



**Higher Education/Course Development Program
Grant Year 2009
(March 15, 2009 – March 14, 2010)**

Request for Proposals

Online Proposal Submissions Due: Friday, February 6, 2009 (5:00 PM)
Original Hardcopy Submission Due: Monday, February 9, 2009
Anticipated Award Date: April 15, 2009
<http://www.ncspacegrant.org/he/>



North Carolina Space Grant Higher Education Course Development Program Request for Proposals

I. Summary

The goal of the Higher Education/Course Development Program is to provide funding to initiate, improve, and/or continue interdisciplinary and/or distance learning courses that will equip the future science, technology, engineering, and mathematics (STEM) workforce for careers in the aero/space industry. Examples of past awards can be found at http://www.ncspacegrant.org/fac_awards2008.

NC Space Grant anticipates making 4 to 6 awards with the maximum individual award of up to \$10,000 for a period of performance up to 12 months (no-cost extensions are not allowed under this solicitation). Proposing institutions are required to provide 100% cost-matching (1:1) using non-federal funds. In other words, if \$10,000 is requested from NC Space Grant, then \$10,000 must be provided as match.

I. Background

The National Space Grant College and Fellowship Program was established by Congress under Title II of the National Aeronautics and Space Administration Authorization Act of 1988. Today the 52 Space Grant Consortia include over 850 affiliates from universities, colleges, industry, museums, science centers, and state and local government agencies.

NC Space Grant, established in 1991, is an active member of the National Space Grant College and Fellowship Program. NC Space Grant currently has 11 university member institutions (Appalachian State University, Duke University, Elizabeth City State University, NC A&T State University, NC Central University, NC State University, UNC-Asheville, UNC-Chapel Hill, UNC-Charlotte, UNC-Pembroke, Winston-Salem State University), 8 industry/government/non-profit partners and has managed and provided nearly \$12 million in support to North Carolina citizens.

NC Space Grant conducts programs in areas of fellowships, scholarships, education, research, and public service to promote, develop and support aeronautics and space-related science, engineering and technology training and programs. A common focus is to involve women, underrepresented minorities, and persons with disabilities, and to reach more citizens of North Carolina.

II. Project Overview and Guidelines

A. Award Range and Performance Period

NC Space Grant anticipates making 3 to 6 awards with the maximum individual award of up to \$10,000 for a one year period of performance (March 15, 2009–March 14, 2010). Proposing institutions are required to provide 100% cost-matching (1:1) using non-federal funds. In other words, if \$10,000 is requested from NC Space Grant, then \$10,000 must be provided as match.

B. Eligibility

Competition is open to individuals at active NC Space Grant university member institutions. Individuals must be qualified to serve as a principal investigator at their respective institution and be permanent US citizens (14 C.F.R. Sections 1260.12(c)(2) and 1260.12 (c)(3); see Section VIII.D, Special Note on U.S. Citizenship Requirements). U.S. public/private schools, school districts, museums, and other not-for-profit educational organizations may apply through partnership with the lead organization. NC Space Grant encourages proposals from females, members of underrepresented minority groups, and persons with disabilities. Submission is limited to one proposal per investigator.

III. Proposal Content

A. Title Page (1 page)

The cover page must include the following items: Project title; period of performance (March 15, 2009–March 14, 2010); PI name, institution, address, phone, fax, and email; concurrence



signatures from the Principal Investigator and the Authorizing Official of the proposing institution; and the program name (Higher Education/Course Development Program).

B. Project Description (5 pages maximum)

Provide a detailed description of the proposed effort that addresses the following items:

- **Project Purpose:** Define the educational need of the proposed effort and clearly describe how NASA content and/or resources will be used to meet that need. Describe how the proposed effort will contribute to NASA’s educational priorities and identify the specific NASA education outcome(s) and objective(s) it supports. Describe how the activity will benefit the local university, other universities, and the NC Space Grant. Furthermore, discuss how the proposed effort aligns with the goals and objectives of the NC Space Grant Strategic Plan.
- **Goals and Objectives:** Clearly state goals and objectives for the proposed effort and provide a rationale for the approach that will be used to achieve them.
- **Project Content:** Clearly describe documented evidence of customer need, how the proposed effort will address this need, and how the goals and objectives will be achieved. Describe innovative approaches, tools and techniques involved.
- **Anticipated Results:** Describe the outcomes of the proposed effort.
- **Sustainability:** Include a discussion of how project will be sustained beyond the funding period.
- **Dissemination:** Discuss plans for disseminating results to broader community.
- **Evaluation:** Describe the program evaluation plan including Specific, Measurable, Acceptable, Realistic, and Time-bound (SMART) outcomes-based objectives:

