

UNIVERSITY OF NORTH CAROLINA at GREENSBORO
Request for a New Degree Program

Date: October 9, 2009

CIP Discipline Specialty Title: Physical Sciences, Other
CIP Discipline Specialty Number: 40.9999 Level: B M 1st Prof D
Exact Title of the Proposed Degree: Professional Master of Science in Nanoscience
Exact Degree Abbreviation (e.g. B.S., B.A., M.A., M.S., Ed.D., Ph.D.): M.S.
Does the proposed program constitute a substantive change as defined by SACS? Yes No
a) Is it at a more advanced level than those previously authorized? Yes No
b) Is the proposed program in a new discipline division? Yes No
Proposed date to establish degree program (allow at least 12 months for proposal review):
month January year 2010
Do you plan to offer the proposed program away from campus during the first year of operation?
Yes No

(CIP Discipline Specialty Number can be found at <http://nces.ed.gov/pubs2002/cip2000/>)

I. Description of the Program

A. Describe the proposed degree program (i.e., its nature, scope, and intended audience).

Nanoscience is the “investigation, fabrication and characterization of matter ... structured at dimensions level below 100 nm, which includes manipulation with nanoscopic details and their restructuring.” Nanoscience is by its very nature interdisciplinary. The required educational curriculum is also, by nature interdisciplinary involving various educational curricula within Science, Technology, Engineering, and Mathematics, (STEM).

The proposed Master of Science in Nanoscience will be a Professional Science Master’s (PSM) program designed to provide students with advanced training in science and business as well as practical workplace skills. The program is being established in conjunction with the Joint School of Nanoscience and Nanoengineering (JSNN), established by the University of North Carolina at Greensboro (UNCG) and the North Carolina Agricultural and Technical State University (NC A&T). Although this degree program will be administered by UNCG, students will be able to take courses at both UNCG and NC A&T and it is expected that JSNN will promote extensive collaborative effort among the faculty members of the two Universities and the faculty members of the JSNN, and between the faculty members in the basic and applied sciences.

Traditional thesis Master’s programs are research-oriented where the student specializes in a single discipline. Professional Science Master’s programs have been developed in many science fields and usually involve cross training in more than one academic discipline and are intended to address the needs of high technology industries. The structural concepts for these degree programs have been developed through support from the Sloan Foundation. The proposed degree program follows the model developed for other PSMs and will be among the first PSM degree programs for Nanoscience (Rice University and Arizona State University also have Nanoscience PSMs). This Program is intended to fill the demand for nanoscience professionals articulated in *Challenges Facing Nanotechnology Exploitation* by

C. O. Oriakhi “The highly interdisciplinary nature of nanoscience and nanotechnology poses a significant challenge to academia, government, and industry. One of the immediate challenges facing companies developing nanotechnologies is assembling a team conversant with every aspect of nanoscale science and technology.”

It has been estimated that two million nano-trained workers will be needed world-wide (M.C. Roco, AIChE Journal, 2004). The PSM degree program in Nanoscience will produce highly skilled graduates who will work in fields like manufacturing and technical marketing for high technology companies incorporating aspects of nanotechnology in their products. This non-thesis degree program will help position central North Carolina at the forefront of the next wave of innovation and technology transfer from the laboratory to the manufacturing floor. The explosive growth in this area requires knowledgeable professionals at every point on the product timeline from research to development, manufacturing to marketing. Whereas the Ph.D. in Nanoscience degree program is primarily directed at R&D jobs, the Professional Master of Science in Nanoscience is primarily directed toward the more business-oriented aspects of management, manufacturing and marketing and will help to enable the commercialization of R&D innovations in many industries.

The Professional Master of Science in Nanoscience, is designed for students with strong backgrounds in either science or engineering who seek additional specialized training to qualify them for positions in nanoscience or nanotechnology development or manufacturing companies.

B. List the educational objectives of the program.

The proposed Professional Master of Science in Nanoscience degree program’s objective is to produce graduates who are prepared to directly enter private enterprise activities in nanoscale commercialization, manufacturing and business.

C. Describe the relationship of the program to other programs currently offered at NC A&T and UNCG, including the common use of: (1) courses, (2) faculty, (3) facilities, and (4) other resources.

The proposed program meshes well with both institutions educational and research thrusts in engineering, biology, technology, chemistry, nutrition, computational science and business. Most of the courses for this program will be drawn from courses currently offered by the two Universities. The proposed program also relates well to the doctoral program in Nanoscience that is under development within the Joint School of Nanoscience and Nanoengineering.

The program is not expected to harm other Master’s programs at NC A&T or UNCG because the current Master’s programs are thesis Master’s aimed at producing researchers while the Professional Master’s is aimed at producing trained professionals for positions in technical marketing and manufacturing management.

II. Justification for the Program—Narrative Statement

A. Describe the proposed program as it relates to:

1. The institutional mission and strategic plan. If it is a graduate program, what Research Cluster does it support and how?

This program will directly foster, through its formal internship program, the kind of collaborative relationships emphasized in both institutions' strategic plans, both across disciplines and with other institutions. The proposed program will support many of the current and planned Research Clusters including: (1) Advanced Materials & Nanotechnology (new materials and manufacturing processes); (2) Public Health (health and safety issues of nanomaterials in occupational safety, drug delivery systems, new diagnostic tools); and (3) Biotechnology and Biosciences (new materials & applications of nanoscience in biology, agriculture and medicine).

The availability of trained professionals in nanoscience will be a critical ingredient for growth in this field. The PSM program in Nanoscience will provide technical and business training to enable entrepreneurial skills needed in various nanoscience areas such as nanomaterials, drug design and delivery, genetic screening, biosensors biotechnology, surface engineering, energy, environmental improvement, agricultural enhancement and toxicology.

JSNN Professional Master of Science in Nanoscience is also consistent with the UNC-Tomorrow initiative designed to provide focused direction to future development at each of the 16 campuses of the UNC system. JSNN and its educational program address the "global readiness", "economic transformation and community development", "health", "environment", "outreach and engagement" and "changes to internal policies and processes" aspects of the plan.

The JSNN facility will be located on the South Joint Millenium Campus (on land that was originally part of NC A&T's farm) established as part of the Greensboro Center for Innovative Development (now know as Gateway University Research Park), a collaborative initiative between the two universities. It is our goal to complete the facility in the fall of 2011.

Initially, JSNN will have four technical focus areas including Nanobioscience, Nanometrology, Nanomaterials and Bioelectronics. These technical areas will afford numerous opportunities for collaboration with industrial partners and are expected to provide opportunities for internships for Professional Master of Science students.

2. Student demand

We anticipate the enrollment of five to ten students in this program's first year. There is a huge demand for "nano-trained" workers in the nanoelectronics, biotechnology, medical devices, pharmaceutical, defense and materials industries. It is expected that students will be interested in pursuing the degree as both part-time and full-time students.

