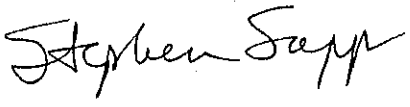




**MEMORANDUM**

**To:** Donna E. Shalala, President

**From:** Stephen Sapp  
Chair, Faculty Senate 

**Date:** August 29, 2008

**Subject:** Faculty Senate Legislation #2008-05(B) – Proposal for the Establishment of an Interdepartmental PhD Program in Human Genetics and Genomics at the Miller School of Medicine

\*\*\*\*\*

On August 27, 2008, the Senate voted to approve the proposal for the establishment of an Interdepartmental PhD Program in Human Genetics and Genomics at the Miller School of Medicine as presented by William Scott, Professor, Human Genetics.

The proposal is enclosed for your information.

The legislation is now forwarded to you for your action.

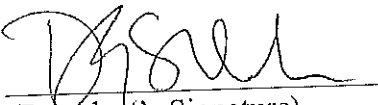
SS/rh

Enclosure (proposal)

**cc:** Thomas LeBlanc, Executive Vice President and Provost  
Pascal Goldschmidt, Sr. Vice President and Dean, Miller School of Medicine  
Aileen Ugalde, Vice President and General Counsel, Board of Trustees  
William Scott, Professor, Human Genetics

Faculty Senate Legislation #2008-05(B) – Proposal for the Establishment of an Interdepartmental PhD Program in Human Genetics and Genomics at the Miller School of Medicine

**PRESIDENT'S RESPONSE**

APPROVED:  DATE: Sept 9, 2008  
(President's Signature)

OFFICE OR INDIVIDUAL TO IMPLEMENT: DEAN PASCAL GOLDSCHMIDT

EFFECTIVE DATE OF LEGISLATION: IMMEDIATELY  
(if other than June 1 next following)

NOT APPROVED AND REFERRED TO: \_\_\_\_\_

REMARKS (IF NOT APPROVED): \_\_\_\_\_

## Proposal for Interdepartmental Program in Human Genetics and Genomics

### 1. Rationale

- a. Title of Degree: Ph.D. in Human Genetics and Genomics
- b. Purpose and Goals

The Interdepartmental Program in Human Genetics and Genomics is a multi-disciplinary program aimed at training scientists broadly in areas of human genetics and genomics relevant to human health and disease. Modern medicine is increasingly dependent on "genomic literacy" among practitioners and patients, and training the scientists who will work in genomics is part of the mission of a modern academic medical center. Indeed, genetics and genomics are increasingly viewed as central sciences in medical training and research, as summarized in the following passage from Dr. David Valle's 2003 presidential address to the American Society for Human Genetics (Valle, *Am J Hum Genet* 2004;374-381):

"We are fortunate participants in a biomedical revolution; even better, we are at the edge of the wedge of knowledge that is driving this revolution. Understanding individuality in terms of its genetic basis, evolutionary origin, effect on phenotype, and consequences for health is a central challenge that looms before us. Ultimately, we must learn how to evaluate and incorporate individuality into an effective, prospective form of medicine that relies heavily on prevention."

This viewpoint is echoed by University of Miami Miller School of Medicine Dean Pascal Goldschmidt, in his remarks on the recent opening of the Miami Institute for Human Genomics (Miami Herald, November 28, 2007, p. A1):

"Genomic research will change the way we practice medicine by translating the new knowledge of the Human Genome Project into findings that will help our patients survive some of the most common deadly diseases, through very targeted, personalized treatments. Ultimately, our discoveries will allow us to prevent many of these diseases altogether."

A critical complement to a world-class human genetics and genomics research program is a broad-based graduate training program. Research facilities provide the venues for training Ph.D. students, and ongoing research programs benefit from the interaction with trainees. Human genetics is a multidisciplinary field that requires training in three core competencies: clinical, molecular, and statistical genetics. This broad training differentiates human genetics graduate programs from other programs in molecular biology, biochemistry, epidemiology, or statistics which focus training on one of the three core areas. Currently, University of Miami graduate students with an interest in human genetics and genomics must enroll in one of the other existing graduate programs which generally do not include training in all three core human genetics disciplines. The establishment of a Ph.D. program in human genetics will allow these students who have common academic and research interests in human genetics and genomics to form a more cohesive community, and form a "critical mass" of students taking human genetics courses. Forming an interdepartmental program allows faculty from across the university to participate in training these students under a unified umbrella.

