

Douglas G. MacMynowski

(formerly MacMartin)

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Research Interests

Interdisciplinary application of feedback analysis and control tools to research problems in large scale distributed dynamic systems. My current research is in two main areas: in climate dynamics, including geengineering and climate variability, and in modeling and control design for the Thirty Meter Telescope project.

Education

- Ph.D. (1992) Massachusetts Institute of Technology, Dept. of Aeronautics and Astronautics. Major in controls; minor structural dynamics. Thesis topic: "A Stochastic Approach to Broadband Control of Parametrically Uncertain Structures".
- S.M. (1990) Massachusetts Institute of Technology, Dept. of Aeronautics and Astronautics.
- B.A.Sc. (1987) University of Toronto, Engineering Science, Aerospace option.

Professional Experience

- 2008-present Senior Research Associate, Department of Control and Dynamical Systems, California Institute of Technology, and visiting investigator, Carnegie Institute; also guest researcher at Lund University Dept of Astronomy (2010).
- 2006 Visiting Scientist, University of New South Wales and University of Adelaide
- 2002-2008 Senior Research Fellow, Dept. Control & Dynamical Systems, Caltech.
- 2000-2002 Visiting Associate, Dept. Control & Dynamical Systems, Caltech.
- 1994-2000 Flow Control Program Manager (99-00), Active Control Theme Leader (96-99), and Senior Research Engineer (94-96), United Technologies Research Center.
- 1993-1994 Assistant Research Officer, National Research Council of Canada.
- 1992-1993 Postdoctoral Fellow, Dept. of Aeronautics and Astronautics, MIT.
- 1987-1992 Research Assistant, Dept. of Aeronautics and Astronautics, MIT.

Professional Service

- Senior member, AIAA. Member American Geophysical Union (AGU).
- Co-organizer of "*Climate Feedbacks and Climate Dynamics*", 2004 AGU fall meeting.
- Member, AIAA Fluid Dynamics Technical Committee 2002-2006, member of Flow Control Architecture and Algorithms sub-committee, and lead editor of document clarifying flow control nomenclature to improve communications between fluids and control researchers.
- Treasurer, AIAA Guidance, Navigation and Control Technical Committee, 1998-2004.
- Area chair for "Control and Dynamics of Flexible Structures" for the AIAA Guidance, Navigation and Control Conference, 2001 and 2002 and co-chair/chair for "Multidisciplinary Control", 2003 and 2004.

- Reviewer for AIAA Journal, AIAA J. Aircraft, AIAA JGCD, AIAA JPP, AHS Journal, ASME JDSMC, CASI Journal, EJC, IEEE CST, IEEE TAC, IJRNC, JIMSS, JOSA(A), JSV, OCAM, SIAM JAM, TCFD, Climatic Change.
- External review panel member for JPL SMAP dynamics (Soil Moisture Active & Passive mission), and for ESO E-ELT (European Extremely Large Telescope) construction proposal.

Honours and Awards

- Guest researcher, Lund University, Dept Astronomy, 2010.
- UTRC Leadership Council, 1996-2000.
- UTRC Outstanding Achievement Awards for technical contributions in helicopter cabin active noise control for laboratory demonstration and successful flight test, 1994 and 1996.
- NASA Certificate of Appreciation for support of the development and flight of the Middeck Active Control Experiment, 1995
- Barbara Zdasiuk Medal for highest graduating average in Eng. Science, U. Toronto, 1987.
- Canadian Aeronautics and Space Institute (CASI) student award, Toronto branch, 1987.

