



The Joint School of Nanoscience and Nanoengineering

Department of Nanoscience

2016 – 2017 Graduate Student Handbook

[Rev #3; Date: August 8, 2016]



*Let not what you do define what you are.
Rather, let what you want to become define what you do.
- John Hurt, NSF (1997)*



August 14, 2015

Dear JSNN Nanoscience Students:

To our continuing students, “Welcome back”, and to our incoming students, “Welcome”.

The 2015 – 2016 academic year marks the sixth year of the Joint School of Nanoscience and Nanoengineering (JSNN). Over the past five years, we have seen much growth in our infrastructure, research scope, course offerings, faculty, and students, and collaboratively creative culture; as well as in our relationships with host and sister universities, our community, and our industrial colleagues. In the spring of 2012, JSNN Nanoscience department graduated its first student in the spring of 2012 and awarded its first two Ph.D. degrees in May 2014. This year, we plan to continue the two semester core math course and the ‘Selected Reading’s in Nanoscience’ course for incoming students, as well as several new elective courses, as part of our continuous improvement process. We also welcome Ms. Jerri Price, Executive Assistant and the newest member of the JSNN’s interdisciplinary Nanoscience team. Additionally, much thanks goes to Gateway University Research Park, which plans to complete the JSNN’s remaining research laboratory and infrastructure projects this year.

Consider this handbook as a quick reference guide. This year’s Nanoscience department update should contain details of the program revisions, mentioned above. Please let us know if you find any errors or omissions, so that we can incorporate these refinements in future handbook updates. During the course of the year, the UNCG also may post updated documents. For the most up-to-date UNCG related materials, please read the corresponding documentation on the UNCG’s web site.

Remember that “Innovation/creative genius is one percent inspiration and ninety-nine percent perspiration” – Thomas Edison (Harper’s Monthly, 1932). We look forward to working with you, and to another exciting, creative, and productive year. Our team is here to provide the tools, resources and stewardship that support your career goals. If you have any questions, please ask. If you have any recommendations, please share them. Other key factors that will impact your success include your work ethic, creativity, and course of study, as well as critical thinking, communication, time management and collaborative skills.

Best wishes for the coming year.



Daniel J. C. Herr

Professor and Nanoscience Department Chair
Director, Nanomanufacturing Innovation Consortium (NIC)
The Joint School of Nanoscience and Nanoengineering
2907 East Lee Street, Greensboro, North Carolina 27401

(336) 285-2862 [Office]

(919) 656-5585 [Mobile]

djherr@uncg.edu



<http://jsnn.ncat.uncg.edu/>

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Preface

This handbook provides Nanoscience graduate students with a single portal for accessing some key information during their tenure at JSNN. Handbook updates will be time stamped. Much of this document reflects official material posted on UNCG's website. As such, this handbook is intended to serve as an abridged reference source for selected relevant topics of interest for JSNN's Nanoscience students. Please note that this handbook may not be comprehensive, nor does the information contained in this document supersede material posted by UNC Greensboro. Your recommendations are welcome and should be forwarded to the Nanoscience Department Chair.

JSNN Nanoscience Graduate Student Handbook: <http://jsnn.ncat.uncg.edu/wp-content/uploads/2016/08/NS-Working-GSH-R4-DH-081616.pdf>

UNCG Graduate School Bulletin: <http://www.uncg.edu/grs/bulletin/nano.html>

UNCG Academic Calendar: <http://www.uncg.edu/reg/Calendar/acaCal/fa12.html>

Other Sources of Information and support for graduate students:

UNCG Graduate School Academic Office

The University of North Carolina at Greensboro

241 Mossman Building

1202 Spring Garden Street

Greensboro, NC 27412

Phone: (336) 334-5596

General Fax: (336) 334-4424

Admissions Office Fax: (336) 256-0109

E-mail: inquiries@uncg.edu

URL: <http://www.uncg.edu/grs/>

Office Hours: Monday - Friday 8:00 am - 5:00 pm

Joint School of Nanoscience and Nanoengineering [JSNN]

Professor James G. Ryan

Founding Dean,

Room - 204

Joint School of Nanoscience and Nanoengineering

2907 East Lee Street

Greensboro, NC 27401

E-mail: jgryan@ncat.uncg.edu

Phone: (336) 285-2805; Cell: (336) 479-2487

General Fax: (336) 500-0115

URL: <http://jsnn.ncat.uncg.edu/?s=graduate+school>

Dean's Staff	Title	E-mail	Phone	Room
Mr. Elie Azzi	Research Associate	e_azzi@uncg.edu	(336) 285-2802	204B

Nanoscience Department

Professor Daniel J. C. Herr

Chair, Nanoscience Department

JSNN Room -208L

Phone: (336) 285-2862; Cell: (919) 656-5585

E-mail: djherr@uncg.edu

Nanoscience Faculty	Title	URL	Room
Tatyana Dyakonov [336-285-2800]	Adjunct Instructor		
Daniel J. C. Herr [336-285-2862; djherr@uncg.edu]	Professor and Chair; 1 st year Ph.D. Candidate Advisor	http://jsnn.ncat.uncg.edu/faculty/daniel-joseph-christian-herr-ph-d/	208L
Christopher Kepley [336-285-2865; ckkepley@uncg.edu]	Associate Professor and Director of Graduate Studies	http://jsnn.ncat.uncg.edu/faculty/christopher-kepley-ph-d/	106H
Dennis R. LaJeunesse [336-285-2866; drlajeun@uncg.edu]	Associate Professor	http://jsnn.ncat.uncg.edu/faculty/dennis-r-lajeunesse-ph-d/	208D
Hemali Rathnayake [336-285-2860]; hprathna@uncg.edu]	Associate Professor	http://jsnn.ncat.uncg.edu/faculty/hemali-rathnayake-ph-d/	208K
James G. Ryan [336-285-2805; jgryan@uncg.edu]	Professor and Founding Dean	http://jsnn.ncat.uncg.edu/faculty/james-g-ryan-ph-d/	204E
Jianjun Wei [336-285-2859; j_wei@uncg.edu]	Associate Professor	http://jsnn.ncat.uncg.edu/faculty/jianjun-wei-ph-d/	208J
Joseph M. Starobin [336-285-2871; jmstarob@uncg.edu]	Associate Professor	http://jsnn.ncat.uncg.edu/faculty/joseph-m-starobin-ph-d/	208F
Ethan Will Taylor [336-256-0459; ewtaylor@uncg.edu]	Adjunct Professor	http://jsnn.ncat.uncg.edu/faculty/ethan-will-taylor-ph-d/	

The JSNN Nanoscience faculty is responsible for this department's academic, research, and operates in accordance with established UNCG policies. For academic advising, or policies regarding research, students are encouraged to consult with any of the professors, listed above, as warranted.