Only forty Ph.D. programs in Human Genetics are registered with the American Society of Human Genetics. **A Ph.D. program focused on human genetics and genomics would be**

the first in Florida, and one of only a handful in the southeastern United States. The opportunity thus exists to build a unique, dynamic training program to complement the developing human genetics and genomics research community at the University of Miami.

c. Demand and Job Market

Human genetics is a discipline concerned with identifying the inherited basis for human traits. These traits are both normal variations in the population (height, weight, eye color) and variable health states, such as disease phenotypes. Individuals earning PhD degrees in human genetics have various career options, including clinical laboratory (after fellowship training and board certification, for which existing programs are available at the University of Miami), research laboratory, or computational research in academia, healthcare, and the biotechnology industry. The need for such scientists has been discussed in many articles describing the fruits of the Human Genome Project. One such article, "The Future of Genetics—Career Opportunities for Young Scientists," (by E. Pain, published in the *Science Careers* section of the *Science* journal website, 9/26/2006) notes that PhD scientists with training in both statistical and molecular genetics are in demand for academic and industrial research, particularly in the areas of pharmacogenetics, gene-environmental interactions, and translation of findings to the health care setting. As economic development plans in South Florida continue to focus on the potential growth in biotechnology, graduate programs preparing students for careers in that industry are crucial. The PhD program in Human Genetics and Genomics fills part of that need.

As noted above, the practice of medicine is increasingly considering both the genetic basis of both disease as well as the response to treatment. These initiatives are variously termed "personalized medicine," "genomic medicine," or part of a broader "translational medicine." At the core of each is the idea that scientific discovery can be used to tailor or refine medical care for subsets of the population, based in part on an individual's genetic background. As genomic medicine continues to develop, the demand for scientists trained in the molecular and statistical methods used to dissect complex human traits will be high.

d. Relationship to Other Fields and Interactions with Departments

The proposed Human Genetics and Genomics program is an interdisciplinary biomedical graduate program based at the Miller School of Medicine. While many of the faculty will be appointed in the Dr. John T. Macdonald Foundation Department of Human Genetics, it is anticipated that faculty with active research programs related to human genetics in other departments across the University will affiliate with the program. Such a matrix model is proposed for membership in the Miami Institute for Human Genomics, and it is likely that researchers affiliated with the Miami Institute for Human Genomics would also participate in the interdepartmental Ph.D. program. For a partial list of potential faculty, see "Faculty" section.

e. Relationship to Undergraduate and Professional Programs

The proposed program is a natural progression for undergraduates in many scientific disciplines (such as biology, chemistry, biochemistry, mathematics, computer science) who wish to train in molecular or statistical genetics. The program complements, and is distinct from, existing Ph.D. programs, as it is focused on genetics and genomics as applied to human diseases and traits; such focus is currently not present in other departmental or interdepartmental programs. The program includes a clinical training component, whereby students will rotate through medical genetics clinics and observe the application of human genetics in a health care setting. This

activity will be coordinated with the existing Medical Genetics residency program and provide an opportunity for Ph.D. students to interact with M.D. medical geneticists.

## 2. Physical Resources

### a. Library Holdings

The University of Miami libraries have adequate resources to support this program. The printed and electronic versions of key Human Genetics and Genomics journals are available. As with other scientific research-based programs, the most important resource is online access to journals and other publications. The Calder Library at the Miller School campus has been critically evaluating potential additions to the current physical and electronic resources available for Human Genetics and Genomics research. We will continue to assist the library in evaluating the contribution these additional resources would make to the proposed Ph.D. program. However, at present, no additional special collections are **required** to support this program.

### b. Laboratory Resources and Equipment

The University of Miami and the State of Florida have committed substantial resources to developing state-of-the-art genomics and computational laboratories through the Dr. John T. Macdonald Foundation Department of Human Genetics, Miami Institute for Human Genomics and Center for Computational Science. These research organizations are critical elements in the environment necessary to train Ph.D. students in Human Genetics and Genomics, and augment an already strong life sciences research environment at the Miller School of Medicine, Rosenstiel School of Marine and Atmospheric Science, and Coral Gables campuses.

*The Dr. John T. Macdonald Foundation Department of Human Genetics and Miami Institute for Human Genomics*

The Dr. John T. Macdonald Foundation Department of Human Genetics and Miami Institute for Human Genomics occupy 5,000 square feet of office and computational laboratory space on the 8th floor of the new Clinical Research Building at the Medical School campus, and approximately 20,000 square feet of laboratory and 1,500 square feet of office space at the South Research Campus. In late 2008, both laboratories will move into 72,000 square feet of contiguous space in the Biomedical Research Building currently under construction.

Housed within the Miami Institute for Human Genomics are several shared resources that facilitate genetics and genomics research and training:

**Biorepository:** The Miami Institute for Human Genomics biorepository offers high-throughput processing and storage of blood, DNA, RNA, and tissue samples for genomics research. The facility has 3500 square feet to house an automated DNA extraction facility, robotics for allocation and manipulation of samples, and freezers for specimen storage. The biorepository utilizes the Nautilus laboratory information system to track receipt and allocation of each specimen.

**Genotyping core:** The Miami Institute for Human Genomics maintains 4000 square feet devoted to genotyping, with platforms suited to genome-wide association studies of millions of markers (Illumina BeadStation and Affymetrix GeneChip), moderate-scale genotyping of hundreds of markers (Sequenom MASSArray), and single marker genotyping (ABI TaqMan).

