

Georgia Tech Library Collection Development Policy

School of Aerospace Engineering (DRAFT) 2004

Collection Development Objectives

The Library & Information Center at Georgia Institute of Technology supports faculty and student research and the curriculum through the doctoral degree level in the discipline of Aerospace Engineering. It also supports research projects and programs conducted on behalf of faculty researchers, research engineers, and research scientists and in the School's various laboratories and research centers.

School Profile - Overview

The School of Aerospace Engineering is one of nine schools in the College of Engineering. The School prepares students at the bachelor's, master's, and doctoral levels for a career in vehicle engineering, with primary emphasis on flight vehicles. In 2004, Georgia Tech's College of Engineering placed 4th nationally in graduate school rankings by the *U.S. News and World Report* and the School of Aerospace Engineering ranking 4th nationally in the specific subject discipline.

There are 36 faculty members (23 professors, 6 associate professors, 5 assistant professors, and 2 adjunct professors). In addition, there are 8 professors emeriti and 1 lecturer. Three professors have joint appointments with one of the following: Georgia Tech Regional Institute, the School of Civil Engineering, or the School of Biomedical Engineering.

School Chair

Dr. Robert Loewy, William R. T. Oakes Professor, 404-894-3002,
robert.loewy@aerospace.gatech.edu

Group Email Address(es)

Academic & Research Faculty: general.faculty@ae.gatech.edu

Academic Faculty only: academic.faculty@ae.gatech.edu

All Faculty and Staff: aerospace@ae.gatech.edu

Graduate Students: contact Loretta Carroll (x4-6046 or
loretta.carroll@aerospace.gatech.edu)

Undergraduate Students: Revonda Mullis (x4-3001 or
revonda.mullis@aerospace.gatech.edu)

Library Committee or Chair -- none

School Web Site

<http://www.ae.gatech.edu>

Professional Accreditation

In addition to the institutional accreditation by the Southern Association of Colleges and Schools (SACS), the College of Engineering and the School of Aerospace Engineering is accredited by its professional accreditation organization, the Accreditation Board for Engineering and Technology (ABET).

School Profile – Curriculum

Enrollment

Enrollment	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Undergraduate	245	239	266	339	368	445	523	638	733	n/a
Graduate	190	202	196	213	224	260	264	284	363	n/a

Data from the Georgia Institute of Technology 2003 Fact Book, *tables 4.17, 4.18 --*
www.irp.gatech.edu)

Degrees offered

Bachelor Degree -- B.S.	Master Degree -- M.S.	Doctoral Degree -- Ph.D.
Aerospace Engineering	Aerospace Engineering	Aerospace Engineering

Beginning in spring 2004, an Undergraduate Minor in Aerospace Engineering (18 hours) is offered.

Degrees awarded

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Bachelor	37	35	35	32	50	29	51	45	65	n/a
Master	57	54	38	59	38	53	68	68	70	n/a
Ph.D.	12	21	16	24	18	11	18	21	17	n/a

Data from the Georgia Institute of Technology 2003 Fact Book, *tables 5.6, 5.7, 5.8 --*
www.irp.gatech.edu)

AE Undergraduate Educational Objectives

- To provide students with a comprehensive education that includes in-depth instruction in aerodynamics, aircraft and spacecraft structures, flight mechanics, orbital mechanics, flight propulsion, and design of aerospace systems.
- To prepare students for careers in aerospace engineering by emphasizing analysis and problem solving; exposure to open-ended problems and design issues including manufacturing, maintenance and fostering teamwork; communications skills; and individual professionalism.
- To provide adequate research and independent study opportunities that cultivate lifelong learning skills and nourish creative talents.

School Profile – Research

Faculty Research Interests

Aerodynamics and Fluid Mechanics

- Aerothermodynamics Research and Technology
- Computational Aerodynamics
- Experimental Aerodynamics

Research topics include: computational aeroacoustics, aerodynamics of highly maneuverable aircraft, measurement and computational prediction of rotary wing aerodynamics, sonic boom prediction and reduction methods, adaptive subgrid models for large-eddy simulation of turbulence, parallel and distributed computing algorithms, fluid flow imaging, diagnostics, and control, prediction of chemically reacting and thermally excited hypersonic flows, vortex interactions and vortex flow control, direct numerical simulation of turbulence on massively parallel computers, hypersonic propulsion/airframe integration, and turbulent mixing and radiative signatures from aircraft and rocket plumes.