From the JSNN Vision and Mission:

Vision: The Joint School of Nanoscience and Nanoengineering (JSNN) was formed as a collaborative project of North Carolina A&T State University and The University of North Carolina at Greensboro. The JSNN's research and educational programs focus on Nanoscience and Nanoengineering. The strengths of the two universities in the basic sciences and in engineering make them ideal partners for this new interdisciplinary school.

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.
Limited only by your imagination...

“I’d like to express my appreciation to the North Carolina legislature for its support of the Joint School of Nanoscience and Nanoengineering. Even during these challenging economic times, our leaders have not lost sight of the bigger picture and our vision for a bigger, better and brighter future for economic development accomplished by investing in education and its long-term ability to sustain our region’s growth.

One of the most visible and tangible outcomes of this joint collaboration and its convergence of technologies will be our ability to leverage the research completed by faculty members at both universities which will then translate into viable companies and businesses that support economic development in this area. The resulting outcome is that there is a direct impact for all of us from readily available technologies and new products fueled by nanotechnology that will relate to everyday use - outside of the laboratory and classroom - and inside our homes and businesses.

The launch of this joint school will assist in developing an enhanced faculty and educated workforce in the areas of Nanoscience and Nanoengineering. The bottom line is economic development because we will be a more attractive area for academic, professional and corporate recruitment. We envision that the Joint School of Nanoscience and Nanoengineering will be a model for other public universities and systems of higher education to adopt.” - Dr. Linda P. Brady [Former Chancellor, UNC Greensboro]

“Culture refers to a clearly articulated and broadly shared set of values that define the very nature of an organization”

A set of values that builds that culture:

- **Shared fate.** “We have a shared fate,” he said. “We have to collaborate.”
- **Excellence.** “There has to be a common standard of excellence in everything we do,” he told the faculty and staff gathered.
- **Accountability.** “People have to be held accountable. We all do.”
- **Innovation.** “We have to have an entrepreneurial spirit,” he said. “We have to act like we’re a start-up.”
- **Transparency.** “That means clarity – about how decisions are made.”
- **Inclusion.** “We all have a stake in UNCG,” he explained. Ideas can come from anyone and anywhere, he added. UNCG needs inclusive decision-making and communications.
- **Fun.** We’re at college, he said. “We should get joy out of that – the joy in what we accomplish together.”

Degree Programs

Ph.D. in Nanoscience

The PhD in Nanoscience requires a minimum of 60 hours and is designed to prepare students to take positions in industrial, governmental, or academic research settings by providing a solid background in nanoscience theory and experimental techniques through course work and dissertation research. Advanced elective courses in nanoscience areas ensure students will have substantial depth of understanding in their area of interest and enable them to effectively carry out advanced nanoscience research.

Professional Master of Science in Nanoscience

The 33-hour, non-thesis, on-line MS in Nanoscience program follows the Professional Science Masters degree model, featuring course work in nanosciences and business and an internship to provide practical experience. It is designed for students with strong backgrounds in technical fields who seek additional specialized training to qualify them for positions in companies that work in the field of nanotechnology.

Admission To The Nanoscience Graduate Program

Applicants are notified of offers of admission by letter from The Graduate School. Successful applicants are offered full graduate admission or provisional admission for a specific program in a specific term. Students must confirm their acceptance into the graduate program. If the admitted applicant does not register for the term specified in the admission letter, the admission may be subject to subsequent review. If necessary, students can defer admission for one year and not be subject to subsequent review via Graduate School policy.

Full Graduate Admission

All applicants must have obtained the following:

1. A bachelor's degree from an accredited college or university. For students from non-U.S. schools, applicants must submit their transcript for evaluation by an accepted international academic credential evaluation organization, such as World Education Services (WES), to demonstrate that their undergraduate performance satisfies this requirement.
2. Satisfactory academic standing as an undergraduate. This corresponds to a "B" (3.0 GPA) average or better in the undergraduate major and in courses prerequisite to the proposed graduate study.
3. Verification that the applicant has taken the Graduate Record Examination (GRE) (verbal, quantitative, and analytical writing) or other authorized examination. Students from non-U.S. schools also must demonstrate proficiency in the use of the English language.
4. In addition to the application materials required by The Graduate School, applicants must submit a personal statement indicating their interest in the program and a current Curriculum Vitae.
5. Qualified applicants will have a BS degree in an area related to nanoscience (physics, chemistry, biology, mathematics, computer science, or engineering) and, as a minimum, completed calculus through differential equations.

Provisional Admission

Promising applicants who hold a baccalaureate degree but do not meet the formal requirements listed above may be granted provisional admission. Full graduate standing is granted when these students satisfactorily complete prescribed courses or otherwise remove deficiencies. They must meet any special conditions attached to their admission, by either The Graduate School or their major department, no later than upon the completion of 15 semester hours of graduate credit.

Among provisionally admitted applicants may be the following:

1. Applicants with a bachelor's degree from a non-accredited institution.
2. Applicants with a bachelor's degree from an accredited institution, who lack undergraduate work considered essential for graduate study.
3. Applicants whose scholastic records are below admission standards but who show promise for success.

A graduate student admitted provisionally is not eligible for appointment to an assistantship or fellowship until full graduate standing is achieved. Provisionally admitted students will have specifically stated conditions that must be met to progress in the program. Provisionally admitted students who are dismissed for failing to meet the provisions of their admission will be eligible to submit a new application to The Graduate School after two semesters or the equivalent and may be admitted only upon the recommendation of the major Department Head or Director of Graduate Study and with the approval of the Dean of The Graduate School. While on academic dismissal, students are not eligible to take courses through the VISIONS program.

Deferral of Admission and Leave of Absences

Graduate admission to a degree or certificate program may be deferred for a maximum of one year from the initial term of admission. The student is responsible for contacting the department to determine if admission for subsequent terms is allowed.

