

Proposing Institution
Clemson University

Title of Proposed New Program
Interdisciplinary PhD, Nursing & Genetics

Submission Date
Fall, 2006

President James F. Barker
Clemson University

A. Classification:

- | | |
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| 1. Name of the proposed program: | Interdisciplinary PhD Nursing & Genetics |
| 2. Academic Unit: | School of Nursing |
| 3. Designation, type and level of degree: | Doctor of Philosophy |
| 4. Proposed implementation date: | August, 2007 |
| 5. CIP code: | 511608 |
| 6. Program Identification: | New |

Justification

This proposal is a request for approval to establish a new interdisciplinary Doctor of Philosophy in Nursing and Genetics for implementation in the fall of 2007. This program is designed for nurses who seek advanced practical and theoretical education related to genetics with an interest to work in industrial, healthcare, academic or governmental settings.

Few graduate nurses in academia or practice have formal education in genetics, yet advances in this area project to be one of the most significant factors affecting health care over the next 10 plus years. The recent sequencing of the human genome is associated with frequent reports of new genetic discoveries related to healthcare. Studies reveal that 9 of the 10 leading-causes of death have genetic components (www.cdc.gov). Response to the “genetic paradigm shift” is important for the profession of nursing (Frazier & Oswald, 2002). Nurses with expertise in genetics need to be involved at all levels of healthcare and policy making by developing strategies to expand nursing knowledge to their practice, teaching, and research (Berry & Hern, 2004). Currently only one doctoral program in the country offers a specialty option in genetics for nurses. More than one institution needs to address the challenge to meet the nation’s emerging health care needs, education and research associated with new technologies and dogma associated with human genetics. The School of Nursing at Clemson University plans to proactively respond by developing a new generation of nurses with an interdisciplinary PhD in Nursing and Genetics.

This innovative proposal is based on the recognition that the problems facing health care require an interdisciplinary approach at the doctoral level. The interdisciplinary approach promotes intellectual growth by challenging conventional thinking and addressing areas that are too broad or too complex to be dealt with adequately by a single discipline (AACN, 2005). Successful grant applications to NIH (National Institutes of Health) and other federal sources require the expertise of multiple disciplines to work toward solutions for complex health care problems. NIH has established genetics as a priority for funding through NINR (National Institute for Nursing Research). Based on an extensive review of the literature and input from external health care constituents, an interdisciplinary degree offers the best use of current resources and meets the complex health care needs of the future. In recent years various School of Nursing (SoN) faculty members have added outside disciplines to the graduate student clinical problem/thesis committees including an epidemiologist from Greenwood Genetics Center, doctorally prepared pharmacists and specialty practice physicians. Other committees have included faculty from a variety of departments such as Microbiology, Psychology, Public Health, English, Business and the Ethics Center. In addition faculty members in the SoN have collaborated in their research with other disciplines including laboratory studies to monitor DNA activity in populations of women at high risk for breast cancer and effects of berry extract on immortal cell lines.

The proposed interdisciplinary PhD curriculum seeks to prepare nurses for leadership roles in research, policy and practice related to genetics. Students will have the option of developing skills in basic and applied research; as bench scientists; interventionists with individuals groups and populations; and health policy and ethics. Students with a baccalaureate or

master's degree in nursing would be eligible to enter at different levels to work toward the doctorate (BS to PhD, MS to PhD). Articulation models to allow entry of non-nurses will be addressed in the future.

Clemson's mission statement emphasizes the university's commitment to "fulfill a covenant between its founder and the people of South Carolina by establishing a 'high seminary of learning' through its historical land-grant responsibilities of teaching, research, and extended public service." Clemson offers a wide array of high-quality graduate programs that respond to the needs of professionals in the field. The University promotes excellence in selected areas of the creative arts, health, human development, the humanities, social sciences, and the hard sciences. The primary goal of the university is to "develop students' communication and critical-thinking skills, ethical judgment, global awareness, and scientific and technological knowledge." The mission of the School of Nursing (SON) reflects that of the larger university. Table 1 highlights the congruence between the vision and mission statements of Clemson University (CU), as currently defined by the Commission on Higher Education (CHE), the College of Health Education, and Human Development (HEHD) and the School of Nursing (SON).

Table 1 Comparison of Vision and Mission Statements

Clemson University	College of HEHD	School of Nursing
<p><u>Vision.</u> <i>Clemson will be one of the nation's top-20 public universities.</i></p>	<p><u>Vision.</u> <i>The College of HEHD will be the innovative force for creating collaborative models to enhance community well being providing a foundation for social and economic development.</i></p>	<p><u>Vision.</u> <i>To be a leading innovative center engaged in preparing nurses for leadership, scholarship and practice to improve the health of people in SC and the global community.</i></p>
<p><u>Mission.</u> <i>The mission of Clemson University is to fulfill the covenant between its founder and the people of South Carolina to establish a "high seminary of learning" through its historical land-grant responsibilities of teaching, research and extended public service. Doctoral and research programs are designed to add to the fiscal viability of the state, nation and world. Excellence is sought in selected areas of ... "health, human development, the humanities, social sciences, and the hard sciences." The primary goal of the university is to "develop students' communication and critical-thinking skills, ethical judgment, global awareness, and scientific and technological knowledge."</i></p>	<p><u>Mission.</u> <i>The College of HEHD will be recognized for innovative, multidisciplinary instruction, research, and outreach/service that support and enhance human capabilities in all life stages and environments by preparing skilled professionals and creative leaders and by building healthy well-educated communities.</i></p>	<p><u>Mission.</u> <i>To provide a scholarly center of learning that prepares nurses at the ... graduate levels who can advance scientific nursing knowledge and evidence-based nursing practice through research and outreach. The academic culture of the school values intellectual curiosity, personal accountability, diversity, interdisciplinary collaboration and the art and science of human caring.</i></p>

The proposed interdisciplinary PhD in Nursing & Genetics at Clemson University is aligned with the vision of the university to achieve Top 20 status and would serve as a national model. All of the current top 20 public universities who have nursing schools offer doctoral

(PhD) programs in nursing (2005). Expanding the pool of doctoral students and drawing on the strengths of existing programs with this innovative interdisciplinary program promotes the vision of Clemson University and its visibility.

A national nursing shortage that will hit crisis levels within the next decade is well documented (AACN, 2005). A critical component of that shortage is an even more severe nursing faculty shortage. Doctorally-prepared leaders are needed for university teaching, scholarly research and health policy formation, as well as to enable educational mobility for nurses and potential nurses within the region. In May, 2001 the Southern Regional Education Board (SREB) reported that by the end of 2006, more than 780 nurse educators were expected to retire. Similar statistics are demonstrated in South Carolina (SC). Loss of experienced nurse educators has detrimental effects on curricula planning, management and evaluation, and the supply of mentors for inexperienced faculty.