After the program is formally established, this program will be advertised regionally and nationally via internet and departmental postings. Also, in the future, a request to establish a distance learning option for the PSM program will be considered.

The goal is to routinely have greater than 30 students entering the program after the third year of existence.

3. *Societal need (For graduate, first professional, and baccalaureate professional programs, cite manpower needs in North Carolina and elsewhere.)*

The Joint School of Nanoscience and Nanoengineering's Professional Master of Science in Nanoscience degree program is designed to produce graduates with advanced training so that they are prepared to enter private enterprise activities in nanoscale commercialization and manufacturing. This is an important need in North Carolina. The diverse array of disciplines in biology, chemistry, physics, engineering, nutrition and technology that are converging to form the interdisciplinary enterprises of nanoscience and nanotechnology are rapidly spawning an array of materials and techniques in research laboratories globally which hold the promise, and increasingly the reality, for new materials and new products. Research laboratories across North Carolina, particularly at its public and private universities, are "leading performers" in quality nanotechnology research and development (*A Roadmap for Nanotechnology in North Carolina's 21st Century Economy*. NC Board of Science & Technology, April 2006). However, the state lags other regions in the commercialization of these nanoscience research efforts in terms of nanotechnology-based business startups and in employment opportunities for North Carolina's citizens that such startups would offer. Commercial opportunities that could flow from the state's research enterprise in nanoscience are particularly bright in the areas of medicine and chemistry. In medicine, nanotechnology promises new drug delivery systems, implantable sensors, and new diagnostic tools offering real-time results. In chemistry, nanoscale catalysts and surface coatings offer lower costs across a wide array of areas from automotive engineering and textiles to petroleum refining and food processing. To make the leap from the research laboratory to new products, and new jobs, requires an educated managerial workforce that comprehends simultaneously (a) the interdisciplinary scientific basis of nanoscience (b) the implications that nanotechnology holds for not only revolutionizing the materials available for presently envisioned products but to see nanotechnology's promise for entirely new classes of products as well (c) the skill set required for managing the nano-manufacturing procedures required to make nano-products; and (d) the ability to communicate an awareness and understanding of nanotechnology to the business and entrepreneurial community in North Carolina. It is the central objective of the Professional Master of Science in Nanoscience degree program to produce such managers for North Carolina businesses and manufacturing operations.

4. *Impact on existing undergraduate and/or graduate academic programs. (e.g., Will the proposed program strengthen other programs? Will it stretch existing resources? How many of your programs at this level currently fail to meet Board of Governors' productivity criteria? Is there a danger of proliferation of low-productivity degree programs at the institution? Is there a potential for this program to be low-producing?)*

We believe this program will strengthen existing undergraduate programs in engineering, the sciences and mathematics, computational sciences, technology, and nutrition by offering an attractive alternative graduate program for the graduates of those programs. Existing resources will be enhanced by the additional faculty to be hired by the JSNN. The committee feels this program will appeal to a wide array of potential students and will not become low producing. Further, the concomitant development of the doctoral program is expected to stimulate interest in nanosciences and to further strengthen enrollment in the professional masters program.

B. Discuss potential program duplication and program competitiveness

1. Identify similar programs offered elsewhere in North Carolina. Indicate the location and distance from NC A&T and UNCG. Include a) public and b) private institutions of higher education.

There are no similar master's programs at other institutions (public or private) in North Carolina.

2. Indicate how the proposed new degree program differs from other programs like it in the University. If the program duplicates other UNC programs, explain a) why is it necessary or justified? and b) why demand (if limited) might not be met through a collaborative arrangement (perhaps using distance education) with another UNC institution? If the program is a first professional or doctoral degree, compare it with other similar programs in public and private universities in North Carolina, in the region, and in the nation.

The Professional Master Science in Nanoscience degree program is designed for students with strong backgrounds in science, engineering or technology, who seek additional specialized training to qualify them for positions in nanoscience or nanotechnology development or manufacturing companies. The technical focus areas of JSNN particularly the emphasis on nanobioscience, will differentiate it from others in the U.S.. The only other Professional Master's Programs in nanoscience are at Rice University and Arizona State University which do not offer a biological focus.

- C. Enrollment (baccalaureate programs should include only upper division majors, juniors and seniors).

Headcount enrollment

Show a five-year history of enrollments and degrees awarded in similar programs offered at other UNC institutions (using the format below for each institution with a similar program; this data can be found at <http://www.northcarolina.edu/content.php/aa/planning/traditional.htm> ; indicate which of these institutions you consulted regarding their experience with student demand and (in the case of professional programs) job placement. Indicate how their experiences influenced your enrollment projections.

There are no similar M.S. programs in nanoscience in the UNC system.

Institution: N/A _____

Program Title: _____

	(year)	(year)	(year)	(year)	(year)
Enrollment					
Degrees-awarded					

Use the format in the chart below to project your enrollment in the proposed program for four years and explain the basis for the projections:

	Year 1 (2010-11)	Year 2 (2011-12)	Year 3 (2012-13)	Year 4 (2013-14)	Year 5 (2014-15)
Full-time	5	10	15	20	22
Part-time	5	10	15	20	23
Total	10	20	30	40	45

Please indicate the anticipated steady-state headcount enrollment after four years:

Full-time 20 _____ Part-time 20 _____ Total 40 _____

SCH production (upper division program majors, juniors and seniors only, for baccalaureate programs).

Use the format in the chart below to project the SCH production for four years. Explain how SCH

projections were derived from enrollment projections (see UNC website

http://intranet.northcarolina.edu/docs/finance/projects/FUNDING_MANUAL.pdf for a list of the

disciplines comprising each of the four categories). The SCH values below are based on (1) the projected

enrollments above; (2) full-time enrolled hours = 9, part-time enrolled hours = 6; and (3) a subject course

composition of: Category IV (engineering) SCHs = 7%; Category III (sciences) SCHs = 52%; Category II

(nutrition & business) SCHs = 34%; Category I (mathematics) SCHs = 7%.

Year 1	Student Credit Hours		
Program Category	UG	Masters	Doctoral
Category I		5	
Category II		25	
Category III		39	
Category IV		5	

Year 2	Student Credit Hours		
Program Category	UG	Masters	Doctoral
Category I		11	
Category II		51	
Category III		78	
Category IV		11	

Year 3	Student Credit Hours		
Program Category	UG	Masters	Doctoral
Category I		16	
Category II		77	
Category III		117	
Category IV		16	

Year 4	Student Credit Hours		
Program Category	UG	Masters	Doctoral
Category I		21	
Category II		102	
Category III		156	
Category IV		21	

III. Program Requirements and Curriculum

A. Program Planning.

1. List the names of institutions with similar offerings regarded as high quality programs.

Rice University
Arizona State University

CNSE of UAlbany (M.S. & Ph.D. programs in Nanoscience as well as Nanoengineering but no Professional Master of Science Degree Programs)

2. *List other institutions visited or consulted in developing this proposal. Also discuss or append any consultants' reports, committee findings, and simulations (cost, enrollment shift, induced course load matrix, etc.) generated in planning the proposed program.*

James Castracane, Ph. D.
Professor, Head-Nanobiosciences
Director of CATN2
College of Nanoscale Science and Engineering
University at Albany-SUNY

B. Admission. List the following:

1. *Admissions requirements for proposed program (indicate minimum requirements and general requirements).*

BS from an accredited institution in science, engineering or technology.