To request a deferral of admission, admitted students must submit a completed 'Deferral of Admission Form' to the admitting department's Director of Graduate Study no later than the first day of classes of the term of initial admission. This form may be found by cutting and pasting the following URL into your web browser: <http://grs.uncg.edu/forms/> and clicking on the 'Admitted Student Forms' bar at the upper left of the screen. The deferral request must be for a specific term and may not exceed one year from the original term of admission. After considering the request, the department will forward the form to The Graduate School for processing and The Graduate School will notify the student of the decision. Merit-based financial aid (teaching/research assistantships, scholarships, and fellowships) will not be deferred and the student must compete again for the awards for the term of deferral (if approved).

Students who have not enrolled after one year and have not requested a deferral of admission will be required to reapply.

Students can take a leave of absence, as warranted.

Registration

Dates for registration periods for each semester are published in the University's Academic Calendar, pages 2-3 of the Graduate Bulletin, and on the University Registrar's website (www.uncg.edu/reg). Registration at UNCG is an automated process conducted online through UNCGenie.

All eligible students (new and continuing) receive electronic personal data (EPD) information and registration access window information via their UNCG email prior to each registration period. Most graduate students will find a pre-assigned advising code in their EPD; however, in certain programs students must see their advisors to obtain advising codes.

Continuing students who do not pre-register for the next semester during the Early Registration periods in November (for spring semester) and in April (for summer/fall semester) will be required to pay a late registration fee.

Immunization Clearance

Students who have been admitted to UNCG are required by North Carolina State law to submit an immunization form with appropriate verification of immunizations. This form is available online and must be satisfactorily completed and returned to Student Health Services. Failure to comply with this requirement within 30 calendar days from the first day of each semester will result in the student's being administratively withdrawn from the University.

This requirement applies to all students, regardless of whether they are part-time or full-time. Students subjected to an administrative withdrawal for failure to comply with medical clearance requirements are entitled to a refund, subject to the guidelines of the University's Refund Policy. (See the section on 'Tuition Policies' below).

Tuition Policies

Currents tuition related policies and fees may be found at the following URLs: <http://grs.uncg.edu/financial/estimated-cost/> and <http://grs.uncg.edu/bulletin/>.

Financial Support for Graduate Students:

- **Graduate, Research and Teaching Assistantships,**
- **Scholarships and Fellowships, and**
- **Research and Travel Funds**
- **Grant Support**

The Department attempts to provide support for all eligible Ph.D. students. The support is intended to (1) assist you in meeting the expenses of graduate study without having to find employment outside of the university, and (2) provide student assistance to faculty in meeting their research and teaching responsibilities.

Departmental Graduate Assistantships

Departmental Graduate Assistantships are provided for well-qualified Ph.D. students for the first year or until they pass the qualifying exam, pending performance and the availability of funds. They are intended to provide experiences to either (1) support the research activities of one or more faculty members or (2) support the student's exposure to the JSNN's mission and to the breadth of Nanotechnology. As such, the work areas are assigned by the department chair, based on recommendations from the JSNN's faculty and staff. The chair remains the advisor by default until the successful completion of foundational requirements.

Work assignments associated with the Graduate Assistantship require the most general knowledge and skill base. The tasks are intended to provide service to the school. Students can expect reassignment with each semester in order to broaden exposure and experience; however, some positions will require

commitment for multiple semesters. Service hours are flexible with respect to academic schedules and range from 10 to 20 hours per week by agreement with the assigned supervisor.

Graduate Research Assistantships

Once you pass the qualifying exam and secure a graduate research advisor, you may be supported with a Graduate Research Assistantship. The Graduate Research Assistantship is supported by specific grants under the professor's research interests. Activities assigned by the faculty are intended to develop your skills in specific areas and lead from the general dissertation area to the specific dissertation title.

Graduate Teaching Assistantships

Two semesters of teaching or the equivalent is expected before graduation. Generally this is expected in the third year. If the dissertation advisor deems it appropriate experience and supportive of future career ambitions, and the student has sufficient advanced credits, the student may receive a Graduate Teaching Assistantship. While there are no undergraduate classes or labs associated with JSNN, there may be opportunities to teach as either partner institution or an undergraduate college affiliated through consortia agreement. Other forms of meeting the teaching experience e.g. STEM outreach materials development may be done under a research assistantship.

Please remember that students who accept assistantship support are expected to work on the specified service assignment, as discussed above. If you refuse to carry out your assigned duties, you may lose your assistantship. If you believe that you are being asked to perform excessive or inappropriate work as a graduate assistant, you should discuss this with your supervisor. If you cannot resolve the problem, you should discuss it with the Graduate Student Manager and/or the Department Chair. The payment stipends attached to graduate assistantships are paid monthly.

External Grants

Some private foundations and federal funding agencies make grants available to support graduate student research and dissertation progress. You are strongly encouraged to explore these types of funding opportunities by inquiring at the Office of Research Services and by looking for announcements in newsletters of professional organizations, or others that your advisor may know about. Your advisor can assist in identifying possible sources of external support and in the preparation of the proposal. Formal proposals for research often must be routed through the Office of Research Services.

Students seeking individual external funding must have a faculty sponsor. The faculty sponsor is responsible for ensuring that the procedures for submission of the application are followed appropriately. Faculty members who assign or supervise research conducted by students are responsible for the scientific integrity of the study, for safeguarding the rights and welfare of subjects in the research. Faculty sponsors serve as the PI on student protocols. All student-initiated proposals for funding must be mutually agreed upon by the student and his/her advisor. The faculty advisor has the final say as to whether the proposed activities are consistent with the goals and mission of the School, and whether they place inappropriate burdens on faculty, staff or students.

Other Funding for Research and Travel

A. Graduate Student Association (GSA) Funds

The GSA represents the interests of graduate students on campus. Each department that grants graduate degrees, including NAN, has representatives. The GSA ensures that graduate students have a voice in all aspects of university life. The GSA also sponsors some activities of interest to graduate students and

provides funds for some professional activities. For more information, please contact Nancy Poole, Vice President of Public Relations, at gsavppub@uncg.edu.

The GSA office in Elliot Center has application forms for dissertation/dissertation awards and for travel support awards. The completed application forms must be submitted to the GSA Finance Committee in 256 Elliot. At the present time, dissertation/dissertation awards of \$300 are made available on a first-come/first-serve basis. Funding is in the form of reimbursement for incurred expenses, and receipts must be submitted within 45 days of the purchases made. Conference travel awards of up to \$300 (if presenting), or \$150 (if attending only), are also made available for graduate students. Travel grants are in the form of "professional development funds." If presenting, students can receive up to 2 awards per year. If attending only, one award per year is the maximum.