<i>Specific</i>	Provide enough detail about your project to help us know exactly what will be done;
<i>Measurable</i>	Goal should be such that when you are through you have some tangible evidence of completion (metrics) to indicate success;
<i>Acceptable</i>	Aligned with NASA and NC Space Grant Strategic Goals;
<i>Realistic</i>	Set appropriate targets based on your budget level;
<i>Time frame</i>	This is a 12 month grant and should be reflected in the description, analysis and results.

- **Participants:** Identify the number of project participants (students, faculty). Describe how the program will actively seek and recruit the involvement of women, underrepresented minorities, and persons with disabilities.
- **Collaboration:** Identify probable industry, NASA, or other collaborations that would facilitate course support.
- **Prior Support:** Demonstrate PI’s effectiveness of prior work or successes in supporting STEM instruction and/or learning. Show any NASA sponsored or aero/space related research and/or teaching that is performed by the Principal Investigator. If the PI is a recipient of a prior NC Space Grant award, describe the project(s) and impact(s).

C. Vita (2 pages)

Include a vita for the proposing Principal Investigator of no more than two pages. Include a brief paragraph for all other key personnel.

D. Support Letter (1 letter)

Provide one letter of support from the department head or chair that expresses the importance of the proposed course to the department and the direction of the university.

E. Budget and Budget Narrative (2 pages)

Provide a detailed budget in the format outlined in Appendix D, Higher Education/Course Development Program – Proposed Budget for Grant Year 2009, along with a budget narrative. Each format should include expense summaries as well as the 100% (1:1) non-federal cost match requirement.

- Direct salary expenses should be separated by titles or disciplines with hours, rates, and total amounts for each position. Student salary expenses should also be noted.
- Proposed travel should include the number of trips, destination, duration, etc. International travel is not allowed.



- Food expenses are not allowed.
- Equipment (including computers), furniture, building/remodeling costs, and general office supplies may not be charged to the grant but may be used to contribute to the organization's required matching funds.
- The NC State University/NASA National Space Grant College and Fellowship Program grant does not cover facilities and administrative costs. Unrecovered facilities and administrative costs may be used for required cost-matching. The detailed budget must include a description of the required 1:1 (100%) non-federal matching funds.

IV. **Proposal Format**

The following guidelines and restrictions apply to all proposals. Proposals not meeting these requirements may not be considered.

- Proposals must be submitted in PDF format.
- Proposals should be one-sided, single-spaced on standard 8 ½ x 11 paper, no smaller than 12 point font and with no less than one inch margins throughout. Text restrictions are inclusive of all illustrations, tables, charts, exhibits, etc.
- All pages must be numbered sequentially.
- Proposals should contain only appendices and attachments specifically called for.
- All information you wish for reviewers to consider should be included in your proposal. It is not acceptable to refer reviewers to websites or other external sources for additional information or as evidence for your narrative. Appendices and attachments are not allowed.

V. **Proposal Submission**

Proposal submission will be conducted via the NC Space Grant website at <http://www.ncspacegrant.org/proposals/> by February 6, 2009 at 5:00 PM. One complete single electronic file in PDF format is required by the on-line system. Electronically submitted proposal **must** contain all required signatures. Questions concerning the on-line proposal submission system should be directed to proposals@ncspacegrant.org.

The original proposal with all required signatures must arrive at NC Space Grant by February 9, 2009. Late or incomplete submissions may not be considered. Hard copy submissions should be sent via express mail, commercial delivery, or courier to:

Dr. Chris Brown, Director
North Carolina Space Grant
NCSU - Research Building II
1009 Capability Drive, Suite 210
Raleigh, NC 27606

VI. **Proposal Review and Evaluation**

Proposals will be reviewed by a panel of individuals who are scientifically literate, but not necessarily experts in the proposed area. The following areas will be considered in the evaluation of the proposal:

Educational merit (25%)

- Degree to which proposed effort advances higher education STEM instruction and learning;
- Degree to which proposed effort offers innovative methods, approaches, and concepts;
- Degree to which proposed effort builds on lessons learned and/or best practices of past coursework and/or research activities undertaken by the PI;
- Reasonableness and clarity of project goals and objectives; and
- Degree to which the proposed effort provides sustained opportunities for students to deepen their knowledge about NASA-supported areas of science, the nature of science, and engineering.



