

**IBiS**

**INTERDISCIPLINARY  
BIOLOGICAL  
SCIENCES  
PROGRAM**

*Last Updated September 10, 2021*

# **Graduate Program Guide**

Northwestern

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Northwestern University complies with federal and state laws that prohibit discrimination based on the protected categories listed above, including Title IX of the Education Amendments of 1972. Title IX requires educational institutions, such as Northwestern, to prohibit discrimination based on sex (including sexual harassment) in the University's educational programs and activities, including in matters of employment and admissions. In addition, Northwestern provides reasonable accommodations to qualified applicants, students, and employees with disabilities and to individuals who are pregnant.

Any alleged violations of this policy or questions with respect to nondiscrimination or reasonable accommodations should be directed to Northwestern's Office of Equity, 1800 Sherman Avenue, Suite 4-500, Evanston, Illinois 60208, 847-467-6165, [equity@northwestern.edu](mailto:equity@northwestern.edu).

Questions specific to sex discrimination (including sexual misconduct and sexual harassment) should be directed to Northwestern's Title IX Coordinator in the Office of Equity, 1800 Sherman Avenue, Suite 4-500, Evanston, Illinois 60208, 847-467-6165, [TitleIXCoordinator@northwestern.edu](mailto:TitleIXCoordinator@northwestern.edu).

A person may also file a complaint with the Department of Education's Office for Civil Rights regarding an alleged violation of Title IX by visiting [www2.ed.gov/about/offices/list/ocr/complaintintro.html](http://www2.ed.gov/about/offices/list/ocr/complaintintro.html) or calling 800-421-3481. Inquiries about the application of Title IX to Northwestern may be referred to Northwestern's Title IX Coordinator, the United States Department of Education's Assistant Secretary for Civil Rights, or both.

### Land Acknowledgment:

Northwestern is a community of learners situated within a network of historical and contemporary relationships with Native American tribes, communities, parents, students, and alumni. It is also in close proximity to an urban Native American community in Chicago and near several tribes in the Midwest. The Northwestern campus sits on the traditional homelands of the people of the Council of Three Fires, the Ojibwe, Potawatomi, and Odawa as well as the Menominee, Miami and Ho-Chunk nations. It was also a site of trade, travel, gathering and healing for more than a dozen other Native tribes and is still home to over 100,000 tribal members in the state of Illinois.

It is within Northwestern's responsibility as an academic institution to disseminate knowledge about Native peoples and the institution's history with them. Consistent with the University's commitment to diversity and inclusion, Northwestern works towards building relationships with Native American communities through academic pursuits, partnerships, historical recognitions, community service and enrollment efforts.

## **The Interdisciplinary Biological Sciences (IBiS) Graduate Program**

The IBiS program, begun in 1993, was a natural extension of increasing collaboration by research faculty in cellular, molecular, and structural biology and a number of related disciplines. The primary mission of the IBiS program is to encourage the development of our Ph.D. students as independent, creative research scientists and teachers.

The IBiS graduate program brings together basic and applied sciences faculty from Northwestern University's Judd A. and Marjorie Weinberg College of Arts and Sciences and the Robert R. McCormick School of Engineering and Applied Sciences. Participants in the IBiS program include faculty in Molecular Biosciences, Biomedical Engineering, Chemical and Biological Engineering, Chemistry, Neurobiology, Anthropology, Civil and Environmental Engineering, Engineering Sciences and Applied Mathematics, and Mechanical Engineering. With approximately 65 preceptors in eight academic departments on the Evanston campus, the IBiS program readily allows students to cross departmental and disciplinary boundaries in choosing courses and faculty research advisors.

An important hallmark of the IBiS program is that our preceptors are deeply committed to helping students prepare for the career options that await them after the completion of the Ph.D. degree, such as further academic training, employment with a biotechnology or pharmaceutical company, teaching at the college level, scientific journalism, science policy and administration, or many other endeavors. As part of that preparation, IBiS co-sponsors BioOpportunities, BioSurvival Skills, and Pathway to the Professoriate, all aimed at preparing our graduates for successful careers.

Northwestern University reserves the right to change without notice any statement in this publication concerning, but not limited to, rules, policies, tuition, fees, curricula, and courses.

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## SECTION 1 – ALL STUDENTS: IBiS REQUIREMENTS FOR THE Ph.D.

### ALL STUDENTS

#### IBiS REQUIREMENTS FOR THE Ph.D.

##### Summary by Year

The [program requirements by quarter](#) can be found on the IBiS website.

- 1<sup>st</sup> year: First three quarters – six courses with grades, three rotations, seminars  
End of spring quarter – selection of thesis advisor and admission to program,  
summer quarter – rigor & reproducibility course
- 2<sup>nd</sup> year: Part 1 of qualifying exam, ethics course, usually TA at least one quarter and  
take at least one special topics course, research, seminars
- 3<sup>rd</sup> year: Part 2 of qualifying exam & admission to candidacy, usually TA at least one  
quarter and take at least one special topics course, research
- 4<sup>th</sup> year+: Annual reviews, research, permission to write, final exam

