 44, No. 1, pp. 124–131, February 1997.
5. Beale, G.O., Arteaga, F.J., and Black, W.M., "Design and Evaluation of a Controller for the Process of Microwave Joining of Ceramics," *IEEE Transactions on Industrial Electronics*, Vol. 39, No. 4, pp. 301–312, August 1992.
6. Beale, G.O., "Real-Time Simulation of Dynamic Systems on a Pyramid Architecture," *IEEE Transactions on Industrial Electronics*, Vol. 37, No. 4, pp. 212–220, June 1990.
7. Hoos, A.B., Koussis, A.D., and Beale, G.O., "A Channel Dynamics Model for Real-Time Flood Forecasting," *Water Resources Research, American Geophysical Union*, Vol. 25, No. 4, pp. 691–705, April 1989.
8. Yen, K.K., Cook, G., and Beale, G.O., "Parameter Space Study of Parallel Algorithms Using Stale Data," *Transactions of The Society for Computer Simulation*, Vol. 5, No. 4, pp. 229–241, October 1988.
9. Polites M.E. and Beale, G.O., "Modeling and Designing Digital Control Systems with Averaged Measurements," *International Journal of Control*, Vol. 48, No. 1, pp. 161–177, 1988. Selected by NASA to appear as a New Technology Report.
10. Hartley, T.T., Beale, G.O., and Cook, G., "The Use of Multirate Input Sampling to Provide an Improved Runge-Kutta Simulation," *IEEE Transactions on Industrial Electronics*, Vol. 34, No. 3, pp. 387–390, August 1987.
11. Perry, S.D. and Beale, G.O., "Evaluation of Parallel Algorithms for the Real-Time Simulation of a Stiff Nonlinear System," *IEEE Transactions on Industrial Electronics*, Vol. 34, No. 2, pp. 158–162, May 1987.
12. Beale, G.O. and Hartley, T.T., "Stability Considerations: Numerical Methods and Control Theory Equivalences," *IEEE Transactions on Industrial Electronics*, Vol. 34, No. 2 pp. 180–187, May 1987.
13. Perry, S.D. and Beale, G.O., "Parallel Simulation Using Stability Region Placement Methods," *IEEE Transactions on Industrial Electronics*, Vol. 34, No. 2, pp. 200–204, May 1987.
14. Beale, G.O., "Adaptive Integration Operators for Real-Time Digital Simulation," *IEEE Transactions on Industrial Electronics*, Vol. 34, No. 1, pp. 65–69, February 1987.
15. Hofmann, M., Caviedes, J., Bourne, J., Beale, G.O., and Brodersen, A., "Building Expert Systems for Repair Domains," *Expert Systems, The International Journal of Knowledge Engineering*, Vol. 3, No. 1, pp. 4–12, January 1986.
16. Hartley, T.T. and Beale, G.O., "Integration Operator Design for Real-Time Digital Simulation," *IEEE Transactions on Industrial Electronics*, Vol. 32, No. 4, pp. 393–398, November 1985.

17. Beale, G.O. and Cook, G., "Non-Iterative System Identification Applied to Wind Tunnel Valve Control," *IEEE Transactions on Industrial Electronics*, Vol. 32, No. 1, pp. 71–77, February 1985.
18. Beale, G.O. and Bentley, S.E., "Parameter Estimation Using Microprocessors and Adaptive Random Search Optimization," *IEEE Transactions on Industrial Electronics*, Vol. 31, No. 1, pp. 85–89, February 1984.
19. Cook, G. and Beale, G.O., "Application of Least Squares Parameter Identification with Fixed-Length Data Window to the Steel Bending Process," *IEEE Transactions on Industrial Electronics*, Vol. 30, No. 4, pp. 334–339, November 1983.
20. Beale, G.O. and Cook, G., "Optimal Digital Simulation of Aircraft via Random Search Techniques," *AIAA Journal of Guidance and Control*, Vol. 1, pp. 237–241, July–August, 1978.
21. Beale, G.O. and Cook, G., "Frequency Domain Synthesis of Discrete Representations," *IEEE Transactions on Industrial Electronics and Control Instrumentation*, pp. 438–443, November 1976.