In July 2005, officials from Clemson University and Greenwood Genetic Center (Greenwood, SC) announced an initiative to find causes and cures for birth disorders and health problems common to the residents in SC. This included the formation of a Genetics Collaborative to increase research and doctoral education in human genetics, with an investment of nearly \$15 million. The interdisciplinary partnership with the School of Nursing will increase the numbers of doctoral students enrolled in those courses and nurses graduating with specialized knowledge in genetics.

Relationship of the Program to Other Programs in the University

The essence of an interdisciplinary education is reflected in the partnership among faculties from multiple departments, schools, centers and institutes to provide a variety of courses and share in the work of student dissertation committees. These academic units include **Psychology, Mathematical Sciences, Political Science, Policy Studies, Health Disparities and Human Genetics**. The **Human Genetics** Department, in partnership with Greenwood Genetics Center, will be a strong partner by providing multiple core and cognate courses. Other disciplines such as Biochemistry, Chemistry, Biological Sciences, Environmental Engineering and Science, and International Family and Community Studies can provide consultation and committee membership for doctoral students. The close proximity of the **Biological Sciences Laboratories** to the collaborative and interdisciplinary **Nursing Research Laboratory** allows for partnership in bench science research projects. Recently faculty in the School of Nursing established the Center of Excellence in Partnerships for Community Outreach, Research on Health Disparities and Training. This center provides students' with enhanced access to diverse populations for research in newly recognized areas of genetics linked with obesity, Type 2 diabetes and other related disorders. Partnership with this center has the potential to positively impact the health and well-being of SC residents by focusing on genomic health-related issues that are correlated with some of South Carolina's health-related morbidity and mortality rates, which are among the worst in the nation.

Assessment of Clemson University programs as related to the proposed program

a. Human Genetics and Biochemistry. The genetics and biochemistry departments were combined during the restructuring of the College of Agriculture, Forestry and Life Sciences (AFLS). Human Genetics is a key partner in the proposed PhD program and their departmental faculties have been very positive about collaboration. There is a willingness to offer critical core courses; provide lab space, equipment, and serve on dissertation committees. Research awards per faculty average \$118,800. Greenwood Genetics Center (GCC) faculties and staff are also positive about the proposed degree program. They are also willing to provide lab space, equipment, and adjunct faculty to co-teach seminars and to serve on committees. GCC has achieved international recognition for expertise in a focused area of research—Fragile X, autism, and mental retardation. It also has a strong

clinical focus. The Greenwood Genetics Center is 60 miles from the main Clemson University campus. Polycom conferencing is available.

b. Chemistry. Some faculty members in the department are conducting pharmaceutical research. This would provide another important option for student research. The unit has a stable rate of research funding (3 to 4 million per year).

c. Biological Sciences. The research areas of molecular and cell biology are obvious fits for interdisciplinary research partnerships with nursing. The laboratories are located in close proximity to the nursing research laboratory. A willingness to share equipment and expertise has been expressed. Recently new faculties from highly ranked programs have been added to alleviate some of the heavy teaching loads in this area.

d. Environmental Toxicology. Several faculties have a research interest in carcinogens and the environment as well as related policy interests.

f. Environmental Engineering and Science. This is one of Clemson's strongest programs. It has consistently been ranked in the Top 20 graduate programs (US News and World Report). Faculty members conduct research in the areas of environmental chemistry and environmental policy with a stable record of external funding averaging around \$220,000 per faculty per year.

g. Policy Studies. One of these courses will be taught by the Policy Studies faculty and included in the Ethics and Policy cognate. Faculty members are supportive and willing to co-teach courses and serve on dissertation committees.

h. International Family and Community Studies. The institute offers courses in human rights law (including health) and international law and children which could be selected as electives. Faculty members are experts in the area of policy development and legal aspects and are willing to collaborate, provide guest lectures and serve on dissertation committees. One faculty member holds faculty rank in the School of Nursing. Annual external funding averages around 4 million dollars.

Methodological and statistical expertise is available from the interdisciplinary partners in mathematical sciences, psychology departments and also statistics. A biostatistician is a faculty member in the School of Nursing.

Relationship to Other Programs in the State, Region, and Nation

The interdisciplinary PhD in Nursing and Genetics does not duplicate the curriculum of any existing academic programs in South Carolina or regions in most of the country. While there are two nursing PhD programs in South Carolina, the MUSC, Charleston program focuses on vulnerable populations and the USC-Columbia school with a PhD in Nursing Science focuses on influencing the quality of local, regional, national, and international health care. Neither are interdisciplinary programs. A strong component and primary focus of the new Clemson University interdisciplinary program proposal is genetics. The deans at the USC and MUSC Colleges of Nursing in coordination with the CU School of Nursing director have agreed to share a course from each program. The shared course from Clemson University will be a survey course designed to cover advances in human genetics. The shared courses from MUSC and USC are reflected in the section of this proposal that discusses the curriculum.

A search of doctoral programs was conducted identifying only one program in the country that focused on nursing and genetics. This program at the University of Iowa has options for doctoral study in genetics and post-doctoral training in genetics. Four programs were identified with currently active genomic nursing programs, four with master's options and only one with a doctoral option. (See Table 2: Currently Active Genetic Nursing Programs in the U.S.)

Table 2 **Currently Active Genetic Nursing Programs in the US**

Nursing/Genetics	Program Description	Status	# Graduates
University of Iowa, College of Nursing (Iowa City, IA)	Offers an Advanced Practice Nursing in Genetics (APNG) curriculum in their MSN program. Beginning in the fall of 2005, two APNG courses will be offered online. <i>Options for doctoral study and post-doctoral training in Genetics</i> are also available.	1980-present	Masters level: 8 enrolled Doctoral level: 5 enrolled
University of California, San Francisco Dept. Physiologic Nursing (San Francisco, CA)	The Department of Physiological Nursing at the University of California, San Francisco (UCSF), offers <i>three dual specialty graduate programs</i> in advanced practice nursing: cardiovascular/genetics, oncology/genetics and gerontology/genetics	2001-2004 (received a one year extension in 2005)	Masters level: 10 enrolled
Columbia University School of Nursing (New York, NY)	Offers a <i>subspecialty</i> in Clinical Genetics in their <i>Master's Program</i> . Can be used as a <i>Certificate Program</i> or non-degree educational opportunity of the Center for Advanced Practice.	1990's-present	Masters level: Fewer than 25
University of Pittsburgh (PA)	Offers both <i>post-baccalaureate and post-master's certificates</i> in Genetics using existing courses focused on Genetics at the college of nursing, medical school and school of public health. New doctoral fellowships prepare pre and postdoctoral nurse scientists to develop their research trajectories utilizing the application and evaluation of genetic information.	2004-present New 2006	No students yet. No students yet.