Relevance to NASA and NC Space Grant goals (25%)

- Degree to which proposed effort is aligned with one or more of the NASA Office of Education outcomes as well as NC Space Grant Strategic Goals for Education;
- Degree to which proposed effort cultivates diversity and extends access to NASA;
- Degree to which proposed effort utilizes NASA's unique contributions to science, engineering, and exploration; and
- Likelihood that the proposed effort will be sustained beyond the initial funding period.

Management (20%)

- Qualifications, capabilities, and experiences of the principal investigator;
- Likelihood proposed activities will result in an efficient and productive effort;
- Realistic schedule/timeline or other description of how project goals, objectives and major milestones will be met; and
- Level of collaboration with other projects, institutions, professional societies, and/or other appropriate partners.

Evaluation (15%)

- Evaluation plan describes appropriate methods for determining the extent to which the project has achieved its goals and objectives;
- Evidence that appropriate evaluation processes are embedded throughout the life-cycle of the project.

Budget (15%)

- Clarity and reasonableness of the funding request;
- Degree of alignment between proposal narrative and budget;
- Degree to which proposed effort demonstrates effective use of funds; and
- Degree to which proposed outcomes justify total costs.

VII. Reporting Requirements

A final report is required at the conclusion of the award that includes an evaluation of the program's effectiveness relative to the proposed objectives and the NC Space Grant strategic plan (format and due date will be provided). Recipients will be required to provide data necessary for NC Space Grant to report to NASA through the Consortium Management and Information System (CMIS) on the expenditures of Space Grant and matching funds. This data typically includes but is not limited to: description of work performed; evaluation of the impact of work performed; number of students, teachers, staff, faculty, and general public involved; gender and ethnic breakdown of participants; list of papers published, presentations given, conferences hosted/attended.

A detailed budget summary will also be required that summarizes all project expenditures, and includes a comparison of the proposed budget to actual expenditures for all categories. A signed statement of cost sharing from the PI's Office of Sponsored Programs must accompany the budget summary.

VIII. Other Requirements

A. Acknowledgment of Support

An acknowledgment of NC Space Grant support (logo and/or written) must appear in all publications of any material based on this funding in the following terms: "Supported by the North Carolina Space Grant." The NC Space Grant logo can be downloaded at www.ncspacegrant.org.

B. Audit and Records

Financial records, supporting documents, statistical records, and other material pertinent to this grant shall be retained by the grantee for a period of at least three years following submission of the final project report and shall be made available to NC Space Grant upon request.

C. Payments

Contingent upon NC Space Grant's receipt of NASA funds, a sub-agreement will be established between the grantee's institution and NC State University. The grantee institution shall receive payments under this grant through that institution's Office of Sponsored Projects. Invoices must



be submitted no later than 30 days after the last day of the month in which the expense was incurred. Late invoices may not be honored.

D. Changes in Principal Investigator

If the principal investigator leaves the grantee institution or otherwise relinquishes active direction of the project, the institution must notify NC Space Grant as soon as possible and the award will be terminated. Awards may not be transferred if the PI leaves the grantee institution to another institution that is not an active academic member of the NC Space Grant.

E. Suspension or Termination

This grant may be suspended or terminated if the grantee fails to comply with all the terms and conditions of the grant.

F. Nondiscrimination

No person shall be excluded from participation in, be denied benefits of, or be otherwise subjected to discrimination under this grant on grounds of race, color, national origin, religious affiliation, physical disability, gender, or sexual orientation.