2. *Documents to be submitted for admission (listing or sample).*

Original transcripts of all previous undergraduate and graduate studies, three letters of recommendation & GRE scores

3. *Foreign Students*

In addition to meeting the other criteria, must get a satisfactory score on the Test of English as a Foreign Language (TOEFL) or the IELTS test as an alternate to TOEFL.

It is predicted that students who are otherwise qualified (in terms of GPA, GRE and TOEFL/IELTS scores) to be admitted may have some weaknesses (e.g., in mathematics). These students may be admitted on a provisional basis if background deficiencies are identified that can be corrected early in each student's course of study.

C. Degree requirements. List the following:

1. *Total hours required.* - 33 credit hours
2. *Proportion of courses open only to graduate students to be required in program (graduate programs only).* - 50%
3. *Grades required.*
Students are required to achieve a GPA of 3.0 or above to graduate from the program with no more than six credits below B. If a student receives more than six credits below a grade of B or a failing grade, he/she will be dismissed from the program. Only grades of B or better will count toward the Master of Science degree.
4. *Amount of transfer credit accepted.* - No more than 6 credit hours.
5. *Other requirements (e.g. residence, comprehensive exams, thesis, dissertation, clinical or field experience, "second major," etc.).* - An internship or project (6 credit hours)
6. *Language and/or research requirements.* - none
7. *Any time limits for completion.* - five successive calendar years.

- D. *List existing courses by title and number and indicate with an (*) those that are required. Include an explanation of special numbering system. List (under a heading marked “new”) and describe new courses proposed*

Disciplinary Foundation Courses (9 credits). These are courses that build on the undergraduate degree to ensure appropriate depth of knowledge in the student’s discipline. Appropriate courses will be selected with a student’s program advisor. These graduate level courses will come from offerings at both North Carolina A&T State University and the University of North Carolina at Greensboro. If the course is currently taught, there is an (E). If the course is new then there is an (N). The university offering the course is in parenthesis. It is expected that appropriate courses will be added to the list below as they become available with the approval of the UNCG Graduate Council and the Dean of JSNN.

1. Physics

PHYS 620 Quantum Mechanics I (E) (NC A&T)
PHYS 615 Electromagnetic Theory I (E) (NC A&T)
PHYS 630 Statistical Mechanics (E) (NC A&T)
PHYS 737 Physics of Solids (E) (NC A&T)

2. Chemistry

CHE 632 Advanced Analytical Chemistry I (E) (UNCG)
CHE 641 Advanced Inorganic Chemistry I (E) (UNCG)
CHE 553 Advanced Organic Chemistry (E) (UNCG)
CHE 661 Advanced Physical Chemistry I (E) (UNCG)

3. Nutrition

NTR 625 Gene Expression and Protein Metabolism (E) (UNCG)
NTR 626 Energy, Carbohydrate, Lipid Metabolism (E) (UNCG)
NTR 627 Antioxidants and Bioactive Food Components (E) (UNCG)
NTR 628 Vitamins and Minerals (E) (UNCG)

4. Mathematics

MAT 695 Real Analysis (E) (UNCG)
MAT 546 Partial Differential Equations with Applications (E) (UNCG)
MAT 624 Numerical Analysis (E) (UNCG)
STA 651 Mathematical Statistics (E) (UNCG)

5. Computational Sciences

CSC 640 Software Design (E) (UNCG)
CSC 656 Foundations of Computer Science (E) (UNCG)
CSC 653 Advanced Theory of Computation (E) (UNCG)
CSC 671 Advanced Database Systems (E) (UNCG)

6. Biology

BIO 504 Advanced Topics in Cell Biology (E) (UNCG)
BIO 595 Advanced Genetics (E) (UNCG)
BIO 543 Biophysics
BIO 540 Genes and Signals (E) (UNCG)

7. Engineering

ELEN 805 Thin Film Technology for Device Fabrication (E) (NC A&T)

ELEN 614 Integrated Circuit Fabrication Methods (E) (NC A&T)
CHEN 655 Nanostructured Materials and Engineering Applications (E) (NC A&T)

8. Technology

ECT 614 Microelectronics Fabrication Technology (E) (NC A&T)
MFG 651 Principles of Robotics (E) (NC A&T)
MFG 674 Advanced Automation and Control (E) (NC A&T)
MFG 760 Advanced Manufacturing Process/CNC (E) (NC A&T)
MSIT 673 Industrial Productivity Measurement and Analysis (E) (NC A&T)
MFG 770 Managing a Total Quality System (E) (NC A&T)
MFG 780 Reliability Testing and Analysis (E) (NC A&T)
MSIT 779 Statistical and Research Methods in Industrial Technology I (E) (NC A&T)
TRAN 727 Global Supply Chain Management (E) (NC A&T)

Nanoscience Survey Courses (9 credits). The student will take three courses that will introduce them to fundamental concepts, methods, and discoveries in different areas of Nanoscience (These survey courses are being created for the proposed Ph.D. in Nanoscience.)

1. Nanophysics

This course will cover such topics as elements of quantum mechanics, electrodynamics, statistical mechanics, optics, electronics; limits of smallness; quantum nature of the nanoworld; and quantum consequences for the macroworld. The course will also review the transition of physical laws from classical mechanics to quantum mechanics as size approaches the atomic scale. The relationship of fluctuations at the nanoscale and macro behavior and the interaction between electromagnetic waves and matter at the nanoscale will also be covered. Principles of the instruments used to study nanophenomena will also be reviewed. Upon completion of the course, the successful student will have an understanding of the fundamentals of nanophysics and different characteristics that can be achieved at the nanoscale. The student will also learn about the equipment and industrial applications of nanophysics.

2. Nanochemistry

This course will teach students about the fundamentals of nanochemistry and the techniques of nanomaterial synthesis. Course topics include formation methods for Nanorods, Nanotubes and Nanowires, Self-Assembly topics such as microporous and mesoporous materials from soft building blocks, self-assembling block copolymers and self-assembly of large building blocks, Chemical patterning and Lithography. The controlled generation of materials with characteristic features on the nano-scale level will be the main focus. A survey of current progress in the preparation of nanomaterials with applications in drug delivery techniques, and in biomimetics applications will be covered. Upon completion of the course, the successful student will have an understanding of the breadth of nanochemistry applications and an understanding of the methods and techniques employed by nanochemists.