Adapted from: "Advanced Practice Nurses in Genetics: A Survey of ISONG Members." Genetics Health Services Research Center, Baltimore, MD (2005) and U. Pittsburgh, School of Nursing "Targeted Research and Academic training Program for Nurses in Genomics" fall 2006 brochure

The Master's of Science, major in nursing program of the School of Nursing (SoN) at Clemson University averages 80-100 students and graduates approximately 20 students per year. These graduates are a logical group to recruit for entry into the interdisciplinary PhD in Nursing and Genetics program.

Overall purpose

The purpose of the Clemson University School of Nursing, Interdisciplinary PhD in Nursing and Genetics is to prepare nurse scientists to: extend the knowledge base relevant to nursing, translate research to advance the discipline of nursing, and collaborate in interdisciplinary research and practice.

Objectives of the program are to:

1. Collaborate with other disciplines to generate knowledge and develop theories that focus on the genomic aspects of actual and potential health problems of diverse individuals, families, groups, and communities while addressing health disparities.

2. Formulate health promotion, disease prevention and treatment strategies that translate and integrate genomic knowledge from a variety of disciplines.
3. Demonstrate leadership that facilitates interdisciplinary development and application of ethical guidelines and health policy in genetics.
4. Disseminate research findings to develop models of nursing practice that incorporate the expanding knowledge of genetics.

Anticipated employment opportunities for graduates, or demand for services

The proposed interdisciplinary PhD in Nursing and Genetics responds to a number of needs within the state. This includes the areas of academics, industry, healthcare agencies and government. Specific examples include:

Anticipated employment opportunities for graduates, or demand for services

The proposed interdisciplinary PhD in Nursing and Genetics responds to a number of needs within the state. The Final Report of the Advanced Practice Nurses in Genetics: A Survey of ISONG Members (2005) revealed these nurses work in a variety of primary workplace settings including academics, industry, healthcare agencies and government. **A key area will be in addressing the nursing faculty shortage at the baccalaureate and graduate level in South Carolina.** Academic positions could include many aspects of research including clinical and translational research, as well as work with genetic aspects of disorders for individuals, families and communities in South Carolina. Specialists at the Greenwood Genetics Center have indicated that a key need for these graduates will be in educating health care providers related to the interpretation of complex genetic tests for well informed decisions. It is expected that graduates will be in high demand by healthcare agencies including hospitals, ambulatory clinics, genetic clinics, public health agencies. Health policy positions offer another option related to work in policy development associated with genetics.

Need for the program in the state

Nurse leaders in genetics emphasize the need for nurses to "...promote the use of genomic research technologies and information in the context of health, biology, and society, as well as in nursing research, practice, education and policy" (Feetham, Thomson, and Hinshaw, 2005). Doctorally prepared nurses in genetics can bring issues to the "appropriate forums, use results of research in health and social policy debates, and participate in developing optimal practices and policies that are in the best interest of individual patients, families and groups..." with health problems now recognized to be associated with genetic/genomic causes (Olsen et al, 2003; Wakefield, 2004).

Currently there are only **three** registered nurses in SC identified as genetic nurses, including one educated as a genetic counselor. Advanced practice nurses working with patients/families with inherited or familial genetic disorders are able to provide genetic counseling, physical examination, order testing and provide prescriptions to better meet the needs of this clientele. Currently, there are no programs in the area offering advanced education with a genetics focus for nurses. This is consistent with a study by the International Society of Nurses in Genetics (ISONG, 2005) which found "...nurses with interest in genetics have had limited access to genetics courses, clinical rotations, and degree programs in genetics." As part of their program of research, some graduates would be interested in collaborating with clinicians to solve patient related research questions and translate new genetics knowledge to "the bedside." The proposed interdisciplinary PhD in Nursing and Genetics would meet this need for nurses interested in genetics focused programs as interventionists, bench scientists or in ethics and health policy.

Access to doctoral nursing (PhD) programs has been identified as problematic for potential students in the upstate by the CU SoN Community Advisory Board and SC upstate health

care agencies. In spring, 2006 the School of Nursing conducted a targeted survey in upstate South Carolina (SC) to determine the level of interest in the proposed program. Five thousand surveys were mailed to BS and MS nursing graduates using a list from the SC Department of Labor, Licensing and Regulation. From a single mailing, more than 570 completed surveys were returned, a response rate greater than 11% which is considered a strong response rate for this methodology.

Of surveys returned, 44% (n=248) of respondents indicated a strong interest in attending an interdisciplinary PhD nursing and genetics program if it were offered by Clemson University. Of the 248 responding with interest, 52% (n=129) indicated they would be ready to enroll in the next two years. Another 39% (n=96) indicated an anticipated enrollment in 3-5 years, and the final 10% in 6-10 years. Potential enrollees who specified their current area of practice are evenly distributed across the spectrum from administration and education, to pediatrics, obstetrics, and geriatrics. Nineteen percent indicated their specialty as medical/surgical and another 39% specified 'other.'

Given the opportunity to specify a preference for one of the three major cognates in the proposed program, 56% (n=239) indicated 'Interventionist,' 'Bench Scientist' (24%) and 'Health Policy and Ethics' (20%). Respondents who indicated a desire to enroll in the next two years reflected the same distribution as above with 59 persons interested in Interventionist, followed by 34 in Bench Scientist, and 33 in Health Policy. With the 11% response to one mailing of the survey, there appears to be significant 'pent-up' demand for doctoral nursing education in Upstate SC. Since most potential applicants indicated they are employed with family and other responsibilities, easy accessibility to courses, educational resources, and faculty support will be important to the success of the program.

Since analysis of the survey, several students from surrounding states have contacted the SoN with queries regarding the new interdisciplinary PhD. Based on the survey and queries, there appears to be significant interest by individuals in target areas for recruitment including South Carolina, western North Carolina, and northeast Georgia as well as interested students in the broader community with special interests in genetics (public health, health policy and ethics). Recent master level graduates, not included in the survey, have already expressed interest in the program.

Enrollment

Admissions Criteria Specific to the program

The interdisciplinary PhD in Nursing and Genetics students applying for the program will have at least a bachelor's degree in nursing from an accredited institution. Other requirements will include:

- a. GRE scores equivalent to the current scores of 500 for verbal and quantitative sections and 4.0 for the analytical writing section.
- b. Thesis or publication. (BSN applicants entering without a data-based research experience will be required to satisfactorily complete a thesis utilizing the 6 hours of cognate electives prior to beginning the core courses in the doctoral program.)
- c. Submission of a Curriculum Vita.
- d. Written statement of career goals.
- e. Graduate School application with three letters of recommendation which address research and scholarly potential
- f. Interviews with two nursing faculty (may be personal, polycom or telephone depending on individual circumstances)

g. Cumulative GPA of 3.4 or higher in the undergraduate (and/ graduate programs if applicable).

