

**School of Earth and Atmospheric Sciences
Georgia Institute of Technology**

Strategic Plan

March 1, 2009

Introduction

The previous Strategic Plan for the School was formulated in 2003, which was notable for providing a new plan for interdisciplinary research and education and for broadening the mission of the School, to bring it into better alignment of the vision and mission of the Institute. Our efforts over the past 5 years have been very successful in addressing the goals put forward in this plan. At the School's summer 2008 retreat, an assessment of the 2003 Strategic Plan was undertaken in the context of the self-study report. Responding to this assessment, the current Strategic Plan represents an evolution of the 2003 Plan, taking into account progress and changes in the School, the external environment, and emerging opportunities.

Vision

The vision of the School of Earth and Atmospheric Sciences is:

To lead in innovative research and educate the future leaders in earth and atmospheric sciences for the 21st century, within the context of a premier technological research university.

Mission Statement

The mission of the School of Earth and Atmospheric Sciences is to realize the vision through building pillars of excellence in the following three areas:

- Breakthrough discoveries through research in earth and atmospheric sciences as well as in interdisciplinary research involving the earth system and the environment;
- Vibrant learning experiences and environments that prepare students to pioneer the advancement of knowledge in earth and atmospheric sciences and become the future leaders of academia, government and industry;
- Public engagement that applies our research to inform public policy, resource management, environmental sustainability, and economic development, both locally and internationally.

Strategic Advantages

The strategic advantages for EAS are determined by external opportunities, strengths within Georgia Tech, and strengths internal to EAS.

External strengths for earth and atmospheric sciences include:

- increasing recognition of the strong coupling that exists between the environment and the economy
- increasing concern over management of the environment and its key renewable and non-renewable resources
- national imperative to address the issue of anthropogenic climate change
- high public visibility of environmental issues
- increasing job opportunities in the earth and atmospheric sciences, particularly in the private sector

The considerable strengths of Georgia Tech include:

- an excellent and diverse student body, an exceptional faculty and staff, committed alumni, and many friends who have a vital interest in the future of the Institute
- vigorous, dynamic research programs that produce technology and innovation, helping to drive local, national, and international economic growth
- a focused mission with a historical commitment to innovative technology and science and the foundation of successful enterprise
- an enriching local environment situated in the heart of the vibrant city of Atlanta
- growing support from a rapidly expanding technological economic base in Atlanta and, increasingly, throughout Georgia
- a developing global role that will help shape science and technology as well as the policies that guide the future of technology
- a culture that fosters strong foundations for multidisciplinary and entrepreneurial activities and that orients the campus community to apply its knowledge to address real problems and opportunities
- innovative facilities and campus settings designed to encourage interactions across units and the campus community and build bridges to adjacent neighborhoods.

Internal strengths within EAS include:

- a dynamic and energetic faculty
- established history of broad and relatively large external research funding
- major programmatic strengths in atmospheric chemistry/air quality and climate and a growing reputation in oceanography, geophysics, and geochemistry
- excellent quality of undergraduate students
- superb facilities for education and research in the Environmental Science and Technology Building
- significant interdisciplinary research with other units on campus
- increasing success in application of earth and atmospheric science research for economic development and sustainability

Strategic Challenges

The strategic challenges for EAS are determined by external challenges, challenges within Georgia Tech, and challenges and weaknesses internal to EAS.

External challenges for earth and atmospheric sciences include:

- shrinking pool of traditional students pursuing careers in technical fields
- small number of high-quality U.S. graduate students
- converting interest of high school students in environmental issues into scientific interest

Challenges within Georgia Tech include:

- increasing competition for scarce Institute resources
- the need to integrate strengths in science and technology with the human and social sciences

Challenges and weaknesses within EAS:

- low number of undergraduate majors
- faculty demographics with many untenured faculty and recently promoted Associate Professors
- very low level of endowment and private funding
- insufficient funding from the state to support the large increase in undergraduate credit hours (TAs and lab coordinators), which is preventing the hiring of unfilled faculty lines
- office space to house the increasing number of graduate students, postdocs and research scientists.

Goals and Strategies

The core strategic goal of EAS is to increase the impact of its research and educational programs in addressing societal challenges related to the environment and natural resources. Specific goals for the School are to:

Goal 1: Increase the impact of the EAS undergraduate program.