Microarray core: Three platforms from Agilent, Affymetrix, and Illumina are available for RNA expression analysis in the microarray core. The core is equipped with a bioanalyzer to assess RNA quality.

DNA sequencing facility: Both high-throughput (Illumina Solexa) and smaller-scale (ABI 7900) sequencing platforms are available for use. A Nimblegen system is also available for array-based resequencing and copy number detection.

General molecular genetics laboratory: The Miami Institute for Human Genomics has 14,000 square feet of well-equipped general laboratory space for positional cloning and general genetics experiments.

Models of Human Disease core: The Miami Institute for Human Genomics is in the process of developing a Center for Models of Human Disease which will host core facilities dedicated to working on non-human models of human genetic traits.

Computational Laboratory Facilities: The Miami Institute for Human Genomics computer network consists of approximately 150 personal computers running Windows XP, eight Sun Microsystems UNIX workstations, and a Sun T2000 Oracle database server running the Solaris 10 operating system. Twenty-five terabytes (TB) of storage is connected to the database server, and an additional 400 TB of file storage is available for the storage and processing of genomic data. Most commonly used human genetics and genomics software is available on this network, as well as standard statistical software such as SAS, R, and SPSS.

#### *Center for Computational Science*

High-performance computing and bioinformatics is crucial to modern genomics research. The Center for Computational Science is jointly developing with the Miami Institute for Human Genomics a research program in bioinformatics. This program administers the computational resources necessary for Miami Institute for Human Genomics research and provides a strong foundation for training graduate students in statistical genetics and bioinformatics. High-performance computing resources are being developed jointly with the Center for Computational Science, and consist of a 250-node UNIX/LINUX cluster, a SunFire 12K supercomputer, and several other multiprocessor machines for genetic and genomic analysis. A "bioinformatics toolkit" is currently being developed that will provide access to several bioinformatics software packages for analysis of genomic data.

#### *Other Laboratory Resources*

Through this interdisciplinary graduate program, students may affiliate with laboratories with access to additional core resources. These include the National Institutes of Health-supported Histology, Confocal Microscopy and Imaging, and Experimental Animals core facilities at the Bascom Palmer Eye Institute, the Confocal microscopy, flow cytometry, protein analysis, and transgenic/gene knockout core facilities at the Sylvester Comprehensive Cancer Center, the cell purification and banking facility in the Department of Microbiology and Immunology, and the electron microscopy core facility in the Department of Cell Biology and Anatomy. Access to these facilities and other departmental shared resources will depend on the research mentor's academic appointment or laboratory affiliation.

#### c. Extramural Funding

The University of Miami Office of Research has tabulated National Institutes of Health funding for federal fiscal year 2007. Current figures show that the University of Miami received \$103.5

million in National Institutes of Health funding, of which over \$88 million went to the Miller School of Medicine. The Miller School of Medicine ranks 44<sup>th</sup> in National Institutes of Health funding (up from 52<sup>nd</sup> in 2006), compared to all U.S. medical schools. These figures include an estimated \$9 million in awards supporting human genetics and genomics research.

### 3. Curriculum

#### a. Divisions of the Discipline

The program in Human Genetics and Genomics will be divided into molecular and computational tracks. All students will receive training in both molecular and computational genetics in the core curriculum offered in years 1 and 2. After choosing a track and research mentor, students will then select electives for further training in the molecular or computational sub-disciplines of human genetics. Some of these electives will be developed as "special topics" courses by program faculty, and others are available through existing biomedical graduate degree programs.

#### b. Course Descriptions

The program will take advantage of several established course offerings, including the interdisciplinary biomedical science (IBS) survey and ethics courses, existing epidemiology and biostatistics courses, and biochemistry and cell biology courses. New courses developed for this program include a two-course core series called "Human Genetics I" and "Human Genetics II", which will cover core competencies in human genetics and genomics, and an ongoing seminar-journal club series each semester. In the third or fourth year of study, all students will take a seminar on ethics and public policy issues in human genetics and genomics as part of this seminar-journal club series. This core set of courses is intentionally limited to allow greater flexibility for selecting upper-level electives to meet specific training goals for students within each of the two tracks. Other courses in eukaryotic molecular genetics, genetic epidemiology, and advanced statistical genetics will be developed for higher-level requirements and electives within each track.

#### c. Proposed Schedule of Course Offerings

The core curriculum will consist of introductory survey courses, research ethics, two new human genetics courses, a clinical rotation, and two courses in basic biostatistics. Students will also participate in seminars and regular journal clubs each semester. Electives will be chosen from existing biochemistry, cell biology, epidemiology, biostatistics, and other offerings, depending on the student's specialization.

Students will begin research rotations at the start of the first semester, gaining experience in several laboratories prior to choosing a mentor for dissertation research. Each student must complete at least three rotations prior to choosing a project and mentor. Students should choose a mentor by the end of the first year.

In addition to core coursework, students will be required to serve one semester as a teaching assistant for a core course. This experience will include giving at least one lecture, leading small group discussions, and holding regular office hours to discuss student questions. This will generally take place in the student's third or fourth year, and will be graded as a one-credit pass-fail course.

## Year 1

### Fall Semester

IBS 601	Interdisciplinary Biomedical Studies I	5 credits
HGG	Human Genetics I	3 credits
HGG	Seminar/Journal club	1 credit
HGG	Lab rotations	1 credit
IBS 680	Research Ethics	0 credit
EPH 501	Biostatistics I	3 credits
		=====
		13 credits

### Spring Semester

IBS 603	Interdisciplinary Biomedical Studies II	2 credits+
HGG	Human Genetics II	3 credits
HGG	Seminar/Journal club	1 credit
IBS 683	Professional skills and ethics	1 credit
HGG	Lab rotations	1 credit
EPH 502	Biostatistics II	3 credits
HGG	Elective	2 credits
		=====
		13 credits

+IBS 603 is a 4-module course. Modules 1 and 3 (signaling and cell biology) are required, and modules 2 and 4 (membrane physiology and human genetics) are optional.

### Summer Semester I

HGG	Lab Rotations	1 credit (if needed)
HGG	Dissertation Research	2-3 credits
		=====
		3 credits

### Summer Semester II

HGG	Dissertation Research	3 credits
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Students may begin registering for dissertation research credit upon affiliating with a research mentor and beginning laboratory work related to the proposed dissertation research project. Students continuing laboratory rotations into the summer will not register for dissertation research credit. Students are expected to take the qualifying examination by end of summer II. No more than 6 credits of dissertation research may be taken before passing the qualifying examination.

## Year 2

### Fall Semester

Both tracks:		
HGG	Seminar/Journal club	1 credit



Molecular genetics track:		
HGG	Molecular Genetics	3 credits
	Elective	3 credits
HGG	Dissertation research	3 credits
		=====
		10 credits

Computational genetics track:		
EPH 521	Fundamentals of Epidemiology	3 credits
EPH 603	Statistical Methods in Epidemiology I	3 credits
HGG	Dissertation research	3 credits
		=====
		10 credits

Spring Semester		
Both tracks:		
HGG	Seminar/Journal club	1 credit
HGG	Clinical rotation	1 credit

Molecular genetics track:		
	Elective	3 credits
HGG	Dissertation research	6 credits
		=====
		11 credits

Computational genetics track:		
HGG	Genetic Epidemiology	3 credits
	EPH Elective (EPH 605 or EPH 624)	3 credits
HGG	Dissertation research	3 credits
		=====
		11 credits

Summer I & II – both tracks		
HGG	Dissertation research	3 credits

**Years 3 and beyond:**

HGG	Dissertation research, teaching practicum, and electives	9 credits
HGG	Seminar/Journal club (includes one semester of ethics/public policy seminar)	1 credit
		=====
		10 credits

**Total requirements:**

Core course credits: 27 (molecular track); 33 (computational track)  
 Electives: 8 credits (molecular track); 5 credits (computational track)  
 Seminars/Lab Rotations: 12-13 (based on 5 years)  
 Dissertation credits: 24

Total: 71 – 75 credits

#### 4. Faculty

##### a. Program Faculty

The core teaching faculty will be drawn from those investigators affiliated with the Dr. John T. Macdonald Foundation Department of Human Genetics and the Miami Institute for Human Genomics, however, this is not a requirement for program membership. Other University faculty with research interests in human genetics may join the program faculty as well. The following faculty from the Dr. John T. Macdonald Foundation Department of Human Genetics the Miami Institute for Human Genomics, and the Steering Committee that developed this proposal have indicated interest in becoming program faculty members and meet the requirements for membership outlined below. A list of additional faculty interested in joining this program is being developed by the Steering Committee.

The Dr. John T. Macdonald Foundation Department of Human Genetics and Genomic Medicine: William K. Scott, Ph.D.; Susan H. Blanton, Ph.D., Eden R. Martin, Ph.D., Margaret A. Pericak-Vance, Ph.D., John R. Gilbert, Ph.D., Jeffery M. Vance, Ph.D., M.D., Stephan L. Zuchner, M.D., Michael Slifer, M.D., Ph.D., Gaofeng Wang, M.D., Dale J. Hedges, Ph.D., Sawsan Khuri, Ph.D., Deborah Barbouth, M.D., Jacob McCauley, Ph.D., Liyong Wang, Ph.D., Richard Morris, Ph.D., Evadnie Rampersaud, Ph.D.

Department of Neurology:  
Carlos T. Moraes, Ph.D

Department of Ophthalmology:  
Abigail Hackam, Ph.D.

Department of Molecular and Cellular Pharmacology:  
Sandra Lemmon, Ph.D.

Department of Pediatrics:  
Lisa Baumbach-Reardon, Ph.D.

The criteria for full faculty membership are modeled on other interdepartmental programs at the University. These criteria will be monitored by the steering committee, which will make final decisions on faculty membership: Some of these requirements will be waived for new junior faculty and recruits who have high promise for teaching and mentoring graduate students but have not had adequate time to establish an independently funded research program.

- 1) To have established an ongoing, independent research program in some area of human genetics and genomics;
- 2) To have published human genetics and genomics research results in peer-reviewed journals;
- 3) To have an interest in training and teaching graduate students in human genetics and genomics, demonstrated by teaching in human genetics and genomics program courses, other courses, seminars, and journal clubs taken by human genetics and genomics students;
- 4) To have trained graduate or postgraduate students in human genetics and genomics;

- 5) To have maintained independent funding at the national level for human genetics and genomics research. Acceptable sources of funding do not include postdoctoral funding fellowship awards or sources of funding that are outside the usual peer review process. The member must be able to fund human genetics and genomics graduate students who have decided to perform dissertation research in the member's laboratory. This support would begin after the student has finished laboratory rotations and passed the qualifying examination.

Faculty wishing to join the Human Genetics and Genomics program will submit to the steering committee an application consisting of a curriculum vitae and a cover letter explaining the reasons for the application. Qualified faculty will be invited to give a seminar to the program faculty and students. A two-thirds affirmative vote of the steering committee is needed to accept a faculty member. Appeals of negative decisions on faculty membership can be made to the Graduate Council as outlined in its bylaws.

#### b. Additional Faculty

At present, no additional faculty need to be hired in order to launch this program. However, additional faculty with research programs in genetics and genomics will be recruited by various departments at the University. If such faculty meet criteria for inclusion and are interested in participating, they will be admitted to the faculty of this program using the process outlined above. Therefore, we anticipate that the program's faculty will grow over time.

#### c. Interactions

The interdepartmental nature of the program ensures that students will interact with faculty from many departments. Human genetics and genomics is a topic of interest in several other graduate programs, indicating students will have the opportunity to meet other students with similar interests in other programs.

The Human Genetics and Genomics steering committee will coordinate course offerings, seminars, and journal clubs with other departments and programs. It is anticipated that faculty from these other departments will participate on Human Genetics and Genomics student committees.

Computational/quantitative skills, including statistics and bioinformatics, have become increasingly important for the training of all biomedical PhD students. The courses and resources developed by this PhD program will be able to directly benefit the students in other biomedical PhD programs.

### 5. Graduate Students

#### a. Students

This is a new program, and there are no students currently enrolled. We anticipate enrolling a minimum of four students per year within three years of program initiation. We have discussed the possibility of enrolling more students per year if sufficient numbers of qualified applicants apply and accept invitations to join the program. The Office of Graduate Studies and Office of Research have indicated that additional funds will be made available to expand incoming classes to six or eight students should applications warrant.

b. Requirements for Admission, Retention, and Graduation

To be considered for admission, applicants must have a bachelor's degree in one of the biological or physical sciences. Applicants should have a strong quantitative background and should meet UM Graduate School minimum GRE score requirements. Applicants are considered for the doctoral degree only. An admissions subcommittee of the Steering Committee will evaluate all applications and interview applicants. This subcommittee will make recommendations to the full Steering Committee, which will decide which applicants will be offered admission to the program.

*Student Progress and Admission to Candidacy*

When a student enters, the program director will aid the student on selection of first-year electives and laboratory rotations.

In order to remain in good standing with the program, students must maintain an overall 3.0 grade point average and earn no less than a 3.0 (B) grade in each core (required) course. Students must pass three laboratory rotations, participate in the required seminars and journal clubs, and present at a program research colloquium once per year.

**By the end of Year 1**, each student will complete laboratory rotations and select a faculty mentor. This selection will be reviewed by the Steering Committee. Upon approval by the Steering Committee, student advising will shift to the faculty mentor.

**By the end of the Fall Semester, Year 2**, each student will form a five-member examination committee (at least 3 members must be Human Genetics and Genomics faculty members, and at least one must be from outside the Human Genetics and Genomics faculty) in consultation with his/her faculty mentor. The composition of the committee will be reviewed by the Steering Committee and Chair, and submitted to the Dean of the Graduate School for formal appointment and approval.

This examination committee will 1) advise the student on his/her proposed research program; 2) meet at least yearly with the student to evaluate research progress; 3) evaluate the dissertation proposal and proposal defense; 4) read and comment on the draft dissertation; and 5) meet, when the dissertation is completed, to conduct the final oral examination to determine if the student has produced original research results meriting completion of the Ph.D. program.

**In the spring of Year 2**, the student will prepare and defend a written qualifying examination that will consist of:

**PART A:** A short (5 page, single-spaced) grant proposal on a human genetics and genomics topic of the student's choosing. The proposal should be in the style of a small grant or foundation proposal, with one page allocated to specific aims, one to background and significance, and three to the general approach and methods. The specific aims outlined in the proposal should not have been previously submitted for funding by the mentor. This proposal should reflect the student's own thinking and not be revised or critiqued by the advisor prior to the defense.

**PART B:** Within two weeks of presenting the written proposal, the student will defend the proposal in an oral examination in front of the committee.