Grant Support

As mentioned above, research grants typically support dissertation research once a student has passed the qualifying examination. This funding is critical to the success of a student's dissertation research, as it supports the overhead, equipment, and supplies. Please note that these competitive awards must be used for research described in the proposed statement of work, and usually cannot be used for off-topic projects. As such, it is important that the student and advisor select a topic of mutual interest that is aligned with the funded award.

Degree Requirements: Doctoral Program **[See the 2016-2017 Graduate Bulletin** **(<https://grs.uncg.edu/graduatebulletin/graduate-programs/graduate-degree-programs/departmental-and-program-listings/jsnn/>)]**

Fundamentals of Nanoscience Courses (15 credit hours)

NAN 601 – Nanochemistry (3)
NAN 602 – Nanobiology (3)
NAN 603 – Nanophysics (3)
NAN 604 – Nanotechniques (3)
NAN 605 – Mathematical Methods (3) or

Laboratory Rotations (4 credit hours)

Students will rotate through four research labs during the course of the first two semesters (seven weeks in each lab). The purpose of these rotations is to aid in choosing a dissertation research topic by familiarizing students with research at JSNN and provide training in laboratory techniques needed for dissertation research. The labs will be selected by the student based on the student's interests and with the advice of his or her advisor/committee and permission of faculty member responsible for the laboratory in which the rotation assignment will take place. From the establishing document; keep in mind the advisor is the chair, not the lab manager. Students may take a lab rotations taught by NCAT faculty, with the permission from that faculty member and through the consortia agreement process.

NAN 611 – Nanoscience Laboratory Rotation (4x1)

Professional Development Seminars (2 credit hours)

In the first two semesters of study, students will take professional development seminars that will expose them to a variety of research and professional development topics such as intellectual property issues, confidentiality, ethical issues in nanoscience, writing successful grant proposals, effective presentation and writing skills, etc.

NAN-621: Professional Development Seminar I (1)

NAN-622: Professional Development Seminar II (1)

NAN-692-08 Directed Studies-Selected Readings in Nanoscience (1 credit hour)

This one credit seminar course is offered each fall semester. It provides first year students with an overview of each Nanoscience faculty's research program, and an opportunity to network with potential graduate research advisors.

Qualifying Examination

Students will take a four section qualifying exam on their knowledge of the fundamentals of nanoscience, typically at the end of their first year as a full-time student. The qualifying examination will consist of two 3 hour sessions, with chemistry and math covered in session 1 and biology and physics covered in session 2. For this exam, each session occur from 09:00 to 12:00 and 13:00 to 16:00. If this schedule is changed for any reason, students will be informed expressly with adequate warning. The test will be held in a JSNN classroom.

The rules for taking the qualifying exam are as follows:

- You may use a calculator
- There will be no other electronic devices taken into the room (cell phones, computers, netbooks, iPads, iPods)
- Single copies of each exam and blue books will be provided
- All materials are to be returned at the end of the session

Important information about the style of the exam:

- There are 12 questions total (3 in each discipline)
- You may answer 10 of the 12 questions, specifically 3 questions from 2 sections and 2 questions from 2 sections
- Students must sit at least three seats from each other

After completion, the sections will be graded individually. The passing grade for the exam will be determined by a committee of faculty verifying that all guidelines have been followed. Students will be notified to schedule a meeting with the Department Chair to discuss exam outcomes and next steps. Students will have a total of two chances to pass the qualifying exam in order to retain their position in the graduate program.

[Note: To be approved to continue towards a Ph.D., students who pass the qualifying examination must have secured a written commitment from **at least one** Nanoscience faculty member to serve as their advisor. Students who fail to secure an advisor within one semester after passing the qualifying examination will transition to the Masters program, and will not qualify to take Dissertation Research related courses.]

Advanced Nanoscience Electives (15 credit hours)

Beginning in the second year of the program, the faculty advisor will recommend 3-5 doctoral-level elective courses from the following areas: physics, chemistry, nutrition, engineering, mathematics, computer science, biology and environmental science. Faculty advisors may excuse up to 6 credits of advanced courses and substitute research credit.

NAN-710 Scientific Integrity (1 credit hour)

Students are required to take the JSNN Scientific Integrity class as an advanced elective. This class explores contemporary issues related to scientific integrity and responsible conduct in research (RCR). Topics expose students to the issues that arise in scientific research such as authorship on publications, use of animals and human subjects, conflicts of interest, etc. and ways to handle these issues.

Dissertation Research (24 credit hours minimum)

By the end of the first year, students will be assigned a dissertation advisor and prepare a dissertation proposal. Students will present their proposals to a general JSNN audience in the form of a seminar and defend the proposal in the form of an oral exam.

Dissertation research begins in the second year and students will take a minimum of 3 hours of dissertation research each semester.

Students will complete a written dissertation of their research and give a public oral presentation of the completed work. The student also must defend orally the dissertation to the dissertation comment. The seminar and defense must occur in the same term that the student applies for graduation.

NAN-799: Nanoscience Dissertation Research (24)

Other Requirements

Seminars: Students are required to attend departmental and JSNN seminars, so they may acquire a broad understanding of various current problems in nanoscience.

Teaching Experience: Students are required to gain the equivalent of two semesters of teaching experience, which may be met through a variety of means. Students will work with their advisor/committee to develop a suitable plan to gain appropriate teaching experience.

Degree Requirements: On-line Professional Master of Science Program [See the 2016-2017 Graduate Bulletin (<https://grs.uncg.edu/graduatebulletin/graduate-programs/graduate-degree-programs/departmental-and-program-listings/jsnn/>)]

Nanoscience Survey Courses (9 credit hours)

Students choose three courses to introduce them to fundamental concepts, methods, and discoveries in different areas of nanoscience. The online courses, listed below, are available for professional master level students.

NAN 601: Nanochemistry (3)

NAN 602: Nanobiology (3)

NAN 603: Nanophysics (3)

Disciplinary Foundation Courses (9 credit hours)

Appropriate courses to build on the undergraduate degree ensuring appropriate depth of knowledge in the student's discipline will be selected with the student's program advisor.