## Contributed Conference Papers:

1. Soucacos, P.P. and Beale, G.O., "Design of a Robust Reconfigurable Control Algorithm for Underwater Vehicles Experiencing Stern Plane Jams," *Proc. of American Control Conference*, June 14–16, 2006, Minneapolis, MN.
2. Shahid, M.Z., Soucacos, P.P., and Beale, G.O., "Fault Recovery in Underwater Vehicles Using Fully Automatic Reconfigurable Control," *Proc. of IEEE ISIE 2005*, June 20–23, 2005, pp. 87–93, Dubrovnik, Croatia.
3. Arteaga-Bravo, F.J., Contramestre, M.A., Vizcaya, M.A., and Beale, G.O., "Software Design for Simultaneous Stabilization with Multiple Bounded Domains using Factorization Approach," 4th Congress on Automation and Control, Merida, Venezuela, Nov. 12–14, 2003 (in Spanish).
4. Beale, G.O. and Shahid, M.Z., "Controller Reconfiguration for Stern Plane Jams in Underwater Vehicles," *Proc. of 11<sup>th</sup> Mediterranean Conference on Control and Automation*, June 18–20, 2003, Rhodes, GR.
5. Ammeen, E.S. and Beale, G.O. "Advanced Control System for Detection of and Recovery from Submarine Component Failures," *Proc. of 13<sup>th</sup> Ship Control Systems Symposium*, April 2003, Orlando, FL.
6. Beale, G.O. and Kim, J.H., "Fisher Discriminant Analysis and The  $T^2$  Statistic for Process Fault Detection and Classification," *Proc. of IEEE IECON '02*, November 5–8, 2002, Seville, Spain.
7. J.H. Kim and G.O. Beale, "Fault Detection and Classification for Underwater Vehicles with Quantification of Contributing Variables," *Proc. of 10<sup>th</sup> Mediterranean Conference on Control and Automation*, July 9–12, 2002, Lisbon, Portugal.
8. Arteaga-Bravo, F., Beale, G.O., and Montilla, O., "Multiple Bounded Domains for Simultaneous Stabilization: Interpolation Conditions for Two Plants," *Proc. of SIAM Conference on Linear Algebra in Signals, Systems and Control*, August 11–15, 2001, Boston, MA.
9. Kim, J.H. and Beale, G.O., "Fault Detection and Classification in Underwater Vehicles Using the  $T^2$  Statistic," *Proc. of 9<sup>th</sup> Mediterranean Conference on Control and Automation*, June 27–29, 2001, Dubrovnik, Croatia.
10. Vukić, Z., Borović, B., and Beale, G.O., "Trajectory Following Neuro Controller For Submarine Maneuvering in Horizontal and Vertical Planes," *Proc. of 9<sup>th</sup> Mediterranean Conference on Control and Automation*, June 27–29, 2001, Dubrovnik, Croatia.