##### IBiS Program Requirements

1. Academic:
  - 6 IBiS or comparable elective courses by the end of spring quarter of year 1. One of these courses must be IBiS 432 Statistics for Life Sciences, and at least 3 others need to be IBiS (or DGP) core courses.
  - 2 years of seminar series, IBiS 462, in years 1 and 2 (Molecular Biosciences or Neurobiology seminar series)
  - 2 quarters of training courses, IBiS 421 & IBiS 423, in years 1 and 2
  - 2 quarters of special topics courses, IBiS 455, in years 2 and 3; B grade or better
2. Satisfactory performance (grade of B or better) in each of three different laboratory rotations (IBiS 499)
3. Thesis advisor agreement with an IBiS preceptor by the end of the third quarter
4. Successful completion of part 1 of the qualifying examination before the end of fall quarter of the second year and part 2 before the end of fall quarter of the third year
5. Satisfactory performance in teaching assignments (varies with total graduate student enrollment and course needs; minimum two)
6. Annual reviews
7. Acceptance of at least one first-author data paper by the time of defense
8. Approval of dissertation
9. Successful completion of final examination
10. Seminar presentation of research

##### Miscellaneous IBiS Requirements

- Research group seminars
- IBiS retreat (attendance required in years 1 through 4)
- Special interest group seminars (e.g., Molecular Biology Club, Biophysics Club)
- IBiS recruitment

## **SECTION 1 – ALL STUDENTS: IBiS REQUIREMENTS FOR THE Ph.D.**

### **The Graduate School Requirements**

1. Successful completion of at least 9 graded courses. A “B” average must be maintained in these courses
2. Approval of qualifying exam and prospectus
3. Dissertation according to TGS standards
4. Successful completion of final examination
5. Time to degree limited to nine years from initial registration
6. Passing score on the TOEFL IBT, Versant, or SPEAK by all students with bachelor’s degrees from non-English-language institutions
7. Registration every quarter including summer in order to receive a stipend

Please refer to The Graduate School website for further details about [Ph.D. requirements](#).

**If you have any questions, please ask Cathy Prullage in the IBiS office.**

## SECTION 2 – ALL STUDENTS: IBiS REQUIREMENTS FOR THE Ph.D., MSTP & QSB

### MSTP/IBiS REQUIREMENTS FOR THE Ph.D.

The requirements for students joining IBiS from the Medical Scientist Training Program are similar to those of the non-MSTP/IBiS Ph.D. students. MSTP students should refer to Section 1 of the Program Guide for IBiS program requirements. The items on the list below address specific requirement differences of an MSTP/IBiS (M.D./Ph.D.) student. The [program requirements by quarter](#) can be found on the IBiS website.

### IBiS Program Requirements

1. Academic:
  - 3 IBiS or comparable elective courses by the end of spring quarter of year 1. One of these courses must be IBIS 432 Statistics for Life Sciences, and at least 1 other needs to be an IBiS (or DGP) core course (check the [current course offerings](#) online or from the IBiS office).
  - Ethics in Biological Research (IBIS 423) in year 1
2. Laboratory rotations not required
3. Thesis advisor determined prior to joining IBiS
4. Plan to take part 1 of the qualifying exam in fall of year 1
5. Plan to take part 2 of the qualifying exam in fall of year 2
6. Satisfactory performance in teaching assignments (varies with total graduate student enrollment and course needs; minimum one)

### QSB/IBiS REQUIREMENTS FOR THE Ph.D.

The requirements for transfer students from the QSB master's program to the IBiS Ph.D. program are very similar to those of other IBiS students. QSB transfer students should refer to Section 1 of the Program Guide for IBiS program requirements. The items on the list below address specific requirement differences of QSB/IBiS students. The [program requirements by quarter](#) can be found on the IBiS website.

### IBiS Program Requirements

Academic:

- 3 IBiS or comparable elective courses by the end of spring quarter of year 1. The number of core courses taken as a QSB/IBiS student must equal at least 4, including IBIS 432 Statistics for Life Sciences, and the total number of courses taken by the end of spring quarter of year 1 in IBiS must equal at least 6.

**If you have any questions, please ask Cathy Prullage in the IBiS office.**

## SECTION 3 – ALL STUDENTS: COURSES & TRAINING

### IBiS COURSES AND TRAINING

#### Graduate Advisory Committee

Upon your arrival at Northwestern, you will be assigned a faculty advisor. Your advisor will help you to decide what classes you will take during your first year and will support you in the important task of choosing your rotation and thesis supervisors. Your advisor must approve all electives that you choose to take. The IBiS office will schedule three formal meetings between you and your advisor during your first year, prior to the start of each quarter. You should also feel free to consult your advisor as the need arises during the course of the year. It is of particular importance that you contact your advisor if you are experiencing problems with any of your courses or with a rotation.

The graduate advisory committee is also responsible for assigning your qualifying exam and thesis committees, and for ensuring that you have annual meetings with your thesis committee.

#### Courses

Please refer to the IBiS website for [current course offerings](#).

All first-year students must take a combination of IBiS core courses and elective classes. The courses described below are graduate-level courses that provide a broad foundation of life science research. All students are required to take at least four and up to six of the IBiS (or DGP) core courses. Students are required to earn a grade of B or better in each of the courses, and to complete the selected courses by the end of the first academic year. Any variation from these requirements, or others described below, requires the approval of the graduate advisory committee. Refer to the IBiS website for [registration requirements](#).

Courses are subject to change each quarter, and up-to-date information can be found in [CAESAR](#) prior to each quarter. Additional classes either on the Evanston campus or Chicago campus may be appropriate as electives.