Admission to candidacy in the Human Genetics and Genomics Ph.D. program requires the following:

- Maintain a grade point average of 3.0 or better in courses.
- Be accepted by a faculty mentor as a dissertation student.
- Pass Part A of the qualifying exam, written research proposal.
- Pass Part B of the qualifying exam, oral presentation of proposal.

Students failing to qualify by the end of Year 2 will be evaluated by the Steering Committee for continuation in the program.

**By the end of the spring semester, Year 3**, the student will prepare and defend a dissertation proposal. The student will submit a 12-15 page (single spaced) research proposal, similar to the format of a standard NIH grant proposal (part A), and orally present and defend the proposal to the examination committee within 2 weeks (part B). The oral examination (part B) will be chaired by a committee member other than the student's faculty mentor.

#### *Final Dissertation Defense*

With the approval of his/her examination committee, each candidate will prepare a written dissertation and present the research results at a public seminar. The dissertation should include data from at least one manuscript, first-authored by the candidate, accepted for publication in a peer-reviewed journal. Following the seminar, the candidate will meet with the examination committee in a closed session to defend the dissertation. This session will be chaired by a member other than the candidate's faculty mentor. The examination committee must approve the dissertation as a work of original research meriting the award of the Ph.D. degree in accordance with graduate school policies and procedures. In extraordinary circumstances, the publication requirement may be waived by a vote of the majorities of both the examination committee and steering committee.

#### c. Teaching Assistants

There is no current need for teaching assistants.

#### 6. Administration

##### a. Administration Increments Needed

At start-up the program is projected to utilize one-half of an administrative assistant's time for program coordination. This will likely increase to full-time effort as the program increases enrollment over time.

There should be at least \$12,000 provided to support the administrative activities of the Steering Committee Chair/Program Director.

A student room with adequate space for students not yet affiliated with a laboratory has been identified by The Dr. John T. Macdonald Foundation Department of Human Genetics. Such space will be outfitted with appropriate desks, phones, and computers.

Funds are needed for 1.5 years of stipend support per student ( $\$25,000 \times 4 \times 1.5 = \$150,000$  + tuition waivers + 80% health insurance costs), to allow the program to admit four students per year and cover the positions until rotations are completed and the student is affiliated with a faculty mentor. After program support ends, student stipends will be covered by the individual mentor's research grants. Money for travel and publication costs will also come from individual mentor's research funds.

It is anticipated that faculty will be supported by their departments to participate in teaching the core courses for the program.

#### b. Administration and Academic Direction

The program will be administered by a Steering Committee and a Program Director, who will serve as its Chair. The steering committee will have eight members elected at large from the program faculty. Members will be elected for four year terms, with two members rotating off each year.

The Program Director will be appointed by the Associate Dean for Graduate Studies, after consultation with the Steering Committee. The Program Director will serve a (renewable) five-year term and may be removed at any time by the Associate Dean for Graduate Studies or a vote of six members of the Steering Committee. The Program Director is responsible for overall leadership of the program, carrying out the decisions of the Steering Committee, representing the program to University administration, and overseeing budgetary, recruiting, teaching, and student progress.

The Steering Committee will meet monthly to discuss academic and policy decisions and to evaluate applications for membership (by both students and faculty) in the program. Members of the program are encouraged to work through Steering Committee members to address issues of concern; however, any full faculty member may request to address the Steering Committee by writing the Program Director.

An annual meeting of the program faculty will be held to discuss matters of interest to the entire faculty.

#### 7. Comparison with other Established Programs

There are 40 U.S. institutions registered with the American Society of Human Genetics offering a Ph.D. in Human Genetics ([http://www.genednet.org/pages/grad\\_training.shtml](http://www.genednet.org/pages/grad_training.shtml)). These 40 institutions include all of the top ten NIH-funded medical schools in the U.S. (2005): Johns Hopkins University, University of Pennsylvania, University of California- San Francisco, Washington University in St. Louis, Duke University, University of Washington, University of California-Los Angeles, Yale University, University of Pittsburgh, University of Michigan. Of the 62 members of the Association of American Universities, 27 are registered with the American Society of Human Genetics as having Ph.D. degree programs in Human or Medical Genetics.

**None of these 40 programs is in the state of Florida.** A survey of training programs reveals a variety of faculty and student sizes. Faculty number as few as eight or as many as 82; student numbers range from four to 84. The smallest programs (fewer than ten students) tend to focus on just one sub-discipline of human genetics, usually statistical genetics and genetic epidemiology (e.g. Southern California, Pennsylvania, Michigan). Larger, comprehensive programs tend to have both molecular and computational tracks, similar to the one proposed

here. The largest programs (Baylor, Duke, Emory, Johns Hopkins, University of North Carolina, University of Washington) are umbrella programs that combine human genetics with other (non-human) genome science programs.

The proposed University of Miami PhD Program in Human Genetics and Genomics would be comparable in size (16-25 students) to programs at University of Alabama-Birmingham (27 faculty), Indiana University-Purdue University, Indianapolis (73 faculty), Boston University (15 faculty), University of Pittsburgh (50 faculty), Vanderbilt University (34 faculty), and Virginia Commonwealth University (29 faculty). These programs also tend to have similar structure (two tracks, molecular and computational) and course requirements. Each offers a stipend, and tuition remission, and has post-doctoral training in human genetics and genomics.

#### 8. Budget

##### Year 1

4 students @ [redacted] stipend plus [redacted] ([redacted] of health insurance)  
50% of program coordinator  
Recruitment visits  
Minor equipment  
Office supplies, software, books, etc  
Overload for Program Director  
Student social events, meeting travel, etc.

Total

##### Years 2 and later

6 student-equivalents, 100% coordinator, plus above

Expenses for the program will be borne jointly by the Office of Graduate Studies (which will provide support for student stipends and a program coordinator), the Dr. John T. Macdonald Foundation Department of Human Genetics (which will provide student space, support for the program director, small equipment, and recruitment funds), and the Miami Institute for Human Genomics, which will also provide programmatic support.

*Redacted*

9. Letters of Support



**MILLER**  
SCHOOL OF MEDICINE

MEMORANDUM

To: Stephen Sapp, Ph.D.  
Chair, Faculty Senate

From: Jeffery M. Vance, Ph.D., M.D.  
Chair, Dr. John T. Macdonald Foundation Department of Human Genetics

RE: Proposed Ph.D. Program in Human Genetics and Genomics

Date: August 5, 2008

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I am writing to confirm the support of the Dr. John T. Macdonald Foundation Department of Human Genetics for creation of an Interdepartmental Ph.D. Program in Human Genetics and Genomics. As described in the proposal, the department will provide student space, support for the program director, small equipment, and support for departmental faculty teaching core courses.

The proposed program fills an important need in biomedical education at the University of Miami, providing a broad-based education in the clinical, molecular, and statistical aspects of Human Genetics and Genomics. The faculty of the Dr. John T. Macdonald Foundation Department of Human Genetics endorsed the creation of the program and is committed to its future success.



**MILLER**  
SCHOOL OF MEDICINE

MEMORANDUM

To: Stephen Sapp, Ph.D.,  
Chair, Faculty Senate

From: Margaret A. Pericak-Vance, Ph.D.  
Associate Dean for Human Genomic Programs  
Dr. John T. Macdonald Foundation Professor of Human Genomics  
Director, Miami Institute for Human Genomics (MIHG)

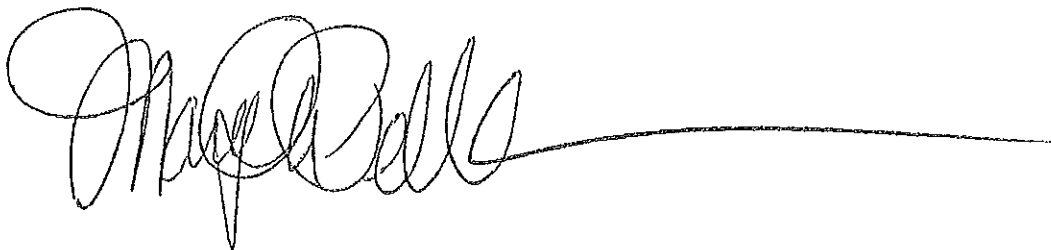
RE: Proposed Ph.D. Program in Human Genetics and Genomics

Date: August 5, 2008

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I am writing to confirm the support of the Miami Institute for Human Genomics for creation of an Interdepartmental Ph.D. Program in Human Genetics and Genomics. As described in the proposal, the MIHG will provide programmatic support for the program.

Establishing an educational program in human genetics and genomics fills a need at the University of Miami. A broad-based graduate training program is critical to the continued development of the genomics research programs at University of Miami. The proposed program will complement the research initiatives of the MIHG and the Miller School of Medicine, and the members of the MIHG support its creation.



**MILLER**  
SCHOOL OF MEDICINE

August 4, 2008

Dr. Stephen Sapp  
Chairman  
Faculty Senate Committee  
University of Miami  
325 Ashe Administration Building  
Coral Gables, Florida 33146.

Dear Steve,

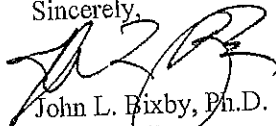
I am pleased to present to the Faculty Senate a proposal to create a new interdisciplinary PhD Program in Human Genetics and Genomics. This program will have its home in the medical school, but will be open to faculty housed at the Coral Gables and RSMAS campuses as well.

The program proposal was developed by a Program Steering Committee of our colleagues, chaired by Dr. Bill Scott, a professor of Human Genetics. Under Dr. Scott's leadership, the committee has developed an innovative and thoughtful approach to graduate training in Genetics and Genomics. This effort has been extensively discussed for many months among medical school faculty, PhD program directors, and department chairs. Support is widespread and deep and the roster of participating faculty is sure to grow in the years to come.