IX. Point of Contact

Questions regarding this announcement should be directed to:

Dr. Chris Brown, NC Space Grant Director, cbrown@ncsu.edu, (919) 513-2457;

Ms. Jobi Cook, NC Space Grant Associate Director, jobi_cook@ncsu.edu, (919) 515-5933; or

University	Campus Director	Email
Appalachian State University	Dr. Anthony Calamai	calamaiag@appstate.edu
Duke University	Dr. F. Hadley Cocks	Hadley01@duke.edu
Elizabeth City State University	Dr. Thomas Rossbach	tjrossbach@mail.ecsu.edu
North Carolina A&T State University	Dr. William Craft	craft@ncat.edu
North Carolina Central University	Dr. Shawn Sendlinger	ssendlinger@nccu.edu
North Carolina State University	Dr. Fred DeJarnette	dejar@ncsu.edu
University of North Carolina at Asheville	Dr. Brian Dennison	dennison@unca.edu
University of North Carolina at Charlotte	Dr. Bharat Yoshi	bsjoshi@uncc.edu
University of North Carolina at Chapel Hill	Dr. Gerald Cecil	cecil@physics.unc.edu
University of North Carolina at Pembroke	Dr. Jose D'Arruda	jose.darruda@uncp.edu
Winston-Salem State University	Dr. Elva Jones	jonese@wssu.edu



APPENDIX A: Chart/Matrix of Areas of Specific Interest to NASA Education

Content Themes	Strategic Objectives (Broad)	Tactical/operational Objectives (Focused)
Lunar Exploration Aeronautics Space Science Earth Science Engineering Robotics Rockets/ Propulsion Systems Engineering	<p>Build a continuity of experiences that result in a well-trained qualified workforce</p> <p>Improve STEM teaching and/or student comprehension</p> <p>Improve educator access to and comfort level in using and teaching NASA materials</p> <p>Inform students about STEM careers</p> <p>Provide access to authentic NASA data, resources, facilities</p> <p>Use educational technologies to reach a wide and diverse audience</p>	<p>Develop or refine an infrastructure to deliver and disseminate NASA content and resources</p> <p>Repurpose, adapt, modify existing NASA education and/or other materials</p> <p>Develop and/or implement projects, activities, modules, approaches that benefit high school learners</p> <p>Develop and/or implement projects, activities, modules, approaches that bridge between high school education and informal, elementary, middle school, or postsecondary education</p> <p>Research studies, using NASA content and resources, that results in effective STEM teaching and learning and can inform future NASA education programming</p>



APPENDIX B: NASA Education Strategy and Framework Overview

High achievement in STEM education is essential to the accomplishment of NASA's mission. NASA contributes to national efforts for achieving excellence in STEM education through a comprehensive education portfolio implemented by the Office of Education, the Mission Directorates, and the NASA Centers.

Education Goals

NASA is pursuing three major education goals:

- **Strengthen NASA and the Nation's future workforce**—NASA will identify and develop the critical skills and capabilities needed to ensure achievement of its mission priorities. To help meet this demand, NASA will continue contributing to the development of the Nation's STEM workforce of the future through a diverse portfolio of education initiatives that target America's students at all levels, especially those in traditionally underserved and underrepresented communities.
- **Attract and retain students in STEM disciplines**—To compete effectively for the minds, imaginations, and career ambitions of America's young people, NASA will focus on engaging and retaining students in STEM education programs to encourage their pursuit of educational disciplines critical to NASA's future engineering, scientific, and technical missions.
- **Engage Americans in NASA's mission**—NASA will build strategic partnerships and linkages between STEM formal and informal education providers. Through hands-on, interactive educational activities, NASA will engage students, educators, families, the general public, and all Agency stakeholders to increase Americans' science and technology literacy.

Education Outcomes and Objectives

Three associated outcomes align all education activities:

- **Outcome 1 (Higher Education):** Contribute to the development of the STEM workforce in disciplines needed to achieve NASA's strategic goal through a portfolio of investments.
- **Outcome 2 (Elementary and Secondary Education):** Attract and retain students in STEM disciplines through a progression of educational opportunities for students, teachers, and faculty.
- **Outcome 3 (Informal Education):** Build strategic partnerships and linkages between STEM formal and informal education providers that promote STEM literacy and awareness of NASA's mission.

These outcomes are intended to:

- Provide educators with unique teaching tools, compelling teaching experiences, and world-class research experiences; inspire students through hands-on activities to pursue careers in science, mathematics, engineering, and technology; and make use of current and emerging information and communication technology to extend the reach of NASA's education activities.
- Improve students' problem-solving skills, and competence in and appreciation of STEM disciplines, and enhance the scientific and technological literacy of the American public.