Goal 2: Enhance the profile of our Ph.D. students so that they are competitive with the top students from our peer universities.

Goal 3: Conduct research that expands the frontiers of knowledge in earth and atmospheric sciences, promotes interdisciplinarity, and continues the upward trajectory of EAS to a recognized position of international scientific leadership.

Goal 4: Recruit, nurture and retain an outstanding and diverse faculty engaged in scientific research that is recognized worldwide for its excellence and impact.

Goal 5: Increase the impact of EAS research and education through enhanced pathways for faculty, students and staff to share their knowledge and expertise with the community, state, nation, and world.

Goal 6: Transform the unit management practices to increase efficiency and functionality while reducing costs.

Detailed objectives, strategies, and targets for each of these goals are provided below. The objectives, strategies and targets build upon the initiatives and successes of the past 5 years.

Goal 1: Increase the impact of the EAS undergraduate program.

Strategies:

- 1) Increase EAS major enrollment to a level of 100 majors.
 - a) Enhance the visibility of the undergraduate program to high schools through educational outreach programs.
 - b) Enhance the visibility of the undergraduate program for Georgia Tech undergraduates through presentations made in the 1000-level service courses.
 - c) Encourage the EAS faculty to include undergraduates from other majors in their research and advise them to take a minor in EAS.
 - d) Better inform Institute recruitment, academic, and professional practices officers about the EAS undergraduate program.
 - e) Improve the EAS web site to make the undergraduate program more visible.
- 2) Improve the three tracks currently available to EAS majors.
 - a) Change the names of the tracks to Meteorology, Environmental Geosciences, and Geophysics.
 - b) Revise the track requirements and develop new courses, and identify suitable technical electives outside EAS.
 - c) Identify new faculty hires that will be able to offer complementary courses in the different tracks.
3. Inform EAS majors of the full range of opportunities available to graduates of EAS.
 - a) Utilize the freshman seminar course to describe career options.
 - b) Engage EAS alumni to describe their careers to the students.
 - c) Improve career advising.
4. Increase the exposure of the Georgia Tech student body to courses concerning earth, atmospheric and environmental sciences.
 - a) Increase the number of students in the current 1000 and 2000 level courses by creating new sections to release oversubscription in these courses.
 - b) Develop additional introductory courses in the areas of energy and natural resources, oceanography, climate and environmental change, and natural hazards.
 - c) Articulate EAS minors that target students with varying backgrounds and interests.
 - d) Participate in the development of campus-wide minors.

Targets:

- 100 undergraduate majors
- 40 undergraduate minors
- 4 new undergraduate courses targeted at the broad undergraduate population
- 7 new EAS minors and 3-4 minors across disciplines (e.g., CEE, Biology)

Goal 2: Enhance the profile of our Ph.D. students so that they are competitive with the top students from our peer universities.

Strategies:

1. Increase the overall quality of the graduate student applicant pool, particularly for U.S. students that have graduated from top undergraduate institutions.
 - a) Improve the EAS web site, which is our primary recruiting tools. Provide support and assistance so that each faculty member has an attractive, informative, and effective web page.
 - b) Identify top U.S. institutions from which we would like to attract applicants. Have our faculty visit these institutions to give seminars, talk to their faculty about our program, meet with undergraduate students, and leave recruiting materials with the institution. Prepare powerpoint recruitment materials that all faculty members can use.
 - c) Work with our alumni who are in faculty positions to identify top candidates at their university/college.
 - d) Build upon our relationships with Peking University and Universidad Nacional Colombia de Medellin and establish relationships with a additional international universities.
 - e) Improve the effectiveness of the visits of prospective students and follow-up by faculty and our current graduate students.
 - f) Maintain graduate student stipends that are competitive with the top competitor departments through annual adjustments.
2. Maintain a stable population of 90-100 graduate students (thesis M.S. and Ph.D), while increasing the overall quality of students and the numbers of earth science students.
 - a) Increase the funding base for earth science faculty.
 - b) Increase the number of graduate students from historically underrepresented minorities.
 - c) Increase the selectivity of the Ph.D. program, through the admissions process and evaluation of the Ph.D. comprehensive exam.
3. Enhance the profile of our Ph.D. students so that they are competitive with the top students graduating from other universities.
 - a) Increase the number of students obtaining graduate fellowships from competitive national programs (e.g. NASA, NSF, EPA). Maintain on the web a list of fellowship opportunities. Notify all graduate students and faculty members approximately 30 days before applications are due for a specific fellowship. Individually encourage the qualified students to apply. Provide financial incentives for students that are awarded a graduate fellowship from competitive national programs.
 - b) Establish expectations whereby Ph.D. students are expected to present a paper at a national conference by the end of their second year and to submit a paper for publication by the end of their third year. Each student should attend at least one conference per year.
 - c) Expand the international educational and research experiences for our students. Encourage student to go to international meetings and summer schools and help them obtained the needed funding.
 - d) Establish specific expectations for presenting and publishing papers.
4. Implement a program to help students develop the necessary skills to succeed in professional life beyond the traditional academic and research experiences.