11. Beale, G.O. and Kim, J., "A Robust Approach to Reconfigurable Control," *Proc. of 5th IFAC Conference on Maneuvering and Control of Marine Craft*, August 23–25, 2000, Aalborg, Denmark.
12. Montanaro, J.S. and Beale, G.O., "Feedback Control for Canceling Mechanical Vibrations," *Proc. of IEEE IECON '98*, pp. 1433–1438, August 31–September 4, 1998, Aachen, Germany.
13. Ammeen, E.S., Gibson, J.D., and Beale, G.O., "Robust Depth-Keeping by Means of Simultaneous Stabilization," *Proc. of 4th IFAC Conference on Maneuvering and Control of Marine Craft*, September 10–12, 1997, pp. 42–47, Brijuni, Croatia.
14. Gibson, J.D. and Beale, G.O., "Stabilizing a Nonlinear System Over a Range of Operating Points," *Proc. of 4th IFAC Conference on Maneuvering and Control of Marine Craft*, September 10–12, 1997, pp. 65–68, Brijuni, Croatia.
15. Ammeen, E.S. and Beale, G.O., "Fuzzy Depth Control for a Submersible Vehicle," *Proc. of IEEE ISIE '97*, Guimaraes, Portugal, pp. 1185–1190, July 7–11, 1997.
16. Gibson, J.D. and Beale, G.O., "Convex Parametrization for Bounded Domain Stabilization," *Proc. of KoREMA '96*, Opatija, Croatia, pp. 18–20, September 1996.
17. Beale, G.O. and Li, M., "Controller Robustness Analysis for Microwave Heating of Ceramics," *Proc. of KoREMA '96*, Opatija, Croatia, pp. 13–16, September 1996.
18. Arteaga-Bravo, F.J. and Beale, G.O., "Simultaneous Stabilization with Multiple Bounded Domains of Stability in Chemical Process Control," *Proc. of IEEE IECON '95*, pp. 830–835, Orlando, November 1995.
19. Li, M., Beale, G.O., and Tian, Y.L., "Automatic Control During Microwave Heating of Ceramics," *Proc. of Microwaves: Theory and Application in Materials Processing III*, American Ceramic Society, Cincinnati, May 1995.
20. Kyle, A.M.J. and Beale, G.O., "Transient Performance and the Gap Metric," *Proc. of 33rd IEEE Conference on Decision and Control*, pp. 2656–2658, Orlando, December 1994.
21. Li, M., Beale, G.O., and Black, W.M., "Feedback Control of Temperature Profiles During Microwave Joining of Ceramics," *Proc. of Spring Meeting of the Materials Research Society*, pp. 643–648, San Francisco, April 1994.
22. Beale, G.O. and Arteaga, F.J., "Automatic Controls to Prevent Thermal Runaway During Microwave Joining of Ceramics," *Proc. of Spring Meeting of the Materials Research Society*, pp. 265–270, San Francisco, April 1992.
23. Beale, G.O., "Utilization of the GAM-2 Pyramid for Real-Time Simulation," *Proc. of IEEE IECON '89*, pp. 389–394, Philadelphia, November 1989.
24. Waggener, M.S., Testa, F., and Beale, G.O., "A New Approach to Robot Kinematic Analysis," *Proc. of SME 1989 World Conference on Robotics Research*, pp. 4.29–4.38, Gaithersburg, May 1989.
25. Waggener, M.S., Testa, F., and Beale, G.O., "A New Solution Method for Robot Kinematic Equations," *Proc. of SME 1988 World Conference on Robotics Research*, June 1988.
26. Kharbanda, S., Brodersen, A., Bourne, J., Beale, G.O., and Ortega, J., "ADROIT - A Diagnostic Rule-Oriented Intelligent Tester," *Proc. of IEEE Southeastcon '88*, pp. 537–541, April 1988.
27. Hartley, T.T. and Beale, G.O., "Matrix Integrators for Real-Time Simulation," *Proc. of IEEE IECON '87 Topical Conference on Industrial Applications of Control and Simulation*, pp. 63–69, Cambridge, November 1987.
28. Kawamura, K., Beale, G.O., et al., "NESS: A Coupled Simulation Expert System," *Proc. of the ACM SIGART International Symposium on Methodologies for Intelligent Systems*, pp. 28–39, Knoxville, October 1986.