Table 3

PROJECTED TOTAL ENROLLMENT						
YEAR	FALL		SPRING		SUMMER	
	Headcount	Credit Hours	Headcount	Credit Hours	Headcount	Credit Hours
2007-08	6	54	6	54	0	0
2008-09	12	109	12	90-108	0	0
2009-10	15	117-153	15	90-160	6	18
2010-11	21	144-160	21	117-180	12	36
2011-12	21	144-160	21	117-180	9	27

Table 4

ESTIMATED NEW ENROLLMENT						
YEAR	FALL		SPRING		SUMMER	
	Headcount	Credit Hours	Headcount	Credit Hours	Headcount	Credit Hours
2007-08	6	54	0	0	0	0
2008-09	6	54	0	0	0	0
2009-10	6	54	0	0	0	0
2010-11	3	27	0	0	0	0
2011-12	6	54	0	0	0	0

Tables 3, 7 and 9 contain information based on survey results. **Table 3** represents the total enrollment for each full-time student taking 9 credit hours during the fall and spring semesters of years one and two of the four year degree. During year three they will take 6-12 credit hours in the fall and spring semesters depending on the cognate area chosen. Nine credit hours will be taken during the fall of year four and 6-9 credit hours depending on the status of the needed cognate and elective courses. Candidates will begin their dissertation hours during the summer of year three and continue through the summer sessions of year four with the goal of graduation at the end of year 4. Projected numbers were taken from positive responses received from the spring 2006 survey. Using the Graduate School average of 10% of interested students converting to enrollees, 6 students are anticipated in the fall semester of the first two years. In years 3-5, nine students total are anticipated. Interest in doctoral study from a new cohort of bachelor's and master's degree graduates once the program is established is anticipated. With only one other doctoral program offering advanced study in nursing and genetics coupled with Clemson University's reputation, students from the national and international arena are anticipated to apply.

Table 4 represents the estimated new enrollment for academic years 2007-2012. These numbers are extracted from the interest survey conducted by the School of Nursing spring

2006. Academic years 2007-2011 reflect the calculation of a graduate admissions formula based on numbers obtained from the interest as documented by the survey. The drop of enrollment for 2010-2011 is included to reflect a potential gap in the existing pool and the establishment of a new pool of students. Continued recruitment will be in place to avoid this enrollment lag. Academic year 2011 reflects a new student pool of BSN and MS graduates from years 2007-2011 as the new PhD Nursing and Genetics program establishes a national reputation.

Curriculum

The curriculum in the Interdisciplinary Doctor of Philosophy in Nursing and Genetics program is designed to develop theories in genetics and prepare leaders and scholars in nursing and related disciplines to contribute to the body of knowledge. While this program is based in the School of Nursing, it is interdisciplinary with students taking courses in a variety of Clemson University schools, departments or institutes. A unique feature of this program is a collaborative agreement to bring together faculty and doctoral students from South Carolina's leading research universities for academic inquiry, exploration and research. These are the Clemson University School of Nursing and the Colleges of Nursing at the University of South Carolina and the Medical University of South Carolina. In addition, the College of Nursing at the University of Iowa has agreed to offer an online nursing research course that focuses on genetics.

All students must enter with a minimum of a baccalaureate degree in nursing. Ninety credits are required of a student enrolling post-baccalaureate or 70 credits for post-master's degree nursing students. BSN students without a background in data-based research will be required to use 3-6 hrs of the cognate electives to complete a research project providing documentation of their ability to be successful in a doctoral program. Building on existing courses in Nursing, Genetics, Biochemistry, Policy Studies, Political Science, Psychology and Mathematical Sciences an interdisciplinary faculty team has worked collaboratively to plan a curriculum including the development of a total of three new courses for this degree.

Table 5.1 Entrance Options for the Interdisciplinary PhD in Nursing & Genetics

BS-PhD Option	
NURS 333 Healthcare Genetics (3)	3 credits
NURS 804 (2) Nursing Theory	2 credits
NURS 806 (2) Adv Assessment	2 credits
NURS 807 (2) Research	2 credits
NURS 808 (2) Research Analysis	2 credits
NURS 809 (3) Adv Pathophysiology	2 credits
NURS 827 (3) Foundations of Nursing Ed.	3 credits
NURS 828 (3) Nurse Educator	3 credits
	Subtotal = 20 credit hours plus
MS-PhD Option	
Core	34 credit hours
Cognate	12 credit hours
NURS 889 Seminars	6 credit hours
Dissertation	18 credit hours
	Total = 70 credit hours

The proposed curriculum for the PhD in Nursing and Genetics is composed of 12 core courses and three cognate specialties/tracks. The core curriculum provides 34 hours of coursework in the areas of genetics, health policy and ethics, theory development, and

quantitative and qualitative research methods. In the specialty cognates, students pursue advanced study in basic Genetics [Bench Research], applied population Genetics as an Interventionist or genetics in Ethics/Health Policy. Seminars and electives bring the cognate hours to 18 hours. With 18 hours of dissertation, the total credit hours required is 70. This can be accomplished full-time, over a four year period.

A sample curriculum follows with course descriptions. Variations will exist in the courses required depending upon the specialty cognate selected and courses that have already been taken that meet the intent, goals and purposes of the academic program. The coordinator of the PhD program in Nursing and Genetics, in concert with individual faculty advisors, will work with each individual to determine the requirements for their program of study.

Proposed Curriculum Plan Interdisciplinary PhD Nursing and Genetics

Table 5.2 Core Courses

Course	Credit hours
1. NRPhD 802 (MUSC) Knowledge Development in Nursing	3 credits
2. NURS 901 Advances in Human Genetics	3 credits
3. GEN 610 Basics I	3 credits
4. GEN 620 Basics II	3 credits
5. NURS 905 Genetics Ethics & Health Policy	3 credits
6. MTHSC 805 Data Analysis	3 credits
7. PSYCH 810 Research Design & Quantitative Methods I	3 credits
8. PSYCH 811 Research Design & Quantitative Methods II	3 credits
9. NURS 811 (USC) Qualitative Methods in Nursing Research	3 credits
10. NURS 903 Interdisciplinary Research	1 credit
11. GEN 640 Bioinformatics	3 credits
12. 96:415 (UI) Genetic Nursing Research**	3 credits
Total	34 credit hours

**University of Iowa course identification number

***NOTE: Bolded courses are new to the PhD Nursing & Genetics curriculum

Table 5.3 Three Proposed Cognates

Ethics & Policy	Interventionist	Bench Research
POST 842 Ethics & Public Policy (3 credits)	GEN 670 Human Genetics (3 credits)	GEN 810 Methods in Molecular Biology (3 credits)
POSC 877 Public Policy Evaluation Seminar (3 credits)	GEN 830 Population Genetics (3 credits)	GEN 820 Genomics & Proteomics (3 credits)
Elective* (6 credits)	Elective* (6 credits)	Elective* (6 credits)
NURS 889 Seminar (6 credits)	NURS 889 Seminar (6 credits)	NURS 889 Seminar (6 credits)
Dissertation (18 Credits)	Dissertation (18 Credits)	Dissertation (18 Credits)
Total = 36 credits	Total = 36 credits	Total = 36 credits

*Note: For BSN students, cognate electives may be used for thesis hours.