- a) Improve student technical writing skills through a writing course targeted at the thesis proposal for the Ph.D. comprehensive exam.
- d) Establish a seminar course to address personal and professional skills (e.g. oral and poster presentations, the research process, professional societies, manuscript and proposal writing, research and professional ethics, reviewing and responding to reviews, resume writing and job interviews, teaching).

Targets:

- Applicant pool with at least 60 U.S. applicants (at least half from the top 100 nationally ranked colleges and universities).
- Acceptance by at least half of the domestic applicants from top U.S. undergraduate institutions that receive offers.
- Half of the U.S. Ph.D. students participate in some international experience.
- 10% of our Ph.D students receive nationally competitive fellowships.
- Each Ph.D. student presents a paper at a national or international conference by the end of the 2nd year.
- Each Ph.D. student submits a paper for publication in a journal by the end of the 3rd year.

Goal 3: Conduct research that expands the frontiers of knowledge in earth and atmospheric sciences, promotes interdisciplinarity, and continues the upward trajectory of EAS to a recognized position of international scientific leadership.

Strategies:

1. Attract and support a larger cadre of postdocs recruited from the top Ph.D. programs both nationally and internationally.
 - a) Establish a named postdoc program that is widely advertised with an annual deadline for applications.
 - b) Identify funding sources for postdocs outside individual grants, through development activities and the establishment of research centers.
 - c) Identify and support postdocs working in interdisciplinary areas with two or more faculty members.
2. Establish nationally recognized research centers to foster interdisciplinary research and improve program visibility and to improve our ability to attract and direct resources.
 - a) Actively compete for opportunities to establish centers funded by national funding agencies.
 - b) Develop the appropriate collaborations within Georgia Tech and beyond needed to respond to opportunities to establish centers.
2. Stimulate interdisciplinary research collaborations within EAS and with other Schools.
 - a) EAS faculty give seminars to other Schools.
 - b) EAS faculty members more frequently give seminars in the Friday Seminar series.
 - c) Invite faculty members from other Schools to give seminars in EAS.
 - d) Establish informal seminars with groups of faculty from other schools with a common interest.
 - e) Co-teach interdisciplinary courses.
 - f) Co-advise graduate students.

3. Continue to raise the international profile of EAS and individual faculty members.
 - a) Actively encourage national and international workshops, conferences, and symposia to be held in Atlanta.
 - b) Nominate faculty and students for prominent national awards.
 - c) Increase participation in national/international panels, advisory boards, and organization of national and international conferences, workshops, and symposia.
 - d) Increase participation in major national and international research efforts (e.g. field programs, etc).
4. Actively encourage participation of EAS faculty in major interdisciplinary research initiatives at Georgia Tech.
 - a) Target additional participation in developing Institute-wide initiatives, including energy, sustainability, systems biology, scientific computing.
 - b) Take the lead on new initiatives, such as Focused Research Programs and proposals to such programs as NSF IGERT, STC, etc.

Targets:

- Establish a named postdoc program funding at least 6 postdoctoral scholars annually.
- Establish at least two nationally recognized research centers .
- Increase the funding from industry to \$1M per year.

Goal 4: Recruit, nurture, and retain an outstanding and diverse faculty engaged in scientific research that is recognized worldwide for its excellence and impact.