Business/Management Courses (9 credit hours)

Degree Progression, Expectations, and Evaluation Procedures

Course of Study for the Ph.D. Program:

Semesters 1 to 3: Core classes and preliminary qualifying exam

A student's first year at JSNN will be a challenge. It is a time for the incoming class to learn to work as a team, and to help each other navigate through the broad interdisciplinary curriculum. It is a time to learn about JSNN's nanoscience culture and help students refine potential research directions. Students are expected to be on- and nanoengineering research platforms and potential research options, to research the dual faculty and to secure at least one faculty member as a potential dissertation advisor, by making a compelling case for them to accept you as an advisee. A student's options are greatly enhanced by how they conduct themselves on and off site. First year students are expected to be at the JSNN during regular university business hours. They are encouraged to speak with senior student researchers and to meet with potential advisors early and often. This will facilitate a greater understanding of JSNN's research site, to participate in relevant JSNN activities, to contribute to the School's success from the beginning through the end of each semester, and to successfully complete each required course. **Key goals for first students include: passing all courses with a grade of ≥ 3.0 , pas the qualifying examination, and secure a graduate research advisor.**

Fundamentals of Nanoscience (15 hours):

NAN 605 – Mathematical Methods (3)

NAN 601 – Nanochemistry (3)

NAN 602 – Nanobiology (3)

NAN 603 – Nanophysics (3)

NAN 604 – Nanotechniques (3)

Laboratory Rotations (4 hours): Laboratory Rotations are an opportunity to become conversationally proficient in areas outside of the student's current area of expertise. In the first two semesters, students will rotate through four research labs to become familiar with research at JSNN and to provide training in laboratory techniques needed for dissertation research, under course number NAN 611. ***Lab rotations are 1 credit hour per lab, with two seven week lab rotations per semester.***

These lab rotations provide the students with an opportunity to clarify their preferences for potential dissertation advisors. These rotations also provide an opportunity for Nanoscience faculty members to know and assess the potential advisees, with respect to the alignment of research interests and grants, mastery of the fundamental science, lab techniques, creativity, innovation, work ethic, etc. Students are expected to proactively use this time, when not in class, to demonstrate their initiative to potential faculty advisors and to develop a compelling justification to be selected and supported by a preferred research group. This is a time for a student to become exposed to the work that is done in a lab outside of his or her

expertise in order to develop the foundation of understanding of how radical interdisciplinary cooperation can develop into intelligent cooperation in innovation.

Nanoscience Seminar (2 hours):

In the first two semesters of study, students will take professional development seminars that will expose them to a variety of research and professional development topics, under course numbers NAN 621 and NAN 622.

Qualifying Exam:

Students, who demonstrate a grade of ≥ 3.0 in each of their first year foundational courses, will take a qualifying exam on their knowledge of the fundamentals of nanoscience at the end of their first year of coursework in order to continue in the program. Students must pass the qualifying to continue in the Ph.D. program, and are allowed to take the exam twice. See Degree Requirements for more information.

Securing a Dissertation Advisor:

Dissertation Advisors are not assigned to students until they pass the qualifying examination. Prior to taking the qualifying exam, each student should secure a written note from a potential dissertation advisor that confirms that faculty member's willingness to accept that student as an advisee. Please note that matching an advisor with an advisee, entry into a research phase of the Ph.D. program and financial support are based on many factors, such as the student's interest, performance, quality of work, creativity, transdisciplinary focus, teamwork, productive time on-site, work ethic, initiative, etc. Prior to securing an advisor, each student is expected to speak with each Nanoscience faculty member, and gain a foundational understanding of each research group's scope, culture, and potential funding opportunities. Please invest a significant effort in getting to know your faculty team. The matching of an advisor an advisee and an advisor's decision to accept a new student is an important milestone, as they will be working closely together for several years. For example, each faculty member's expectations may differ slightly with regards to publications, funding, work ethic, supervision, and expectations, e.g., working during summers, vacations, and weekends, etc.

A student may pass the qualifying examination and secure the approval of more than one potential advisor. In that case, within one month of the qualifying exam, the Nanoscience faculty will review the advising opportunities and reach consensus on specific dissertation advisor assignments for each of these students. It represents a critical milestone in a graduate student's program. By establishing this Advisor-Advisee relationship, the advisor agrees to mentor and support the advisee through the dissertation research process. Correspondingly, the advisee commits to working with that advisor. The advisee agrees to remain in good standing, to demonstrate creativity in research and a good work ethic, and to persevere and successfully complete the work required for the degree, in a timely manner.

Defining a Course of Study and Elective Courses:

Once a student secures a dissertation advisor, the advisor and student will compose a draft course of study tailored to help that student prepare for a successful dissertation research program. *Within one semester*, the advisor will work with the student to prepare and submit a signed course of study form and committee cover page that provides specific and customized guidance for each student's set of elective courses, defines the dissertation research topic area, suggests appropriate outreach and teaching activities, provides an initial timeline for key programmatic milestones, and identifies the Chair of the student's dissertation committee. The advisor also will provide guidance on what external activities and engagements, such as potential teaching assignments, would best serve the advisee. A completed and signed off course of study should be submitted about two months after taking the qualifying examination.

**Semesters 3 to 4: Identify dissertation theme
and begin research and elective course of study**

Defining a Dissertation Topic:

During the first semester after passing the qualifying examination, the student and dissertation advisor prepare a draft statement of the student's interim project area. This topic provides the framework for the student's research and continuing course of study. The specific dissertation topic would be defined before the end of the 5th semester, before the presenting the Preliminary Research Proposal, publicly in the doctoral seminar.

Dissertation research begins in the second year and students will take a minimum of 3 hours of dissertation research each semester. The student's dissertation research will be tracked under course number NAN 799, Dissertation Research.

Advanced nanoscience Electives (15 hours):

Beginning in the second year, each student will choose 3 doctoral level courses from a diverse set of the topic options, such as: Physics, nutrition, engineering, mathematics, computer science, biology and environmental science. Students may substitute dissertation research for two electives in the third year, with consent of the student's advisor/committee.

NAN-710 Scientific Integrity (1 credit hour)

Students are required to take the JSNN Scientific Integrity class before they graduate. Explores contemporary issues related to scientific integrity and responsible conduct in research (RCR). Topics expose students to the issues that arise in scientific research such as authorship on publications, use of animals and human subjects, conflicts of interest, etc. and ways to handle these issues.