29. Goodman, H.D. and Beale, G.O., "A Multi-Microprocessor System for Real-Time Digital Simulation," *Proc. of IEEE IECON '86*, pp. 462–468, Milwaukee, October 1986.
30. Beale, G.O., "Adaptive Integration Operators for Real-Time Digital Simulation," *Proc. of IEEE IECON '85*, pp. 577–581, San Francisco, November 1985.
31. Arteaga, F.J., Cook, G., and Beale, G.O., "Computer Aided Digital Control Design Using Time-Domain Specifications," *Proc. of IEEE Southeastcon '85*, pp. 316–320, Raleigh, April 1985.
32. Beale, G.O. and Hartley, T.T., "Optimization of Discrete Transfer Functions for Real-Time Simulation," *Proc. of IEEE IECON '84*, pp. 943–947, Tokyo, October 1984.
33. Yen, K., Cook, G., and Beale, G.O., "A Comparison of Three Real-Time Digital Simulation Methods Using Multi-Rate Sampling," *Proc. of IEEE IECON '84*, Tokyo, pp. 948–950, October 1984.
34. Shepard, M.E., Beale, G.O., and Cook, G., "Optimal Discrete Transfer Functions Through Complex Curve Fitting," *Proc. of the 16th Southeastern Symposium on System Theory*, pp. 43–47, Mississippi State, March 1984.
35. Hartley, T.T. and Beale, G.O., "Dynamic System Modeling with Walsh Transforms," *Proc. of the 16th Southeastern Symposium on System Theory*, pp. 29–34, Mississippi State, March 1984.
36. Cook, G. and Beale, G.O., "Application of Least Squares Parameter Identification with Fixed-Length Data Window to the Steel Bending Process," *Proc. of Fall IEEE IECON '82*, Palo Alto, November 1982.

## Invited Conference Papers:

1. Soucacos, P.P. and Beale, G.O., "Robust Reconfigurable Control for Recovery from Stern and Bow Plane Jams in Underwater Vehicles," *Proc. of 14<sup>th</sup> Mediterranean Conference on Control and Automation*, IT, June 28–30, 2006, Ancona, IT.
2. Beale, G.O., Kim, J.H., and Shahid, Mian Z., "Active Fault Tolerant Control to Mitigate Faults Affecting Maneuvering of Underwater Vehicles," Invited Presentation at REDISCOVER 2004, Cavtat, Croatia, June 14–16, 2004.
3. Beale, G.O. and Kim, J.H. "Detection and Classification of Faults Affecting Maneuverability of Underwater Vehicles," *Proc. of IEEE IECON '03*, pp. 261–267, Roanoke, VA, November 2003.
4. Beale, G.O., Ammeen, E.S., and Gibson, J.D., "Effects of Random Sample Periods on Depth Control Performance and Stability Robustness," (plenary paper), *Proc. of 4th IFAC Conference on Maneuvering and Control of Marine Craft*, September 10–12, 1997, Brijuni, Croatia.
5. Beale, G.O. and Arteaga-Bravo, F.J., "Simultaneous Stabilization with Multiple Bounded Stability Domains," *Proc. of KoREMA '96*, pp. 1–7, Opatija, Croatia, September 1996 (selected to appear in *KoREMA Automatika* as an original scientific paper).
6. Li, M., Beale, G.O., Tian, Y.L., and Black, W.M., "Modeling and Control for Microwave Heating of Ceramics," *Proc. of American Control Conference*, pp. 1235–1239, Seattle, June 1995.
7. Beale, G.O. and Langford, C.G., "Partitioning of Simulation Computations on a Pyramid Architecture," *Proc. of First Inter-American Engineering Conference*, pp. 164–173, Miami, December 1990.
8. Beale, G.O., "A Study of Real-Time Simulation on the GAM Pyramid," *Proc. of Nineteenth Annual Pittsburgh Conference on Modeling and Simulation*, pp. 1875–1881, Pittsburgh, May 1988.
9. DeAbreu, A., Hartley, T.T., and Beale, G.O., "Matrix Multistep Methods," *Proc. of Nineteenth Annual Pittsburgh Conference on Modeling and Simulation*, pp. 1699–1704, Pittsburgh, May 1988.