#### IBiS CORE COURSES

##### IBIS 401 Molecular Biophysics

Protein structure; nucleic acids structure; forces that determine macromolecular structure; transport and diffusion; macromolecular assemblies; molecular machines and single molecule studies; x-ray crystallography; electron microscopy and image reconstruction; nuclear magnetic resonance; spectroscopy

##### IBIS 402 Eukaryotic Molecular Biology

Chromosome and genomic organization, gene structure, transmission of genetic information, transcriptional regulation of gene expression; Principles of protein folding; cellular mechanisms of protein quality control; transmission of prions and prion-like aggregates and amyloid and protein conformational diseases; Scales of organization of the transcriptome and proteome from individual pathways to complex networks, and from cellular to organismal levels

## **SECTION 3 – ALL STUDENTS: COURSES & TRAINING**

### **IBIS 404 Principles and Methods in Systems Biology**

Systems biologists use mathematical-based experimental analysis and modeling to study biological problems. Quantitative techniques and computational tools help investigators analyze heterogeneous complex data about molecular networks to uncover meaningful relationships about key components. These studies inspire a framework for understanding the activity of living states. Related principles about dynamic biological systems are the focus of the systems biology course.

### **IBIS 406 Advanced Topics in Cell Biology**

This course provides the opportunity to explore areas of eukaryotic cell biology through analysis of scientific literature and in-depth background research. Students investigate cellular components, mechanisms, and methods used in cell biology research. Students present topics orally to their colleagues and use primary data from scientific publications to design, propose, and defend cell biology research projects.

### **IBIS 407 Genetics & Epigenetics**

Exploration of the classic and contemporary scientific literature on genetic and epigenetic control of phenotype, genetic analysis, genetic interactions, genetic model systems and genetic experiments. The focus of the course will be on learning to think about genetic data and to design genetic experiments and screens to answer biological questions.

### **IBIS 410 Quantitative Biology**

Quantitative approach to molecular and cell biology, focused on developing an understanding of connections between biomolecule structure and dynamics, and behavior of cells. The course will also include review of topics from statistics of random variables and statistical data analysis relevant to biology and biophysics.

### **IBIS 432 Statistics for Life Sciences**

Statistics course with emphasis on the application of statistical methods and data analysis techniques to the life sciences. Topics include descriptive statistics, normal distribution, random variables, sampling distribution, confidence intervals, hypothesis tests, p-values and multiple correction, linear regression, model selection, diagnostics, logistic regression, contingency tables, resampling, clustering, dimension reduction, and genomics data analysis.

## **ELECTIVE COURSES**

Students can tailor their curriculum to their specific interests by substituting up to two of the IBiS core courses with electives from Biological Sciences, Chemistry, Chemical & Biological Engineering, or other departments. These courses should be 300- or 400-level courses. All electives must be approved by the faculty advisor of the graduate advisory committee.

## **SPECIAL TOPICS COURSES**

Special topics courses are offered regularly for small groups of graduate students. The teaching faculty and topics change during each academic quarter. Each student takes a total of two special topics courses in the 2nd and/or 3rd years.

## **TRAINING COURSES**

All students are required to take IBIS 421 Rigor & Reproducibility in Research and IBIS 423 Ethics in Biological Research in their first and second years, respectively.

## SECTION 3 – ALL STUDENTS: COURSES & TRAINING

### SEMINARS

#### Departmental Seminar

Students must register for the departmental seminar, IBIS 462, each quarter, excluding summer, during their first two years. All students are required to attend the Molecular Biosciences departmental seminar (Thursdays at 12:30pm) or the Neurobiology departmental seminar (Tuesdays at 12:45pm).

#### Informal Seminar Programs

In addition to the formal seminar series, numerous informal seminar programs are offered within the University. These include special departmental seminars, symposia, laboratory group meetings, various journal clubs, and meetings of special interest groups, such as the Molecular Biology Club and the Biophysics Club. Participation in such activities is considered an important part of graduate training in IBiS.

#### Proficiency

The IBiS Program requires that all students demonstrate a basic proficiency in all areas of modern biology. This requirement is satisfied by successful completion of all the required graduate coursework with grades of B or better. In some circumstances, the graduate advisory committee, in consultation with the student, may require an individual student to take an additional course or be a teaching assistant for a specific course. Students are expected to read widely in the primary literature related to their area of research.

International students who did not complete their undergraduate education in an institution in which the language of instruction was English must demonstrate English proficiency before being able to serve as teaching assistants. Students need to have received a score of 26 or more on the speaking portion of the TOEFL internet-based test, a score of 65 or more on the Versant English test, or a score of at least 50 on the SPEAK test. Students with scores below these thresholds may be enrolled in [Integrated Academic Skills](#), and will need to retake the exam. The IBiS program will not subsidize the cost of any English-language exams.

## **SECTION 3 – ALL STUDENTS: COURSES & TRAINING**

### **Academic Integrity**

Both the University and the IBiS graduate program take academic integrity very seriously. Cases of suspected academic dishonesty, including suspected plagiarism, will be referred directly to The Graduate School for follow-up, and may result in expulsion from the IBiS program. Among the most important goals of graduate education are maintaining an environment of academic integrity and instilling in students a lifelong commitment to the academic honesty that is fundamental to good scholarship. Standards of academic honesty are violated whenever a student engages in any action that jeopardizes the integrity of scholarly work. Such actions include, without limitation, cheating in the classroom or on examinations, including Ph.D. qualifying examinations; the intentional and deliberate misuse of data in order to draw conclusions that may not be warranted by the evidence; fabrication of data; omission or concealment of conflicting data for the purpose of misleading other scholars; use of another's words, ideas or creative productions without citation in either the text or in footnotes; paraphrasing or summarizing another's material in such a way as to misrepresent the author's intentions; and use of privileged material or unpublished work without permission. For more information please refer to [The Graduate School website](#).

### **Conflict Resolution**

When conflicts occur between advisor and student, they should first try to resolve the issue themselves. If the conflict cannot be resolved, the student may wish to seek advice or intervention from the chairperson of the graduate advisory committee, the program director, their thesis committee chairperson, or another member of their committee.

### **Petitions and Appeals**

The preceptors recognize that deviations from the program requirements may be warranted in certain cases. Students may submit petitions requesting a variation in the requirements whenever they believe that they can adequately justify their request. Minor variances from the requirements may be requested, in writing, of the chairperson of the graduate advisory committee. Substantial variances require a petition, in writing, to the director of the IBiS program.

Similarly, the student may appeal decisions made by the faculty or IBiS administration. Such appeals should be justified in writing to the director of the IBiS program. The director will establish an appropriate impartial committee to make a recommendation to the IBiS faculty, who will vote on the appeal. Alternatively, the student can appeal to the Associate Dean of The Graduate School.

[Additional resources](#) may be found on The Graduate School website.

## SECTION 4 – FIRST-YEAR STUDENTS: ORIENTATION

### FIRST-YEAR STUDENTS

#### ORIENTATION

Typically, first-year students are expected to be available on the Evanston campus on September 1st. The first weeks at Northwestern University will include a number of orientation activities. The schedule of the activities is available from the IBiS office and changes from year to year. First-year students should plan to participate in the orientation activities listed below and are encouraged to participate in additional orientation events at Northwestern.

#### General Schedule

- Orientation meeting held on first day
- Appointment with IBiS academic advisor
- IBiS scientific retreat held off campus
- Conversations with faculty about fall quarter rotations
- The Graduate School new student orientation
- New international student orientation
- Lab safety training
- Formalizing fall quarter research rotation agreements
- Registration for courses

#### Selection of Fall Quarter Courses and Lab Rotations

During the beginning of September, you will meet with a member of the graduate advisory committee to determine your coursework and to discuss rotation choices. During this same time period, you should meet with faculty to discuss rotations. **You must have met with each of your rotation advisor choices and discussed your interest in rotating in their labs in the fall quarter.** Submit four rotation choices ranked in order of preference to the IBiS office by the deadline. The program will then match students to one of their four choices. Every effort will be made to give students their first or second choices, but this may not always be possible. Submit the signed "[Independent Research Advisor Agreement](#)" to the IBiS office.

## SECTION 5 – FIRST-YEAR STUDENTS: REGISTRATION

### REGISTRATION

Courses usually carry one unit of credit. Full-time registration consists of either three or four units per quarter. See the [current program requirements](#) on the IBiS website for further details.

### Typical Profile, Year 1

#### YEAR 1 – FALL QUARTER:

**IBIS 499-0** Independent study (1<sup>st</sup> laboratory rotation); **1 credit** – minimum grade: B  
**IBIS 462-0** Seminar in Biological Sciences (Molecular Biosciences or Neurobiology seminar series); **0 credits** – Satisfactory/Unsatisfactory

#### **2 additional courses**

**IBiS core course(s)** offered in fall; **1 credit** – minimum grade: B; see [current course offerings](#) and/or **related elective(s)** (requires graduate advisor approval); **1 credit** – minimum grade: B

#### YEAR 1 – WINTER QUARTER:

**IBIS 499-0** Independent study (2<sup>nd</sup> laboratory rotation); **1 credit** – minimum grade: B  
**IBIS 462-0** Seminar in Biological Sciences (Molecular Biosciences or Neurobiology seminar series); **0 credits** – Satisfactory/Unsatisfactory

#### **2 additional courses**

**IBiS core course(s)** offered in winter; **1 credit** – minimum grade: B; and/or **related elective(s)** (requires graduate advisor approval); **1 credit** – minimum grade: B

#### YEAR 1 – SPRING QUARTER:

**IBIS 499-0** Independent study (3<sup>rd</sup> laboratory rotation); **1 credit** – minimum grade: B  
**IBIS 462-0** Seminar in Biological Sciences (Molecular Biosciences or Neurobiology seminar series); **0 credits** – Satisfactory/Unsatisfactory  
**IBIS 432-0** Statistics for Life Sciences; **1 credit** – minimum grade: B

#### **1 additional course**

**IBiS core course** offered in spring; **1 credit** – minimum grade: B; or **related elective** (requires graduate advisor approval); **1 credit** – minimum grade: B

#### YEAR 1 – SUMMER QUARTER:

YOU MUST REGISTER EVERY SUMMER IN ORDER TO RECEIVE YOUR STIPEND

**IBIS 421-0** Rigor & Reproducibility in Research; **0 credits** – Satisfactory/Unsatisfactory  
**TGS 500-0** Advanced Doctoral Study; **0 credits** – no grade; **provides full-time status**

## SECTION 5 – FIRST-YEAR STUDENTS: REGISTRATION

### Online Registration

**All students must register by the deadline communicated by TGS and the IBiS office or they may not be paid correctly.**

1. **Go to <https://www.caesar.northwestern.edu/>.** If you have any login/access problems, please contact registration tech help at (847) 491-HELP (they can walk you through registering online), and if you have course questions, contact the IBiS office at (847) 491-4301 or [ibis@northwestern.edu](mailto:ibis@northwestern.edu).
2. **Clear any holds.** Holds are indicated once you log in to CAESAR. You are responsible for clearing any holds before attempting to register. You will not be able to register with a hold on your student account. To clear a financial hold, please consult with the Life Sciences Financial Services office.
3. **Obtain permission from the department offering the course for any restricted courses.** Permission can be obtained from the appropriate department. Obtaining permission before attempting to register will facilitate the process.