Semesters 5 to 8: Continue research and elective course of study

Semesters 9 to 14: Potential research program extension

Sequence of Events for Graduation

Year 1:

Semester 1:

- Required Coursework:
 - Core classes: NAN 605 – Mathematical Methods and Nan 601– Nanochemistry (3 credits each).
 - 2 Laboratory Rotations: NAN 611, two one credit seven week long workshop style courses (1 credit each).
 - Seminar: NAN 621 Professional Development Seminar I (1)
- Journal Club, attendance once per week
- Departmental Seminar, attendance once per week
- Interview all Nanoscience faculty by the end of the semester
- NAN 692-7 – Selected Reading in Nanoscience (1)

Semester 2:

- Required Coursework:
 - NAN 603 - Nanophysics and NAN 602 - Nanobiology (3 credits each).
 - 2 Laboratory Rotations: NAN 611, two one credit seven week long workshop style course (1 credit each)

- Seminar : NAN 622 Professional Development Seminar II (1)
- Journal Club.
- Departmental Seminar, attendance once per week.
- Submit documentation of faculty interest from potential dissertation advisors, due by April 15th, or date designated by the department.

Summer year 1:

Take the Comprehensive Examination for entrance into the doctoral program. Exam will encompass four areas of study: NANO 701 – Mathematical Methods (3); NAN 601 – Nanochemistry (3); NAN 602 – Nanobiology (3); and NAN 603 – Nanophysics (3). Please note that future qualifying examinations may include recent Journal Club and departmental Seminar topics.

- If you pass the exam, you will be assigned a dissertation advisor. This assignment provides the student an opportunity to begin developing and working on their dissertation research under the mentorship of their advisor.
- With your advisor, you fill out plan of study and secure a thesis committee for the graduate school prior to the beginning of semester 3.

Year 2:

Semester 3:

- Required Coursework:
 - NAN 604 - Nanotechniques
 - Take an elective course, selected from the department approved list and chosen with consultation with your dissertation advisor.
- Engage in Dissertation work, NAN 799
- Begin to formulate dissertation project
- ***Retake the Comprehensive exam in December, if needed.***

Semester 4:

- Required Coursework:
 - Elective courses (if needed)
- Prepare your dissertation proposal, NAN 799.
- Assemble your dissertation committee of four to five members; this committee may vary by advisor, but generally will include your advisor, two to three other Nanoscience/UNCG faculty members, and one or two members from outside UNCG.
- Present your dissertation proposal

Summer year 2:

- Continue dissertation work
- **Present your dissertation proposal.**

Year 3:

Semester 5: Present your dissertation Proposal. MUST BE DONE BY SEMESTER'S END!!

Continue Research, NAN 799

Year 3.5-and beyond

- Annual dissertation committee meeting/progress reports.
- Prepare, write and defend your doctoral dissertation.
- Upon a successful defense, file for graduation with the Graduate School.

Ph.D. Student Time-Line Options

Legend

C-Chemistry
M-Math
B-Biology
P-Physics
R-Research
QE- Qualifying Exam
PP-Proposal Presentation
SP-Study Plan

Fall1	Spring1		Summer1	Fall2		Spring2		Summer2		Fall3	Spring3	Summer3	Fall4	Spring4	Summer4	Fall5	Spring6	Summer5	Fall6	Spring6	Summer6	Fall7	Spring7
C/M	B/P	QE1	C/SP/R								PP												
					QE2	C/SP/R							PP										
					Masters																		
C/M	B/P			C/M	QE1	C/SP/R							PP										
							QE2	C/SP/R						PP									
							Masters																
C/M	B/P					B/P	QE1	C/SP/R							PP								
									QE2	C/SP/R						PP							
									Masters														
C/M	B/P			C/M		B/P	Masters with options																

Dissertation Guidelines

UNCG provides guidelines for preparing a dissertation. It provides students with an overview of a timeline and key dates, style and format requirements, and the online submission process. A current copy of the UNCG Dissertation manual may be found at the following URL:

<http://grs.uncg.edu/current/td-manual/>

Funding

Funding is not guaranteed after the first academic year and support will be based on performance. Please note that progress towards degree completion may impact student support.

Recognition and Awards

Each year, the Nanoscience faculty may recognize outstanding students, who best exemplify and reflect JSNN's goals, vision, work ethic, and culture. One or more first year students may be recognized for demonstrating an exemplary integrated and interdisciplinary educational, training, collaborative, peer mentoring, and service experience. Additionally, each year, a senior level graduate student may be recognized for serving as a role model by demonstrating: creativity, collaboration, innovation, progress, thrift, and entrepreneurship in their research.

Expectations and Requirements

Expectations:

- Class attendance is mandatory, and students are expected to understand and follow each instructor's attendance policy. If you have an unavoidable conflict, religious observance or other situation where you are not able to attend class, let the instructor know before class. Considerable will be given for sudden illness and unexpected emergencies. <https://grs.uncg.edu/graduatebulletin/academic-regulations/general-policies/attendance/>
- You are expected to attend JSNN events and functions, e.g. attendance at seminar and journal club is mandatory.
- While not mandatory, students may be asked to volunteer to assist with outreach and other school programs, these activities are voluntary but highly encouraged. Second year Nanoscience students who have passed their qualifying exam will work with their research advisers.
- Students will begin the process of satisfying their teaching requirement once that have passed the qualifying examination.
- Work safely and attend every safety seminar by GURP. Each student must read and understand the "Chemical Hygiene Plan and Hazardous Materials Safety Manual"

Requirements:

- Minimum credit hours for degrees: The minimum number of credit hours required for the Ph.D. degree is 60, including dissertation. The minimum number of credit hours for the Professional M.S. degree is 33 credit hours including internship.
- Grades Required: Students are required to achieve a GPA of 3.0 or above to graduate from the program with no more than 6 credits below B. If a student receives more than 6 credits below a grade of B or one failing grade, he/she will be dismissed from the program. Only grades of B or better will count toward the doctoral degree.
- Amount of transfer credit accepted: Students entering the program with graduate credits received while enrolled in another doctoral program may transfer up to 15 non-dissertation credit hours of appropriate doctoral level coursework with the approval of Joint School of Nanoscience and Nanoengineering

Graduate Studies Committee and by the Graduate School prior to entering the doctoral program (preferably) but no later than the completion of their first graduate semester. Students must provide syllabi from the courses for which they would like transfer credit.

