Catherine Anne Moseley Matos

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Education: **Georgia Institute of Technology, Atlanta, GA** September 1990 – 2001

- **Ph.D. in Aerospace Engineering, August 2001** GPA 3.56 / 4.0

  "Download Reduction on a Wing-Rotor Configuration using Actively Controlled Trailing Edge Flaps and Blowing", Advisor Dr. Narayanan Komerath

  The objective of this thesis is to explore the flow field of a tiltrotor-like setup and methods for download reduction and wake deflection. A series of load, surface pressure, and velocity measurements were taken in windtunnel experiments, exploring several different methods of controlling the flow in the rotor-wing setup. Emphasis is on use of trailing edge flaps and blowing. Computer code simulations are used to model the experimental setup and guide development of an actively controlled flap system.

- **Master of Aerospace Engineering, December 1995** GPA 3.54 / 4.0

  "Multi-scalar Differential Diffusion with Mean Scalar Gradients in Isotropic Turbulence", Advisor Dr. P.K. Yeung

  Thesis studied the differential diffusion of passive scalars in the presence of uniform mean scalar gradients by performing direct numerical simulations of statistically stationary, homogeneous, isotropic turbulence. Adapted Direct Numerical Simulation code to massively parallel computers.

- **Bachelor of Aerospace Engineering, June 1994** GPA 3.80 / 4.0

Employment:

- **Mathematics Instructor** 2001-present
  Clayton College and State University
- **Adjunct Faculty, Mathematics** 2002-present
  Art Institute of Atlanta
- **Adjunct Faculty, Mathematics** 2002-present
  Chattahoochee Technical College
- **Graduate Research Assistant** 1994-2001
  School of Aerospace Eng., Georgia Tech

Relevant Coursework:

Flow Diagnostics	Flow Control	Low and High Speed Aerodynamics
Rotorcraft Theory	Combustion	Dynamics of Turbulence
Probability	Technical Writing	Scientific Computing

Research Experience:

Experimental-

Laser visualization of unsteady flow features between a rotor and wing, 3D velocity and pressure measurements in the Harper Wind Tunnel at Georgia Tech	1996 -2001
Parafoil surface geometry and stall characteristic measurements for NASA	1997
Tilt-rotor tests at Boeing Vertol, Philadelphia	1996
JT8D engine inflow measurements at Delta Airlines Technical Operations, Atlanta	1998
Refinement of Spatial Correlation Velocimetry Technique to measure large scale flow velocities.	1996-98

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Research Experience:

Computational-

Modification of three-dimensional potential code to model wing-rotor interaction	1999-2001
Adaptation of Direct Numerical Simulation code to massively parallel computers	1994-95
Undergraduate Research Assistant- Aerospace Engineering Investigated behavior of passive scalars in turbulent flow	1993-94

Skills:

Technical Writing and Editing
Public Speaking
Spatial Correlation Velocimetry
Flow Visualization and Measurement
Photogrammetry
Fluent in FORTRAN, Windows, Microsoft Office, HTML, and Unix administration
Familiar with LabView, FAST, C++, Tecplot, Framemaker
Operation and maintenance of Copper vaporasers

Honors:

National Science Foundation Fellowship	1994-98
Georgia Tech Presidential Fellowship	1994-98
Georgia Tech President's Scholarship	1990-94
Outstanding Junior AE Award	1993
Tau Beta Pi - Engineering Honor Society	
Sigma Gamma Tau - Aerospace Honor Society	
Secretary and Initiation Coordinator	1993-94
Gamma Beta Phi - Honor / Service Society	
Phi Kappa Phi - Honor Society	
Golden Key Honor Society	

Leadership Positions:

Research Assistantship, School of Aerospace Eng., Georgia Tech	1994-2001
"NASA Means Business" Student Competition - *Team Leader*, Georgia Tech Team - Finalist in competition all three years - Gained Public Speaking experience to varied audiences, including engineering, elementary school and MBA students, government and industry personnel, in both large groups and one-on-one settings.	1999, 2000, 2001
Team leader for JT8D engine inflow tests at Delta Airlines Technical Operations	July 1998
Teaching Assistant, Georgia Tech Mathematics Department, Calculus II	1993
Mentor, NASA/GT SHARP PLUS program	1999, 2000
Student Teacher, Kids Interested in Discovering Science Club	1992-94

Additional Professional Activities:

Georgia Tech President's Scholarship Evaluation Committee	1996-2000
Developed web pages for Experimental Aerodynamics Group, NASA Means Business team, AHS Aerodynamic Measurement Techniques Technical Committee, MNT Financial Services, Inc., Mill Grove Homeowner's Association	1996-2002
Poster Paper, American Astronomical Society Annual Meeting, Pasadena Acoustic Shaping Applications in Space Based Manufacturing	Nov. 1999
Poster Paper, AIAA Mini-Symposium, Atlanta	Feb. 2000
Student Member, AIAA Aerodynamic Measurement Techniques Technical Committee	1997-2000
Completed Cornell workshop on massively parallel computing	Sept. 1995

Professional Affiliations:

Member, American Institute of Aeronautics and Astronautics (AIAA)
Member, American Helicopter Society (AHS)

Publications & Reports:

Komerath, N.M., Matos, C.A., Reddy, U.R., “Flowfield Issues Related to Tiltrotors”, AHS Specialists’ Meeting on Tiltrotor/Runway Independent Aircraft Technology and Applications, Arlington, TX, March 2001.

Matos, C.A., Komerath, N.M., “Download Modification using Surface Blowing”, AHS Specialists Meeting on Aeromechanics, Atlanta, GA, November 2000.

Ganesh, B., Matos, C.A., Coker, A., Hausaman, J., Komerath, N.M., “A Costing Strategy for Manufacturing in Orbit using Extraterrestrial Resources”, Abstracts of Proceedings of the Second Space Resources Utilization Roundtable, Golden, CO, Lunar & Planetary Institute, Nov. 2000.

Matos, C.A., Coker, A., Changeau, D., Ganesh, B., Hausaman, J., Kriengsiri, P., Thienprayoon, P., Tan, X.Y., Komerath, N.M., “Acoustic Shaping, Inc: Leaders in Space-Based Manufacturing, Year 2: Customer Engagement Plan”, Report to NASA as part of the “NASA Means Business” Program, May 2000.

Wanis, S.S., Matos, C.A., Komerath, N.M., "Acoustic Shaping: Application to Space Based Construction",AIAA 00-1020, 38th AIAA Aerospace Sciences Meeting and Exhibit, Reno, Nevada, Jan. 2000.

Komerath, N.M., Matos, C.A., Coker, A., Wanis, S., Hausaman, J., Ames, R.G., Tan, X.Y., “Acoustic Shaping: Enabling Technology for a Space-Based Economy”, Abstracts of Proceedings of the First Space Resources Utilization Roundtable, Golden, Co., Lunar & Planetary Institute, Oct. 1999.

Matos, C.A., Ames, R., Changeau, D., Coker, A., Hausaman, J., Tan, X.Y., Wanis, S., Komerath, N.M., “Acoustic Shaping, Inc.: Leaders in Space-Based Manufacturing”, Report to NASA as part of the “NASA Means Business” Program, July 1999.

Matos, C.A., Reddy, U.C., and Komerath, N.M., "Rotor Wake/Fixed Wing Interactions with Flap Deflection", Proceedings of the 55th Annual Forum of the American Helicopter Society, Montreal, Canada, May 1999.

Matos, C.A., Reddy, U.C., Mahalingam, R., Ames, R.G. & Komerath, N.M., "Flow Measurements in the JT8D Test Cells", Report to Delta Airlines Technical Operations, Aug. 1998.

Matos, C.A., Klapper, J., Mahalingam, R., Funk, R.B., Komerath, N.M., “Aerodynamics of the X-38 Parafoil”, Report to NASA JSC, April 1998.

Matos, C. A., Mahalingam, R., Ottinger, G., Klapper, J., Funk, R. B., and Komerath, N.M., " Wind Tunnel Measurements of Parafoil Geometry Aerodynamics", AIAA Paper 98-0606, 36th AIAA Aerospace Sciences Meeting , January 1998, Reno, NV.

Reddy, U.C., Matos, C.A., Mahalingam, R, Funk, R.B. & Komerath, N.M., "Velocity Measurement in a Rotor Wake Interacting with a Fixed Wing", AIAA 98-1033, 36th Aerospace Sciences Meeting & Exhibit, Reno, NV, Jan. 98.

Reddy, U.C., Matos, C.M., Mahalingam, R. & Komerath, N.M., "Whole-Field Velocity Measurement In Unsteady Periodic Flows", AIAA 97-2325, Proceedings of the 15th AIAA Applied Aerodynamics Conference, Atlanta, GA, Jun. 97.

Reddy, U.C., Matos, C.A., Darden, L.A., Villareal, L., Ames, R.G., Funk, R.B. & Komerath, N.M., "Measurement of Fountain Effect Flows Using Spatial Correlation Velocimetry", Report to RITA Inc./Bell Helicopter Textron Inc., GITAER-EAG-97-6, May 1997.

Komerath, N.M., Funk, R.B., Reddy, U.C., Darden, L.A., Mahalingam, R.M., Ames, R.G., Wong, O.D., Villareal, L., Gregory, J., Moseley, C.A., Harden, C. & Akovenko, J., "Velocity measurements around a tilt-rotor model", Report to Boeing Defense & Space Systems, Helicopter Division, GITAER-EAG-97-2, Feb. 1997.

Komerath, N.M., Ames, R.G., Darden, L.A., Moseley, C.A., "Characterization of Micro-UAV Behavior in Gusty Environments" Proceedings of the First International Conference on Micro Air Vehicles, Atlanta, GA, Feb. 97 .

Yeung, P.K., Moseley, C.A. “A Message-passing, Distributed Memory Parallel Algorithm for Direct Numerical Simulation of Turbulence with Particle Tracking”, Parallel Computational Fluid Dynamics: Implementations and Results Using Parallel Computers, A. Ecer, J. Periaux, N. Satofuka and S. Taylor, editors, Elsevier Science B.V. 1995, pp 473-480.

Yeung, P.K., Moseley, C.A. “Effects of Mean Scalar Gradients on Differential Diffusion in Isotropic Turbulence”, AIAA 95-0866, 33rd AIAA Aerospace Sciences Meeting, Reno, NV, January 1995.