## SECTION 6 – FIRST-YEAR STUDENTS: ROTATIONS

### RESEARCH ROTATIONS

Each student conducts independent research in three different laboratories prior to selection of a thesis advisor. This research complements the formal coursework taken during the first year and exposes the student to different research programs within IBiS. Research rotations also provide the faculty with an opportunity to evaluate the investigative performance and research potential of each student. The evaluations of each student are a major factor in the decision concerning their formal admission to the IBiS program in June of the first academic year.

The most important function of the research rotation is to aid students and faculty in establishing mutually agreeable student/thesis advisor partnerships. The faculty member and student discuss available research projects in the lab and decide on a rotation project. Rotation projects generally do not form the basis for a thesis project, but provide valuable hands-on laboratory experience. By participating in the daily routine of the laboratory, students are able to judge how comfortable they feel in that laboratory environment. Meanwhile, faculty members use several criteria to judge whether a student will prove to be an asset to their laboratory. Among these are:

1. **Commitment.** Scientific research is not a 9-to-5 job. Projects often require students to work in the evenings and on weekends.
2. **Execution and documentation of experiments.** A research career depends on the clear and reliable execution of experiments that are often complicated. These experiments have to be fully documented in protocols and lab books.
3. **Interest.** A hallmark of independent investigators is that they are motivated by curiosity, driven by the “need to know.” Students are encouraged to seek out published information relating to their projects and to think critically about how their project relates to the overall scientific enterprise.
4. **Maturity.** Scientific research depends on effective communication among laboratory workers. Common sense, cooperation, and courtesy are essential qualities for the proper functioning of a research laboratory.

### Selection of Winter and Spring Quarter Rotations

The arrangements for independent research other than the fall quarter rotations are made directly between the student and the faculty member. The graduate advisory committee can help students in this important task. The obligation of approaching individual faculty members lies with the student. Each faculty member may accommodate one student in the fall and winter quarters, and may accommodate more than one student during spring quarter. Each faculty member will accept the student for independent research on the basis of direct discussions with the student. Students should approach as many faculty members as is necessary to select a rotation advisor. In cases in which students are unable to find a rotation within IBiS, rotations outside IBiS (*e.g.*, with faculty in the DGP) must be approved by the director of the IBiS program and the student’s academic advisor. Such requests are limited to spring quarter.

## SECTION 6 – FIRST-YEAR STUDENTS: ROTATIONS

Arrangements for independent research advisors for the winter and spring quarters must be made by the last day of classes of fall and winter quarters, respectively. **No formal commitments can be made prior to two weeks before the end of fall and winter quarters.** Agreements made prior to this two-week period are not binding for either the student or the preceptor. The completed “[Independent Research Advisor Agreement](#)” should be submitted to the IBiS office by the deadline to formalize the agreement.

Students can gather information necessary to select independent research advisors in the following ways:

1. **Discussion with individual faculty members.** Discussions with the faculty are essential in selecting an advisor. This is an opportunity to discuss in some depth the research projects available in the laboratory. Students should meet with all faculty members whose research programs are of possible interest to them. Such meetings do not constitute a formal agreement, and the student should therefore meet with multiple faculty members each quarter.
2. **Reading the literature.** A great deal can be learned about the research being pursued in each laboratory by reading recent papers describing that research. Reprints and preprints of recent manuscripts can be obtained online or from individual faculty members; the faculty member may also provide a short list of other recent research papers and review articles of particular interest.
3. **“Brown Bag” lunch talks.** These short seminars are presented by IBiS preceptors and provide an excellent forum for students to get to know the program faculty and learn about the many exciting areas of research represented in IBiS. These seminars are also intended to help students identify laboratories in which they would like to rotate. *First-year students are expected to attend these seminars.*
4. **Discussion with graduate students and postdoctoral fellows.** First-year graduate students can learn a great deal from postdocs and students at more advanced levels in the program. They are usually eager to talk about their research and their experiences. The IBiS Student Organization conducts a graduate student seminar series wherein members describe their research accomplishments and goals to fellow students; this is an excellent source of information about individual research projects and the general laboratory environment.
5. **Annual IBiS retreat.** The annual IBiS retreat is held off campus. Students are introduced to faculty and their research programs in short seminars and through informal discussions. Graduate students and postdoctoral research fellows participate in this retreat, and are also a valuable source of information for incoming students.
6. **Research group seminars.** Most laboratories hold regular group meetings. Students may want to inquire about attending the meetings of a laboratory in which they may wish to rotate during a future quarter. Some research groups also participate in joint research seminars, such as the Molecular Biology Club and the Biophysics Club, which provide excellent opportunities to gather information.

## SECTION 6 – FIRST-YEAR STUDENTS: ROTATIONS

### Rotation Reports

The research advisor assigns a letter grade based on the student's investigative performance during the quarter. Part of this grade is the evaluation of a written research report submitted by the student at the end of the quarter. The written research report, along with the research advisor's critique of the report, will be placed in the student's file and will contribute to the evaluation of the student for admission to the IBiS program. The research report (single-spaced) should be composed according to the following guidelines:

- a. **Title page.** The title of the research project and the student's name should be printed on a separate cover page.
- b. **Specific aims.** Provide a clear, concise, point-by-point summary of the aims of the research project. Do not exceed one-half page.
- c. **Background and significance.** Briefly sketch the background of the research project. Indicate how this project relates to the long-term objective of the advisor's research. Include relevant references. Do not exceed two pages (not including references).
- d. **Experimental design and methods.** Describe the procedures and biological materials used in the project. Clearly indicate the contributions of others currently involved in the project. Do not exceed two pages.
- e. **Results.** Describe the results of all experiments. Use tables and figures to present data; include figure legends.
- f. **Conclusions/discussion.** Discuss interpretation of results, significance of findings, problems and limitations of the procedures used, and future research directions. Do not exceed two pages.
- g. **References.** List all references cited in the text, including all authors and the full title of the publication. Use the reference format of the journal *Cell*.