3. Nanobioscience

This course will focus on interdisciplinary studies of biological molecules, systems and processes on a nanoscale level, based on the principles and concepts of physics, chemistry, biology, math and engineering. It will concentrate on recent advances in nanobiology: the development and applications of nanoparticles, and nanodesigns of materials with biological

properties; new strategies for measuring nanodimensions, simulating, manipulating and studying biomolecules, biochemical interactions in living cells, between cells, in biological systems and in response to external stimuli; the inventions and uses of novel biosensors and imaging agents as diagnostic tools for detecting disease, microorganisms, or monitoring the environment. Upon completion of the course, the successful student will have an understanding of the convergent nature and the underlying fundamentals of nanobioscience as well as the broad variety of current applications of nanobioscience.

4. Nanotechniques

An introduction to techniques used in microscopy and analysis. Methods such as Scanning probe microscopy: Basics of SPM, Scanning tunneling microscopy, Near-field scanning optical microscopy (NSCOM); X-ray diffraction: Structural characterization of the nanomaterials, High-resolution diffraction, Reflectometry, Small-angle X-ray scattering and line profile analysis; Electron Microscopy: Electron optical system, Electron range, Scanning electron microscopy (SEM), Environmental SEM (ESEM), Transmission electron microscopy (TEM) Environmental TEM (ETEM) Electron energy loss spectroscopy (EELS), Electron Probe Micro Analysis or Energy Dispersive X-ray spectroscopy (EDS/EDX) and Electron Diffraction. Upon completion of the course, the successful student will have an understanding of the fundamentals of analytical techniques and the training to use charge particle microscopes as well as chemical analytical equipment.

9 hours of business/management courses. Possible courses include (NCATSU & UNC-G):

1. MBA 600: Business Statistics (1.5 hrs) (E) (UNCG)
2. MBA 601a: Fundamentals of Entrepreneurship (1.5 hrs) (E) (UNCG)
3. MBA 602: Presentation and Interpretation of Financial Statements (1.5 hrs) (E) (UNCG)
4. MBA 606: Marketing Management (E) (UNCG)
5. MBA 607: The Operations Function (1.5 hrs) (E) (UNCG)
6. MBA 603: Economic Analysis (1.5 hrs) (E) (UNCG)
7. MBA 615: Leadership Assessment and Development (1.5 hrs) (E) (UNCG)
8. BUAD 712: Foundations of Enterprise Management (3 hrs) (E) (NC A&T)
9. ACCT 708: Seminar in Financial Concepts (3 hrs) (E) (NC A&T)
10. BUAD 705: Seminar in Business Analysis (3 hrs) (E) (NC A&T)

6 credit hours of internship in an appropriate private or public enterprise engaged in research, commercialization or manufacturing or **6 credit hours of Project** on an appropriate subject.

IV. Faculty

- A. *List the names of persons now on the faculty who will be directly involved in the proposed program. Provide complete information on each faculty member's education, teaching experience, research experience, publications, and experience in directing student research, including the number of theses and dissertations directed for graduate programs. The official roster forms approved by SACS can be submitted rather than actual faculty vita.*

Graduate faculty from the physics, engineering, technology, chemistry, and business programs at NC A&T or UNCG were involved in the development of this proposal. They are:

Faculty	Title	Department/School/College	Phone
AbdellahAhmidouch	Associate Professor/Chair	Physics/College of Arts and Sciences, A&T	(336) 285-2105
David W. Aldridge	Professor/Associate Dean	Biology/College of Arts & Sciences for Research & Graduate Studies, A&T	(336) 334-7807
Phillip Bowen	Professor & Director, Center for Drug Discovery	Chemistry & Biochemistry/College of Arts & Sciences, UNCG	(336) 334-4257
Steven Danford	Associate Professor	Physics & Astronomy/College of Arts & Sciences, UNCG	(336) 334-3308
Roger J. Gagnon	Associate Professor/Director of MS in Management Program	Business Administration/School of Business & Economics	(336) 334-7656
Margaret I. Kanipes	Associate Professor	Chemistry/College of Arts and Sciences	(336) 285-2233
Jagannathan Sankar	Professor	Mechanical & Chemical Engineering/College of Arts & Sciences	(336) 256-1151
Donald C. Crickard	Associate Dean	Bryan School, UNCG	(336) 334-5338
James G. Ryan	Dean	JSNN	(336) 217-5128
Ji Y. Shen	Associate Professor/Acting Chair	Manufacturing Systems/School of Technology	(336) 334-7116

In addition to the 12 faculty who will be hired by JSNN, graduate faculty from the physics, engineering, biology, chemistry, and computational science programs at NC A&T or UNC-G will be affiliated with JSNN and are likely to interact with Professional M. S. in Nanoscience students. A representative list of affiliated faculty is shown below and resumes are included in Appendix A.

- At NC A&T State University: Abdellah Ahmidouch, Zerihun Assefa, Sunyoung Bae, Solomon Bililign, Goldie Byrd, Samuel Danagoulian, Gregory Goins, Shanthi Iyer, Margaret Kanipes, Ajit Kelkar, Debasish Kuila, Patrick Martin, Perpetua Muganda, Mary Smith, Divi Venkateswarlu
- At UNCG: Norman H. L. Chiu, Alice Haddy, Edward Hellen, Yashomati Patel, Promod Pratap, Patti Reggio, Joseph Starobin, Yousef Haik
- JSNN: James G. Ryan

B. Estimate the need for new faculty for the proposed program over the first four years. If the teaching responsibilities for the proposed program will be absorbed in part or in whole by the present faculty, explain how this will be done without weakening existing programs.

The only new faculty will be those required for teaching the nanoscience survey courses which are also being developed for the Ph.D. program in nanoscience. The projected enrollment in this program will not be so large as to have any detrimental impact on quality in the physics, engineering, computer science, biology, chemistry, business, nutrition, mathematics and computational science programs at A&T or UNC-G.

C. If the employment of new faculty requires additional funds, please explain the source of funding and if approval has been obtained to use these funds.

The costs for the additional new faculty in nanoscience are included in the Ph.D. program's proposal.

- D. Explain how the program will affect faculty activity, including course load, public service activity, and scholarly research.*

This program will engage the faculty at NC A&T and UNCG in the rapidly expanding areas of nanoscience and nanotechnology which have broad applicability in science, medicine and manufacturing. Expanded faculty engagement in nanoscience will increase opportunities for public service activity and scholarly research in this important area. This non-thesis program's impact on course loads for faculty should be minimal since it relies primarily on existing courses. The major additional load would be advising students enrolled in the program's internship courses.

V. Library

- A. Provide a statement as to the adequacy of present library holdings for the proposed program.*

Current library holdings at NC A&T and UNC-G are adequate for the proposed M.S. program.