APPENDIX C: NC Space Grant Strategic Plan, 2005-2010

INTRODUCTION

North Carolina Space Grant (NC Space Grant), established in 1991, is an active member in a national network of university-based consortia. Established by Congress and implemented by NASA, the National Space Grant College and Fellowship Program contributes to the nation's science enterprise by funding research, education, and public service projects through a national network of 52 Space Grant consortia. NC Space Grant has eleven university member institutions, 7 industry/government/non-profit partners and has managed and provided nearly \$12 million in support to North Carolina citizens.

VISION FOR THE NC SPACE GRANT

To expand the opportunity to participate in NC Space Grant programs to all citizens of North Carolina.

MISSION

To promote, develop and support aeronautics and space-related science, engineering and technology training and programs in North Carolina.

FUNDING

NC Space Grant program funding is provided through an annual base grant from NASA, annual recurring funding from the NC General Assembly, supplemental competitive grants from NASA, private contributions, and annual matching funds from the consortium members.

University Member Institutions

Appalachian State University	NC Central University	UNC-Charlotte
Elizabeth City State University	NC State University	UNC-Pembroke
Duke University	UNC-Asheville	Winston Salem State University
NC A&T State University	UNC-Chapel Hill	

Partners

Kenan Institute for Engineering, Tech. & Science
 Lord Corporation
 North Carolina Department of Public Instruction
 Pisgah Astronomical Research Institute

Advisory Council

NASA Langley Research Center
 Virginia Space Grant Consortium
 Lord Corporation
 UNC Office of the President
 NC DOT, Aviation Division
 NC Museum of Life and Science
 NC Community College System
 Pisgah Astronomical Research Institute

Goals for the NC Space Grant are established in the areas of: Fellowships and Scholarships; Higher Education; Research Infrastructure; K-12 Professional Development; Informal Education and Public Outreach; and Expansion and Growth. A common focus is to expand programs to more citizens of North Carolina, and involve women, underrepresented minorities, and persons with disabilities. These goals and desired outcomes are specific and measurable and have the acceptance of all NC Space Grant participants. While aggressive, they are realistic, can be



achieved in the time frame suggested and are aligned with NASA guiding documents and North Carolina's needs in education and training.

Fellowships and Scholarships

Better equip the future STEM workforce.

- Engage 15-25 students per year in hands-on, aero/space-related research projects with an emphasis on networked collaborations within the consortium, NASA laboratories and shared facilities such as Pisgah Astronomical Research Institute.
- Engage 10-20 students per year in aero/space-related study projects.
- Facilitate positive mentor relationships between 25-45 students and faculty members per year.
- Provide venues for 25-45 students to conduct research presentations annually.

Actively pursue the participation of women, underrepresented minorities, and persons with disabilities.

- Increase the participation of women to 50%, and maintain this percentage participation through 2010.
- Maintain the participation of underrepresented minorities at or above 27.1% through 2010.

Desired Outcomes

- 75% of undergraduates who participate will pursue aero/space-related graduate studies or employment.
- 75% of graduate students who participate will obtain aero/space-related employment.
- Increase the number of yearly awards granted by 100%.
- Significantly improve engineering and science students' training in hardware design and development.

Higher Education

Better equip the future STEM workforce.

- Provide 10-15 extramural, aero/space-related work/study experiences to students per year.
- Facilitate positive mentor relationships between 10-15 students and faculty members per year.
- Provide venues for 10-15 students to conduct research presentations annually.
- Increase the number of extramural, aero/space-related work/study experiences by 50%.
- Participate in the International Masters Program in Aerospace Engineering.
- Develop 4 sustainable interdisciplinary and/or distance learning courses which engage 10-20 students each and are focused on enriching students understanding of complex aero/space issues.
- Coordinate with Space Grant Consortia from other states to generate support for education programs of mutual interest.
- Enhance Pre-College Educators' knowledge of aero/space issues.
- Provide professional development training for 25 pre-college educators per year.
- Engage 100 pre-college educators annually at the NC Space Grant NASA Educator Resource Center Satellite Center.
- Partner, as appropriate, with other organizations to provide pre- and in-service teacher development workshops and training opportunities.

Actively pursue the participation of women, underrepresented minorities, and persons with disabilities.

- Increase the participation of women to 50%.
- Maintain the participation of underrepresented minorities at or above 27.1%.