10. Beale, G.O., "Maintaining Simulation Stability Through Adaptation," *Proc. of IEEE IECON '86*, pp. 481–485, Milwaukee, October 1986.
11. Kawamura, K., Beale, G.O., et al., "Coupling Expert Systems and Simulation," *Proc. of the Conference on Artificial Intelligence for Space Applications*, Huntsville, October 1986.
12. Beale, G.O., "Adaptive Integration Algorithms for Simulating Nonlinear Systems," *Proc. of Seventeenth Annual Pittsburgh Conference on Modeling and Simulation*, pp. 965–972, Pittsburgh, April 1986.
13. Kawamura, K., Beale, G.O., et al., "Development of a Coupled Expert System for Spacecraft Attitude Control Problems," presented at *Workshop on Coupling Symbolic and Numerical Computing in Expert Systems*, Bellevue, August 1985.
14. Beale, G.O. and Vogt, S.M., "Microprocessor-Based Automation of a Production Welding Process," presented at *IEEE 28th NCSE*, Greensboro, November 1983.
15. Bentley, S.E. and Beale, G.O., "Identification and Improved Control of GTAW Voltages Utilizing Digital Series Compensation," *Proc. of IEEE 19th Conference on Decision and Control*, pp. 1050–1057, Albuquerque, December 1980.
16. Beale, G.O. and Cook, G., "Digital Simulation and Optimization via Random Search Techniques," *Proc. of IMACS International Symposium on Simulation Software and Numerical Methods for Differential Equations*, pp. 13–18, Blacksburg, March 1977.

## Book and Book Chapters:

1. Hartley, T.T., Beale, G.O., and Chicatelli, S.P, *Digital Simulation of Dynamic Systems: A Control Theory Approach*, Prentice Hall, 1994.
2. Beale, G.O., "Control System Modeling and Simulation," in *Encyclopedia of Science and Technology*, 7th Edition, pp. 379–381, McGraw-Hill, New York, 1992.
3. Beale, G.O. and Kawamura, K., "Coupling Symbolic and Numerical Computation for Intelligent Simulation," in *Knowledge-Based Approach to System Diagnosis, Supervision, and Control*, edited by S. Tzafestas, pp. 137–152, Plenum Press, New York, 1989.
4. Kawamura, K., Beale, G.O., et al., "Development of a Coupled Expert System for Spacecraft Attitude Control Problems," in *Coupling Symbolic and Numerical Computing in Expert Systems*, edited by J.S. Kowalik, North-Holland, Amsterdam, 1986.

## Workshops and Tutorials:

1. Tutorial on "Theory and Applications of Kalman Filtering," Naval Surface Warfare Center, Carderock Division, April 16–17, 2008, Bethesda, MD.
2. Tutorial on "Adaptive and Robust Control," (with Prof. Zoran Vukić), IEEE SoutheastCon 2000, April 7, 2000, Nashville, TN.
3. Workshop on "Theory and Applications of Kalman Filtering," (with Dr. Gerald Cook), NASA Goddard Space Flight Center, July 13–16, 1993, Greenbelt, MD.
4. Tutorial on "Intelligent Control System Design and Analysis," (with Mr. Charles Buenzli), 1986 American Control Conference, June 16, 1986, Seattle, WA.
5. Tutorial on "Industrial Applications of Expert Systems," (with Mr. Charles Buenzli), IEEE IECON '85, November 22, 1985, San Francisco, CA.

6. Tutorial on “Industrial Applications of Expert Systems,” (with Professors Bourne and Kawamura), Vanderbilt University Continuing Engineering Education Program, May 2–4, 1984, Nashville, TN.