Research rotation reports are to be turned in to the advisor and a copy submitted to the IBiS office no later than the last day of exams for each quarter.

## SECTION 6 – FIRST-YEAR STUDENTS: ROTATIONS

### Selection of a Thesis Advisor

The selection of a thesis advisor is the responsibility of the student and is mandatory for formal admission to the IBiS program. It is expected that each student will have made the arrangements necessary for designation of the thesis advisor by the last day of classes for spring quarter. No formal commitments can be made prior to two weeks before the end of the quarter. Agreements made prior to this two-week period are not binding for either the student or the preceptor.

Selection of a thesis advisor does not strictly require prior rotation in the preceptor's laboratory. Likewise, a research rotation in a particular laboratory does not constitute a commitment on the part of either the student or the research advisor concerning a permanent thesis laboratory assignment. Any student is free to approach any IBiS faculty member concerning thesis advisor agreements.

Students are encouraged to inform more than one faculty member of an interest in conducting thesis research in their laboratory; however, a single commitment must be initiated by returning a signed [thesis advisor agreement](#) to the IBiS program office. Final approval for all arrangements rests with the IBiS program director and the chairperson of the department in which the selected thesis advisor holds their primary appointment, and is not formalized until the student is granted admission to the second year of the IBiS program. The same type of information described previously for research rotations also applies to the selection of an advisor. Remember that one-on-one discussions with the faculty are extremely important. Students are encouraged to explore all laboratories in the IBiS program in which they might like to perform independent thesis research.

**In exceptional circumstances**, a student who is in good standing may be granted permission by the graduate advisory committee to pursue a fourth rotation during the summer of the first year in an IBiS laboratory, or, with the approval of DGP leadership, in a DGP laboratory. This requires the agreement of the fourth rotation advisor and does not represent a formal commitment for a thesis advisor agreement.

### Selection of Research Clusters

Once students have identified a dissertation laboratory, they will also choose cross-campus [research clusters](#) in which to participate in order to facilitate collaboration and depth of training in their area of specialization. These clusters serve as foci for training activities (*e.g.*, symposia, poster sessions, journal clubs) and specialized coursework, and bring together students and faculty with common research interests from across Northwestern.

## **SECTION 7 – FIRST-YEAR STUDENTS: ADMISSION TO THE PROGRAM**

### **ADMISSION TO THE IBiS PROGRAM**

Formal admission to IBiS is not granted until the student has adequately demonstrated scientific potential based on performance in coursework and effectiveness in independent research, and secured a thesis advisor. Decisions concerning formal admission to the doctoral program are made in June of the first year. The faculty evaluates each student's accomplishments during the first year. Minimal requirements for admission include six courses completed with grades of B or better, and the completion of three quarters of independent research (laboratory rotations) with grades of B or better. The grades for the rotations will be based on the student's investigative performance. Each student's effectiveness in independent research will be judged on the basis of the evaluations by the first-year research advisors. The material evaluated in considering formal admission will include the research advisor's critique of the research report and each research advisor's comments on the student's potential in the graduate program.

Students will be notified in writing during June of the first academic year of the decision concerning their formal admission to the doctoral program. Arrangements regarding thesis research are not considered final until the student is formally admitted to the IBiS doctoral program.

## SECTION 8 – SECOND- AND THIRD-YEAR STUDENTS: THE QUALIFYING EXAM

### SECOND- AND THIRD-YEAR STUDENTS

#### THE QUALIFYING EXAMINATION

Before the end of fall quarter of the second year, each student should write and defend a thesis research proposal. Before the end of fall quarter of the third year, each student will present their research progress toward their thesis, and productivity and progress will be assessed. After successfully completing both parts of the exam, students will advance to candidacy.

#### Qualifying Exam Committee Membership

At the end of summer quarter of the first year, the chairperson of the graduate advisory committee determines the membership of each student's committee. The qualifying examination is administered by a faculty committee consisting of a chairperson, two members, and the advisor as an observer. At least three members of the qualifying exam committee, including the chairperson, must be IBiS faculty and also members of the Northwestern Graduate Faculty. The committee chairperson must be someone other than the student's advisor. This qualifying exam committee will normally continue as the thesis committee to monitor the student's progress at formal annual reviews. A student and their advisor may request changes to the thesis committee from the chairperson of the graduate advisory committee.

It is the responsibility of the student to schedule each portion of the examination. The student should contact committee members to identify a suitable exam date, and reserve a room. *All members of the qualifying exam committee must be physically present for each part of the qualifying exam and may not participate remotely.*

#### The Written Proposal

The written proposal will be submitted to the members of the qualifying examination committee no later than two weeks before part 1 of the qualifying examination.

Research proposals follow guidelines similar to those of an NIH pre-doctoral fellowship application. The proposal should be typed, single-spaced, on standard-size (8½" x 11") paper with one-inch side, top and bottom margins and a font size not smaller than 11. Length should be 7-10 pages. Be sure to reference all sections appropriately. Good proposals are clear, precise, and succinct. While IBiS thesis projects are generally organized around testing fundamental biological hypotheses, some projects will also involve additional valuable activities such as developing experimental and/or theoretical tools or observational studies that generate hypotheses (e.g., synthetic biology tools, chemical biology tools, genetic screens, structural biology, computational modeling or simulations). In such cases, the proposal should include a plan either for utilizing the new tool to answer biological questions or for testing the hypotheses generated. All proposals must include an explicit statement of the impact of the proposed work on fundamental biological knowledge.

## SECTION 8 – SECOND- AND THIRD-YEAR STUDENTS: THE QUALIFYING EXAM

- a. **Title page.** The title of the proposal and the student's name, as well as the date, time, and location of the exam should be printed on a separate cover page.
- b. **Summary.** This should be a brief synopsis of the proposed research. It should include a statement of specific aims and objectives, the scientific background of the proposal, the methods or procedures to be used, and the potential significance of the research. Limit to one-half page.
- c. **Specific aims.** Provide a clear, concise, point-by-point summary of the aims of the work proposed in the form of hypotheses to be tested. Limit to one page.
- d. **Background and significance.** Discuss the essential background of the present proposal, critically evaluate existing knowledge, and specifically identify the gaps that the project is intended to fill. State the importance of the research described in this proposal by relating the specific aims to longer-term objectives. (two to three pages)
- e. **Experimental design and methods.** Discuss in detail the experimental design and the procedures to be used to accomplish the specific aims of the project. Describe essential controls, analytical methods, and protocols to be used. In cases where a new tool is being developed, discuss essential validation and how this new tool will change the types of questions that can be asked. Also provide a tentative sequence or timetable for the investigation. Elaborate on any new methodology and its advantage over existing methodologies. Discuss potential difficulties and limitations of the proposed procedures, alternative hypotheses and backup approaches to achieve the aims. (approximately five pages)
- f. **References.** List all references cited in the text according to their order of appearance, including all authors and the full title of the publication using proper citation practices.
- g. **Appendix.** Extra diagrams or figures not included in the main text that are helpful to the examiners can be included as an appendix. The appendix should not exceed two pages.

### Evaluation Guidelines

The qualifying examination committee will evaluate the student's written proposal per the guidelines below. The proposal must be focused, rigorous, and feasible for a graduate student to complete within four years.

#### General guidelines

- **Written proposal deadline:** two weeks prior to meeting
- **The project is focused.** Have clearly defined goals, hypotheses, specific aims and experiments that advance fundamental biological knowledge.
- **Present the literature.** Understand the background and details of the area of study.
- **Identify the critical unanswered questions** and design experiments that address these questions rather than providing incremental, superficial details.

## SECTION 8 – SECOND- AND THIRD-YEAR STUDENTS: THE QUALIFYING EXAM

### Written proposal should contain

- rigorous approaches that lead to impactful conclusions.
- a clear impact on fundamental biological knowledge
- specific aims and an explanation of why they matter
- validation of proposed new methods
- hypotheses which should be tested using appropriate controls
- expected outcomes, alternative directions, different approaches
- timeline

### Discussion and questions

- Be prepared to defend the proposal, and to demonstrate understanding of the background and details of the subject area.
- Alternative approaches or experiments should be considered.

The proposal defense focuses on the thesis research proposal as well as basic knowledge of modern biology. The student is expected to demonstrate proficiency in topics covered in the IBiS core courses and departmental seminars. A copy of the final thesis proposal must be provided to the IBiS office.

### **Research Progress**

The research progress portion of the qualifying exam consists of a presentation to the exam committee and discussion in response to questions from the committee. The student typically will prepare a slide presentation of their data. The meeting normally lasts about 1.5 – 2 hours.

### **Evaluation Guidelines**

The qualifying examination committee will evaluate the student's productivity and progress toward the thesis. The committee needs to be convinced that enough work has been done, that the project is feasible, and that the proposed project can be accomplished within three more years.

### Data

- High-quality experimental data with rigorous controls and clear interpretation

### Oral Presentation

- ~45-minute slide presentation to the committee
- Discuss the details and expectations of the exam committee with the chairperson as the presentation is prepared.

If the project has changed since the first part of the exam, it will be the student's responsibility to outline and defend the new proposal as well as demonstrating progress toward the goals of the new project.

## **SECTION 8 – SECOND- AND THIRD-YEAR STUDENTS: THE QUALIFYING EXAM**

### **Outcome of the Qualifying Exam**

At the end of each part of the exam, the student's advisor will leave the meeting first, giving the student the opportunity to express any concerns to their committee members that they might not feel comfortable discussing in their advisor's presence. The committee chairperson will summarize the committee's assessment of the student's performance, inform them of the outcome, and whether there are any conditions to be fulfilled. In addition, the chairperson will provide a brief, confidential, summary of the discussion of the student's performance to the advisory committee chairperson.

### **Advancement to candidacy**

Students must demonstrate satisfactory performance in all categories, and pass both parts of the qualifying exam, in order to be admitted to candidacy and remain in the program. The relevant forms must be signed by each of the committee members and returned, completed, to the IBiS office. A copy of the final proposal must also be provided to the IBiS office.

After the student has successfully completed both parts of the qualifying exam, the IBiS program will formally recommend the student to The Graduate School for admission to candidacy for the Ph.D.

### **Failure to advance to candidacy & the master's degree**

Students whose performance in each of the three qualifying exam categories (advanced understanding of biology, research aptitude, and research accomplishment) is judged insufficient for advancement to candidacy but sufficient to merit consideration for a terminal master's degree may petition the program director for permission to write and defend a master's thesis. If the petition is granted, the thesis proposal must be rewritten in the format of a master's thesis and defended before a master's degree exam committee, which is usually reconstituted from the qualifying exam committee. The awarding of a terminal master's degree by IBiS should reflect significant achievement by the degree recipient. A terminal master's degree will be awarded by The Graduate School upon recommendation by the program director acting on the advice of the chairperson of the graduate advisory committee and the master's degree exam committee.