- Time limits for completion: A typical time-frame for completion of the Ph.D. degree on a full-time basis will be 4 years; however, students may take up to 7 academic years to complete all of the requirements for the degree. Students may take up to a maximum of 72 credit hours in the Nanoscience doctoral program depending on individual needs. Students may petition the JSNN Graduate Studies Committee and the Graduate School for an extension if there are compelling reasons for requiring more than seven years to complete the requirements (e.g. part time students will typically take 2 – 3 years more to complete their courses of study). No credit will be given for courses taken more than five years prior to enrollment at JSNN. Transfer credit is also tied to time. Transfer credit can expire. See the Graduate School policy.
- Qualifying exam: Students will take a qualifying exam at the end of their first year of full-time study in order to continue in the program. The exam will test the students on their knowledge of the fundamentals of Nanoscience. Students who do not pass the exam, in May, will be allowed to take the exam again at the end of their third semester.
- Dissertation proposal: By the end of the first year, students will be assigned a dissertation advisor. This individual must hold tenure-track faculty status within the JSNN or be a tenure-track faculty member within either of the two parent universities with affiliated faculty status in the JSNN, including collaborating and adjunct faculty. In consultation with the advisor, the student will prepare a dissertation proposal. The dissertation proposal is a statement document on how the student intends to accomplish the proposed goals of his/her research. A written document in the form of a (NIH or NSF) grant proposal needs to be prepared along with a 45 min presentation. Students will present their proposals to a general JSNN audience in the form of a seminar, followed by a defense of their proposal in the form of an oral exam. (timing: end of 2nd yr, beginning 3rd yr) A week prior to their seminar, student need to provide their committee members a copy of their dissertation proposal. In addition, students are responsible to send out a public announcement to the JSNN community including the following information: title of dissertation topic, abstract, advisor's name, time and location of the presentation (1 week prior to their presentation date).
- Seminars: Students will be required to attend departmental and JSNN seminars so that they may acquire a broad understanding of various current problems in nanoscience.
- Safety Training: All students need to go through safety training to access any of the laboratories at JSNN. Each laboratory has specific guidelines for training please consult with the lab manager for access.
- Teaching experience: Students are required to gain the equivalent of two semesters of teaching experience. The teaching experience requirement may be met through a variety of means and the student is expected to work with his/her advisor/committee to develop a suitable plan to gain appropriate teaching experience.
- Dissertation: Each student must complete a written dissertation of his/her research and give a public oral presentation of the completed work. In addition, the student must defend this dissertation orally to his/her dissertation committee. The seminar and defense must occur in the same term that the student applies for graduation.

- **Ethics and Integrity:** Students must read and understand the UNCG Academic Integrity Policy, Student Code of Conduct, and Ethics and Professional Standards, which may be found at the following links:
 - <http://sa.uncg.edu/handbook/academic-integrity-policy/>
 - <http://sa.uncg.edu/handbook/student-code-of-conduct/>
 - <https://sites.google.com/a/uncg.edu/cap-hesa/professional-standards>
- “Students should recognize their responsibility to uphold the Academic Integrity Policy and to report apparent violations to the appropriate persons. Students who do not understand the Policy or its application to a particular assignment are responsible for raising such questions with their faculty member. By enrolling in the university, each student agrees to abide by the Academic Integrity Policy.”
- Fundamental values that provide the framework for UNCG’s Academic Integrity Policy include: “Honesty, trust, fairness, respect, and responsibility. Academic Integrity Policy violations include, but may not be limited to: Cheating, plagiarism, misuse of academic resources, falsification, and facilitating academic dishonesty. Code of Conduct violations include student actions that convey: Threats, coercion, harassment, intimidation, or hostile environments. Ranges of sanctions for the permanent record process vary by the type of charge. Procedures for handling academic integrity charges also may be found at the links listed above.

These requirements are designed to prepare graduates for competitive careers in a dynamic and evolving global work environment.

Responsible Conduct in Research

Students should review the NIH update on the requirements for instruction in responsible conduct in research (RCR) as outlined on Nov. 24, 2009 in Notice Number NOT-OD-10-019 (<http://grants.nih.gov/grants/guide/notice-files/not-od-10-019.html>). The update provides information about the purpose of RCR training, the applicability, the background and development of NIH criteria, and best practices in RCR education.

All research activities conducted by faculty or students at JSNN must comply with UNCG policies on research. The Office of Research Compliance (ORC) coordinates compliance measures on campus and acts as a resource for the university community’s concerns regarding compliance requirements. The ORC website, <http://www.uncg.edu/orc>, contains links and details about the University’s required policies. It is incumbent upon each Principal Investigator and research team member to comply with the most up to date protocols, guidelines and processes. These policies include:

1. The University Policy and Procedure for Ethics in Research
2. The Policy on the Protection of Human Subjects in Research
3. The Policy on the Protection of Animal Subjects in Research
4. The Policy on Data Safety and Compliance Monitoring
5. The Copyright and Use Policy
6. The Patent and Copyright Policies
7. The Guidelines on Use of Indirect Cost Recovered
8. Policy on Data Safety and Compliance Monitoring

The JSNN has additional procedures that are specific to faculty, staff, and students. Selected JSNN procedures are provided below. Policies are provided to assist faculty, staff and students in the timely, appropriate and successful conduct of research.

Scientific Integrity

Ensuring Scientific Integrity is expected by all students, staff and faculty members. This includes not only the appropriate conduct of studies, protection of human subjects, financial disclosure, conflict of interest, citations of relevant work, and storage and use of data, but authorship and ownership issues. Furthermore, there will be strict enforcement protecting the integrity of data. Absolutely no tolerance is afforded to manipulation or falsification of data, including (but not limited to): data point manipulation, image manipulation (inappropriate photoshopping, etc.), and fabrication of data. Supplementary federal and UNCG policies may be found on the UNCG webpage. Additional oversight is provided by various School and university committees, as well as funding and state or federal agencies.
Data and Safety Monitoring.

The UNCG Compliance Officer coordinates Data Safety Monitoring. The UNCG IRB and the JSNN Research and Scholarship Committee assist with safety and compliance monitoring to ensure adherence to approved study procedures and consent procedures, security of data, protection of subject confidentiality, and provision of appropriate protections to subjects.