Recent Research Support

- *Monitoring of geo-engineering effects and their Natural and anthropogenic analogues*, (KISS study program), 2011-2012
- *Improving Interannual Prediction Skill in a Changing Climate via the Identification of Compensating Coupled Model Error* (DOE), 2011-2013. (With Eli Tziperman, Harvard.)
- *Geoengineering Controllability* (private donor), 2008-2011.
- *Closed Loop Control of Vortex Formation* (AFOSR MURI), 2005-2010. PI: Tim Colonius, joint between Caltech, Princeton, Northeastern, IIT.
- *Climate: Complex system, simple behavior* (McDonnell fndn), 2003-2007. (w/ E. Tziperman)
- *Design Development* (2004-2009) and *Early Construction* (2009-2011) of TMT (Moore fndn).
- *Conceptual design of the California Extremely Large Telescope* (Caltech Board of Directors), 2000-2003.
- *Integrated Control of Inlet/Compression Systems, & Actively Stabilized Isentropic Supersonic Inlet* (DARPA Micro-Adaptive Flow Control and Quiet Supersonic Platform projects), 2000-2002. Joint project between MIT, Caltech, NASA Glenn, and Northrop Grumman.
- UTRC funding: DARPA (separation control), National Rotorcraft Tech. Center and Sikorsky (noise control), Pratt & Whitney (externals & controls management, eddy current inspection), and internal UTRC (active control leadership, flow control, noise control).

Consulting

- CSA Eng. (2008-09) aeroservoelasticity, (2003-04), wind-turbine vibration/noise control
- UTRC (2001-02), helicopter active noise control

Teaching

- CDS 110a/101 (2009-11; co-instructor, 2003, 2008), *Analysis and Design of Feedback Systems*; undergraduate/graduate 1st quarter introductory controls.
- CDS 110b (2004-05, 2009-11) *Introduction to Control Theory*; undergraduate/graduate 2nd quarter controls class covering estimation, optimal control, and robustness.
- CDS 111 (2001-2004) *Applications of Control*; undergraduate/graduate class focused on laboratory implementation of control designs.
- Ae240 (co-instructor, 2009) *Closed-loop Flow Control*

Publications

Patents:

- P1. Welsh, W. A., MacMartin, D. G., Finn, A. M.; “System for computationally efficient active control of tonal sound or vibration”, US Patent 7,224,807, May 29, 2007.
- P2. Millott, T. A., MacMartin, D. G., Goodman, R. K., Fuller, J. W.; “Computationally efficient means for optimal control with control constraints”, US Patent 7,197,147, Mar 27, 2007.
- P3. MacMartin, D. G., Welsh, W. A., Fuller, J. W.; “System for computationally efficient adaptation of active control of sound or vibration”, United States Patent 7,003,380, Feb. 21, 2006.
- P4. Millott, T. A., MacMartin, D. G., Park, C. G., “Adaptation performance improvements for active control of sound or vibration”, (continuation) US Patent 6,856,920, Feb 15, 2005.
- P5. Millott, T. A., MacMartin, D. G., Park, C. G., “Adaptation performance improvements for active control of sound or vibration”, US Patent 6,772,074 Aug. 3, 2004.

Book Chapters:

- B1. MacMynowski, D.G. and D. Williams, “Flow Control Terminology”, *Fundamentals and Applications of Modern Flow Control, (Chapter 3)* AIAA, 2009.
- B2. Williams, D. and MacMynowski, D. G., “A Brief History of Flow Control”, *Fundamentals and Applications of Modern Flow Control, (Chapter 1)* AIAA, 2009.

Journal Articles:

- J1. Heimsten, R., MacMynowski, D. G., Andersen, T. and Owner-Peterson, M., “Concept, modeling, and performance prediction of a low-cost large deformable mirror”, *submitted, Applied Optics*, 2011.
- J2. MacMynowski, D. G., “Control of a “hyper-segmented” space telescope”, *submitted, AIAA J. Guidance, Control and Dynamics*, 2011.
- J3. MacMynowski, D. G. and Tziperman, E., “Using transfer functions to quantify ENSO dynamics in data and models”, *submitted, Philosophical Transactions of the Royal Society A*, 2011.
- J4. Carson III, J. M., Açikmeşe, B., Murray, R. M., and MacMynowski, D. G., “A Robust Nonlinear Model Predictive Control Algorithm Augmented with a Safety Mode”, *submitted, Automatica*, 2010.
- J5. MacMynowski, D. G., Shin, H.-J., Caldeira, K., and Keith, D., “Can we test geoengineering?” *to appear, R.S.C. J. Energy & Environmental Science*, 2011.
- J6. Heimsten, R. Owner-Peterson, M., Ruppel T., MacMynowski, D. G. and Andersen, T., “Suppressing low-order eigenmodes with local control for deformable mirrors”, *to appear, Optical Engineering*, 2011.
- J7. MacMynowski, D. G., Shin, H.-J., and Caldeira, K., “The frequency response of temperature and precipitation in a climate model” *Geophysical Research Letters*, 38, L16711, 2011. (doi:10.1029/2011GL048623)
- J8. MacMynowski, D. G., Heimsten, R., and Andersen, T. “Distributed force control of deformable mirrors”, *European J. Control*, Vol. 17, No. 3, pp. 249-260, 2011.
- J9. Joe, W. T., Colonius, T., and MacMynowski, D. G., “Feedback control of vortex shedding from an inclined flat plate”, *Theoretical and Computational Fluid Dynamics*, 25, 2011. (doi:10.1007/s00162-010-0204-8).
- J10. MacMynowski, D. G. and Tziperman, E., “Testing and improving ENSO models by process using transfer functions”, *Geophysical Research Letters*, 37, L19701, 2010. (doi:10.1029/2010GL044050).

- J11. MacMynowski, D. G. and Andersen, T., "Wind buffeting of large telescopes", *Applied Optics*, **49**(4), pp. 625-636, 2010. (doi:10.1364/AO.49.000625)
- J12. MacMynowski, D. G. "Can we control El Niño?" *Environmental Research Letters*, **4**, 2009.
- J13. MacMynowski, D.G., "Interaction matrix uncertainty in active (and adaptive) optics", *Applied Optics*, Vol. 48, No. 11, pp. 2105-2114, 2009.
- J14. Lessard, L. A., D. G. MacMynowski, M. West, A. Bouchez, and S. Lall, "Experimental validation of single-iteration multigrid wavefront reconstruction at the Palomar Observatory", *Optics Letters*, Vol. 33, No 18, pp 2047-2049, 2008.
- J15. Lessard, L. A., M. West, D. G. MacMynowski and S. Lall, "Warm-started wavefront reconstruction for adaptive optics", *J. Optical Society of America (A)*, Vol. 25, No. 5, pp. 1147-1155, 2008.
- J16. MacMynowski, D.G. and E. Tziperman, "Factors affecting ENSO's Period", *J. Atmospheric Sciences*, Vol. 65, No. 5, pp. 1570-1586, 2008.