Strategies:

1. Actively mentor and support junior faculty.
 - a) Chair meet with untenured faculty individually several times per year.
 - b) Help junior faculty develop a network of faculty contacts and mentors.
 - c) Minimize the School service load for untenured faculty, while at the same time taking maximum advantage of their good ideas and enthusiasm in all School activities.
 - d) Aggressively work to address issues regarding spousal employment.
 - e) Work with junior faculty to develop best practices in graduate student advising/mentoring.
2. Provide appropriate resources and rewards for our outstanding faculty members:
 - a) Develop resources through capital campaign and other activities.
 - b) Establish professorships or other named positions that can be used to reward and stimulate activities of faculty members at all ranks.
 - c) Nominate outstanding faculty members for national and institute awards.
3. Actively work to retain our excellent faculty members.
 - a) Actively keep individual salaries competitive through market adjustments.
 - b) Proactively act to retain faculty members that are being recruited by other universities, rather than waiting for them to get an offer from an other university.
 - c) Provide ongoing support for research equipment (including computing), beyond the period of start-up funds.

4. Provide the support network for creating independent and contributing Research Scientists.
 - a) Provide opportunities for teaching and interacting with students, with commensurate salary support.
 - b) Identify mechanisms to provide bridging salary support during gaps in funding.
 - c) Increase the number of research scientists in the earth sciences.

Targets:

- 100% retention of productive faculty
- Attract 2 additional named Chairs to the School
- Attract 2 professorships for junior faculty
- Market salary adjustment for our Associate Professors

Goal 5: Increase the impact of EAS research and education through enhanced pathways for faculty, students and staff to share their knowledge and expertise with the community, state, nation, and world.

Strategies:

1. Provide opportunities and methods for faculty and students to engage with industry and to support improved economic outcomes.
 - a) Develop partnerships with other schools and centers at Georgia Tech, small businesses, corporations, chambers of commerce, local and state governments, and other organizations involved in new venture and economic development.
 - b) Promote the entrepreneurial spirit and, working with the existing business development centers at Georgia Tech, develop a process that assists EAS faculty and students as they pursue patents, licensing, and start-up ventures.
 - c) Encourage faculty to engage in external consulting, and assist in identifying appropriate consulting clients.
 - d) Establish an External Advisory Board consisting mostly of regional corporate leaders.
2. Support and enhance K–12 science education in the state through sustained contact to develop experiences and programs with and for teachers and students.
 - a) Facilitate faculty interactions with CEISMC to increase participation in K-12 activities.
 - b) Reward faculty members for K-12 and public outreach activities.
3. Encourage more publicity for EAS research and educational activities.
 - a) Identify interesting and important papers and presentations well in advance.
 - b) Work with Georgia Tech’s Communications Staff to provide media training to faculty members that are interacting with the media.
 - c) Develop an improved web presence for EAS that is richer in content that is accessible to a broad audience.
4. Develop new opportunities for EAS faculty to inform public policy.

Goal 6: Transform the unit management practices to increase efficiency and functionality while reducing costs.

1. Increase computational capability while reducing costs and power usage
 - a) Transition to a shared multi-user cluster system.
 - b) Increase use of thin clients and student laptops, and decrease reliance on traditional computing labs.
 - c) Eliminate outdated computer systems that are inefficient in terms of power use and cooling needs.
 - d) Substantially reduce the number of printers.
2. Complete the transformation to an online information management system
 - a) Paperless management of student and faculty applications.
 - b) Online databases for alumni, property inventory, directories, etc.
 - c) Support call tracking system.
3. Substantially reduce paper usage
 - a) Limit student printing.
 - b) Online course materials and online submission of lab reports and term papers.
 - c) General use printers default to two-sided printing mode.
4. Support Green Campus initiatives
 - a) Enable recycling within the ES&T building, beyond the services provided by the University.
 - b) Follow the “green purchasing guide” for supplies.
 - c) Reduce unnecessary power usage through turning off lights, turning off and unplugging equipment as appropriate.
 - d) Engage faculty, staff and students in promoting resource and energy conservation.
8. Enhance staff capabilities and training
 - a) Provide incentives and recognizing excellence in performance through awards and salary adjustments.
 - b) Provide resources for each staff member to participate annually in skills-development activities.