Table 5.4 Sample Schedule, BS to PhD

<i>1st Summer Session</i>			<i>2nd Summer Session</i>		
NURS 333 3(3,0)			NURS 807 2(2,0)		
3 credits			2 credits		
<i>Fall I</i>			<i>Spring I</i>		
NURS 809	online	3(3,0)	NURS 808		2(2,0)
NURS 804		2(2,0)	NURS 827		3(3,0)
NURS 806		2(1,2)	96:415	online	3(3,0)
7 credits			8 credits		
<i>Fall II</i>			<i>Spring II</i>		
GEN 610		3(3,0)	GEN 620		3(3,0)
NYPD 802	online	3(3,0)	GEN 640		3(3,0)
NURS 828		4(2,4)	Elective course		3(3,0)
10 credits			9 credits		
<i>Fall III</i>			<i>Spring III</i>		
NURS 905		3(3,0)	NURS 903		1(1,0)
NURS 901		3(3,0)	Cognate courses		
NURS 811	online	3(3,0)	Elective course		3(3,0)
9 credits			7-10 credits		
<i>Fall IV</i>			<i>Spring IV</i>		
PSYCH 810		3(3,0)	PSYCH 811		3(3,0)
Cognate courses			Cognate courses		
MTH SC 805		3(3,0)	Elective courses		
Seminar hours		3(3,0)	Seminar hours		3(3,0)
9-12 credits			6-12 credits		
<i>1st Summer Session</i>			<i>2nd Summer Session</i>		
Dissertation credits 3(3,0)			Dissertation credits 3(3,0)		
<i>Fall V</i>			<i>Spring V</i>		
Dissertation hours			Dissertation hours		
Cognate courses			Cognate courses		
Elective courses			Elective courses		
6-9 credits			6-9 credits		
<i>1st Summer Session</i>			<i>2nd Summer Session</i>		
Dissertation credits 3(3,0)			Dissertation credits 3(3,0)		

Table 5.5 Sample Schedule, MS to PhD

<i>Fall I</i>			<i>Spring I</i>		
GEN 610		3(3,0)	GEN 620		3(3,0)
NRPhD 802	online	3(3,0)	96:415	online	3(3,0)
NURS 811	online	3(3,0)	GEN 640		3(3,0)
9 credits			9 credits		
<i>Fall II</i>			<i>Spring II</i>		
NURS 905		3(3,0)	NURS 903		1(1,0)
NURS 901		3(3,0)	Cognate courses		
MTH SC 805		3(3,0)	Elective courses		
9 credits			6-9 credits		
<i>Fall III</i>			<i>Spring III</i>		
PSYCH 810		3(3,0)	PSYCH 811		3(3,0)
Cognate courses			Cognate courses		
Elective courses			Elective courses		
Seminar hours		3(3,0)	Seminar hours		3(3,0)
6-12 credits			6-12 credits		
<i>1st Summer Session</i>			<i>2nd Summer Session</i>		
Dissertation credits 3(3,0)			Dissertation credits 3(3,0)		
<i>Fall IV</i>			<i>Spring IV</i>		
Dissertation hours			Dissertation hours		
Cognate courses			Cognate courses		
Elective courses			Elective courses		
6-9 credits			6-9 credits		
<i>1st Summer Session</i>			<i>2nd Summer Session</i>		
Dissertation credits 3(3,0)			Dissertation credits 3(3,0)		

Students admitted to candidacy must pass a comprehensive examination. Candidates for the PhD in Nursing and Genetics will develop and conduct an independent research study that makes a contribution to the body of knowledge in their cognate specialty. This process culminates with the writing of a dissertation and dissemination of the findings. Graduates of this program will be prepared to pursue careers as bench scientists, ethicists/health policy, academicians and researchers.

New Courses to be added:

NURS 901 3(3,0) Focuses on an overview of the disciplines and content areas related to advances in human genetics/genetics. Topics will include aspects of biochemical, molecular, population Genomics and cytogenetics as they relate to genomic healthcare. Bioinformatics will be addressed, incorporating the use of genetic databases for research and clinical settings.

NURS 903 1(1,0) Examination of interdisciplinary research in the life sciences as a means of integrating information, data, techniques, tools, perspectives, concepts, and/or theories from

two or more disciplines or bodies of specialized knowledge to advance knowledge development or solve problems.

NURS 905 3(3,0) Designed for healthcare professionals. Analyzes relationships among political climate, policy design and government action as related to ethical, legal and social issues surrounding availability of genetic information. Examines an ethical perspective, outcomes on health policies relating to genomic issues as well as contemplated actions based on new medical techniques

Table 6 Faculty

List Staff by Rank (e.g. Professor #1, Professor #2, Associate Professor #1, etc)	Highest Degree Earned	Field of Study	Teaching in Field (Yes/No)
<i>NURSING Faculty</i>			
Professor #1	PhD	Nursing & Health Policy	Yes
Professor #2	PhD	Sociology, Health Disparity	Yes
Professor #3	EdD	Higher Education & Administration	Yes
Professor #4	DNS	Nursing Science	Yes
Professor #5	PhD	Health Policy	Yes
Associate Professor #1	PhD	Nursing	Yes
Associate Professor #2	PhD	Nursing	Yes
Associate Professor #3	PhD	Microbiology, Genetics	Yes
Assistant Professor #1	DHA	Health Administration	Yes
<i>INTERDISCIPLINARY Faculty</i>			
Professor #1	PhD	Developmental Psychology	Yes
Professor #2	PhD	Economics	Yes
Assoc. Professor #1	PhD	Experimental Psychology, Human	Yes
Assoc. Professor #2	PhD	Microbiology	Yes
Assistant. Professor #1	PhD	Genetics	Yes
Assistant. Professor #2	PhD	Genetics	Yes
Assistant. Professor #3	PhD	Biological Sciences	Yes
Assistant. Professor #4	PhD	Cellular Biology	Yes
Assistant Professor #5	PhD	Statistics	Yes
Adjunct Faculty #1	MD	Clinical Geneticist	Yes
Adjunct Faculty #2	MD	Clinical Geneticist	Yes

Faculty qualifications. The coordinator of the PhD program holds a PhD in microbiology and is a master's prepared nurse, with a research program in the area of genetics, DNA activity. She has completed two post-doctoral programs in Genetics. One was an eight-week post-doctoral fellowship at the Summer Genetics Institute provided through a joint partnership of the National Institute of Nursing Research and Georgetown University. The second focused on high risk assessments of inherited or familial cancers. She has served as consultant and advanced practice nurse for the new Cancer Risk and Screening Program (CriSP) program at St. Francis-Bon Secours Hospital in Greenville.