Desired Outcomes

- 75% of undergraduates who participate will pursue aero/space-related graduate studies or employment.
- 75% of graduate students who participate will obtain aero/space-related employment.
- 75% of training participants will report that their knowledge of aero/space issues has been enhanced. 75% of training participants will report that they will use provided training in their classroom.

Leverage funds with other sources to provide additional support for Higher Education programs.

Research Infrastructure

Enhance the research infrastructure of the educational institutions of the state.

- Provide 5 seed grants per year to new or transitioning faculty members to facilitate their professional development.
- Provide information to consortium institutions on NASA research programs and grants.
- Facilitate research collaborations between NC Space Grant member universities and NASA Field Centers.
- Establish a database of aero/space-related projects and principal investigators in North Carolina.
- Coordinate with Space Grant Consortia from other states to generate support for research programs of mutual interest.

Actively pursue the participation of women, underrepresented minorities, and persons with disabilities.

- Increase the participation of females to 50% of all participants.
- Maintain the participation of underrepresented minorities at or above 27.1%.

Desired Outcomes

- 75% of faculty awarded seed grants will receive promotions within 5 years.
- 75% of faculty receiving seed grants will serve as Principal Investigators on aero/space-related research projects within 5 years.

Leverage funds with other sources to provide additional research development projects.

Informal Education and Public Outreach

Enhance informal educator knowledge of aero/space issues.

- Provide professional development training for 25 informal educators per year.
- Partner, as appropriate, with other organizations to provide informal educator development workshops and training opportunities.

Inform and educate the public on the importance of NASA programs to the United States.

- Provide 5 competitive grants targeted to increasing the public's knowledge of and appreciation of NASA sponsored programs per year.
- Participate in 20 speaking engagements annually.
- Recruit and equip university faculty to inform and educate the public.
- Serve as a resource for the news media on up-to-date aero/space information.
- Serve as a resource for officials in state government on current programs and future trends in aerospace and space science with potential impact to North Carolina.
- Coordinate with Space Grant Consortia from other states to generate support for public service programs of mutual interest.
- Engage 1,000 high school and university students each year by co-hosting annual Space Day and Astronomy Day events.
- Engage 1,000 members of the general public each year by participating in annual Space Day and Astronomy Day events.



Actively pursue the participation of women, underrepresented minorities, and persons with disabilities.

- Increase the participation of females to 50% of all participants.
- Maintain the participation of underrepresented minorities at or above 27.1%.

Desired Outcomes

- 75% of training participants will report that their knowledge of aero/space issues has been enhanced.
- 75% of training participants will report that they will use provided training in an informal education setting (such as museums, science centers, and community organizations).

Leverage funds with other sources to provide additional support for public service projects.

Expansion & Growth

Expand NC Space Grant Membership.

- Increase the geographic footprint of NC Space Grant in North Carolina.
- Add 2 academic members.
- Add 2 industrial members.
- Add 2 non-profit members.
- Add 2 government agency members.

Increase Funding for NC Space Grant.

- Attain "Designated" status.
- Work through the NC General Assembly to obtain annual recurring funds to support the expansion of programs and accessibility throughout the state.
- Pursue supplemental competitive funding opportunities as they arise from NASA and other sources.



**APPENDIX D:
 HIGHER EDUCATION/COURSE DEVELOPMENT PROGRAM
 PROPOSED BUDGET FOR GRANT YEAR 2009
 (March 15, 2009 – March 14, 2010)**

Institution: _____
PI: _____

Budget Category	Requested Funds	Cost-Match	TOTAL
Salaries	\$ _____	\$ _____	\$ _____
Travel	\$ _____	\$ _____	\$ _____
Supplies	\$ _____	\$ _____	\$ _____
Services	\$ _____	\$ _____	\$ _____
Equipment	\$ <u>XXX</u>	\$ _____	\$ _____
Other (Explain)	\$ _____	\$ _____	\$ _____
Indirect Costs*	\$ <u>XXX</u>	\$ _____	\$ _____
TOTALS:	\$ _____	\$ _____	\$ _____

**The NC State University/NASA National Space Grant College and Fellowship Program grant does not cover facilities and administrative costs. Unrecovered facilities and administrative costs may be used for required cost-matching.*

Budget Narrative: