

## Innovative Aerospace Research

NIA conducts a broad range of engineering and scientific research sponsored by NASA, other government agencies, and the aerospace industry. This work is performed by resident engineers and scientists, faculty, graduate students and consultants in eleven principal areas of investigation.

- ➔ Aeronautical Sciences
- ➔ Aerospace Systems
- ➔ Airspace Management & Systems
- ➔ Atmospheric Science
- ➔ Computational Sciences, Modeling, and Simulation
- ➔ Materials Science and Structures
- ➔ Nanotechnology
- ➔ Planetary and Space Sciences
- ➔ Sensors, Actuators, and Photovoltaics
- ➔ Signals, Controls & Adaptive Systems
- ➔ Unmanned Aerospace Systems (UAS)

Research programs led by distinguished faculty in residence at NIA serve as the core of the Institute's academic research program. These programs focus on:

- ➔ Adaptive Aerospace Vehicle Technology
- ➔ Aerospace Systems Design and Analysis
- ➔ Aerospace Vibration and Acoustics
- ➔ Small Satellites Systems Research
- ➔ Integrated Systems Health Management
- ➔ Photonics, Sensors and Solar Energy
- ➔ Planetary Dynamics and Exploration

- ➔ Aerospace Vehicle Dynamics and Control
- ➔ Nonlinear Multivariable Systems Research

Through NIA's University Research Program, faculty and students at the member universities collaborate with NASA research leaders in fundamental investigations in aerospace, mechanical, electrical and systems engineering; materials science; applied mathematics; atmospheric science and other related fields. NIA also collaborates with leading research institutions worldwide, including universities, government laboratories, industry, and other non-profit institutes to accomplish mutual research objectives.

The proximity of NIA to NASA Langley Research Center (LaRC) enables direct involvement of resident research staff, faculty, and graduate students in NASA-sponsored research programs; fosters efficiencies in collaborative efforts; and facilitates access to LaRC's extensive world-class facilities. NASA benefits by enhanced external research partnerships through NIA's capable and flexible workforce.

NIA conducts applied research with and for the aerospace industry. The industry research programs are often collaborative, involving research staff, faculty, students and NASA colleagues. Through NIA, industrial partners can gain access to LaRC personnel, facilities and intellectual property.

## Exemplary Graduate Education

NIA's unique graduate education program offers M.S. and Ph.D. degrees from the member universities. All coursework, including required core courses as well as state-of-the-art electives in new and emerging technologies, is delivered at NIA headquarters on-site and via distance learning.

Students in this program have the opportunity to participate in leading-edge research programs and

take a unique mix of graduate courses not available at any single university. The program offers collaborative credit sharing among the universities so that up to 50% of the student's classes may be from the other participating universities. Students are supervised by faculty-in-residence or by faculty from the home campus.

Distinguished professors-in-residence, liaison professors, visiting and adjunct faculty and on-site research staff create a vibrant intellectual climate. NIA functions as an extended university campus at which students can fulfill all university residency requirements.

Graduate degrees are available in:

- ➔ Aerospace Engineering
- ➔ Atmospheric Science
- ➔ Computer Engineering
- ➔ Computer Science
- ➔ Electrical Engineering
- ➔ Engineering Mechanics
- ➔ Engineering Physics
- ➔ Environmental Science
- ➔ Materials Science and Engineering
- ➔ Mechanical Engineering
- ➔ Ocean Engineering
- ➔ Planetary Science
- ➔ Systems Engineering

## Continuing Education

NIA provides a wide variety of continuing and lifelong educational opportunities for engineers and scientists in the Hampton Roads region, including courses, seminars, colloquia, workshops, and conferences.

In addition to providing opportunities to increase a researcher's depth of knowledge in a specific field, these programs can also be utilized to broaden perspectives and diversify research portfolios. Programs are made available on the NIA website and can be developed in response to specific requirements.

## Inspirational Outreach

NIA develops education programs and implements outreach campaigns that build excitement for NASA and the aerospace community, inspiring the next generation of engineers, researchers and scientists.

CENTER FOR INTEGRATIVE STEM EDUCATION  
NATIONAL INSTITUTE OF AEROSPACE K-12 student competitions, graduate courses in integrative STEM for teachers, and award-winning classroom resources for formal and informal learning environments.

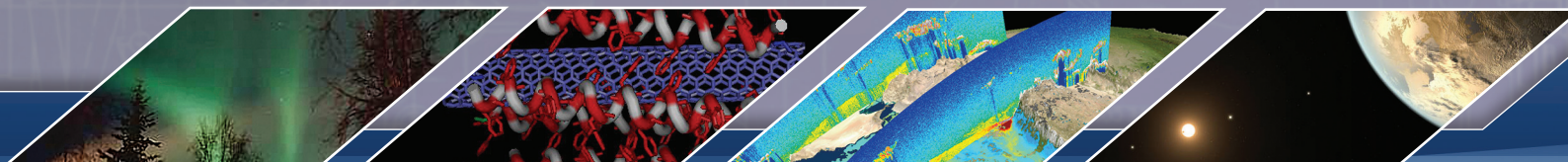
Suite of video programs, including **NASA 360°** live broadcasts, bringing audiences the latest in NASA aeronautics, engineering, and science.