As an interdisciplinary program, faculties from six Clemson University departments, centers or institutes, two Clinical Geneticists with Adjunct Faculty status, two doctoral programs in

nursing within SC, and an internationally known genetic nurse scholar will bring their expertise and experience to the “classroom”. This enables graduate students in this new PhD program to immerse themselves in a curriculum lead and taught by individuals who are knowledgeable and experienced in their disciplines.

New Faculty. One faculty FTE is funded for the first 3 years through a Duke Endowment grant in collaboration with AnMed Health, Oconee Memorial Hospital, Palmetto Health Easley, Cannon and Tri-County Technical College. Based on the projected program enrollment over the next 6 years and the interdisciplinary approach additional faculty needs are not anticipated. Replacement for faculty retirements will focus on recruiting faculty to fill gaps in genetics research expertise among senior SoN faculty members.

In addition, a doctorally prepared Research Associate position was added, funded for the first 2 years through a Duke Endowment grant in collaboration with AnMed Health, Oconee Memorial Hospital, Palmetto Baptist Easley, Cannon Memorial and Tri-County Technical College, to manage a collaborative bench research laboratory in Jordan Hall. This individual has 15 years experience coordinating and supervising facilities, including staff and graduate students. He has technical expertise in physical mapping and DNA sequencing of plant genome, BAC DNA libraries, culturing of blood and immortal cell lines, and application of a variety of assays in both human and food technology research. Because of his education and experience he will also be able to provide lectures for some of the genetics technology related course content.

Current faculties who elect to increase their expertise in the target areas will be supported. Opportunities for further development include:

- 8 week NIH/NINR Summer Genetics Institute (SGI)
- 18-week online web-based Genetics Institute(WBGI) with The Cincinnati Children’s Hospital Medical Center

Other genetics instructional resources include:

- GEPN curriculum resources with links to instructional resources used in GSI and WBGI at www.gepn.cchmc.org
- Self-paced genetics modules based on NCHPEG competencies at www.gepn.cchmc.org
- Practice-based genetics curricula for nurse educators at www.fbr.org
- Genetics and your practice online module at <http://www.marchofdimes.com/gyponline/index.bm2>
- Genetics in Clinical practice at <http://www.acmg.net/resources/cd-rom-01/intro.asp>
- Dolan DNA learning center at <http://www.dnalc.org/>
- NCHPEG education resources at www.nchpeg.org
- Kansas Genetics Education Center at <http://www.li,c/edigec>
- Centre for Genetics Education at <http://www.genetics.com.au/>
- GedEd Project at <http://www.medicine.man.ac.uk/GenEd/>
- Centre for Education in Medical Genetics at <http://www.bwhct.nhs.uk/cemg/index.htm>
- Six week to Genomic Awareness at <http://www.genomicawareness.org/>

Tenured and tenure-track faculty are provided 25% release of an academic semester for research and scholarly activities with additional time granted with funded research release. Provision for consultation is addressed in the university faculty manual and negotiated for individual faculty members as the need arises. Time to attend conferences is based on indirect monies received from grants that can be used for attendance. In addition, each faculty is provided an equal amount of continuing education monies.

Curriculum development needs are addressed by a separate graduate curriculum committee with input from the SoN faculty. A chairperson and two SoN faculty members who teach graduate levels courses are the core members. Ex-officio members include the graduate coordinators, director of the SoN and a representative to the college curriculum committee.

Table 7

UNIT ADMINISTRATION/FACULTY/STAFF SUPPORT						
YEAR	NEW		EXISTING		TOTAL	
	Headcount	FTE	Headcount	FTE	Headcount	FTE
Administration						
2007-08	0	-	1	.5	1	.5
2008-09	0	-	1	.5	1	.5
2009-10	0	-	1	.5	1	.5
2010-11	0	-	1	.5	1	.5
2011-12	0	-	1	.5	1	.5
Faculty						
2007-08	0	-	4	1.0	4	1.0
2008-09	0	-	4	1.0	4	1.0
2009-10	0	-	6	1.5	6	1.5
2010-11	0	-	8	2.0	8	2.0
2011-12	0	-	8	2.0	8	2.0
Staff						
2007-08	0	-	2	1.5	2	1.5
2008-09	0	-	2	1.5	2	1.5
2009-10	0	-	2	1.5	2	1.5
2010-11	0	-	2	1.5	2	1.5
2011-12	0	-	2	1.5	2	1.5

**Faculty student ratios reflect the 1:10 national standard for graduate students. In addition, 1 course= 25% faculty assignment.

Increasing numbers of faculty members reflects replacement of retiring faculty to correlate with increasing numbers of doctoral students with preferred ratios of 1 faculty to 10 students.

Physical plant

There will be minimal added demand on the physical plant. While classroom space will be needed to accommodate the new doctoral courses, classes will be of such size as to be

accommodated in current small classrooms and existing conference rooms. Office space needed for PhD students with assistantships will become available as those students holding graduate teaching assistantships replace temporary clinical instructors who are hired, as needed, each academic year. As these temporary instructors are replaced, the vacated space will be available to doctoral students.

Computer support now available through the College and University will be adequate for use in the doctoral program. The facilities available in the Clinical Learning and Resource Center in Edwards and the Division of Computing and Information Technology computer labs available across campus will be adequate for the additional doctoral students. All offices in the School of Nursing have computers, and these computers will become available to the doctoral students with assistantships who occupy such offices.

Additional laboratory space, now available through Jordan Hall, will be required as the program grows and space needs for wet laboratory research increase. Currently the designated laboratory includes adequate space and equipment to meet the requirements for tissue culture experiments. The facilities allow space for one researcher to work under the hood and two other individuals to work on the tabletops with other experiments or preparation.

Equipment

The primary equipment need will be new technologies required for the bench laboratory shared by nursing and microbiology faculty and their graduate students. Because this is an interdisciplinary program, including the human genetics department, many other laboratories and their equipment are available for the use by doctoral students in nursing.

Library Resources

Clemson University Libraries are evaluated routinely as part of the University's accreditation by the Southern Association of Colleges and Schools (SACS), and the Libraries have been found to meet or exceed recommended standards. Currently the Libraries hold some 1,087,535 volumes and provide access to over 30,000 print and electronic journal titles. This places Clemson University Libraries well above the median for Doctorate-Granting Institutions as reported by the Association of College and Research Libraries (2004 Academic Library Trends and Statistics, copyright 2005).