Expenses for the program will be borne jointly by my office (which will provide support for student stipends and a program coordinator), the Dr. John T. Macdonald Foundation Department of Human Genetics (which will provide student space, support for the program director, small equipment, and recruitment funds), and the Miami Institute for Human Genomics, which will also provide programmatic support.

I look forward to meeting with the Senate, hearing their reactions to the design of the program, and having the opportunity to respond to any questions or concerns they might have. Please let me know if there are any additional materials that the Senate requires.

Sincerely,

  
John L. Fixby, Ph.D.  
Associate Dean



# MILLER

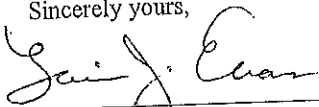
SCHOOL OF MEDICINE

Dear Faculty Senate,

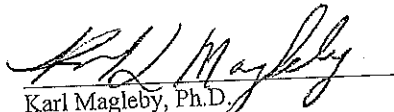
We are pleased to write a letter in support of the proposed PhD Program in Human Genetics and Genomics. This initiative brings a new and exciting academic program to the University of Miami. The Program in Human Genetics and Genomics clearly represents a University-wide and multidisciplinary effort involving multiple departments built around a strong cadre of faculty with a shared interest in Genetics and Genomics and in basic and translational research. This effort will bring together faculty from various departments university wide, to provide a broad base of knowledge and experience for the benefit of our students. Importantly, this program will help to stimulate training in three core competencies: clinical, molecular, and statistical genetics.

We believe that the existence of this Program will also facilitate recruitment of highly qualified graduate students for our current programs, and generally increase awareness of biomedical research opportunities for potential graduate students at the University of Miami. Establishing the graduate program in Human Genetics and Genomics will thus expand the pool of available graduate students, including students affiliated with various departments, and will provide a rich academic environment for students with a specific interest in Genetics and Genomics. We also believe that the Program will be attractive to many MD/PhD applicants. Finally, we want to voice our support for Dr. Bill Scott, a recently recruited colleague, who is the founding chair of the program's Steering Committee. His previous experience, as an active member of the Duke University Program in Genetics & Genomics and the Duke Clinical Research Training Program, and as Director of the Human Genetics track for medical students at the Duke University School of Medicine, bodes well for the success of the Human Genetics and Genomics Program at the University of Miami. We urge you to review this proposal favorably.

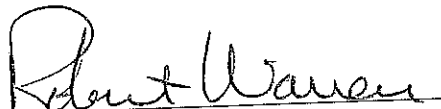
Sincerely yours,



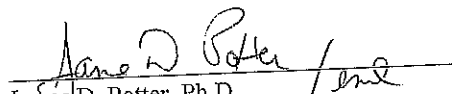
Louis Elsas, M.D.  
Interim Chairman  
Biochemistry and Molecular Biology



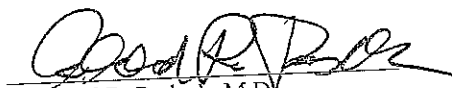
Karl Magleby, Ph.D.  
Chairman  
Physiology and Biophysics



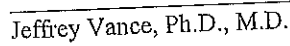
Robert H. Warren, Ph.D.  
Interim Chairman  
Cell Biology and Anatomy



James D. Potter, Ph.D.  
Chairman  
Molecular and Cellular Pharmacology



Eckhard R. Podack, M.D.  
Chairman  
Microbiology and Immunology



Jeffrey Vance, Ph.D., M.D.  
Chairman  
Human Genetics



**MILLER**  
SCHOOL OF MEDICINE

Pascal J. Goldschmidt, M.D., FACC  
Senior Vice President for Medical Affairs and Dean  
Chief Executive Officer  
University of Miami Health System

Memorandum

To: Robyn Hardeman  
Secretary of the Faculty Senate

From: Pascal Goldschmidt, M.D.  
Senior Vice President for Medical Affairs and Dean  
Miller School of Medicine

Date: August 4, 2008 *Pascal J. Goldschmidt*

Subject: Support for the Interdepartmental Human Genetic/Genomics PhD  
Program

I am writing to confirm the Miller School's enthusiastic support for the creation of an Interdepartmental Ph.D. Program in Human Genetics and Genomics.

The proposed program provides a comprehensive approach to the clinical, molecular and statistical aspects of human genetics and genomics. Recent recruiting efforts have synergized with existing expertise in this area to position the Miller School and the University as a leader in training the next generation of human genetics and genomics thought leaders. The creation of an interdisciplinary Ph.D. program is timely and important and the Miller School is committed to its success. I offer my wholehearted support for its establishment.





MEMORANDUM

TO: Faculty Senate

FROM: Dean Terri Scandura *Terri A. Scandura*  
The Graduate School

DATE: 5 August 2008

SUBJ: New program in Human Genetics and Genomics

At the 15 May 2008 meeting of the Graduate Council, those present voted unanimously in favor of the motion "To approve the new program in Human Genetics and Genomics."