- J17. MacMynowski, D. G. and E. Tziperman, "Two-Way Feedback Interaction between the Thermohaline and Wind-Driven Circulations", *J. Physical Oceanography*, Vol. 36, No. 5, pp. 914-929, 2006.
- J18. MacMynowski, D. G., K. Vogiatzis, G. Z. Angeli, J. Fitzsimmons, and J. E. Nelson, "Wind Loads on Ground-Based Telescopes", *Applied Optics*, Vol. 45, No. 30, pp. 7912-7923, 2006.
- J19. Pottebaum, T. and MacMynowski, D. G., "Buffeting of Large Telescopes: Wind Tunnel Measurements of Flow in a Generic Enclosure", *J. Fluids and Structures*, Vol. 22, 2006, pp. 3-19.
- J20. Rowley, C. W., D. R. Williams, T. Colonius, R. M. Murray, and D. G. MacMynowski, "Linear Models for Control of Cavity Flow Oscillations", *J. Fluid Mech.* Vol. 547, 2006, pp. 317-330.
- J21. MacMynowski, D. G., "Hierarchic Estimation for Control of Segmented-Mirror Telescopes", *AIAA J. Guidance, Control and Dynamics*, Vol. 28, No. 5, Sept.-Oct. 2005.
- J22. MacMartin, D. G. "Dynamics and Control of Shock Motion in a Near-Isentropic Inlet", *AIAA J. Aircraft*, Vol. 41, No. 4, July-Aug. 2004, pp. 846-853.
- J23. Chanan, G., MacMartin, D. G., Nelson, J., and Mast, T., "Control and Alignment of Segmented-Mirror Telescopes: Matrices, Modes and Error Propagation", *Applied Optics*, Vol. 43, No. 6, February 2004, pp. 1223-1232.
- J24. MacMartin, D. G. and Chanan, G., "Measurement Accuracy in Control of Segmented-Mirror Telescopes", *Applied Optics*, Vol. 43, No. 3, January 2004, pp. 608-615.
- J25. MacMartin, D. G., "Local, Hierarchic, and Iterative Reconstructors for Adaptive Optics", *J. of the Optical Society of America (A)*, Vol. 20, No. 6, June 2003, pp. 1084-1093.
- J26. MacMartin, D. G., "Collocated Structural Control for Reduction of Aircraft Cabin Noise," *Journal of Sound and Vibration*, Vol. 190, No. 1, 1996, pp. 105-119.
- J27. MacMartin, D. G., Basso, G. L., and Slingerland, F. W., "Aircraft Fuselage Noise Transmission Measurements using a Reciprocity Technique," *Journal of Sound and Vibration*, Vol. 187, No. 3, 1995, pp. 467-483.
- J28. Grocott, S. C. O., How, J. P., Miller, D. W., MacMartin, D. G., and Liu, K., "Robust Control Design and Implementation on the Middeck Active Control Experiment," *AIAA Journal of Guidance, Control, and Dynamics*, Vol. 17, No. 6, Nov.-Dec. 1994, pp. 1163-1170.
- J29. MacMartin, D. G. and Hall, S. R., "Broadband Control of Flexible Structures using Statistical Energy Analysis Concepts," *AIAA Journal of Guidance, Control and Dynamic*, Vol. 17, No. 2, March-April 1994, pp. 361-369.
- J30. Hall, S. R., MacMartin, D. G., and Bernstein, D. S., "Covariance Averaging in the Analysis of Uncertain Systems," *IEEE Trans. on Automatic Control*, Vol. 38, No. 12, Dec. 1993, pp. 1858-1862.

- J31. MacMartin, D. G. and Hall, S. R., "Structural Control Experiments using an H_∞ Power Flow Approach," *Journal of Sound and Vibration*, Vol. 148, No. 2, July 1991, pp. 223-241.
- J32. MacMartin, D. G. and Hall, S. R., "Control of Uncertain Structures using an H_∞ Power Flow Approach," *AIAA J. Guidance, Control, and Dynamics*, Vol. 14, No. 3, May-June 1991, pp. 521-530.

Conference Papers:

- C1. MacMynowski, D.G., P.M. Thompson, J. C. Shelton, L.C. Roberts, Jr., M. M. Colavita, and M. J. Sirota, "Control system modeling for the Thirty Meter Telescope primary mirror", SPIE 2011.
- C2. MacMynowski, D. G. and M. Björklund, "Large Aperture Segmented Space Telescope (LASST): Can we control a 12000 segment mirror?", *American Control Conference*, 2011.
- C3. MacMynowski, D. G., "Controlling Chaos in El Niño", *American Control Conference*, 2010.
- C4. MacMynowski, D. G., Colavita, M. M., Skidmore, W., and Vogiatzis, K., "Primary mirror dynamic disturbance models for TMT: Vibration and wind", *SPIE 7738, Modeling, Systems Engineering, and Project Management for Astronomy IV*, 2010.
- C5. MacMynowski, D. G., Thompson, P. T., Shelton, C., and L. C. Roberts, Jr., "Robustness of the Thirty Meter Telescope primary mirror control system", *SPIE 7733, Ground-based and Airborne Telescopes III*, 2010.
- C6. Thompson, P. T., MacMynowski, D. G., Regehr, M. W., Colavita, M. M., and Sirota, M. J., "Servo design and analysis for the Thirty Meter Telescope primary mirror actuators", *SPIE 7733, Ground-based and Airborne Telescopes III*, 2010.
- C7. Heimsten, R., MacMynowski, D. G., and Andersen, T., "Progress Developing of a Low-Cost Large Deformable Mirror", *SPIE 7736, Adaptive Optics Systems II*, 2010.
- C8. Joe, W. T., Colonius, T. and MacMynowski, D. G. "Optimized waveforms for feedback control of vortex shedding", *Active Flow Control II*, (Springer Berlin/Heidelberg) pp. 391-404. 2010.
- C9. Keas, P. and MacMynowski, D. G. "Adaptive spatial filtering for aeroservoelastic response suppression", *invited paper, AIAA Atmospheric Flight Mechanics Conf.*, 2009. AIAA 2009-5709.
- C10. Joe, W. T., Colonius, T., and MacMynowski, D. G., "Optimized control of vortex shedding from an inclined flat plate", *AIAA Fluid Dynamics Conf.*, 2009. AIAA 2009-4027.
- C11. Seo, B.-Y., Nissly, C., Angeli, G., MacMynowski, D., Sigrist, N., Troy, M., and Williams, E., "Investigation of Primary Mirror Segment's residual errors for the Thirty Meter Telescope", *SPIE 7427, Optical Modeling and Performance Predictions IV*, 2009.
- C12. MacMynowski, D. G., Thompson, P. M. and Sirota, M. J., "Control of many coupled oscillators and application to segmented-mirror telescopes", *AIAA Guidance, Navigation & Control Conf.*, 2008. AIAA-2008-6638.
- C13. Carson III, J. M., Açıkmese, B., Murray, R. M., and MacMynowski, D. G., "A Robust Model Predictive Control Algorithm with a Safety Mode for Small-Body Proximity Operations", *AIAA Guidance, Navigation & Control, Conference*, 2008. AIAA 2008-7243.
- C14. MacMynowski, D. G. and E. Tziperman, "Applying engineering feedback analysis tools to climate dynamics", *American Control Conference*, 2008.
- C15. Carson III, J. M., Açıkmese, B., Murray, R. M., and MacMynowski, D. G., "A Robust Nonlinear Model Predictive Control Algorithm with a Safety Mode", *IFAC*, 2008.
- C16. MacMynowski, D.G., Blaurock, C. and Angeli, G.Z., "Dynamic Analysis of TMT", *SPIE Modeling, Systems Engineering and Project Management for Astronomy III*, 2008. SPIE 7017-31.

- C17. MacMynowski, D. G., Thompson, P. M. and Sirota, M. J., "Analysis of TMT Primary Mirror Control-Structure Interaction", *SPIE Modeling, Systems Engineering and Project Management for Astronomy III*, 2008. SPIE 7017-41.
- C18. Thompson, P. M., MacMynowski, D. G., and Sirota, M. J., "Control Analysis of TMT Primary Segment Assembly", *SPIE Ground Based and Airborne Telescopes*, 2008. SPIE 7012-58.
- C19. Thompson, P. M., MacMynowski, D. G., and Sirota, M. J., "Analysis of TMT Mount Control System", *SPIE Ground Based and Airborne Telescopes*, 2008. SPIE 7012-60.
- C20. Szeto, K. *et al.*, "TMT Telescope Structure System: design and development progress report", *SPIE Ground Based and Airborne Telescopes*, 2008. SPIE 7012-88.
- C21. Shagal, G., MacMynowski, D.G., and Vogiatzis, K., "Finite Element Analysis of TMT Vibrations Transmitted through Telescope-Enclosure-Soil Interaction", *SPIE Modeling, Systems Engineering and Project Management for Astronomy III*, 2008. SPIE 7017-73.
- C22. Joe, W. T., Taira, K., Colonius, T., MacMynowski, D. G., and Tadmor, G. "Closed-loop control of vortex shedding on a two-dimensional flat-plate airfoil at a low Reynolds number", *AIAA Aerospace Sciences Conference*, 2008. AIAA 2008-634.
- C23. Carson III, J. M., Epstein, M. S., MacMynowski, D. G. and Murray, R. M., "Optimal Nonlinear Guidance with Inner-Loop Feedback for Hypersonic Re-entry", *American Control Conference*, 2006.
- C24. MacMynowski, D. G., Blaurock, C., Angeli, G. Z. and K. Vogiatzis, "Modeling wind-buffeting of the Thirty Meter Telescope", *SPIE Modeling, Systems Engineering and Project Management for Astronomy II*, May 2006. SPIE 6271-25.
- C25. MacMynowski, D. G., Blaurock, C., and Angeli, G. Z., "Initial Control Results for the Thirty Meter Telescope", *AIAA Guidance, Navigation and Control Conference*, Aug 2005. AIAA 2005-6075
- C26. MacMynowski, D. G., Angeli, G. Z., Vogiatzis, K., Fitzsimmons, J., Padin, S., "Parametric modeling and control of telescope wind-induced vibration", *SPIE Modeling and Systems Engineering for Astronomy*, June 2004, pp. 266-277. SPIE 5497-26.
- C27. Pottebaum, T. S. and MacMynowski, D. G., "Wind tunnel testing of a generic telescope enclosure", *SPIE Astronomical Structures and Mechanisms Technology*, June 2004. SPIE 5495-30.
- C28. Angeli, G.Z., S. Roberts, D. G. MacMynowski, J. Fitzsimmons, J. Dunn and K. Vogiatzis, "Modeling tools to estimate the performance of the Thirty Meter Telescope", *SPIE Modeling and Systems Engineering for Astronomy*, June 2004. SPIE 5497-24.
- C29. Suzuki, T., Colonius, T., and MacMartin, D. G., "Closed-Loop Control of Vortex Shedding in a Separated Diffuser using an Inverse Method", *AIAA Aerospace Sciences Conference*, Jan 2004. AIAA-2004-0577.
- C30. Suzuki, T., Colonius, T., and MacMartin, D. G., "Inverse Technique for Vortex Imaging and its Application to Feedback Flow Control", *33rd AIAA Fluid Dynamics Conference*, June 2003. AIAA-2003-4260.
- C31. Feakins, S. H., MacMartin, D. G., and Murray, R. M., "Dynamic Separation Control in a Low-Speed Diffuser with Varying Downstream Boundary Condition", *33rd AIAA Fluid Dynamics Conference*, June 2003. AIAA-2003-4161.
- C32. MacMartin, D. G., "Control Challenges for Extremely Large Telescopes", *SPIE Commercial and Industrial Applications of Smart Structures*, March 2003. (5054-32).
- C33. MacMartin, D. G. and Chanan, G., "Control of the California Extremely Large Telescope Primary Mirror", *SPIE Astronomical Telescopes and Instrumentation*, August 2002. (4840-17).
- C34. Shi, F., MacMartin, D. G., Troy, M., Brack, G.L., Burruss, R. S. and Dekany, R. G., "Sparse Matrix Wavefront Reconstruction: Simulations and Experiments", *SPIE Astronomical Telescopes and Instrumentation*, August 2002. (4839-119).

- C35. Dekany R., Padin, S., MacMartin, D., Chanan, G. and Troy, M., "Advanced Segmented Silicon Space Telescope (ASSiST)", *SPIE Astronomical Telescopes and Instrumentation*, August 2002.
- C36. MacMartin, D. G., "Local and Hierarchic Control for Active and Adaptive Optics," *AIAA Guidance, Navigation, and Control Conference*, Monterey, CA, Aug 2002.
- C37. MacMartin, D. G., "Dynamics and Control of Shock Motion in a Near-Isentropic Inlet," 1st *AIAA Flow Control Conference*, June 2002. AIAA 2002-2943.
- C38. Warfield, Z., Paduano, J., MacMartin, D., "Stall Margin Improvement using Feedback Control to Mitigate Inlet Distortion Unsteadiness," *AIAA Flow Control Conference*, June 2002.
- C39. Rowley, C.W., Williams, D.R., Colonius, T., Murray, R.M., MacMartin, D.G. and Fabris, D., "Model-Based Control of Cavity Oscillations, Part II: System Identification and Analysis," *AIAA Aerospace Sciences Conference*, Reno, NV, Jan 2002. AIAA 2002-0972.
- C40. Williams, D.R., Rowley, C.W., Colonius, T., Murray, R.M., MacMartin, D.G., Fabris, D. and Albertson, J., "Model-Based Control of Cavity Oscillations, Part I: Experiments," *AIAA Aerospace Sciences Conference*, Reno, NV, Jan 2002. AIAA 2002-0971.
- C41. MacMartin, D.G., Mast, T.S., Chanan, G., and Nelson, J.E., "Active Control Issues for the California Extremely Large Telescope," *AIAA Guidance Navigation and Control Conference*, 2001. AIAA 2001-4035.
- C42. MacMartin, D.G., Verma, A. Murray, R.M. and Paduano, J.D., "Active Control of Integrated Inlet/Compression Systems: Initial Results", *ASME Fluids Engineering Division Summer Meeting*, New Orleans, May 2001. ASME FEDSM2001-18275.
- C43. McCormick, D.C., Lozyniak, S., MacMartin, D.G., and Lorber, P.F., "Compact High Power Boundary Layer Separation Control Actuation Development", *ASME Fluids Engineering Division Summer Meeting*, New Orleans, May 2001. ASME FEDSM2001-18279.
- C44. Lord, W., MacMartin, D.G., and Tillman, T.G., "Flow Control Opportunities in Gas Turbine Engines", *Fluids 2000*, Denver, CO, June 2000. AIAA Paper 2000-2234.
- C45. Lorber, P., McCormick, D., Anderson, T., Wake, B., MacMartin, D., Pollack, M., Corke, T., Breuer, K., "Rotorcraft Retreating Blade Stall Control," *Fluids 2000*, June 2000. AIAA Paper 2000-2475.
- C46. Millott, T. A., Welsh, W. A., Yoerkie, C. A. Jr., MacMartin, D. G., and Davis, M. W., "Flight Test of Active Gear-Mesh Noise Control on an S-76," *American Helicopter Society 54th Annual Forum*, Washington, DC, May 1998.
- C47. MacMartin, D. G., Davis, M. W., Yoerkie, C. A. Jr., and Welsh, W. A., "Helicopter Gear-Mesh ANC Concept Demonstration," *Active '97*, Budapest, Hungary, Aug. 1997.
- C48. MacMartin, D. G., "Collocated Structural Control: Motivation and Methodology," *IEEE Conference on Control Applications*, Albany, NY, Sept. 1995.
- C49. MacMartin, D. G. and How, J. P., "Implementation and Prevention of Unstable Optimal Compensators," *American Control Conference*, Baltimore, MD, June 1994, pp. 2190-2195.
- C50. MacMartin, D. G., "A Feedback Perspective on the LMS Disturbance Feedforward Algorithm," *American Control Conference*, Baltimore, MD, June 1994, pp. 1632-1636.
- C51. MacMartin, D. G., "Piezoelectric Control of Aircraft Cabin Noise," *Third International Congress on Air- and Structure-Borne Noise*, Montreal, Canada, June 1994, pp. 1269-1274.
- C52. MacMartin, D. G., Basso, G., and Leigh, B., "Reduction of Internal Noise in Turboprop Aircraft," in *78th Structures and Materials Panel Meeting, Specialist's Meeting on Impact of Acoustic Loads on Aircraft Structures*, Lillehammer, Norway, AGARD, May 1994, pp. 21- 1-9. AGARD-CP-549.
- C53. MacMartin, D. G. and Hall, S. R., "Broadband Structural Control using Statistical Energy Analysis Concepts," *American Control Conference*, San Francisco, CA, June 1993, pp. 997-1002.

- C54. MacMartin, D. G. and Miller, D. W., "MIT Middeck Active Control Experiment (MACE): Non-collocated payload pointing control," *1993 SPIE North American Conference on Smart Structures and Materials*, Albuquerque, NM, Feb. 1993. (Paper # SPIE 1917-47).
- C55. Hall, S. R., MacMartin, D. G., and Bernstein, D. S., "Covariance Averaging in the Analysis of Uncertain Systems," *IEEE Conference on Decision and Control*, Dec. 1992, pp. 1842-1849.
- C56. Grocott, S. C. O., MacMartin, D. G., and Miller, D. W., "Experimental Implementation of a Multiple Model Technique for Robust Control of the MACE Test Article," *Third International Conference on Adaptive Structures*, San Diego, CA, Nov. 1992.
- C57. MacMartin, D. G., Hall, S. R., and Bernstein, D. S., "Fixed Order Multi-Model Estimation and Control," *American Control Conference*, Boston, MA, June 1991, pp. 2113-2118.
- C58. MacMartin, D. G., Miller, D. W., and Hall, S. R., "Structural Control using Active Broadband Impedance Matching," *Recent Advances in Active Control of Sound and Vibration*, Apr. 1991, pp. 604-617.
- C59. MacMartin, D. G., Hall, S. R., and Mustafa, D., "On a Cost Functional for H_2/H_∞ Minimization," *IEEE Conference on Decision and Control*, Dec. 1990, pp. 1010-1012.
- C60. MacMartin, D. G. and Hall, S. R., "Structural Control Experiments using an H_∞ Power Flow Approach," *AIAA Guidance, Navigation, and Control Conference*, Aug. 1990, pp. 1634-1644.
- C61. MacMartin, D. G. and Hall, S. R., "An H_∞ Power Flow Approach to Control of Uncertain Structures," *American Control Conference*, San Diego, CA, June 1990, pp. 3073-3080.

Other Publications:

- T1. MacMartin, D. G., *A Stochastic Approach to Broadband Control of Parametrically Uncertain Structures*, Ph.D. thesis, Dept. of Aeronautics and Astronautics, M.I.T., Cambridge, MA, June 1992.
- T2. MacMartin, D. G., *An H_∞ Power Flow Approach to Control of Uncertain Structures*, Master's thesis, Department of Aeronautics and Astronautics, M.I.T., Cambridge, MA, Feb. 1990.

Recent Invited lectures

- Princeton (Mech. & Aerospace Eng.), 10/15/10, "*From El Nino to geoengineering: applications of feedback analysis tools to climate problems*"
- U. Maryland (Aerospace Eng.), 10/14/10, "*From El Nino to geoengineering: applications of feedback analysis tools to climate problems*"
- Penn State (Geosciences), 10/13/10, "*Can we test geoengineering?*"
- KTH (Automatic Control Lab), 9/13/10,
"*Control of future large telescopes: Control of systems with thousands of actuators*"
- JPL (Controls group), 4/2/09, "*Control for the Thirty Meter Telescope*"
- Northrop Grumman (Space Technology), 2/13/09 "*Control for the Thirty Meter Telescope*"
- University of Chicago (Kavli Institute for Cosmological Physics), 12/02/2008
"*Thirty Meter Telescope: Design, Performance, and Control*"
- University of Illinois, Urbana-Champaign (Aerospace Eng.), 12/01/2008
"*Feedback analysis and control in climate dynamics*"
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