- B. State how the library will be improved to meet new program requirements for the next five years. The explanation should discuss the need for books, periodicals, reference material, primary source material, etc. What additional library support must be added to areas supporting the proposed program?*

N/A

- C. Discuss the use of other institutional libraries.*

VI. Facilities and Equipment

- A. Describe facilities needed for the proposed program. What space is presently available to be relocated for the proposed program and what new space will be needed? Include faculty and staff office needs in the discussion.*

A new building for the Joint School of Nanoscience and Nanoengineering including the Professional Master of Science in Nanoscience degree program has been funded by the North Carolina General Assembly. That action also funds new equipment for the program.

- B. Describe the effect of this new program on existing facilities and indicate whether they will be adequate, both at the commencement of the program and during the next decade.*

The new building and existing facilities at NC A&T, UNCG and Gateway University Research Park will provide adequate facilities for the proposed M.S. to both start this program and sustain it over the next decade.

- C. Discuss any information technology services needed and/or available.*

This non-dissertation, M.S. program will require only IT facilities that are currently available at UNCG.

- D. Discuss sources of financial support for any new facilities and equipment.*

The building and new equipment for the nanoscience program have been funded by the NC General Assembly.

VII. Administration

Describe how the proposed program will be administered, giving the responsibilities of each department, division, school, or college. Explain any inter-departmental or inter-unit administrative plans. Include an organizational chart showing the "location" of the proposed new program.

Mission and Management

North Carolina A&T State University and the University of North Carolina at Greensboro have agreed to a specific management plan and administration for the **NC A&T/UNCG Joint School of Nanoscience and Nanoengineering**. An outline of the important operational principles and policies are listed below:

Mission and Organizing Principles

Mission. The mission of the JSNN is to train students to conduct basic and applied research in nanoscience and nanoengineering; offer interdisciplinary Master of Science and Ph.D. degrees and a Professional Master of Science in Nanoscience degree; enhance the access of undergraduate and K-12 students to the fields of nanoscience and nanoengineering; provide nanoscience and nanoengineering training for scientists and engineers already in the workforce; engage in activities that influence economic development locally and globally; and support the entrepreneurial activities at both campuses to better transfer innovation to practice.

Organizing Principles. NCA&T and UNCG are committed to the principle that the JSNN is a shared academic unit of the two institutions in terms of governance and management. NC A&T will be the home institution for nanoengineering faculty, students and the nanoengineering curriculum and degree programs. For the purposes of this agreement, the joint appointment of a Mathematics faculty member between NC A&T's Mathematics Department and JSNN will be part of the JSNN Nanoengineering department and have NC A&T as the faculty member's home institution. The nanoengineering degrees will be awarded by NC A&T. UNCG will be the home institution for nanoscience faculty, students and the nanoscience curriculum and degree programs. The nanoscience degrees will be awarded by UNCG. The JSNN will have the same status as other colleges/schools at the respective partner universities. The School will be housed on the South Campus of the Gateway University Research Park, a collaborative initiative between the two universities. Neither university may commit the JSNN to any activity, service, or other obligation, financial or otherwise, without the written consent of the other partner university.

Organizational Chart with primary features described below

Administration of the JSNN

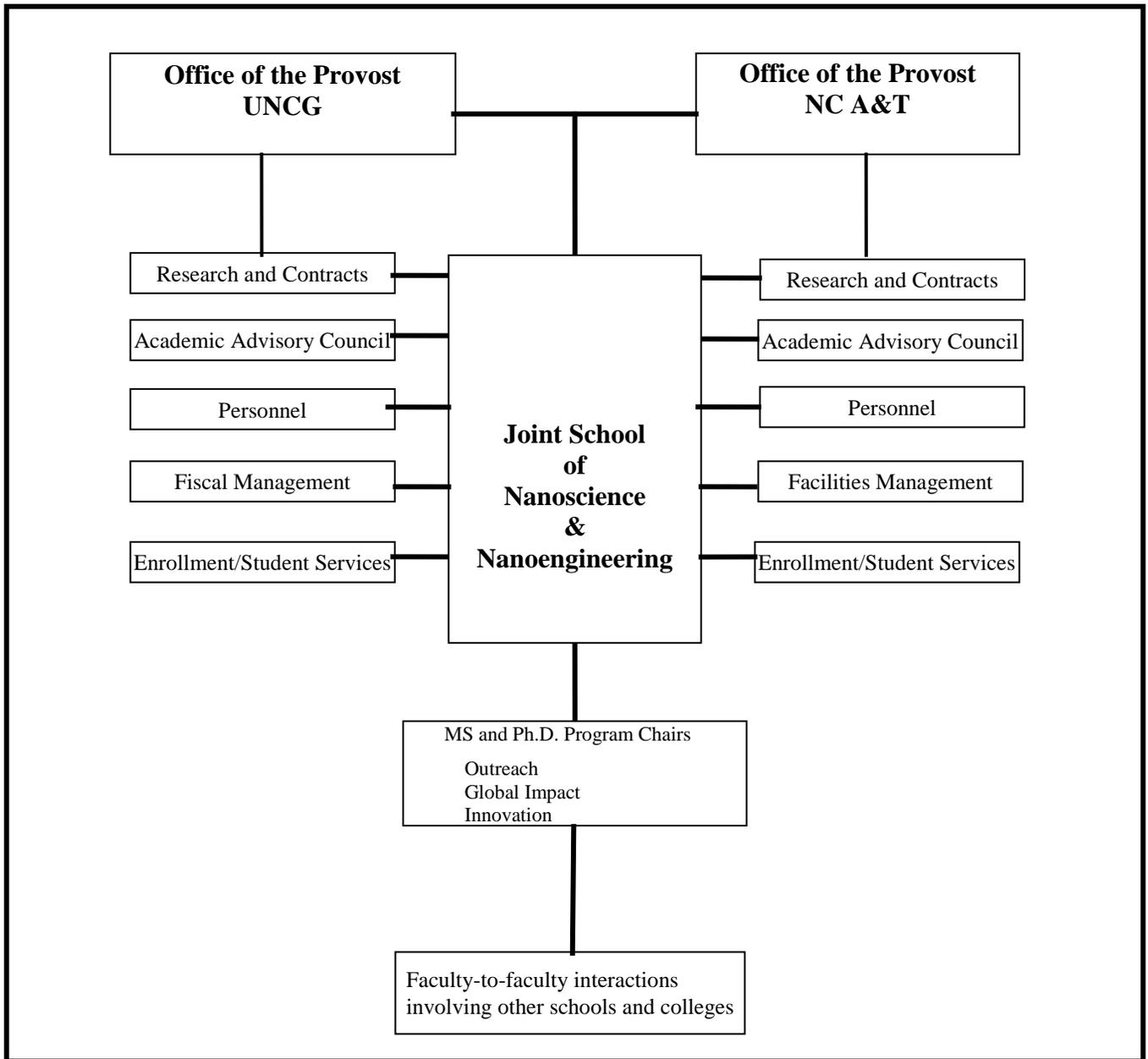
The Dean of JSNN will be appointed by and report to the Provosts of NCA&T and UNCG. The Dean will be responsible for providing academic and administrative leadership for JSNN. A JSNN Academic Advisory Council, composed of the Chief Academic Officers, the Chief

Research Officers, the Graduate School Deans, the Dean of Arts and Sciences of UNCG and the Dean of Engineering of NCA&T at the partner universities will meet at least once each semester to advise the Dean on issues of mission and management. A JSNN Industrial Advisory Board, appointed by the Dean to represent regional interests in nanoscience and nanoengineering, will meet at least once each semester to advise the Dean on issues of regional and state needs.