Additional information related to UNCG's policy on responsible conduct in research may be found at the following link: <http://www.uncg.edu/orc/responsible.html>.

Academic Good Standing and Termination at JSNN

Academic Good Standing: A student is considered to be in good continuing academic standing if that student:

- Maintains a GPA of 3.0 or above, with no more than 6 credits below B and no failing grades;
- Passes the qualifying examination within two attempts;
- Follows the UNCG Academic Integrity Policy, Student Code of Conduct, Ethics and Professional Standards, and Responsible Conduct in Research policies; and
- Completes the degree program within UNCG's specified time limits for completion.

Termination: A student may be terminated from JSNN's program, if that student:

- Receives more than 6 credits below a grade of B or one failing grade,
- Doesn't pass the qualifying examination within two attempts;
- Does not secure a note from a potential dissertation advisor that documents that faculty member's willingness to accept that student as an advisee; or
- Violates UNCG's Academic Integrity, Student Code of Conduct, Ethics and Professional Standards, or Responsible Conduct in Research policies. Please note that an ethics violation may be reflected on a student's permanent record.

Failure to satisfy the service assignment requirements or working for pay outside of JSNN, while on a stipend, without prior authorization, places the student at risk of losing their assistantship.

Other Considerations:

Accommodations:

The Nanoscience Department will strive to satisfy all accommodations specified by the Office of Accessibility Services for students as appropriate. All students seeking accommodation should register with ODS prior to the beginning of the semester and communicate with the Department Head to ensure

all accommodations can be met adequately. The Department Head will work with appropriate faculty to arrange for accommodation in specific classes. For more information, please see: <http://ods.uncg.edu/>.

Academic integrity:

In the JSNN classroom, academic integrity violations are unacceptable. These include (but are not limited to): Plagiarism, in which (1) the words or thoughts of others are presented as those of the student, or (2) adequate citation of relevant references are not included with presented text; Cheating, in which (1) a student's responses to any form of question (test, homework, etc.) are taken from any individual other than the principle student, (2) pre-prepared information (by the student or others) is used to provide answers to assigned questions, or (3) non-approved technologies are used for the completion of the assignment or test.

Advising codes:

Advising codes for each semester can be obtained from the faculty advisor. Prior to assignment of an advisor, this code can be obtained from the Department Head.

Class examination policy:

The Nanoscience department will strive to avoid scheduling two regular examinations on the same day. In the event that a faculty member suggests the scheduling of a make-up exam that would take place on the same day as another regularly scheduled examination, the student may arrange with faculty to reschedule the make-up examination for another day. In the event that an examination has a late start that would cause overlap with another class or JSNN commitment, the student(s) may request that the examination be rescheduled.

Issues with faculty advisors:

Students having trouble with their faculty advisor are first expected to make good-faith attempts to clear up any difficulties directly with the advisor. Upon an unsatisfactory outcome, the student may then involve the Department Head in conversations in an attempt to repair the relationship. In the event that a student believes that the relationship cannot be fixed, the student can seek a new advisor. However, this is a drastic outcome and should be viewed as such. It is the student's responsibility to (1) inform their advisor of their intent to leave and (2) to initiate a conversation between the current and intended advisor to ensure mutual agreement.

Interpersonal Skills and Team Development:

Integral parts of the graduate student experience are the development of team building skills and the ability to understand and exercise the organization's chain of command. For example, JSNN's cross disciplinary culture encourages an interdependent approach to mastering the first year core curriculum. Students with expertise in a given area are encouraged serve as tutors for their peers. Additionally, in class or lab, students are expected to understand their roles as apprentices, and seek guidance from appropriate faculty mentors, as warranted.

Communication Skills:

UNCG's University Writing Center [<http://www.uncg.edu/eng/writingcenter/default.php>]

The mission of our Writing Center is to connect writers with readers. This helps to make good writers better writers. It also encourages writers to develop an awareness about themselves that will help them after they leave the Writing Center. To support this philosophy, our center practices a collaborative approach to sessions, where students and consultants engage in one-on-one conversations about writing - conversations that center on shared knowledge and expertise, as opposed to hierarchical instruction that treats writing center sessions as remediation.

Hours (in person & online):

Sun: 5 p.m. - 8 p.m.

Mon - Thur: 9 a.m. - 8 p.m.

Fri: 9 a.m. - 3 p.m.

Contact: The University Writing Center

The University of North Carolina at Greensboro

3211 MHRA Building

Greensboro, NC 27402-6170

VOICE: 336.334.3125 FREE 336.334.3125

FAX: 336.344.1111

EMAIL askthewc@uncg.edu

WEBMASTER wegum@uncg.edu

UNCG's University Speaking Center [<http://speakingcenter.uncg.edu/about/index.php>]

The University Speaking Center provides consultation support and instructional workshop services for UNCG students, faculty, employees, and members of the Greensboro community. Our support is designed to help speakers further develop their own oral communication confidence and competence. We provide peer-to-peer feedback, guidance, and other support in the areas of public speaking preparation and delivery, interpersonal communication, and group or team communication.

The Speaking Center is located along with the Writing Center in 3211 MHRA. We are on the third floor. MHRA is on the corner of Forest and Spring Garden - across the street from the Mossman Building.

Fall Hours of Operation

Monday - Thursday

10am to 7pm

Friday

9am to Noon

Sunday

4pm to 8pm

Contact: The University Speaking Center

The University of North Carolina at Greensboro

3211 MHRA Building

Greensboro, NC 27402-6170

VOICE: 336.256.1346 FREE: 336.256.1346

WEBMASTER wegum@uncg.edu

Feedback and Recommendations:

Your feedback and recommendations for this working document are always welcome. The goal of this handbook is to provide a simple and abridged reference tool that provides useful information for the JSNN's Nanoscience students. Please let us know if you find any errors or omissions. All inputs will be considered for inclusion in future revisions of this Handbook, as part of our continuous improvement process. Please forward your comments to the Nanoscience department chair.



Joint School of Nanoscience and Nanoengineering

2907 E. Gate City Blvd.
Greensboro, NC 27401 U.S.A.

Phone: +1 (336) 285-2800

Web: <http://jsnn.ncat.uncg.edu>

Twitter: JSNN2907

Facebook page:

<https://www.facebook.com/JointSchoolOfNanoscienceAndNanoengineering>