**eClips** Educational videos and teacher resources that help K-12 students see real-world connections to STEM education

90-second radio spots airing nationally Mon-Fri. Promotes innovative research, technologies and the societal impact of NASA's technology investments. **INNOVATION NOW**

**RASC-AL** Undergraduate and graduate level mission architecture, robotics and engineering design challenges.

Problems designed using authentic math topics rooted in real-world science and engineering data. **SpaceMATH** The Next Generation







## National Institute of Aerospace

NIA is a 501(c)3 non-profit research and graduate education institute created in 2002 to conduct leading-edge aerospace and atmospheric research, develop new technologies for the nation and help inspire the next generation of engineers and scientists.

NIA was formed by a consortium of leading research universities. Members include: Georgia Tech, Hampton University, North Carolina A&T State University, North Carolina State University, the University of Maryland, the University of Virginia, Virginia Tech, Old Dominion University, the College of William & Mary, and the AIAA Foundation.

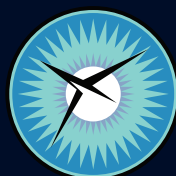
NIA serves as a strategic partner with NASA Langley Research Center and the aerospace community to enable research creativity and expand technology development opportunities. The Institute integrates research and graduate education while creating new government/academia/industry partnerships to solve tomorrow's problems today.

The NIA Research and Innovation Laboratories is a dedicated laboratory building for faculty, student, and staff research, and provides an opportunity for industry and government partners to co-locate on collaborative research and development projects.

Constructed by Virginia Tech with bond funding provided by the Virginia General Assembly on land provided by the City of Hampton, this facility houses a wind tunnel, water tunnel, unmanned aerial vehicles (UAVs) lab, two wet chemistry labs, acoustics lab, nanomaterials lab, computer-aided design center, data center, and a rapid prototyping facility. The facility also houses the Peninsula Technology Incubator, a subsidiary of NIA, and both office and lab space for the Virginia Tech College of Engineering.

### Image on cover:

With our partners, NIA continues to develop novel multifunctional structures and materials for application in aeronautics and space industries.



## National Institute of Aerospace

100 Exploration Way, Hampton, VA 23666

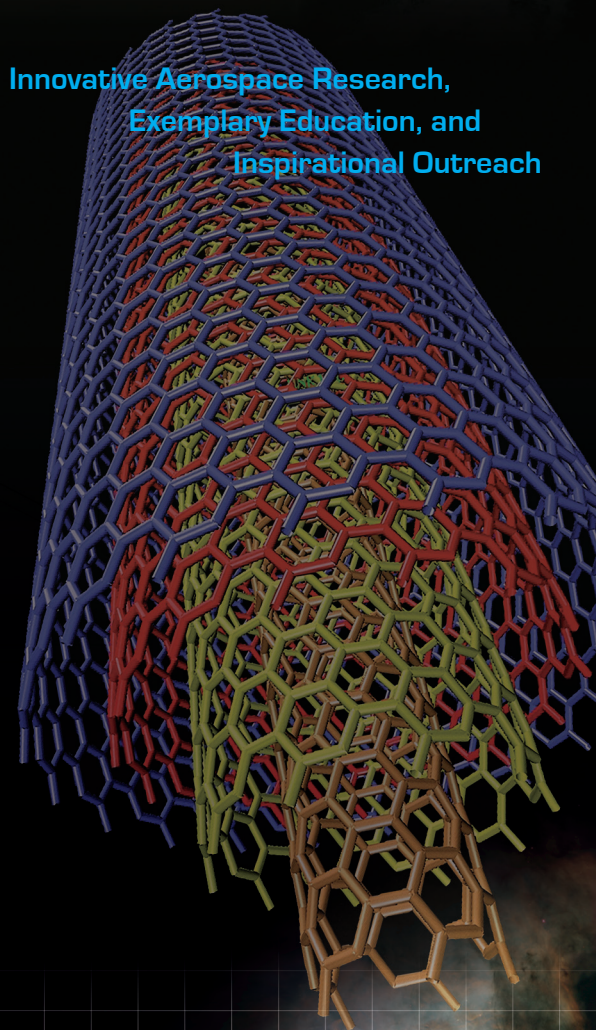
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# NIA

NATIONAL INSTITUTE OF AEROSPACE

Innovative Aerospace Research,  
Exemplary Education, and  
Inspirational Outreach



Innovative Aerospace Research,  
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Outreach

### Our Vision

To be a recognized leader in innovative aerospace research, exemplary education, and inspirational outreach.

### Our Mission

- **Lead and conduct** synergistic research with government, academia and industrial partners to stimulate innovation and creativity;
- **Deliver** unique, collaborative, and comprehensive graduate and continuing education in science and engineering;
- **Inspire** the next generation of aerospace engineers and scientists and provide outreach for the public good;
- **Incubate and commercialize** new intellectual property developed through NIA's research activities.

### Our Objectives

- Establish collaborative research and education centers that are internationally recognized for important intellectual contributions in aerospace-related engineering, science, and technology.
- Remain strategically aligned with NASA Langley and respond to NASA's research and development, education, and outreach priorities as they evolve.
- Develop and grow non-NASA support for research, education and outreach programs, including a robust collaborative research program with the global aerospace industry.
- Collaborate closely with university partners in fulfilling NIA's vision.
- Attract the highest quality researchers, faculty, and students to conduct a collaborative, multi-disciplinary education and research program.

### Our Values

- Our people are our strength;
- Dedication to every stakeholder's success through excellent service;
- Innovation in research and education that impacts future generations;
- Trust and accountability in all relationships;
- We share one vision and act as one team;
- We embrace change and reward innovation.

[www.NIAnet.org](http://www.NIAnet.org)