Aeroelasticity and Structural Dynamics

- Structural Dynamics and Smart Structures

Research topics include: vibration reduction, improved methods for calculation of stability, methods for modeling composite rotor blades, and investigation of the effects of elastic coupling on blade performance and stability.

Flight Mechanics and Controls

- Aerospace Controls

Propulsion and Combustion

- Combustion/Combustors
- Computational Combustion
- Chemical and Electrical Rocket Propulsion

Research topics include: gas turbine combustors; combustion control; unsteady combustion and combustion dynamics; advanced computational approaches for chemically reacting and ionized flows; sensors, diagnostics and health monitoring with emphasis on optical and acoustic methods; low emissions combustors; characterization of synthetic gas fuels; plasma-assisted combustion; solid-propellant combustion and nozzle erosion; fuel sprays and liquid actuators; high energy density propellants; electric propulsion.

Structural Mechanics and Materials Behavior

Specific areas include computational mechanics, composite structures, fracture and fatigue, damage tolerance and failure prediction, experimental mechanics, thermal and environmental effects and non-destructive evaluation, structural stability

(buckling/postbuckling), adaptive structures, structural health monitoring, and system identification.

Some of the areas of intense activity in which graduate students participate as research assistants include: damage tolerance/fatigue/fracture; airworthiness; impact-resistance; efficient and accurate computation tools (finite elements, etc.); modeling of the mechanics of manufacturing; new structural design concepts (ply drop-off, sandwich construction, elastic tailoring); advanced topics in structural mechanics such as anisotropic elasticity and plate/shell higher order or asymptotic theories; and diagnostic methods including C-scan, acoustic emission, and X-ray.

System Design and Optimization

- Aerospace Systems Analysis
- Aerospace Systems Design
- Space Systems Design
- Aerial Robotics

Design encompasses traditional aerospace disciplines (structures, propulsion, aerodynamics, controls, acoustics, etc.), performance (mission analysis, payload, etc.), and life-cycle interests (economics, manufacturing maintainability, supportability, etc.). Representative research tasks include the following:

- Disciplinary research with a focus on design integration
- Vehicle investigation: high-speed civil transport, unmanned vehicles, reusable launch vehicles, rotorcraft
- Life-cycle modeling tools: manufacturing, operations and support, economics
- Design techniques with industry relevance: trade-studies, “optimization”, partitioning, representation, execution, and review
- Soft computing techniques: neural networks, fuzzy logic, chaos, genetic algorithms
- Stochastic methods: response surfaces, probabilistic design, and robust design
- Implementation: simulation, computational methods and tools, and underlying architecture support.

Research Centers / Interdisciplinary Research Centers

- Aerospace Systems Design Laboratory: <http://www.asdl.gatech.edu/>
- Space System Design Lab: <http://www.ssd.gatech.edu/main/>
- Center for Advanced Systems Analysis (CASA)
- Center for Excellence in Rotorcraft Technology (CERT): <http://www.ae.gatech.edu/research/rcoe/coehome.html> (supported by the NRTC, National Rotorcraft Technology Center)
- Georgia Space Grant Consortium: <http://www.ae.gatech.edu/research/gsgc/index.html>
- Space Technology Advanced Research Center: <http://www.star.gatech.edu/> (collaborators: School of Aerospace Engineering, College of Computing, Georgia Tech Research Institute, School of Electrical and Computer Engineering, School of Industrial and Systems Engineering, School of Materials Science and Engineering, and School of Mechanical Engineering)
- Composite Education Research Center / CERC: <http://www.cerc.gatech.edu> (collaborators: School of Aerospace Engineering, School of Civil and Environmental Engineering, School of Chemical Engineering, School of Materials Science and Engineering, School of Mechanical Engineering, School of Textile and Fiber Engineering)

Also active participation in the National Institute of Aerospace (NIA): <http://www.nianet.org/> -- Georgia Tech is one of the six founding universities.

New and Expanding Areas of Interest

- Engineering Embedded Software (in the “Controls” area)
- International Aerospace Programs (a specialized Undergraduate degree is being planned)