COLUMBIA UNIVERSITY

Department of Biomedical Informatics

2013-14 Trainee Handbook

Please Note

All trainees are responsible for familiarizing themselves and complying with the regulations of the department, the University, and of the Graduate School of Arts and Sciences (GSAS) as described in the GSAS Bulletin **(http://www.columbia.edu/cu/gsas/sub/bulletin/site/map/index.html)**. Students are also urged to seek out any additional resources and opportunities, available both through the University and external sources, that might assist their graduate study. While meant to be comprehensive, this handbook is a working document. As such, it could not contain every policy and practice existing in the department. It will updated on an ongoing basis. Trainees should seek clarification when needed about rules and regulations. *Please be aware that lack of knowledge about University, GSAS, and/or departmental rules and policies cannot excuse failure to comply with these regulations.*

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I. Curriculum and Requirements

A. Overview of the Biomedical Informatics Curriculum

The Biomedical Informatics curriculum is designed to meet the needs of a wide range of students with different backgrounds and career goals, while providing a uniform foundation in the essentials of the field.

The program consists of core courses that are required of every student and provide a foundation in general biomedical informatics methods, techniques and theories, while electives enable students to apply these methods to one or more areas of specialization in bioinformatics, translational, clinical informatics, clinical research informatics, or public health informatics. In addition, students conduct research, assist in teaching (if PhD or postdoctoral trainees), and attend colloquia.

Tables 1 describes the degree requirements of the program, listing courses that support each objective. Students are advised to consult the Columbia University Directory of Classes online and department websites for course descriptions and to find out when courses are taught: **http://www.columbia.edu/cu/bulletin/uwb/** The online Columbia University Directory of Classes is the official listing of course offerings by term and is the authoritative resource to which students should always refer. The official University academic calendar that provides dates when classes are in session and dates of commencement takes place is also available from the Columbia main webpage as a quick link: **http://registrar.columbia.edu/academic-calendar/6**

B. Course Requirements

Table 1

Requirement: Core

Description:
Is familiar with problems, issues, and applications in Biomedical Informatics, and is able to apply general theories and methods to solve problems

Courses Required: 4

Can Place Out: No

Courses Meeting the Requirement:

BINF G4001
Introduction to Computer Applications in Health Care and Biomedicine

BINF G4002
Methods II: Computational Methods

BINF G4003
Methods I: Symbolic Methods

and either:

BINF G6002
Methods III: Research Methods (for Clinical, Public Health or Translational track students)

or

BINF G4015
Computational Systems Biology (for Bioinformatics students)

Requirement: Biomedical

Description:
Is conversant with concepts, terminology, institutions, professionals, and methods of the biomedical domain

Courses Required: 1

Can Place Out: Yes, if a physician or nurse

Courses Meeting the Requirement:

BINF G4011
Acculturation to Medicine

BINF G4062
Public Health Informatics

ECBM E4060
Intro-Genomic Information Science & Technology

BIST P6530
Issues and Approaches in Health Policy & Management

G6300/G6301
Biochemistry and Molecular Biology

BCHM G6300
Biochemistry & Molecular Biology of Eukaryotes

P6400/P6402
*Principles of Epidemiology (*fall term*)*

COMS W4761
Computational Genomics

Enrollment in *P6400/P6402 Principles of Epidemiology* for non Mailman students requires cross registration with the Mailman School of Public Health via a permission form and is limited to the change of program period (see academic calendar from the Columbia University website from the quick link tab).

Requirement: Computational

Description:
Can apply computational techniques to manage data, develop software, and solve problems

Courses Required: 1 for MAs, 2 for PhDs

Courses Meeting the Requirement:

COMS W4111 *Database Systems*

COMS W4231 *Analysis of Algorithms*

COMS W4771 *Machine Learning*
or
STAT W4240 *Data Mining* (not both)

COMS W4444 *Programming and Problem Solving*

COMS W4701 *Artificial Intelligence*

Requirement: Mathematical

Description:
Can apply mathematical techniques to analyze data and test hypotheses

Courses Required: 1

Courses Meeting the Requirement:

P6104/P6114
*Introduction to Biostatistical Methods** (taught in fall and summer)

APMA E4990
Data Driven Modeling

BIST P8149
Design of Medical Experiments

STAT W4107
Statistical Inference

STAT G6104
Applied Statistics

HBSS 4199
*Introduction to Biostatistics (*Teachers College)

*Requires placement exam in August and cross registration form from the Mailman School of Public Health. Email jh2477@columbia.edu to register for the placement exam. Enrollment in P6104/P6114 for non Mailman students is limited to the change of program period which occurs during the first two weeks of classes.

Requirement: Elective

Description:
Is able to apply general methods and theories of informatics to one or more areas of specialization: translational bioinformatics, clinical research informatics, clinical informatics, or public health informatics

Courses Required: 2

Courses Meeting the Requirement:

BINF G4004
*Applied Clinical Information Systems (*fall term)

BINF G4005
Process Redesign in a Complex Organization (spring term)

BINF G4016
Quantitative & Computational Aspects of Infectious Diseases (spring term)

BINF G4022
Exploration of Clinician Information Needs (spring term)

BINF G4013
Biological Sequence Analysis (spring term)

BINF G8001
Independent Readings

Any class already approved as a biomedical, computational, or mathematical educational objective

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Requirement: Research

Description:
Can conduct independent research in Biomedical Informatics, can formulate a hypothesis, design a suitable experiment, and carry it out with sensitivity to ethical standards

Courses Required:
1 for MAs, Every Term* for PhDs and Postdoctoral Degree Fellows

Courses Meeting the Requirement:

BINF G6001
Research Projects

BINF G9001
*Doctoral Research (*enroll in after completion of Oral II/Depth Exam)

BINF G9999
Doctoral Dissertation
(enroll in for last term of your registration for PhD)

The fall term dates for rotating students for BINF G6001 are the second week of September through the MLK, Jr. Holiday. For spring term, the dates for rotating students for BINF G6001 are the day following the MLK, Jr. holiday (the first day of classes) until the last day of finals. Research with the permanent research advisor commences the next business day following the last day of finals.

Requirement: Ethics

Description:
Is knowledgeable about the ethical and policy issues that arise during the conduct of basic, translational, and clinical biomedical scientific research

Courses Required: 1 for PhDs and Postdoc Degree Fellows

Course Meeting the Requirement:

CMBS G4010
Responsible Conduct of Research and Related Policy Issues
(Spring term)

Must be taken Spring term of first year

Requirement: Teaching

Description:
Can prepare educational materials, deliver lectures, and evaluate students

Courses Required: 2 for PhDs and Postdoctoral Fellows

Can Place Out: No

Course Meeting the Requirement:

BINF G8010
MPhil Teaching Experience

Requirement: Colloquia

Description:
Is familiar with investigators, institutions, projects, methods and theories in the field locally and at other institutions

Courses Required: Every Term for full-time MA students and PhD

Course Meeting the Requirement:

BINF G4099
Research Seminar

C2B2 Seminar
For bioinformatics students in their second year and above

PhD trainees in their second year and above may request a one semester exemption from Research Seminar to take an alternative course that conflicts with the Research Seminar time

Bioinformatics MA & PhD students in their second year and above may attend the C2B2 seminar in lieu of enrolling in the BINF G4099 Research Seminar.

Part-time MA students are not required to enroll in the BINF G4099 Research Seminar if doing so would put them into the next residence unit category (cause them to incur additional tuition expense). They are expected to attend whenever feasible.

B.1 Master of Arts (MA) Degree

The Master of Arts (MA) degree in Biomedical Informatics prepares trainees for practical, hands-on careers in health care, hospitals, biotechnology, consulting, insurance, pharmaceuticals, and other industries. The program, often referred to as the free-standing MA, can be completed on a part-time basis for up to four years, per GSAS regulations. Full-time students typically complete the program in two years. All students must pass an Oral I Exam before completion of their degree *(see **Section V. Oral Examinations**)*. Course approval forms are to be completed by the student and his/her academic adviser by the close of the Change of Program (also referred to as the cross registration) period each term. Progress in the MA program is tracked each semester using a set of standard reporting forms available online from the department website *(see **Section II. Forms**)*.

Curriculum: *(see **Table 1**)* Students must complete a minimum of 30 points of Columbia University graduate coursework (4000 level or above), address any admission deficiencies (preparatory courses needed in order to enroll in core courses or meet degree requirements), and have accumulated two residence units. Table 1 shows the minimum number of courses required to meet the program's educational objectives. Academic advisers may exempt students from the biomedical, mathematical or computational requirements if the advisors certify the requirements have been met through prior graduate coursework. Advisers may request a transcript and/or syllabi for previous graduate coursework from students before they consent. However, students will be required to take an alternative course in order to meet the 30 point requirement for the degree. Academic advisers may suggest appropriate courses for requirements that have or have not been met. Academic advisers can certify course substitutions by signing the degree flowsheet of the mid-semester reports available online.

Research Project: All MA students must have experience in using biomedical informatics techniques to solve practical problems. This requirement is met by taking BINF G6001: *Research Projects in Biomedical Informatics* under the direction of a faculty research adviser. Students must write a master's essay with the topic and timeline for finishing the project approved by their research adviser. A second reader for the master's essay is chosen by the research adviser and the student from among the DBMI faculty. The nature and scope of master's essay is at the research adviser's discretion. Both the research adviser and second reader sign the master's essay report confirming that the master's essay has been completed. It is the student's responsibility to deliver the signed form and a copy of his/her master's essay to the chair's assistant, who will secure the chair's signature. The completed form is placed in the student's file by the Graduate Program Manager. It is at that point, provided all other requirements have been met, the department can certify the student has met all of his/her requirements for the MA degree.

B.2 Doctoral Degree

The PhD program in Biomedical Informatics trains students in a scientific approach to the use of information in health care and biomedicine. Students enrolled in the doctoral program must register for a minimum of 12 points and a maximum of 18 points each Fall and Spring semester.

Curriculum: Students must complete a minimum of 60 points of Columbia University instruction at the 4000 level or higher, address any admission deficiencies, and complete six residence units. Table 1 shows the minimum number of courses needed to meet the program's degree requirements. Students must consult with their academic advisors to request substitutions, to select appropriate courses, and to choose electives in one of the tracks: bioinformatics, translational informatics, clinical informatics, clinical research informatics, or public health informatics. Those who have prior graduate course work who wish to request a course substitute or exemption should consult with their academic advisor and the graduate program manager for information on the process.

Research Project: Research is the primary focus of the doctoral program and, accordingly, represents more than half of the required points. Doctoral students enroll in the research project course (BINF G6001) for six points per semester in the first year, nine points per semester in the second year, and 12 per semester in the third year. Each student has an advisory committee that consists of a primary faculty advisor and two additional faculty members with an academic appointment in DBMI. The committee must meet with the student at least once each semester to review the student's progress. Students are expected to work on their research a minimum of 25 hours per week in the first year, increasing to 60 hours per week in the third year. The doctoral dissertation is the culmination of the student's research activity. For first year students rotating with different research advisors, the Fall term dates for the first research rotation of BINF G6001 are the second week of September through the MLK, Jr. Holiday. For Spring term, the dates are the day following the MLK, Jr. holiday (the first day of classes) until the last date of final examinations (see the online University academic calendar ***http://registrar.columbia.edu/academic-calendar/6***). Work with the permanent research advisor commences the next business day following the last day of final exams.

B.3 Postdoctoral Degree Fellows

The degree-granting postdoctoral fellowship program is for individuals with an earned doctorate in a related field such as medicine, public health, nursing, computer science, etc. who wish to add informatics training to their prior doctoral work. Fellows are funded by the National Library of Medicine (NLM) Training Grant for up to three years. This program leads to a Masters of Arts (MA) or Doctorate of Philosophy (PhD) degree.

The curriculum and research requirements are the same as for other master's degree and doctoral candidates.

C. Curriculum

C.1 Course Load

Postdoctoral (degree-earning) and PhD students are required to be registered full-time (a minimum of 12 points) each semester for the duration of the program, even during semesters in which they are conducting full-time research. During these semesters, students should register for BINF G6001 *Research Projects* for 12 points (if they are in their third year and have not yet successfully completed their Oral II/Depth Exam) and BINF G9001 Doctoral Research if

they have completed their Oral II/Depth Exam and have earned their MPhil. Their very last semester in the program, students also register for BINF G9999 *Doctoral Dissertation* for 0 points.

Fall Semester:
Entering PhD, Postdoctoral MA and research MA students

C.2. Course Sequencing

BINF G4001
Introduction to Computer Applications in Health Care and Biomedicine

BINF G4003
(see note below) Methods I: Symbolic Methods

BINF G4099
Research Seminar (bioinformatics students in year 2 and above are not required to enroll)

Postdoctoral MA and PhD students are also required to take:

BINF G6001
Research Projects in Biomedical Informatics
Research MA students enroll in BINF G6001 when they are ready to conduct research under the guidance of a faculty member, usually in their last year of the program.

Note: Enrollment in BINF G4003 *Methods I: Symbolic Methods* is dependent upon previous academic preparation as determined by the instructor. The instructor reviews the transcript(s) included with your admissions application to determine suitability for course enrollment and any additional preparatory courses that may be needed prior to enrolling.

Spring Semester:
Entering PhD, postdoc MA and research MA students

BINF G4002
Methods II: Computational Methods (see note below)

and either

BINF G6002
Methods III: Research Methods (for non-bioinformatics students)

or

BINF G4015
Computational Biology (for bioinformatics students)

Postdoctoral MA and PhD students are also required to take:

BINF G6001
Research Projects in Biomedical Informatics

and

CMBS G4010
Responsible Conduct of Research and Related Policy Issues (spring term of first year)

BINF G4099
*Research Seminar (*bioinformatics students in their second year or above are not required to enroll and may attend the C2B2 seminar instead*)*

Note: Like BINF G4003 *Methods I: Symbolic Methods,* enrollment in BINF G4002 *Methods II: Computational Methods* is dependent upon a student's level of preparation, as determined by the instructor. BINF G4002 requires working knowledge of programming and data structures and alogrithms. You may enroll upon permission of instructor. Online options to obtain the requisite knowledge are: 1) Udacity course *Introduction to Programming in Java* (***https://www.udacity.com/course/cs046***) 2) Coursera's *An Introduction to Interactive Programming in Python* (***https://www.coursera.org/course/interactivepython***) 3) Stanford University's *Introduction to Computer Science/Programming Methodology* (***http://see.stanford.edu/see/courseinfo.aspx?coll=824a47e1-135f-4508-a5aa-866adcae1111***), 4) MIT's Introduction to Computer Science and Programming (***http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-00-introduction-to-computer-science-and-programming-fall-2008/index.htm***) 5) *Algorithms, Part I* (https://www.coursera.org/course/algs4part1). The student needs to obtain the equivalent knowledge of Columbia's **COMS W3134** *Data Structures* or **COMS W3137** *Data Structures and Algorithms* in order to obtain sufficient competency to enroll BINF G4002. A description of the Columbia computer science courses is available from the computer science website.

For entering PhD, postdoctoral MA and research MA students, the decision on whether to enroll in five or six courses (inclusive of BINF G4001, BINF G4099 and BINF G6001) Fall term is an individual one. A student's academic advisor and current students can assist in making this decision.

C.3 Courses - Summer
The department does not pay for courses taken by PhD and postdoctoral students in the summer. The cost for any summer course must be paid by the trainee.

Fellows with an MD or nurses are considered to have met the biomedical requirement. The trainee's advisor may suggest an alternative course to take in lieu of that requirement. Substitute courses may include an elective or further research by means of a *Projects* (BINF G6001) or *Readings* (BINF G8001) course.

In all cases, course exemptions and related substitutions must be recorded on the degree flowsheet that is submitted as part of the mid-semester reports each Fall and Spring terms. Faculty advisors can indicate approval of course substitutions by signing their name at the bottom of appropriate form listing the courses students will use toward the degree requirements.

C.5 Grades
With the exception of BINF G4099 *Research Methods,* and CMBS G4010 *Responsible Conduct of Research and Related Policy Issues,* all students must take courses for a grade if they intend to use the course toward their degree requirements. Preparatory computer science courses below the 4000 level taken as prerequisites for BINF G4002 or BINF G4003 do not need to be taken for a grade. Students must receive a grade of B or higher in courses (excluding BINF G6001 or BINF G9001 where the minimum grade required is an A) that they intend to use toward their degree requirements or they may not use the course. If the student learns less than a B, s/he will be required to either retake the same course (if a core course) or a take an approved substitute (if an educational objective) in order to satisfy the degree requirement. Students are expected to receive no less than an A in research courses (BINF G6001 Research

Projects, BINF G9001 *Doctoral Research*). Trainees who receive NC (no credit), INC (incomplete) or CP (credit pending) in any course are subject to review by the Training Committee, as are those who earn grades below the aforementioned minimums.

D. Research Seminars

The Department of Biomedical Informatics sponsors weekly presentations on various informatics topics during which students have an opportunity to gain insight into current research in the field. These seminars may contain information related to questions given during oral examinations. All seminars are held in the VC-5 conference room, unless otherwise indicated.

All students, whether full-time or part-time, are required to attend the weekly *Research Seminar* (BINF G4099) during their first year. Part-time MA students are not required to enroll for the seminar if doing so would require them to pay in excess of two residence units for the degree. However, they are still expected to attend as much as possible.