Internal Organization

JSNN's academic departments and offices will report to the Dean following expected academic organizational structure and have all rights and responsibilities as other academic departments in other schools/colleges at the partner universities. JSNN may collaborate with any other schools or departments at the partner universities to develop shared curricula, research, service, or other mission-related activities following established policies and procedures governing such collaborations. The Dean of JSNN will be responsible for working with the appropriate administrators from the partner institutions to develop transition processes for fiscal, personnel, curricular, research administration, and student management matters as needed during JSNN's start-up period.

Organizational Chart



The following subsections relate to how the administrative tasks will be shared between the two partner campuses

Facilities. JSNN will be housed in a new building to be built and managed by the Gateway University Research Park on the South Joint Millennium Campus under the terms of the existing Management Services and Development Agreement between North Carolina A&T State University and the University of North Carolina at Greensboro. Dean Ryan, our founding dean,

is currently located in space leased on the South Campus in the USDA Building until the JSNN building is constructed on the South Campus.

Fiscal Management. UNCG will act as the financial manager for JSNN beginning in fiscal year ‘09-‘10, using a budget account code established for the JSNN. JSNN will follow all UNCG budget and fiscal management policies and procedures. The budget for the JSNN must be approved by the NCA&T and UNCG Provosts. An annual internal audit of the JSNN will be provided to the partner institutions for review by the Provosts and Chief Financial Officers of NCA&T and UNCG. NC A&T will be designated as the campus responsible for the upkeep of the buildings, but upon receipt of the Building Operation and Maintenance money for JSNN, will transfer the money to Gateway University Research Park in accordance with the Management Services and Development Agreement between Gateway, NC A&T and UNCG. In matters related to building and room inventory, JSNN’s space will be designated as owned by NC A&T (including laboratories, classrooms, offices and common space).

- JSNN will provide a course location file to NC A&T and to UNCG for reporting purposes
- Information for the items titled “Institution Owning Instruction in a Joint Program” and “Site of Instruction” listed in the “Joint Program Reporting Requirements – The University of North Carolina” dated December 1, 2008 will be provided by JSNN to NC A&T and UNCG for reporting purposes.
- JSNN will also provide to NC A&T and UNCG the coding of Student Course File (SCF) and Course Description Table File (CDTF). The coding will be done as required by the document “Joint Program Reporting Requirements – The University of North Carolina” dated December 1, 2008
- GA will provide assistance with coding inventory for buildings and space.

Personnel Management. NCA&T will be considered the home institution for Nanoengineering faculty, staff and students. All Nanoengineering faculty and staff will be NC A&T employees and are subject to NC A&T policies and procedures for position classification, compensation, benefits, sick leave, and other human resource provisions. UNCG will be considered the home institution for Nanoscience faculty, staff and students. All Nanoscience faculty and staff will be UNCG employees and are subject to UNCG policies and procedures for position classification, compensation, benefits, sick leave, and other human resource provisions. The Dean of JSNN will be a tenured faculty member at NC A&T and UNCG representing both universities equally. The administration of the Dean’s compensation, benefits, sick leave and other human resource issues will be administered through NC A&T.

Enrollment/Student Services. NC A&T will administer all student services and enrollment management functions (such as admissions, financial aid, registration, transcripts, international students, and grievance policies) for Nanoengineering students. UNCG will administer all student services and enrollment management functions (such as admissions, financial aid, registration, transcripts, international students, and grievance policies) for Nanoscience students. Any Enrollment Growth funds associated with either Nanoengineering or Nanoscience students received by NCA&T or UNCG respectively will be deposited in the JSNN accounts.

Tuition/fees. The tuition for Nanoengineering and Nanoscience students will be determined by NCA&T and UNCG respectively. Students will pay the fees appropriate for their home institution and receive the privileges of other students at their institution. The fees will go to the institutions for services provided by them (e.g. Activities Fee), or retained by JSNN for services it will provide (e.g. E&T related items). Revenues will be collected by the cashiers at NCA&T and UNCG. The tuition and fee rate approvals will follow General Administration required policies and procedures.

Grant Administration. Grant submission and administration for the faculty and staff of JSNN will be managed by their respective home institutions. Any grants obtained by the Dean may be administered and managed by either NC A&T or UNCG. Faculty will use the RAMSeS electronic research administration software that has been implemented at both institutions for grant submission. F&A rates charged to the grants will be the rate in use by institution administering and managing the grant. Further:

- Grants obtained by JSNN faculty or staff will be credited to their home university. In those instances when grants are submitted by both nanoengineering and nanoscience faculty/staff, the crediting will be shared with both campuses in a manner consistent with the level of responsibility of the participants. The value of the grants will be reported the same way.
- F&A from JSNN grants will be distributed as follows: 20% will go to JSNN and the remainder kept at the home institution of the investigator. JSNN will determine the distribution of the 20% between departments and PIs.
- For Grants obtained by the Dean, 20% of the F&A will go to JSNN to be internally distributed by the Dean and the remaining 80% will be split equally by the two universities.

Management of Compliance at JSNN

JSNN faculty will go through an appropriate review committee (if required in order to carry out certain types of research activities) at the PI's home institution. If no appropriate committee is active at the PI's home institution, then a review of an appropriate committee at the partner institution will be sought. Committee review will be sought in the following cases:

- Work involving animals,
- Work involving human subjects,
- Use Radioactive materials,
- Use of biohazardous materials,
- Resolving conflicts of interest and
- Managing export control.

Faculty and staff may participate in training programs at either campus.

JSNN will hire safety personnel who will work with the safety personnel of both institutions in order to address safety issues locally at the JSNN facility in a manner consistent with the practices and policies of both institutions.

Management of Intellectual Property at JSNN

- JSNN faculty should use the Office of Technology Transfer at their home institution. If the Dean of JSNN is the PI of a research program that generates a patent application or commercialization opportunity, then the Dean should use the Office of Technology Transfer at the institution which administers the grant associated with the patent application or commercialization opportunity. In the event that the patent application or commercialization opportunity is not related to an ongoing grant, then the Dean may choose the Office of Technology Transfer at either NC A&T or UNCG.
- Any fees or patent costs for intellectual property-related activities for JSNN faculty will be paid by NCA&T or UNCG as appropriate.
- The home institution of the inventing JSNN PI will own the right to license any intellectual property developed by the JSNN faculty or staff member. Intellectual property developed by JSNN personnel will be automatically cross-licensed by the PI's home institution to the partnering institution. The partnering institution will not have the right to sublicense the intellectual property of its partner, but will have the right to use the intellectual property in its research activities.