In the broad area of "Genetics or Genomics" Clemson currently holds some 2425 items of which approximately 516 have been published in the past five years (2001 -2006). In the somewhat narrower field of "Human or Medical Genetics" Clemson's holdings exceed 770 items of which 137 have been published between 2004 and the present. Clemson's holdings in the area of genetics and genomics include 247 serial titles.

In the broad scope of "nursing or human health care" Clemson Libraries hold over 7000 titles and has acquired in excess of 150 new titles per year over the each of the past five years. In addition to monographic works, Clemson's holdings in the area of "nursing or human health care" include 468 serial titles.

Publication of monographic works dealing with nursing and human genetics has been limited as indicated by a search of OCLC's WorldCat database. This indicates only some 54 works, world wide, that deal with human genetics and nursing per say. It would appear that no more than eleven titles have been published on this subject since 2003. Clemson currently holds four of these eleven titles and can acquire the others through purchase or interlibrary loan.

Acquisitions of materials dealing with genetics and nursing are made by selectors in the areas of Human Health and Life Sciences. Selectors work with Departmental faculty in determining the most appropriate topics and titles for collection. Current combined annual funding for these areas are in the range of \$150,000 and have kept ahead of inflationary trends for the past five budgetary cycles. No budgetary reductions are expected in the foreseeable future. In addition to normal annual expenditures, current Library policy allocates a \$5,000 budget for the exclusive purchase of materials for newly approved doctoral programs. Expenditure of these funds is made by selectors in consultation with the faculty from the new programs.

Accreditation, Approval, Licensure, or Certification

While the Clemson University School of Nursing has received full accreditation by the CCNE for the bachelor's and master's level programs, the proposed doctor program is not subject to specialized or professional accreditation or approval by any state agency other than the Commission.

Table 8 NEW COSTS TO THE INSTITUTION AND SOURCES OF FINANCING

ESTIMATED COSTS BY YEAR						
CATEGORY	1st	2nd	3rd	4th	5th	TOTALS
Program Administration	34,450	35,828	37,261	38,751	40,301	186,591
Faculty Salaries	0	60,375	116,340	141,924	146,801	465,440
Graduate Assistants	44,904	47,148	109,500	101,978	104,582	398,112
Staff	67,998	70,717	73,546	76,488	79,548	368,297
Supplies and Materials	22,000	22,000	22,000	22,000	22,000	110,000
Library Resources	0	0	0	0	0	0
Equipment	30,000	30,000	30,000	10,000	10,000	110,000
Facilities	0	0	200,000	200,000	200,000	600,000
Other (Identify)	0	0	0	0	0	0
TOTALS	199,352	266,068	578,647	591,141	603,232	2,238,440
SOURCES OF FINANCING BY YEAR						
Estimated FTE Revenue Generated from the State*	122,862	122,862	122,862	61,431	122,862	552,879
Tuition Funding (New students only)**	28,860	28,860	28,860	14,430	28,860	129,870
Other State Funding (Legislative Approp.)	0	0	0	0	0	0
Reallocation of Existing Funds##						
Federal Funding***; #	0	41,544	41,544	41,544	41,544	166,176
	5,000	100,000	100,000	300,000	500,000	1,005,000
Endowment+	375,000	0	0	0	0	375,000
TOTALS	551,722	293,266	293,266	417,405	693,266	2,248,925

* Calculations for estimated FTE revenue generated is based on the 2006-07 MRR formula (\$30,477) with 6 new students in FY 2007-08, 6 new students FY 2008-09, 3 new students FY 2009-10 and 6 new students in FY 2010-2011. See Table 3 on page 9.

** Calculations for student tuition generated are based on the 2007-08 approved full-time tuition for Tier 1 programs (\$3,960/semester) and 2007-08 projected student's fees (\$850/semester) at Clemson University. This includes 6 new students in FY 2007-08, 6 new students FY 2008-09, 3 new students FY 2009-10 and 6 new students in FY 2010-2011. See Table 4 on page 9.

***Projected funding for doctoral student: F31 for minority students; National Research Service Award (NRSA) @ \$20,772

+Duke Endowment funding for the "LPN-Professor" partnership with AnMed Health, Oconee Memorial Hospital, Palmetto Baptist Easley, Cannon and Tri-County Technical College

#Other federal funding

##Reallocation of funds from School of Nursing during times with absence of federal funding.

Budget Narrative

Program Administration Coordinator of Doctoral Program. Includes 50% position of full time faculty member. Position is fully funded by Duke Endowment for first year. As the Duke Endowment funding ends, the School of Nursing will reallocate funds as necessary.

Salaries of Faculty (Reflects FT MS-PhD Schedule)

Current faculty salaries include no new positions in the School of Nursing. Salary reflects assisting the psychology department to add a .5 FTE faculty to teach an additional section of PSYCH 810/811 for students from nursing and other departments due to the consistently high level of enrollment in the first section. This faculty is not reflected in Table 6 because they are not an FTE within the School of Nursing. The extra salary has been added to the budget for faculty salaries in Table 9.)

Graduate Assistants

Students (6) will have the option of participating as graduate teaching assistants or graduate research assistants pending availability of grant funding.

Staff

- **Research Associate position** to provide genetic laboratory management and oversight of student research in the lab. Position is fully funded by Duke Endowment for first year.
- **Student Services Coordinator (50%)** to work with prospective and current students. Coordinator also works with master's level program.

Supplies and Materials reflects laboratory costs associated with tissue culture and genetic technologies. (Examples include fluorescent cell markers and cell flow cytometry.) This will be supplemented with collaborative partnerships and federal funding.

Library Resources (see Library Resources)

Equipment The primary equipment need will be new technologies required for the bench laboratory shared by nursing and microbiology faculty and their graduate students. (E.g. Luminometer plate reader, light microscopy and cell isolation instruments.) This will be funded by federal monies or reallocation of School of Nursing funds as necessary.

Facilities Costs in year three and afterwards reflect rental and renovation costs in new facilities. This will be paid for by federal funding, other donations and/or reallocation of School of Nursing funds as necessary.

Institutional Approval

Board of Trustees	Date: January 18, 2006
College Curriculum Committee	Date: September 5, 2006
College Dean	Date: September 5, 2006
University Curriculum Committee	Date: October 13, 2006
University Provost	Date: November 8, 2006
University President	Date: November 8, 2006

Teaching is an excellent resource for students who focus on ethics and policy as well as for students in the other two focal areas.

Nursing



**Parent Child Family
Area of Study**

340 Nursing Building
Iowa City, Iowa 52242-7121
319-335-7047 Fax: 319-335-5326
www.nursing.uiowa.edu

November 1, 2006

Julie Eggert, PhD, GNP-C, AOCN
Coordinator, PhD Initiative
Associate Professor

Rosanne H. Pruitt, PhD, RN, FNP
Professor and Director
Clemson University School of Nursing

Dear Dr. Eggert and Dr. Pruitt,

Thank you for the opportunity to review the materials describing the proposed curriculum and program design for the Clemson University Interdisciplinary PhD in Nursing and Genomics. This program is responsive to the critical need for doctorally prepared faculty in nursing. It also is responsive to the need for doctorally prepared nursing scholars who have academic preparation in genetic and genomic science, policy and integration of genetic discoveries into clinical practice.

Merits of the proposed program

There are many strengths in this proposed program. These include the substantive basic science, and research methods courses that form a portion of the core courses. The inclusion of three courses that are shared with other doctoral level nursing programs is innovative, and constructive strategy to allow sharing of unique resources and opportunities across institutions. These new proposed courses in the core curriculum address essential content in genetics, genomics, health policy and conduct of interdisciplinary research. These are likely to offer content not readily available at the other doctoral programs in the state, and I would expect that students across these campuses would enroll in them. The tracks for the BSN as well as for the MSN prepared student are also wise options to promote development of future researchers, educators, and health care leaders.

Three focal areas are planned for the proposed program. The Interventionist focus includes courses on population and human genetics. These are important foundational courses and would form the basis for community or selected population level interventions. However, it is not clear how other content, such as that which would be necessary for development and testing of patient centered interventions would be acquired. The content for the personalized level of care, such as assessment, identification, referral, and interventions described in the Essential Nursing Competencies and Curricula Guidelines for Genetics and Genomics (2005) are not as easily identified in the program materials. Opportunities for students enrolled in the program to have access to pediatric and cancer genetics programs may partially address this area.

The second area of bench science rests on two basic science courses. These are a unique strength of this program. Ongoing collaboration and communication among faculty in this interdisciplinary program will be an important component for those students who focus on laboratory aspects of genetic and genomic science. The links between basic and applied science are challenging for some students, and mentorship will be important for these students.

Ethics and policy is an important third focal area of this proposed program. The Center of Excellence in Partnerships for Community Outreach, and Research on Health Disparities and Teaching is an excellent resource for students who focus on ethics and policy as well as for students in the other two focal areas.

Nursing

The curriculum has a strong set of courses and the content in the course descriptions reflect the breadth of scholarship expertise needed for preparing genetics and genomics nursing scholars. However, the proposed program materials were not clear as to where doctoral students will receive hands-on research experiences. The dissertation is listed as being completed over 18 credit hours of study. It is possible that students will be matched with a research mentor or faculty who can provide the student with experience in the day to day management and implementation of research within the dissertation hours. In this reviewer's experience, experiences such as participation in preparation of a human subjects review board application, recruitment of subjects, data collection, data analysis, preparation of reports, interactions among members of a research team, and problem solving, under the guidance of an active research mentor are key experiences in the development of research focused scholars. These are important components of preparation for the PhD research focused degree, and their presence in the curriculum is not clearly described.

The coordinator is well qualified to lead this new program. Faculties identified for this program represent strong academic, clinical and educational knowledge and experience in their respective fields. The nursing faculty members have extensive clinical knowledge in cancer, community, pediatric health, among others. Faculty members are experienced in dissemination of knowledge in education and clinically focused journals. The nursing faculty members do not have sustained programs of externally funded research. It will be important for faculty members across the disciplines in this program to provide leadership and mentoring to students as they prepare for scholarly careers where acquiring funding to maintain research programs is an important skill. As is true with other PhD programs for nurse scholars, this program would be the first step in preparation for a research intensive career, with further education through postdoctoral training being the next phase in scholarly career development.

In reviewing the materials, this reviewer believes the focus of this proposal is appropriately placed on preparation of research focused scholars, rather than in preparing expert clinicians, which would be more appropriate at the DNP level. I raise this topic, as the application materials (page 13) suggest that graduates may be prepared to pursue 'careers as clinicians'. However, the coursework as outlined in the documents is not consistent with this statement. This reviewer recommends that the faculty committee reassess this component of the goal statement.

Potential effect on existing programs [PhD nursing genetics programs]

This program should not have a detrimental effect on the two PhD programs on genetics and genomics nursing and one DNP program in South Carolina. The needs assessment data conducted by the program applicants suggest that this program will attract students for which existing programs do not provide this new content focus. This reviewer does not see overlap with the existing DNP program, as the focus of the DNP is on preparation of expert clinicians who are able to conduct translational research, and focuses on evidence based practice. While complementary, the purposes of the PhD and the DNP education have distinct features and differences.

The effect of this program on existing PhD programs should be one that would facilitate the building the capacity of graduate level institutions to meet the growing need for faculty with research focused expertise in genetics and genomics health science. As noted by Prows et al (2005), a major barrier to increasing the amount of genetics in nursing curricula is the insufficient genetics knowledge of most nursing faculty. The plan for sharing of coursework has the potential to strengthen the entire set of PhD programs in South Carolina.

This reviewer is aware of two research extensive institutions that have formalized genetics components in PhD nursing curricula; as well as individualized student plans of study at other institutions. As cited in the proposal, the program at The University of Iowa includes

genetics/genomics as a focal area, with research experiences and dissertation guidance for students who complete a PhD in Nursing with their focus on genetics. The second is a newly funded T32 program for pre and postdoctoral academic and research training in nursing and genomics at The University of Pittsburgh. This program is in its first year. The proposed program at Clemson is a logical addition to the existing formal programs for PhD level education in nursing and genomics.

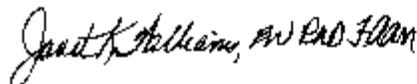
The third route to PhD education in genetics and nursing is arranged by individual students who adapt their courses and research focus interest in genetics, to an existing doctoral program. I have served on the dissertation committees for three such US students, and am aware of several others. Although this will remain the only option for some students who are not movable, it is not the preferred option. For those students, the expertise of faculty, courses, and research experiences may have limited relevance to the level of preparation required for genomic scholarship. The addition of the Clemson program should provide an important opportunity for students in the southeastern part of the US. With only approximately 70 members of the International Society of Nurses in Genetics holding doctoral degrees, there is an urgent need to expand opportunities to prepare nurse scholars who can fill leadership roles in genetics and genomics health care research, education, and policy.

Proposing institution's readiness to support the proposed program- Not addressed in this review

In summary, the proposed Clemson University Interdisciplinary PhD in Nursing and Genomics has a strong foundation of faculty and coursework. Areas that will benefit from further development are identification of research intensive mentored experiences for PhD students, and attention to linking bench and basic science principles and knowledge to identification and testing solutions for clinical as well as policy level problems for individuals, families, selected populations and communities. The program will also benefit from role modeling by faculty who achieve external funding and who develop ongoing programs of interdisciplinary genetic and genomic research.

If you have any questions about this review, please do not hesitate to contact me. Best wishes on successful implementation of this program.

Sincerely,



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 Director of Postdoctoral Training in Clinical Genetics Research
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