Clinical, public health, and translational full-time students must register and attend BINF G4099 *Research Seminar* every Fall and Spring term. Bioinformatics PhD & full-time Bioinformatics MA students must enroll and attend BINF G4099 *Research Seminar* their first year. In their second and subsequent years, they are required neither to enroll in, nor attend, BINF G4099 *Research Seminar* but must attend the C2B2 seminars instead.

BINF G4099 is taken for one point on a Pass/Fail basis and attendance is mandatory. Students who do not attend seminars or miss a number of them, as defined by the instructor, risk not receiving a passing grade. Therefore, students should consult the course instructor regarding the attendance policy and notify the instructor of times they are unable to attend the seminar.

E. Residence Units

Columbia requires a minimum number of residence units (RU) for each degree: two RU for the Master's degree, and six RU for the Doctoral degree. Residence units accrue as follows:

2 or fewer courses	=	1/4 Residence Unit
3 or fewer courses	=	1/2 Residence Unit
4 or more courses up to 18 points	=	1 Residence Unit

The Graduate Affairs Office of GSAS enrolls PhD students in the appropriate residence unit category each term, and ensures that students are registered full-time during the summer without the need to enroll in courses. Once PhD students have accrued six residence units, the Graduate Affairs Office enrolls them in the extended residence (ER) category.

All Research MA students, inclusive of postdoctoral research fellows, must register for the appropriate Residence Unit (RU) category each term when enrolled in courses. Full-time MA students earn the required two RUs needed for the MA degree after two terms (Fall and Spring term of their first year). In subsequent terms, such students who have already accrued the number of residence units needed for the degree should register for Extended Residence (ER). The call number for the Health Sciences Campus RU and ER categories may be found online through the Directory of Classes: **http://www.columbia.edu/cu/bulletin/uwb**

Since Research MA students are self-funded, they must pay particular attention to whether the residence units charged by Columbia correctly correspond to the number of courses they took each term (See **http://gsas.columbia.edu/content/tuition-fees** for an explanation on the number of units and their corresponding costs). Ensuring they have been charged the appropriate residence unit category each term is the ***responsibility of the student.*** Improper monitoring has resulted in erroneous charges. Students are advised to lay out their program plan (the number of courses for which they will register each term) in advance and carefully plan in which terms they plan to fulfill the degree requirements in advance to avoid paying for unnecessary residence units. Errors can be corrected by Student Administrative Services located on the first floor of the Black Building, Room 1-141, 212.342.4790.

Related Link: **http://www.columbia.edu/cu/gsas/sub/bulletin/policies/requirements/unit.html**

F. Teaching Assistant Requirements

Postdoctoral Research Fellows and PhD students are required to serve as teaching assistants for two courses in the department. In order to earn credit for TA responsibilities, students need to register for two points of BINF G8010 *MPhil Teaching Experience* each semester in which they serve as a TA. Students and faculty are solicited in early summer for their top 3 preferences. The Training Committee assigns TAs during the summer based on faculty and student preferences and departmental needs. The assignments will be communicated to students and faculty by the Graduate Program Manager.

G. Registering for Classes

Students use Student Services Online (**https://ssol.columbia.edu**) to register prior to each semester. Students register during appointment windows provided by the registrar's office. You must log into SSOL prior to each semester to find your appointment times at the end of August for Fall term, at the beginning of January for Spring term. For continuing students, there are also preregistration dates listed on the Columbia University registrar's website. Should you not have a registration time assigned, you must contact the Student Admnistrative Services Office (Black Building, first floor, Room 141, tel. 212.305.4790 to request one). There is no financial penalty for adding/dropping courses during the Change of Program period at the beginning of each term. See academic calendar available as a quick link from the main Columbia website for dates when classes are in session as well as change of program period dates: **http://registrar.columbia.edu/academic-calendar/6** If a class is full and you are unable find an alternative class, please contact the department that offers the course to request written approval to register for the class. The Registrar's Office cannot provide an override into a full class without the department's written permission. To take part in late registration, students need to complete an add/drop form and have it signed by the Gradate Program Manager. Fees may apply. Some classes are only available for registration during the change of program period dates because students from those programs are given priority for registration. Even if these classes fill up before the change of program period dates when it is open for you to register for them, it may still be possible to get into the course if the instructor grants permission via the add/drop form available online from the Registrar's website: **http://registrar.columbia.edu/registrar-forms** For classes that are highly subscribed with several sections, such as

courses in the Mailman School of Public Health , you will be able to get into the course but you may not get your first choice of section.

Registering for courses at the Mailman School of Public Health (ie P6104/P6114 Introduction to *Biostatistical Methods* taught in fall or summer or P6400/P6402 *Epidemiology* taught in fall) requires a cross registration form and a visit to the Office of Student Affairs at the Mailman School (722 West 168th Street, Suite 1030, tel. 212.302.3927). The cross registration application form is taken to the department offering the course to request permission and to obtain the signature of the instructor or department coordinator. The form goes to the Mailman Office of Student Affairs for signature of the Vice Dean and then to the CUMC Student Administrative Services Office (Black Building, 1st floor, Room 1-141, tel. 212.342.4790). The cross registration form used by the Mailman School of Public Health can be obtained from the Graduate Program Manager or the DBMI website. The add/drop form for other courses (ie Computer Science, etc) may be obtained from the Registrar's website: **http://registrar.columbia.edu/registrar-forms** .

For those interested in taking P6104 I*ntroduction to Biostatistical Methods* in the Fall term, students must contact Justine Herrera (jh2477@columbia.edu) to sign up for a placement exam before they are eligible to enroll. The exam is normally given during the last week in August. Walk-ins are not allowed.

Related Links:

Columbia's Directory of classes -
http://www.columbia.edu/cu/bulletin/uwb/

Columbia University Registrar-
http://www.columbia.edu/cu/registrar/index.html

Columbia Academci Calendar-
http://registrar.columbia.edu/academic-calendar/6

II. Forms

A. Student Reporting Forms

Progress in the Biomedical Informatics academic program is tracked each semester using a set of standard reporting forms. Reports are required two times per year (on the last day of the University designated change of program period each Fall and Spring terms) and completing them is mandatory. Forms are available on the DBMI website. See the University academic calendar for dates: ***http://registrar.columbia.edu/academic-calendar/6*** Those trainees in any section of BINF G6001 Research Projects or BINF G9001 Doctoral Research will need to meet with their research advisor first and then their academic advisor for signatures (in that order). There are also a series of forms the student will need to complete prior to meeting with the academic advisor that tracks their progress toward completing all of the DBMI requirements.

B. Applying for the Master's Degree

Just as Columbia requires a formal application for admission, it requires applications for its degrees. Applications for the MA degree are handled by the Registrar's Office. After successfully completing the Oral I/Breadth Examination, all students apply for this degree by going to the Registrar's website and dowloading the application for the MA degree. Submit the form to Jennifer Caplan on the Morningside campus, 107 Low Library, jc12@columbia.edu Students should apply for the degree the semester before they intend to sit for the exam. In the event they do not pass the Oral I/Breadth Exam, the registrar will forward the application to the next conferral period (February, May, October).

C. Forms for the MPhil and PhD Degrees

Applications for the MPhil and PhD degrees are handled by the GSAS Office of Dissertations. PhD students apply for the MPhil degree after they have accrued six residence units (six terms of full-time study) and successfully completed the Oral II/Depth Exam. The MPhil Degree Application is processed by the GSAS Office of Dissertations and found online **http://gsas.columbia.edu/forms** Fill in your name, permanent address and dates of successful completion of your Breadth/Oral I and Depth/Oral II exams. Submit the form to the Graduate Program Manager who will obtain the chair's signature, keep a copy for your file, and submit it to the Office of Dissertations.

PhD students submit their Report of the Dissertation Proposal Committee (downloaded from the same website prior to your Dissertation Proposal Defense **http://gsas.columbia.edu/forms**) to the Graduate Program Manager after they have successfully completed their exam. The chair of the exams is the highest ranking, most senior DBMI faculty member. Please see the graduate program manager if you are unsure of whom that may be. The sponsor is your research advisor. The Graduate Program Manager will submit it to the Office of Dissertations and keep a copy for your file.

Finally, PhD students submit their fully completed Application for Dissertation Defense form to the Graduate Program Manager. It is available at **http://gsas.columbia.edu/forms** This should be done approximately six weeks before your scheduled dissertation defense. Be sure to provide the date by which you intend to distribute your dissertation. If you do not provide a date of dissertation distribution, even if it has not yet been distributed, the Office of Dissertations will not process your form. Both the date by which you distribute your dissertation and the date of your defense impact whether you must be registered for the semester of your defense. For GRAs, whether or not you are registered in the semseter of your defense impacts whether you are paid. The Graduate Program Manager will obtain the chair's signature, keep a copy of the form for your file, and submit it to the Office of Dissertations.

The Office of Dissertations sends a blue folder to the Graduate Program Manager shortly before the dissertation defense date. It includes a voting sheet and instructions for the chair of the dissertation defense and paperwork that must be submitted by the student with the dissertation deposit. The Graduate Program Manager will place the forms for the student to deposit with their dissertation in his/her VC-5 mailbox and she will ensure the faculty receives the blue folder. Under no circumstances should the student have the voting sheet in their possession, either before or after the exam. The chair of the proposal defense and dissertation defense is responsible for giving the form to the Graduate Program Manager following the exams.

III. International Students

International students should consult the Office of International Students and Scholars with any questions related to visas, tax treaties and payroll deductions, and how to apply for a social security number (which you must do as soon as possible after coming to Co-

lumbia once you are appointed as a Graduate Research Assistant or GRA). The ISSO Office on the Morningside (main) campus is the official University resource for foreign students and faculty. They hold a separate Fall orientation for incoming students that must be attended. They also provide information sessions on issues such as filing taxes, acclimation to the US and the University, and are an indispensable resource. Students must read their informative manual, Coming to Columbia: Essential Information for New International Students, available online from their website: **http://www.columbia.edu/cu/isso/incoming/** Students are required to check in with them once they have arrived to Columbia. They may be contacted at any time with questions or concerns. You may email them at isso@columbia.edu, newintlstudent@columbia.edu or call 212.854.3587

IV. Advising

A. Academic Advisor

Students are assigned an academic advisor by the department and notified of that assignment in August. Students meet with their academic advisor a minimum of twice a term and should contact their advisor to schedule appointments as far in advance as possible. Academic advisors sign Course Approval Forms (available online from the DBMI website) at the beginning of Fall and Spring terms. The forms are due at the end of the Change of Program registration period (see academic calendar available as a quick link tab from the Columbia main website). In addition to meeting with the academic advisor for course selection approval at the beginning of each semester and in the middle of each semester to review mid-semester reports, students may consult them at any time with problems or concerns.

B. Research Advisor

B.1 Rotation Research Advisor

During the Fall and Spring semesters of their first year, PhD trainees are required to rotate among research labs. Postdoctoral Research Fellows may rotate but are not required to do so. The selection of a permanent research advisor must be made by May 1st of the Spring term. A third research rotation is optional and may be taken at the discretion of the permanent research advisor. Prior to the start of the Fall and Spring semesters, PhD students and postdoctoral fellows should contact the faculty with whom they are considering doing a rotation to request an appointment. Selection of a research rotation advisor must be official by the end of the drop/add period of each semester. Students should discuss expectations for the rotation as well as a finite project to be completed by the end of the term of the rotation with the research advisor. This prevents projects continuing into the next semester which impacts the output of the new research rotation. Email the Graduate Program Manager the name of the faculty member chosen for each rotation, as well as the name of the desired permanent research advisor. The project should not depend on applying for a new IRB as this will delay the research into the subsequent semester which is ill advised. The Training Committee grants final approval of research advisors. For first year students rotating with different research advisors, the Fall term dates for the first research rotation of BINF G6001 are the second week of September through the MLK, Jr. Holiday. For Spring term, the dates are the day following the MLK, Jr. holiday (the first day of classes) until the last date of final examinations (see the online University academic calendar ***http://registrar.columbia.edu/academic-calendar/6***). Work with the permanent research advisor commences the next business day following the last day of final exams.

B.2 Choosing a Research Advisor

PhD students must choose whom they will request as their permanent research advisor by May 1st of the Spring term, making the research rotations in the Fall and Spring of year one of crucial importance. Consider rotation advisors that you might want as a permanent research advisor. Consider rotation advisors that you might want as a permanent research advisor and who have funding if you will require it. Talk with current students about your potential choices. Read the ample print and online resources regarding how to choose an advisor. Make the most informed decision possible. Once you have made the decision, you will need to notify via e-mail the Graduate Program Manager of your selection. The Training Committee grants final approval of the permanent research advisor.

B.3 Guidelines for Research Rotations

Rotations in the first year should be limited to the duration of one semester only (see dates of first year research rotations for Fall and Spring terms in *B.1 Rotation Research Advisor*). It is imperative that rotations begin as closely to the start of the semester as possible and that they end on time to allow students to focus on final exams at the end of the semester and to provide a solid basis for evaluation of the student's performance for grading purposes. Making sure the project for the rotations is one that can be finished within the scope of one semester facilitates a clean transition to the next rotation. Students should submit a written proposal and a final report as part of their rotation. The proposal should include a schedule for meeting with the research advisor, expectations, and deliverables. It shall be due on the first day of the rotation and the final report shall be due on the last date of the rotation. Course grading shall be in the form of a letter grade and will reflect the research advisor's assessment of the student's knowledge of the project, including mastery of the project-related literature, relevant research methods, and the skills required for the project. These skills include communication, collaboration, and professionalism within the research environment.

V. Oral Examinations

The department administers two oral exams. The Oral I/Breadth Exam is taken by students in the free-standing MA program, and by PhD students. In all cases, a student must have completed the core curriculum (BINF G4001, BINF G4002, BINF G4003, BINF G6002 OR BINF G4015) before they may sit for the exam. For PhD students, the Oral I/Breadth Exam is taken 18-24 months into the program (during the winter intercession or summer of their second year). MA students are eligible to sit for the exam in the summer of their first year, provided they have successfully completed the core courses. The Depth/Oral Exam II is taken by PhD students in order for them to receive the MPhil degree, and to qualify for PhD candidacy. The Oral II/Depth Exam is taken after the student has identified his/her dissertation topic. The dissertation proposal defense must take place within six months of passing the Oral Exam/Depth II.

A. Oral I/Breadth Exam

Both PhD and MA students must successfully pass the Oral I/Breadth Exam, which is taken after students have successfully completed the core curriculum. For PhD students, this is usually the summer of their second year but may be taken in the winter intercession of their second year in January. The exam is given three times a year: in January, in Spring term (April or May) or in the summer months of June or July. The exam committee consists of three or four faculty members, at least one of whom should be in the student's area of interest (i.e. clinical, pub-

lic health, biomedical, or translational informatics). The purpose of the exam is to assess the student's breadth of knowledge of the field, the ability to express this knowledge verbally, reason with it, and to synthesize concepts from different areas. The PhD oral exam demands a greater level of understanding of research issues and a demonstration of scientific reasoning capabilities.

Questions are adapted to the student's background or coursework and research. While factual knowledge is important, questions tend to be novel constructions, and often ask the student to bring together information from two or more areas. The committee members use an assessment form, provided by the Graduate Program Manager, to assign scores. They decide by consensus whether the student passes or retakes the exam. The committee chair is responsible for sending a final copy of the form to the Graduate Program Manager. The committee chair is also responsible for informing the student, either in person at the conclusion of the exam, and emailing the decision of the committee (pass or fail) to the student, the Graduate Program Manager, the Graduate Program Director, and the student's research and academic advisors. Along with the decision, the committee chair should inform the student of areas of strength and weakness of the student's performance and, in the case of failure, the earliest date that the student may retake the exam (usually six months) as well as recommendations for improvement. The student should sit with the same exam committee for the retake exam. Students who fail two consecutive exams are at risk of being dismissed from the program. For PhD students, successful completion of this exam results in an MA degree, provided the student has earned the necessary two residence units.

The exam is 45 minutes for MA students and one hour for PhD students. The exam is held in the VC-5 Conference Room and scheduled by the Graduate Program Manager approximately one month in advance, if possible. Students should inform the Graduate Program Manager of their interest in taking the exam several months in advance of the desired schedule date. The Graduate Program Manager will attempt to accommodate requests for specific exam dates; however, scheduling is subject to faculty availability.

In all cases, the faculty strongly encourages students to work in groups to prepare for the exam. The student representatives have information on previous exam questions that have been asked of students and can offer suggestions on how to best prepare for the exam. For PhD students, there will be more of a focus on research than for MA students, reflecting the differences between the two degrees.

B. Oral II/Depth Exam

The Oral II/Depth Exam is taken by PhD students no earlier than six months before they intend to sit for their dissertation proposal defense. This exam is usually given 12 months after the Oral I /Breadth Exam. This exam is the final requirement before a PhD student receives the MPhil degree and is considered for doctoral candidacy, provided the student has earned the necessary six residence units GSAS requires. Within six months of receiving the MPhil degree, the student sits for the dissertation proposal defense as required by the University. Thus, students should plan the timing of the Oral II/Depth Exam accordingly. The student downloads the exam form from the DBMI website and brings it to her exam for the chair of the committee to fill out and return to the Graduate Program Manager.

The goal of the exam is to assess the ability of the student to survey the literature in a given research area, synthesize the achievements, identify the gaps, and propose research hypotheses. The student will select a specific problem based on that work (literature synthesis, gaps, research questions) and present a detailed methodology to address the problem. Before an exam is scheduled, the committee should review the student's work to date and assess the student's readiness to undertake the exam. The work completed as part of the exam is intended to provide a basis for the doctoral dissertation.

When it is decided by the student's internal committee (research advisor and two internal members of the department) that the student is ready to undertake the exam, the student is given 30 days to prepare an oral presentation that is given as a public seminar. The student is responsible for scheduling the examination, which should take place in either the VC-5 Conference Room or the 8th Floor Irving Conference Room. In order to ensure that sufficient notice is given regarding the public part of the defense, the student e-mails an abstract to Elidis Reyes a minimum of three weeks in advance of the examination date. Copies of the slides and the bibliography must be provided to the committee. The exam is two hours, with the first hour given as a public seminar and the second hour taking place as a closed session. In the first hour of the exam, the student describes the literature in a given area, synthesizes the achievements, identifies gaps, proposes research questions, and selects a specific problem, presenting a detailed methodology that addresses the problem. In the second hour, the student's internal committee meets privately with the student and asks additional questions as needed. The committee members use an assessment form, provided by the department, to evaluate the student's proposal with the following emphases: description of the literature, synthesis of achievements, gap analysis (60%), research questions (30%), and methods (10%). They decide by consensus whether the student passes, receives honors or retakes the exam. The committee chair is responsible for sending a final copy of the form to the Graduate Program Manager and e-mailing the exam result to the Graduate Program Director.

With successful completion of the Oral II/Depth Exam and the attainment of six residence units, the student is now eligible for the MPhil degree. Students submit an MPhil Degree Application Form downloaded from **http://gsas.columbia.edu/forms** to the Graduate Program Manager who will submit it to the Office of Dissertations for degree conferral and retain a copy of the form in the student's file. As noted above, the timing of the Oral II/Depth Exam is important in that it is tied to the timing of the Dissertation Proposal Defense. Once awarded the MPhil degree, the student has six months before s/he must sit for the Dissertation Proposal Defense. Therefore, it is important not to schedule the Oral II/Depth exam prematurely. Schedule it when you are prepared to take your dissertation proposal defense within six months of passing the Oral II/Depth exam as agreed to with your research advisor.

VI. Research

A. Time Commitment

Doctoral and Postdoctoral degree-earning students are required to devote a significant amount of time to research: a minimum of 25 hours per week in the first year, increasing to 60 hours by the third year. The time commitment for free-standing MA students should be clearly established with the research advisor before the project begins.

B. Registering for Research Points

Doctoral and Postdoctoral degree-earning students must register for G6001 each semester during the first three years. After earning the MPhil degree, doctoral students enroll in dissertation research (G9001) for 12 points in Fall and Spring terms. Because research is central to the degree program, the project course carries more points than lecture-style courses. In their first year, students should register for six points of BINF G6001 per semester. In the second year, they register for nine points per semester, and 12 points in the third and subsequent years. As the student progresses through the program, the course load from lecture-style courses should decrease accordingly. Doctoral students entering the program after having completed their MA degree in our department will register for BINF G6001 for a minimum of 6 points up to a maximum of 12 points, dependent upon how many other courses they are taking. Students who have earned their M.Phil (successfully completed their Oral I/Breadth and Oral II/Depth exams, accrued six residence units and applied for the MA and MPhil degrees) should register for BINF G9001 *Doctoral Research* for 12 points each semester until the dissertation defense along with BINF G9999 Doctoral Dissertation for zero points in their final semester. It is expected that no other courses required for the degree (save BINF G9001 Doctoral Research) will be taked after earning the MPhil Degree.

MA students are required to enroll in one semester of BINF G6001 Projects for three points. They will be expected to produce a master's essay as part of that research course, the content of which will be determined by the research advisor. All students are expected to receive a minimum of an A in research (BINF G6001, BINF G9001) courses. Once the Training Committee has approved a student's research advisor request, he/she will need to enroll in the appropriate section of BINF G6001 or BINF G9001 under the faculty member's name. If there is no section for that faculty member, contact the Graduate Program Manager.

See ***IV. Advising, B. Research Advisor*** for information on research rotations and the selection of the permanent research advisor.

C. Advisory Committee / Dissertation Committee

At the appropriate time, when agreed to by the research advisor, students will solicit a minimum of two but no more than three faculty members with academic appointments in DBMI to serve as the internal members of their Advisory Committee. The research advisor helps to select and recommend members of the internal and external committees to the student. The internal committee convenes to prepare and administer the Oral II/Depth Exam and the Dissertation Proposal Defense. The internal committee must meet with the student at least once a year to review the student's progress and assign a grade for research. The student is responsible for initiating and arranging these meetings. The most senior, highest ranking internal faculty member (ie Assistant Professor, Associate Professor, Professor) exclusive of the research advisor on the committee serves as the committee chair. The sponsor is the research advisor. The full Dissertation Committee consists of exactly 5 faculty. A minimum of three with a maximum of four members are faculty who have an academic appointment in DBMI. One or two members are external faculty who do not have an academic appointment in DBMI. The external faculty need only participate in the Dissertation Defense and review the student's dissertation a minimum of four weeks before the exam and are not expected to participate in the Oral II/Depth Exam nor the Dissertation Proposal Defense.

D. Grading

Research advisors must assign a letter grade for each research project course, based on the goals described in the following section. If there are multiple advisors, the primary advisor is responsible for assigning the grade. The grading scale is: A (excellent), B (adequate), C (poor), and F (failed). Plus (+) and minus (-) may be used to modify grades. A grade of CP (credit pending) may be assigned only in cases of medical or family emergency. If work is incomplete for other reasons, the advisor should assign a grade of C or F, which can be changed, provided the student addresses the deficiencies by the end of the semester following the C or F grade. Adequate achievement in research is essential to the program. A single grade of F, or a grade of C in two consecutive semesters indicates that a student has significant problems in conducting research, and may result in dismissal from the program.

E. Research Goals

PhD students should pursue five goals when conducting research. Advisors will assign grades based on how well the student has achieved these goals. These guidelines are not intended to be used as a strict checklist of all the behaviors that a student must exhibit in order to earn a particular grade. Rather, they should provide the advisor with a picture of the general level of accomplishments that might warrant a grade of A, B, C or F for each of these goals. The aggregate grade for the course need not be a strict average of the grades for the goals. For example, failure in one of the goals could result in failure for the project.

Goal 1: *Understand the nature of informatics research*

A: Student is intellectually involved in the design of the project; makes creative contributions to the research design; understands the limitations of the data; is aware of problems with the methodology; has ideas for subsequent experiments that might be performed.

B: Student understands the reasons for the current project design, but does not contribute to its planning; carries out expected technical tasks and collects the expected data, but needs assistance to interpret them. Needs to be directed toward next steps.

C: Student has minimal understanding of the design of the project, seems to simply follow instructions by rote.

Goal 2: *Master intellectual and technical skills necessary for research*

A: Student has excellent technical skills, and acquires new techniques independently. Project work is conducted in a well-organized manner, and steps are well documented.

B: Student learns the necessary technical skills, but requires direction. Project work is performed competently, but sometimes lacks organization and is not always documented well.

C: Student demonstrates minimum technical skills and requires extensive help with the work. Project activities are often disorganized and poorly documented.

Goal 3: *Read and apply the scientific literature*

A: Student obtains relevant scientific literature independently; reads

and understands scientific articles; understands some of the problems with the published papers; is able to synthesize ideas from multiple sources; demonstrates ability to apply methods and theories from the literature to the current project.

B: Student reads articles suggested by the mentor, but does not find articles independently; completes reading, but does not synthesize ideas or take a critical approach towards the literature; requires assistance to apply reading to current project.

C: Student does not appear to read suggested articles, or demonstrates only a superficial understanding; does not make a sufficient effort to find additional readings, or to ask for help with understanding the articles; does not understand the relevance of the literature to the current project.

Goal 4: *Develop skills in scientific writing*

A: Student writes well-organized research plans and progress reports; writes papers in style appropriate for journal publication; conveys a logical progression of ideas; makes original contributions; carefully proofreads papers, making only minor errors; cites sources where appropriate, and lists references in appropriate format.

B: Student writes research plans and progress reports that are sometimes incomplete or lacking organization; writes papers with competent statement of the research problem and results, but needs help from the mentor; occasionally shows original input; reports results, but does not analyze too deeply; documents vary in quality, clarity and in writing style.

C: Student writes research plans and progress reports that lack significant parts and are poorly organized; writing frequently lacks an adequate description of the research problem and requires major revision by the mentor; does not make original contributions; proofreads carelessly, with many errors.

Goal 5: *Demonstrate a responsible working attitude*

A: Student demonstrates enthusiasm for the project and commitment to doing the best possible job; shows concern for other team members as well as his/her own project; participates actively in project meetings; always on time and well prepared for meetings; proactive in addressing project goals.

B: Student shows adequate commitment to the project; works well independently, but doesn't go out of his/her way to help team members; not always on time or prepared for meetings; needs to be reminded to address project goals.

C: Student shows no enthusiasm or commitment to the project; fails to assist other team members when asked; frequently late or unprepared for meetings; fails to return email or phone messages; often fails to complete assigned tasks.

VII. Dissertation Proposal and Dissertation Defense

A. Dissertation Proposal Defense

Within six months of successful completion of the Oral II/Depth Exam and the awarding of the MPhil, the student obtains permission from his/her internal committee to defend their proposal. The internal members of the dissertation committee must receive a copy of the proposal at least four weeks prior to the scheduled defense. External members of the Dissertation Committee are not expected to attend the proposal defense. The GSAS Office of Dissertations does not receive a copy of the proposal. The student downloads the proposal defense application from **http://gsas.columbia.edu/forms** and fills in the form for the committee prior to the defense, giving the form itself to the committee chair. The chair is responsible for returning it to the Graduate Program Manager for submission to the Office of Dissertations. The chair of the committee is the most senior, highest ranking faculty member (ie Assistant Professor, Associate Professor, Professor) out of the three or four internal members. The sponsor is the research advisor. The first hour of the examination is public; the second hour is a closed-door session with the committee. For both the sake of convenience and the potential for increased attendance by members of the department, the student is responsible for scheduling the exam in either the VC-5 Conference Room (for Clinical, Public Health or Translational students) or the Irving 8th Floor Conference Room (for Bioinformatics students). In order to ensure that sufficient notice is given regarding the public part of the defense, the student e-mails an abstract to Elidis Reyes, a minimum of three weeks in advance of the examination date. The dissertation proposal is the first step in the development of the dissertation and is required to ensure the viability of the dissertation topic. The student begins the preparation of a dissertation, generally building on the topic that was the subject of his/her Breath/Oral II Exam.

B. Dissertation Proposal Outline

With the approval of the research advisor, the proposal may be distributed to the internal dissertation advisory committee at least 3 weeks prior to the proposal defense. The proposal must be an original and significant contribution to the field of Biomedical Informatics. The project described by the proposal must be reasonable in scope and grounded in the existing literature. At the discretion and approval of the research advisor, the dissertation proposal should consist of 12-30 single-spaced pages with half-inch margins and be done in a minimum of 11 point type. It should be distributed to the 3 internal dissertation committee members a minimum of 4 weeks in advance of the dissertation proposal date and should include the following:

Chapter I: **Introduction** *(Overview of the Thesis)*

Problem Statement
Purpose of the Study
Research Questions/Hypotheses
Experimental Design Associated with Hypotheses
Significance
Contributions
Limitations

Chapter II: **Background and Related Work**

Historical Background
Literature Review
Review of Theories Related to the Topic

Chapter III: **Methodology** *(Details of Thesis)*

Research Questions/Hypotheses
Preliminary Studies *(Optional)*
Experimental Design Applied *(e.g. data sources, data collection, analysis, evaluation, etc.)*

Chapter IV: **Timeline**

Chapter V: **Bibliography**

C. **Dissertation Defense**

A final University-mandated thesis defense is held at the end of PhD training when the student's primary research advisor deems the student to be ready. The remainder of the student's internal dissertation committee will have been involved with the research and must also concur with the decision to defend. For both the sake of convenience and the potential for increased attendance by members of the department, the exam is scheduled by the student in either the VC-5 Conference Room or the Irving 8th Floor Conference Room. In order to ensure that sufficient notice is given for the public part of the defense, the student e-mails an abstract to Elidis Reyes a minimum of three weeks in advance of the examination date. The first hour is public; the second hour is a closed session with the full dissertation committee. The full dissertation committee consists of exactly five faculty. A minimum of three and a maximum of four are internal members of our Department who have an academic appointment in DBMI. One or two members of the five members are external faculty who hold a doctorate but do not have an academic appointment in DBMI. Should external dissertation committee faculty not already be approved dissertation sponsors within GSAS, the Department will need to submit the external faculty member's CV to the Office of Dissertations for approval. Six weeks prior to the dissertation defense, students submit an Application for Dissertation Defense, available from the Office of Dissertations website *(see* **Section II. Forms** *C. Forms for the MPhil and PhD Degrees).* Students submit the dissertation to the Dissertation Committee ***a minimum of four weeks in advance of the scheduled dissertation defense.*** Both the chair and the sponsor must be physically present for the exam to take place. Should a member of the Committee who is neither the chair nor the sponsor be unable to attend the dissertation defense in person, advance approval to hold the exam must be secured by the Chair of the Department from the GSAS Office of Dissertations. The Graduate Program Manager will initiate the approval process.

PhD theses are expected to provide significant innovative insights and new results that add to the knowledge of biomedical informatics. There is a major emphasis on including some type of evaluation of the work, keyed to the initial hypothesis. Dissertations must be written according to the Columbia University guidelines and will generally follow the same chapter outline as described for the dissertation proposal. A template in Microsoft Word is available from the Office of Dissertations website.

After the closed session, committee members discuss the student's performance and indicate their agreement with the final vote by signing the voting sheet provided by the Office of Dissertations. The dissertation committee chair is responsible for returning the voting sheet to the Graduate Program Manager for submittal to the GSAS Office of Dissertations.

Students will need to submit an approval card provided by the Office of Dissertations with their dissertation deposit. The card must be signed by the student's research advisor as well as the DBMI Department Chair (in that order). The card is sent by the Office of Dissertations with the voting sheet for the hair of the Dissertation Committee. The card will be placed in the student's DBMI mailbox for retrieval along with dissertation deposit directions from the Office of Dissertations. Under no circumstances my the student have the voting sheet in their possession at any time. It is the responsibility of the dissertation committee chair to provide the voting sheet to the graduate program manager following the exam. Related Links:

CU Dissertation Office -
http://www.gsas.columbia.edu/dissertations

VIII. NLM Fellows

Appointments to DBMI's National Library of Medicine (NLM) training grant are made annually and are subject to appointment renewal pending: a) continued agency funding, b) departmental need, and c) satisfactory academic progress. The department cannot guarantee continued appointment on the training grant for each year in the program. These appointments are considered an honor and are made in recognition of a student's potential to excel. By Federal guidelines, only US citizens and Permanent Residents are eligible. Predoctoral fellows are eligible for a maximum of five years of agency funding. Postdocs (those possessing a doctorate in any field) are eligible for a maximum of three years of NLM funding. Online appointment forms must be completed for each year on the grant, with a termination form submitted in the last year. NLM funded trainees are required to submit abstracts in early spring term to the Training Committee to be reviewed for possible selection for the mandatory NLM summer meeting (see *NLM Requirements* section below). NLM funded PhD trainees are paid three times a year. Students may contact the Office of Graduate Affairs, P&S Building, 3rd Floor, Room 435 (212.305.8058) or Student Administrative Services (Black Building, First Floor, Room 1-141, tel. 212.342.4790) to inquire when stipend checks for fellows will be received. Those who finish their degree or take an approved leave of absence prior to the end of their appointment date will need to return that portion of the stipend that encompasses the time period after their degree was completed. Fellows with questions about their stipend payments or data on eRA Commons may see James Lapin in the DBMI Finance Office (tel. 212.342.3126, james.lapin@dbmi.columbia.edu)

A. Research Advisors

NLM trainees are restricted to selecting a research advisor from among DBMI's core faculty. Faculty affiliates cannot serve as a research advisor to NLM fellows.

B. NLM Requirements

NLM requires its trainees to attend a mandatory yearly summer meeting. NLM trainees must submit a research abstract to the Training Committee in preparation for this meeting in early Spring term. Trainees must have their research advisors review and approve the abstracts before they are submitted to the Training Committee. The Training Committee will select two poster and 2 presentation abstracts to present at the meeting after suggested edits have been made. Trainees are permitted to attend an additional conference during the year, with a limited/pre-determined dollar amount to be paid by the department if approval is secured in advance of the conference. The amount to be covered will be determined by the department administrator if the trainee is NLM funded, and by the sponsor if the trainee is funded by a research grant. Most clinical, translational and public health trainees are expected to attend the annual AMIA symposium held in the Fall unless a comparable substitute is approved in advance by the research advisor and department administrator. Trainees funded by NLM must submit a yearly progress report detailing courses, publications, and posters or presentations given at conferences during the year.

As part of their appointment as NLM fellows, trainees must complete a personal profile on eRA Commons (**https://commons.era.nih.gov/commons/**) and annual appointment forms on xTrain. Delay will result in non payment of stipend. James Lapin (**james.lapin@dbmi.columbia.edu**, 212.342.3126) is the department contact for problems with xTrain, as well as unpaid balances on student accounts.

IX. Publications

PhD students and postdoctoral fellows are expected to make submissions to publications and conferences each year. The frequency and appropriateness of these submissions are decided by the research advisor. No student or fellow may submit work to any publication or conference without the expressed prior approval of their research advisor. Prior to submission, the research advisor must review final versions of all papers and abstracts submitted to journals, conferences, books or other publications. This policy applies to all publications, regardless of authorship, that deal with work that has been done at DBMI, Columbia University, or any affiliated institution(s).

X. Financial Issues

A. Stipend *(PhD Students & Postdoctoral Research Fellows Only)*
The Department of Biomedical Informatics guarantees funding for all Ph.D. trainees. Funding for postdoctoral research fellows is renewable on an annual basis up to 3 years at the department's discretion subject to funding availability and departmental need. Funding covers tuition, single student health insurance fees, University fees and a stipend. The amount and frequency of checks is dependent upon funding source and position. Trainees who receive their checks at the start of each semester should go to the Bursar's office in Black Building (Rm. 109) to collect their check. Inquire about direct deposit (if interested) at the Bursar's office or refer to the GSAS Student Handbook, available from the Office of Graduate Affairs (P&S 3rd Floor, Room 435, tel. 212.350.8058, biomedicalsciences@columbia.edu).

B. Fees
Students with fees on their account for such things as library fines are responsible for resolving these fines expeditiously. Failure to do so will result in holds that will prevent registration and issuance of diplomas. James Lapin (james.lapin@dbmi.columbia.edu, tel. 212.342.3126) is the department contact for student account issues for fees covered by the department (ie tuition, single student health insurance, computer, etc).

Related Links:

Student Services Online:
https://ssol.columbia.edu/

Office of Student Financial Planning:
http://cumc.columbia.edu/student/finaid/

C. Health Insurance
DBMI enrolls postdoctoral and PhD students in single student health insurance Trainees who require dependent coverage must pay Health Services for this additional coverage directly. If a student already has insurance and wishes to decline this coverage, he/she will need to inform the department so that appropriate paperwork can be submitted by the DBMI Finance Office. Postdocs or PhDs ending their appointment in December must submit a waiver form by November 1 to Health Services requesting cessation of coverage. Failure to do so may result in the student or sponsor being responsible for the health insurance fees for the Spring semester, a time when the student is no longer in residence. Please note that any change of status (ie leave of absence) may result in cessation of coverage.

D. eRA Commons
NIH supported graduate students must have an eRA Commons account. You may request an eRA Commons account from the Sponsored Project Administration (SPA)InfoEd Help Desk at infoedhelpdesk@columbia.edu James Lapin, Grants Manager (tel. 212.342.3126, james.lapin@dbmi.columbia.edu) is the contact for funded DBMI graduate students.

E. RASCAL
DBMI trainees doing research must complete mandatory RASCAL training, conflict of interest forms, and obtain IRB approval as applicable. See **http://www.columbia.edu/cu/compliance/docs/training/index.html**

F. Taxation
Columbia University staff is not qualified to answer individual questions from students regarding their tax liabilities. U.S. tax law is extremely complex, and each individual's situation varies. Each student is required under the law to seek to understand and comply with the tax law and to pay income tax in a timely manner. According to the Tax Reform Act of 1986, all grant aid (scholarships, fellowships) that exceeds the cost of tuition and required fees, books, and related classroom expenses is subject to U.S. income tax. Columbia University does not withhold taxes on the fellowship checks of U.S. citizens and permanent residents. In addition, the University does not issue 1099 forms indicating the amount of stipend fellowship received by a student. Students are responsible for accurately reporting stipend amounts and for making estimated tax payments if appropriate. Receipts for required fees, books, and supplies should be retained to justify appropriate deductions on the tax return. When fellows hold teaching and research appointments, a portion of the total stipend is subject to federal taxes and a W-2 form is issued from the University. The W-2 reflects only the monthly payments issued based on the instructional or research appointment earned during the tax year. It does include any other stipend payments issued to the student.

For international students, fellowships awarded are subject to taxation and 14 percent federal withholding on the amount in excess of tuition and fees. International students should receive the 1042-S form as tax documentation for their fellowship. Currently, the U.S. has tax treaties or agreements with roughly 40 countries and territories under which their citizens may be exempt from all or part of U.S. income tax. To see which countries have tax treaties and how these treaties affect an individual's tax status, students should consult IRS publication #901 (U.S. Tax Treaties) or check with their consulate. International students may also wish to consult with the International Students and Scholars Office (ISSO) about their taxation responsibilities.

Note: The University does not offer professional tax advice. However, information on taxation issues is available on the Columbia University Document Service Center's Income Tax Forms and Resources Page at **http://www.columbia.edu/cu/lweb/**. Additionally, a tax workshop, sponsored by GSAC, is held every year in March. A representative from H&R Block is invited to answer questions students might have about completing their tax returns. Check the GSAC Web page at **http://www.columbia.edu/cu/gsac/** for further information. The ISSO offers workshops on international taxation, presented by certified public accountants. Contact ISSO at isso@columbia.edu or 212-854-3587.

XI. Travel

A. Approved Travel

All program-related travel must be approved by the research advisor prior to making arrangements. Please e-mail the Graduate Program Manager the approved dates of travel. Fellows that are funded by the NLM Grant attend two meetings a year, the AMIA Annual Symposium in the Fall and the NLM Informatics Training Meeting in the summer. Non-NLM funded students will be covered by their research advisors or by other means arranged by the department administrator. Those students not funded by the department must seek out their own financial support to attend such events. Students may attend other conferences or meetings if approved in advance by their research advisor and the department administrator.

B. Conference Arrangements

Students are strongly encouraged to make travel arrangements as early as possible in order to qualify for early-bird discounts on conference registrations and reasonable airfare or train rates. The student must pay for tickets from his/her own funds; reimbursements are issued only after the student has submitted an expense report correctly and it has been approved and processed by the DBMI Finance Office. Trainees will receive an e-mail with details (included approved monetary limits for travel) prior to meetings mandated by the department (AMIA and NLM). Hotel accommodations for the AMIA annual symposium and NLM meeting are reserved and paid for in advance by the department. Generally, students should plan to share rooms and should not expect to be reimbursed for items that are not directly related to the travel (e.g. room service, dry cleaning, telephone calls, pay-per-view movies, etc.). Students not wishing to share a room will need to pay half of the cost of the hotel stay.

C. Expense Reports

The department will reimburse students for approved travel. In order to be reimbursed, students must submit a travel and expense reimbursement form and provide original receipts related to the travel (e.g.: travel, lodging, food, etc.) taped to 8 ½" x 11" sheets of paper. This should be done immediately upon the return from the travel (no later than ten business days following travel). Expense reports should be submitted to Elidis Reyes. There is a time limit and tax restrictions on obtaining reimbursement for approved travel. Those not submitting reimbursements within specified time frames may be denied reimbursement.

D. Personal Travel

The department does not cover the costs of personal travel. If a student wishes to combine personal travel with an approved trip, the student will be responsible for any additional expenses. The trainee will be required to include an itinerary of the travel that does not include additional days as well as the itinerary they intend to use as part of their reimbursement forms so the University can compare actual costs before the reimbursement can be approved. Those planning to make alternate travel arrangements must consult with the Department in advance for instructions and approval. See ***XIII. Vacation Policy*** for details on vacation limits and approval.

XII. Outside Employment

Doctoral students and postdoctoral fellows are required to seek approval from the Graduate Program Director in advance if they wish to work for a limited number of hours outside of the training program. The department has permitted students with clinical qualifications to work a limited number of hours, provided it presents no conflict of interest with the academic program, does not violate research restrictions on dual compensation and causes no conflict in time to degree completion. A series of approvals from the department and University must be obtained for such activities. Trainees may contact the Graduate Program Manager for further details.

XIII. Vacation Policy

Students receiving funding and stipends are considered to be enrolled students, not employees of the University. Therefore, they do not accrue vacation time nor sick leave. Students are expected to participate in their research projects and all department activities on a full-time basis. The department follows the GSAS policy on vacations for students, cited here: "Students should negotiate reasonable vacation time with their mentor. The period between the spring and fall semesters is considered to be an active time of research and research training and is not considered to be a vacation or holiday." (*GSAS Student Handbook, 2013-14*) Therefore, even when classes are not in session for University or academic holidays as noted in the online University academic calendar (http://registrar.columbia.edu/academic-calendar/6), PhD and Postdoctoral fellows are still expected to be present and engaged in research. To be absent for more than a brief time, it may be necessary to take a formal leave of absence and for stipend support to be suspended until the student returns. In general, vacations should be limited to no more than two weeks total for the academic year (September 1-August 31). Approval must be granted for vacations in advance from the research advisor and the Graduate Program Director. Time spent attending professional meetings does not count against the 2 week limit, but travel tacked on to the beginning or end of conferences will be considered vacation time, and must be approved in advance.

XIV. Sick Time

While students do not accrue sick time, the research advisor in consultation with the Graduate Program Director will act in a reasonable manner in allowing brief absences due to illness. If an absence extends beyond three weeks, the student may be required to apply for a leave of absence from Dean Fred Loweff in the GSAS Graduate Affairs Office, P&S 3-435 (3rd Floor, Room 435), fl12@columbia.edu, tel. 212.305.8058. Students must be in good academic standing in order to be approved for leaves of absences and to eligible to return to the Department following a leave.

XV. Jury Duty

Immediately following receipt of a subpoena or other notice to report for jury duty, trainees must write a letter requesting postponement of jury duty. This issue is particularly critical for funded trainees who could lose their financial support if their academic time is diverted to jury duty.

XVI. Student Representatives

Each summer, students elect two student representatives for the upcoming academic year. The student representatives bring student perspectives, concerns, and ideas to the department, as well as represent DBMI students on the Graduate Student Advisory Council (GSAC), and the Health Science Graduate Student Advisory Council (HS-GSAC). The Representatives are a Postdoctoral or PhD student in at least his/her 2nd year who:

- Are in good academic standing
- Attend GSAC and HS-GSAC meetings serving as the official voting representative for DBMI
- Participate in DBMI activities
- Take trainee concerns to the Graduate Program Director and/or Manager
- Make yearly presentations to the Training Committee regarding student concerns and ideas, surveying the students as needed
- Coordinate Town Hall meetings each term
- Serve on the Admissions Committee
- Participate in recruitment activities as requested by the Admissions Committee

XVII. Events

A. Retreat

The Department holds an annual DBMI retreat in September at the beginning of the Fall semester. Attendance is mandatory. Students enrolled in classes that conflict with the retreat must contact their instructor in advance to explain they are required to attend a mandatory departmental retreat and will need to miss the first day of class. They should request and complete any assignments in advance as necessary. DBMI courses will not be held that day.

B. Departmental Socials

The Department hosts informal social gatherings in the VC-5 Conference Room. Notifications are transmitted via email.

XVIII. Office Policies

A. Photocopying

The photocopying machine located on VC-5 is a shared resource intended for research-related use and for reasonable amounts of academic copying. VC-5 copiers should not be used by TAs to duplicate documents en masse for students in their classes, or any other large copy jobs. The Columbia Copy Center located on the 2nd floor of P&S should be used for such big jobs. For more information on access to a copy card for the copy center, please see Elidis Reyes.

B. Telephones

If a phone code is needed for long distance calls involving a research project, first check and see if your research advisor has a long distance phone code they can provide you. If they do not, request that they e-mail the Department Administrator to verify the need on your behalf and to request a phone code. If the research pertains to one of their grants, the Department Administrator will need to charge the appropriate account.

C. Mailboxes

Each student has a mailbox on VC-5 near the pantry. Students are responsible for checking their mailboxes at least once a week. Mail that accumulates will be disposed of at the discretion of the Department Administrator.

D. Space

PhD and Postdoctoral Fellow trainees have cubicles or shared offices on VC-5 in the area known as Student Row. Because departmental needs change during the year, students are not guaranteed the same space for the duration of their training. Students may need to relocate at the end of the summer (or at another time if needed). Because bioinformatics PhD trainees do not do their work on VC-5, they should request space from their Fall and Spring research rotation advisors and, subsequently, from their permanent research advisor.

E. CUMC IDs

CUMC IDs may be obtained in August, provided the Graduate Affairs Office (P&S 3rd Floor, Room 435) received the picture they requested incoming students send them over the summer. If you did not submit a picture or they cannot locate it, proceed to the ID office on the first floor of the P&S Building to the left of the main entrance, Room 1-405c (First Floor, Room 405c), to have an ID made.

VC-5 is a secure floor and card swipe access must be granted in order to enter after normal business hours, and via the VC-5 stairwell and the 5th floor of P&S. A memo will be provided to you to grant such access. Take the memo to hospital security, located on the first floor of the Presbyterian building by the chapel. DBMI is located on a secure floor and cannot be entered via the stairwell or after working hours (outside of 9 a.m.-5 p.m. M-F) unless hospital security has programmed your ID Card to access our floor.

F. Conference Rooms

DBMI has three conference rooms on VC-5: Conference Room A, B, and C. Conference Room A & B are located before the copy room and are where most of the classes given in DBMI will be held along with many of the preparatory exams and defenses (ie Breadth/Oral I, Depth/Oral II, Dissertation Proposal Defense, Dissertation Defense). Please help to keep them clean. Conference Rooms A & B can be divided into separate rooms. Conference Room C is by the kitchen pantry area in the vicinity of the student mailboxes. Trainees may request to reserve DBMI conference room space online from the DBMI website. Under the "*events*" or "*about us*" tabs, select "*conference room.*" You can check conference room availability and make a reservation by filling out an online form. You will receive a confirmation that your request has been submitted. You will be contacted by the administrative staff about your request once the room status has been determined.

G. Shredding
Shredding bins for confidential materials are located in the department in two areas: by the entrance and in faculty row. Should they become full, please alert the administrative staff.

H. Supplies
PhD and postdoctoral research fellows are provided with limited supplies by the department in the Fall term. Those needing supplies should contact Elidis Reyes.

I. Student Lounge
There is a student lounge in Student Row. Please clean up after yourself and do not leave food out overnight under any circumstances. Remember to remove your food from the refrigerator before it spoils.

XIX. Computer Support

A. Computers and Work Space
Computers and work space are provided to Postdoctoral fellows and PhD students. Computers are equipped with basic software. Shared network printers are available in VC-5 for trainee use. Trainees are required to sign an information systems user agreement form governing the use of protected information. Further information on compliance with CUMC and University policies regarding information access will be provided at the mandatory IT seminar in September. Edgecombe is the printer in student row that is primarily used by students. Audubon is the printer in faculty row. Haven is the printer by the student mailboxes. Broadway is the color printer in the copier room and should be used sparingly, if at all. Use printers for University business only. For financial and environmental reasons, please print only when necessary. Should any of the printers need toner or paper, please alert the administrative staff.

B. DBMI IT Assistance
An e-mail account (**dbmi-support@dmi.columbia.edu**) was created to facilitate access to information on computers, network, and personal accounts. Problems with or requests for Unix accounts or disk space, and questions about technical infrastructure (PCs, UNIX boxes, network, suggestions, etc.) should be sent to this account. The DBMI support staff will assist, when feasible, and in the order of departmental priorities. Sajed Naseem is the IT Manager (**sajed@dbmi.columbia.edu**). Sajed is assisted by Kang-Chih Chen (**kac7023@dbmi.columbia.edu**).

C. DBMI E-mail Accounts
Your DBMI e-mail address is in the form:
[first name].[last name]@dbmi.columbia.edu
This is a different e-mail account from your Columbia e-mail.
You are responsible for checking your Columbia and DBMI e-mail regularly as a growing amount of University business is conducted by e-mail only. Questions or problems about your email dbmi email account should be sent to: **dbmi-support@dbmi.columbia.edu**

XX. Additional Information

Carol Friedman, PhD
Graduate Program Director

L.-Raquel Perez, JD
Department Administrator/CFO

Marina Bonanno, EdM
Graduate Program Manager

James Lapin, MBA
Finance and Research Analyst

Elidis Reyes
Administrative Assistant

Rosemary Vazquez
Executive Assistant to the Chair

Sajed Naseem
IT Manager

Training Committee Members

Professor Carol Friedman
Chair of the Committee, Graduate Program Director

Professor Olena "Lena" Mamykina, PhD
Assistant Professor

Professor Noèmie Elhadad, PhD
Assistant Professor

Professor Nicholas Tatonetti, PhD
Assistant Professor

Professor Chunhua Weng, PhD
Assistant Professor

Professor David Vawdrey, PhD
Assistant Clinical Professor

L.-Raquel Pérez, JD
Department Administrator/CFO

Marina Bonanno, EdM
Graduate Program Manager

Useful Websites

GSAS Bulletin:
http://www.columbia.edu/cu/gsas/sub/bulletin/site/map/index.html

The Columbia University guide "*Essential Policies for the Columbia Community*" is available on the following website:
http://www.columbia.edu/cu/facets/