Administrative Services. It is expected and understood that JSNN will compensate the institution that provides the aforementioned administrative services.

Administrative, Teaching, and Research Personnel

Dean Appointment

The dossier of any externally-hired dean will be forwarded by each Provost to their respective campus P&T committees for review and recommendation. The dean is tenured as a faculty member at both institutions. The dean's performance will be reviewed annually by both provosts. The position is classified within the UNC System as a Senior Academic and Administrative Officer (SAAO).

JSNN Faculty Appointments. All JSNN faculty (ranked, tenured, tenure-track, non-tenure track) will hold appointments in JSNN and either UNCG or NC A&T or both.

Joint Faculty Appointments. Any UNCG or NCA&T faculty who wish joint appointments at JSNN will follow established UNC and relevant institutional policies. Similarly, JSNN faculty may hold joint appointments at NC A&T and/or at UNCG following established UNC and relevant institutional policies and procedures.

Faculty Committees/Governance. JSNN faculty will be expected to establish appropriate JSNN committees for admissions, curriculum and search and will have all governance rights and responsibilities as faculty at either partner institution. JSNN faculty will have the appropriate representation as any other school/college on NCA&T and UNCG Faculty Senates. JSNN

faculty will follow established university system policies employed by their home institutions for issues involving due process, grievance, and promotion and tenure.

Campus Representation. JSNN will have the same representation as any other school/college at either partner institution for all other campus functions and activities (such as alumni events, development, strategic planning, and assessment).

Faculty Privileges. JSNN faculty will have faculty privileges (such as IT, parking, bookstore, recreation) at their home institutions. All JSNN faculty will have faculty privileges at both the NC A&T and UNCG libraries.

Reappointment, Promotion and Tenure Criteria and Procedures. JSNN's Nanoengineering faculty will follow established university system policies employed by NC A&T for issues involving promotion and tenure. JSNN's Nanoscience faculty will follow established university system policies employed by UNCG for issues involving promotion and tenure. As is the case with other schools/colleges in the UNC System, JSNN may develop policies that assist in implementing the campus-wide policies in JSNN such as establishing standards for reappointment, promotion and tenure and standards for post-tenure review which are consistent with those of the faculty members' home campuses.

Appeals of Reappointment Denial. In cases of nonreappointment, the appropriate faculty committee for the individual's home institution will hear any appeal consistent with the practices and policies of the home institution with the guidance of the home institution's Chancellor and Provost.

Grievance for Tenure Denial. In cases of denial of tenure by the faculty member's home institution, JSNN faculty members will follow the faculty member's home institution's established procedures for hearing the grievance.

Grievance for Promotion Denial. In cases of denial of promotion by the faculty member's home institution, JSNN faculty members will follow the faculty member's home institution's established procedures for hearing the grievance.

Post-Tenure Review of JSNN Faculty. JSNN will establish its own post-tenure review standards for Nanoengineering and for Nanoscience and will be consistent with the Post-Tenure Review policy and procedure of the home institutions. The procedure for Nanoengineering must be approved by the NC A&T Board of Trustees, Faculty Senate, and Provost. The procedure for Nanoscience must be approved by the UNCG Board of Trustees, Faculty Senate, and Provost. The policy and procedures shall be consistent with the Board of Governors policy, "Performance Review of Tenured Faculty" (Policy 400.3.3), and its corresponding guidelines (400.3.3.1[G]), as it may be amended from time to time.

Due Process Before Discharge or Serious Sanctions. A JSNN faculty member who is the beneficiary of institutional guarantees of tenure as defined by the UNC Code may be discharged, suspended or other sanction imposed only by following the established policies of the faculty member's home institution. Discharge may be for reasons of incompetence, neglect of duty, or

misconduct of such a nature as to indicate that the individual is unfit to continue as a member of the faculty. Such penalties may be imposed only upon the agreement of the Provost of the faculty member's home institution, who will send the faculty member a written statement of intention to discharge the faculty member. The statement shall include the written specification of the reasons for the intended penalty and notice of the faculty member's right, upon request, to a hearing by the faculty Committee on Due Process of the faculty member's home institution. The Committee on Due Process of the faculty member's home institution will provide a hearing, and participation in hearings. Recommendations of the faculty Due Process Committee will be forwarded to the Chancellor of the home institution. Subsequent appeals will be addressed by the home institution Board of Trustees.

When a faculty member has been notified of the decision to discharge the faculty member, he or she may be reassigned duties or suspended with pay at any time (and the suspension continued until a final decision concerning discharge has been reached). A suspension with pay requires agreement by the Chancellor of the faculty member's home institution. All decisions and procedural steps in regard to discharge and serious sanctions must be consistent with Section 603 of the UNC Code, as it may be amended from time to time.

Termination of Faculty Employment due to Financial Exigency or Program Curtailment.

The tenure policies of the JSNN shall provide that the employment of faculty members with permanent tenure or faculty members appointed to a fixed term may be terminated consistent with the respective home institution termination policy/process because of (1) demonstrable, bona fide institutional financial exigency or (2) major curtailment or elimination of a relevant teaching, research, or public-service program. The determination of either of these conditions shall be made by the Chancellor of the faculty member's home institution, after consulting with the academic administrative officers and faculties as required by the Code of the Board of Governors, Section 605 C(1), as it may be amended from time to time, subject to the concurrence by the President and approval by the Board of Governors. All procedures for termination must also be consistent with Section 605, as it may be amended from time to time.

Hearing of Faculty Grievances. JSNN faculty will use the established Faculty Grievance Committee of his/her home institution.

Curriculum/Degrees

Degrees. Nanoengineering degrees will be awarded by NC A&T. Nanoscience degrees will be awarded by UNCG. Faculty and graduates may attend the commencement ceremonies of their home institutions. For degree productivity, graduates will be counted by their home institutions.

Curriculum Approval Process. JSNN courses and curricula will be approved by the appropriate JSNN curriculum committee and forwarded to the home institution for the curriculum (i.e. NC A&T for Nanoengineering and UNCG for Nanoscience) for review and approval through established curricular approval processes. Any conflicts will be resolved by the Provost of the home institution.

Course Offerings. Students may enroll in JSNN courses and/or dual-listed NCA&T or UNCG courses following established consortium registration and enrollment procedures. Student Credit Hours (SCHs) will follow enrollments.

Coordination. Under the principle of “complementing strengths at both campuses”, neither JSNN nor either of the partner institutions will offer courses or programs for JSNN that duplicate each other’s courses or programs.