## Teaching Responsibilities and Achievements:

- Awards
  - Tau Beta Pi Teaching Excellence Award, Vanderbilt University, 1982/83
- Types of Courses Taught
  - Undergraduate Courses  
Classical Automatic Control, Signals and Systems, Introductory Digital Electronics, Advanced Digital Electronics, Microprocessors, Introductory Analog Electronics, Introduction to Electrical Engineering.
  - Graduate Courses  
Modern Control, Optimal Control, Adaptive Control, Computer Control, Digital Simulation Methodology, State Estimation and Stochastic Control, Nonlinear Control, Multivariable and Robust Control, Robust Control via Simultaneous Stabilization, and Robust Control via Polynomial Analysis
- Courses Developed
  - Developed a two-semester sequence of undergraduate signals and systems courses from the previous one-semester course. Rewrote all the Control Systems Laboratory experiments.
  - Introduced graduate-level courses in Multivariable and Robust Control (ECE 720), Robust Control via Simultaneous Stabilization (taught as INFT 940), Robust Control via Polynomial Analysis (taught as INFT 940), and Digital Simulation Methodology (taught as ECE 590).

## Professional and Honor Societies:

Senior Life Member, Institute of Electrical and Electronics Engineers; Member, Eta Kappa Nu, Society of the Sigma Xi, and American Society of Engineering Education; Listed in Who’s Who in the South and Southwest, Who’s Who in Science and Engineering, Who’s Who in American Education, American Men and Women of Science, and Who’s Who in Technology Today.

## General Service:

- Reviewer for:  
IEEE Trans. on Automatic Control, IFAC Control Engineering Practice, IEEE Trans. on Industrial Electronics, IEEE Trans. on Education, IEEE Trans. on Systems, Man, and Cybernetics, IEEE Micro Magazine, Automatica, C-TAT, McGraw-Hill, Trans. of Society for Computer Simulation, PWS-Kent Publishing, Macmillan Publishing, John Wiley & Sons, IEEE RIG proposals, Prentice Hall, NSF grant proposals.
- University Service at George Mason University
  - Faculty Advisor, IEEE Student Branch, 2004–2006
  - ECE Graduate Program Coordinator, 5/1988–9/1990 and 8/1999–6/2003

- Chairman, ECE Grievance Committee, 5/1992–9/1998 and 9/2003–6/2006
  - Chairman, Graduate School Student Appeals Committee 9/1990–5/1993 (Committee member 9/1987–8/1990)
  - ECE Undergraduate Curriculum Committee, 9/1990–8/1998
  - University General Education Task Force, 9/1987–12/1990
  - University Curriculum Matters Committee, 9/1987–5/1989
- Faculty Advisor, Eta Kappa Nu Electrical Engineering honor society, Vanderbilt University, 1985/86

## Other Professional Activities:

- Consultant to:
  - Sverdrup Technology, Inc., Tullahoma, TN, 1982–1983
  - The Babcock & Wilcox Company, Naval Nuclear Fuel Division, Lynchburg, VA, 1982–1983
  - Merrick Engineering, Nashville, TN, 1984
  - Vanderbilt University Medical Center, Anesthesiology Department, Nashville, TN, 1984–1985
  - Advanced Control Technologies, Inc., Nashville, TN, 1987–1988.
  - Naval Surface Warfare Center, Carderock Division (formerly David Taylor Research Center), Carderock, MD, 1987–2009.
  - John Wiley & Sons, Inc., New York, NY, 1989.
  - Institute for Defense Analysis, Alexandria, VA, 2002.
  - QSS Group, Inc., NASA Glenn Research Center, Cleveland, OH, 2004.
  - LT Technologies LLC, Chantilly, VA, 2006–2009.
- IEEE Industrial Electronics Society
  - Administrative
    - Chairman, Membership and Publicity, 1983
    - Member, Administrative Committee, 1984–1990, 1997–2004
    - Senior Member, Administrative Committee, 2005–Present
    - Vice President for Technical Activities, 1986–1989
  - Committees
    - Representative to IEEE R&D Committee, 1981–1982, 1987
    - Member, Microprocessor Applications Technical Committee, 1980–1982
    - Tech. Comm. Chair/Assoc. Trans. Editor for Automatic Inspection and Testing, 1982–1985
  - Conferences
    - Assistant Technical Program Chairman, IECON '85, San Francisco
    - Technical Program Chairman, IECON '86, Milwaukee
    - General Chairman, IECON '87, Cambridge, MA