Support Services.

Library. Library services for faculty and students will be offered jointly by the two partner universities under the terms of an agreement developed by the two library directors and approved by both Provosts.

Information Technology. IT services for faculty and students will be offered by their home institutions. The Dean of JSNN will have access to both University systems and will use an email address indicating the partnership.

Student Services. NC A&T will coordinate access to student support services for JSNN Nanoengineering students. UNCG will coordinate access to student support services for JSNN Nanoscience students. Student IDs will be issued by the student’s home institution to access student services.

Article 7. Contingency

In the unlikely event the JSNN is closed:

Faculty. Should the School be closed, tenured faculty would be relocated at their home institutions under existing UNC policies. Non-tenured faculty and EPA non-teaching staff will be subject to the policies and procedures of the individual’s home institution.

Students. Students would be allowed to complete their programs of study under a closure plan based on existing UNC and partner institutions’ policies.

Facilities/Equipment. Although most buildings and equipment associated with JSNN are expected to be owned by Gateway University Research Park, any building(s) and equipment owned by JSNN would be reallocated by agreement between the two Provosts and Chancellors in keeping with the existing Gateway University Park Management Services and Development Agreement.

Article 8. Amendments/Modification

Agreement modification. The Management Agreement can be amended or modified by mutual agreement between the two partner universities.

VIII. Accreditation

Indicate the names of all accrediting agencies normally concerned with programs similar to the one proposed. None Describe plans to request professional accreditation. None

IX. Supporting Fields

Are other subject-matter fields necessary or valuable in support of the proposed program? Is there needed improvement or expansion of these fields? To what extent will such improvement or expansion be necessary for the proposed program?

The projected enrollment in this program will not be so large as to require any improvement or expansion, aside from the normal growth funding generated by SCHs, of the physics, engineering, technology, computer science, biology, chemistry, business, nutrition, mathematics and computational science programs at NC A&T or UNC-G over the next decade and the funding of the recurring budget of JSNN.

X. Additional Information

Include any additional information deemed pertinent to the review of this new degree program proposal.

XI. Budget

Provide estimates (using the attached Excel spreadsheet) of the additional costs required to implement the program and identify the proposed sources of the additional required funds. Use SCH projections (section II.C.) to estimate new state appropriations through enrollment increase funds. Prepare a budget schedule for each of the first three years of the program, indicating the account number and name for all additional amounts required. Identify EPA and SPA positions immediately below the account listing. New SPA positions should be listed at the first step in the salary range using the SPA classification rates currently in effect. Identify any larger or specialized equipment and any unusual supplies requirements.

Year 1	Student Credit Hours & FTE Equivalents		
Program Category	UG	Masters	FTE Equivalent
Category I		5	0.029
Category II		25	0.082
Category III		39	0.201
Category IV		5	0.055
Total			0.367

Year 2	Student Credit Hours & FTE Equivalents		
Program Category	UG	Masters	FTE Equivalent
Category I		11	0.064
Category II		51	0.168
Category III		78	0.401
Category IV		11	0.122
Total			0.755

Year 3	Student Credit Hours & FTE Equivalents		
Program Category	UG	Masters	FTE Equivalent
Category I		16	0.094
Category II		77	0.253
Category III		117	0.602
Category IV		16	0.177
Total			1.126

Budget for first 3 Years of M.S. Program* Paid from the JSNN budget.

Item	Year 1	Year 2	Year 3
61210 – SPA Administrative Assistant	\$27,000	\$27,000	\$27,000
SPA Fringe Benefits	\$6,480	\$6,480	\$6,480
76592 – Graduate Stipends	\$100,000	\$200,000	\$300,000
Total	\$133,480	\$233,480	\$333,480

* Assumes the costs for the new faculty, equipment, and other components are included in the Ph.D. program’s proposal.

This non-dissertation M.S. program will not require any large or specialized equipment for implementation.

For the purposes of the second and third year estimates, project faculty and SPA position rates and fringe benefits rates at first year levels. Include the continuation of previous year(s) costs in second and third year estimates. Additional state-appropriated funds for new programs may be limited. Except in exceptional circumstances, institutions should request such funds for no more than three years (e.g., for start-up equipment, new faculty positions, etc.), at which time enrollment increase funds should be adequate to support the new program. Therefore it will be assumed that requests (in the “New Allocations” column of the following worksheet) are for one, two, or three years unless the institution indicates a continuing need and attaches a compelling justification. However, funds for new programs are more likely to be allocated for limited periods of time.

XII. Evaluation Plans

All new degree program proposals must include an evaluation plan which includes: (a) the criteria to be used to evaluate the quality and effectiveness of the program, (b) measures to be used to evaluate the program, (c) expected levels of productivity of the proposed program for the first four years of operation (number of graduates), and (d) the plan and schedule to evaluate the proposed new degree program prior to the completion of its fifth year of operation once fully established.

Program Evaluation Format

A. Criteria to be used to evaluate the proposed program:

The Program will be evaluated using the criteria below:

1. Program enrollment and graduation rates.
2. How well does the program prepare students for a career in nanoscience?
3. How effective is the program in recruiting high-quality students with diverse backgrounds?
4. What is the perceived quality of the program from the students’ and graduate’s perspective?
5. What is the perceived quality of the program from the employer’s perspective?
6. How effective is the program at retaining?

B. Measures to be used to evaluate the program:

The Program will be evaluated by the following measures.

1. Program Enrollment and graduation rates.
 - a. Fall enrollment in program.
 - b. Two year graduation rates of students in program.
2. How well does the program prepare students for a career in nanoscience?
 - a. Determining what percentage of students move directly into professional jobs related to their degree.
 - b. The average time between graduation and permanent employment.
 - c. Surveys of program graduates.
 - d. Surveys of the of the employers of the program's graduates.
3. How effective is the program in recruiting high-quality students with diverse backgrounds.
 - a. Quality of students applying (GPA, GRE, or other standardized test).
 - b. Diversity of student applicants in relation to the discipline of their undergraduate program.
 - c. Percentage of applicants admitted.
4. What is the perceived quality of the program from the student's and graduate's perspective?
 - a. Annual student surveys.
 - b. Exit interviews with graduating students.
 - c. Biennial surveys of the programs graduates.
5. What is the perceived quality of the program from the employer's perspective?
 - a. Surveys of the of the employers of the program's graduates.
6. How effective is the program at retaining students?
 - a. First year retention rates of full-time students.

C. Projected productivity levels (number of graduates):

<u>Level</u>	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>TOTALS</u>
Bachelor's					
Master's	<u>0</u>	5	<u>15</u>	<u>25</u>	45
Doctoral					

D. Plan for evaluation prior to fifth operational year.

Annual internal review by the UNCG graduate school and the Joint School of Nanoscience will be done. After the first five years, the program will be included in the regular assessment plans for the universities.