Students whose performance was not satisfactory in any one of the categories mentioned above are normally not eligible for a master's degree, and are dismissed from the program. For example, a student who has demonstrated a good understanding of biology, but who did not perform satisfactory research during their first year in their thesis lab is not eligible for a master's degree.

A summary of minimal requirements for the master's degree is available from the IBiS office.

## SECTION 9 – SECOND- AND THIRD-YEAR STUDENTS: OTHER REQUIREMENTS

### OTHER REQUIREMENTS

#### **Individual Development Plan**

Students should complete the [IDP](#) (with their advisor) in fall quarter of their second year, and update it prior to each annual review. The IDP is designed to foster communication in a variety of areas to ensure that the student and advisor are discussing short- and long-term training goals, and that the student is receiving comprehensive guidance on how best to achieve these goals and make efficient progress toward earning their degree. Both research and training goals should be discussed, as well as the level of effort and commitment necessary to meet these goals. Training goals are expected to evolve over time.

#### **Bioethics Course**

All students are required to take a bioethics course in their second year. The skills learned in bioethics must be refreshed every four years.

#### **Teaching Responsibilities**

Many students will eventually pursue a career that involves both research and teaching. Experience as a teacher is therefore a valuable part of the IBiS graduate program. Participation in teaching is profitable for the student because it provides further expertise in the subject material of the course and enhances the student's verbal communication skills. Each student will participate in the teaching program beginning in the second year, regardless of the method of support of the student. The IBiS program currently requires two quarters of teaching for the Ph.D. degree, although the requirement may vary with total graduate student enrollment. Teaching assignments require that the student work with the course instructor to organize and conduct quiz, discussion, and/or laboratory sections for one quarter. Teaching assignments are arranged by the director of undergraduate laboratories. The TA requirements are usually met in year 2 and/or year 3.

## SECTION 10 – UPPER-LEVEL STUDENTS: ANNUAL REVIEWS

### UPPER-LEVEL STUDENTS

#### ANNUAL REVIEWS

After a student has passed the qualifying examination, the same committee will meet with the student annually until the student graduates. The meetings provide an opportunity for the student to discuss their work with scientists from outside the student's laboratory. At the end of each meeting, the student's advisor will leave the meeting first, giving the student the opportunity to express any concerns to their committee members that they might not feel comfortable discussing in their advisor's presence.

The meetings serve to assess the student's progress toward the Ph.D. degree, but are not intended to be examinations.

**Annual review meetings should be held in the winter quarter for fourth-year students and in the spring quarter for students in their fifth year and beyond.**

Students are responsible for scheduling the annual meetings with their committee. The [annual review forms](#) must be signed by all committee members. A copy of the annual review form will be kept in each student's IBiS program file. The student's Individual Development Plan should be updated at the time of the annual review

## SECTION 11 – UPPER-LEVEL STUDENTS: DISSERTATION & FINAL EXAM

### DISSERTATION AND FINAL EXAMINATION

The advisor, the student, and the thesis committee together determine the appropriate time to write and submit the dissertation. Each student must complete an original research study and produce a dissertation that is acceptable to the final examination committee. Doctoral research usually begins in the summer quarter of the first academic year and continues uninterrupted until all the requirements for the Ph.D. degree have been met, and a satisfactory dissertation has been completed.

#### Requirements for the Ph.D.

All requirements for the Ph.D. degree must be met within nine years of initial registration in the doctoral program. A comprehensive list of the requirements can be found in sections 1 and 2 of the program guide. The [graduation checklist](#) on the IBiS website also contains procedural steps and links to required forms.

The IBiS program expects students to have authored multiple publications over the course of their degree and requires at least one first-author data paper that must be accepted by the time of the defense. Two co-first author publications are equivalent to one first author publication. If a student's thesis committee feels that an exception to this policy is warranted at the time of the "permission to write" meeting, the committee may make an appeal to the director.

#### Final Examination Committee

The final examination committee is usually the same as the qualifying exam committee. Changes to the membership can be made with the approval of the chairperson of the graduate advisory committee. The same rules apply to the composition of the final exam and qualifying exam committees (see section 8 for details). In addition, just as with the qualifying exam, *all members of the committee must be physically present for both the "permission to write" meeting and final exam and may not participate remotely.*

#### Permission to Write Meeting

Approximately three to six months before the expected final examination date, usually after work has been submitted that would satisfy the publication requirement, the student will schedule a "permission to write" meeting with the examination committee. At least two weeks prior to the meeting, the student will submit an outline for a dissertation to the committee. The outline should provide a detailed breakdown of each chapter.

At the "permission to write" meeting, the student will discuss the experimental results and defend the conclusions to be described in the dissertation. The committee will determine whether additional experiments or substantial alterations to the proposed dissertation outline are required prior to scheduling the final exam. Where appropriate, contingencies regarding the outcomes of requested experiments should be agreed upon during this meeting and indicated on the "[Permission to Write](#)" form. At the conclusion of the meeting, the form should be signed by all committee members and then submitted to the IBiS office.

Once permission to write has been granted, the student may begin to write the dissertation and schedule the date of the final examination.

## SECTION 11 – UPPER-LEVEL STUDENTS: DISSERTATION & FINAL EXAM

### Final Examination

Two weeks prior to the final exam, the student will present the committee with the written dissertation. A complete [guide to the writing of the dissertation](#) is available from The Graduate School and should be consulted for stylistic requirements. It is expected that the dissertation will be in a fully-edited and corrected form. The student's advisor must have read and approved the dissertation prior to its submission to the committee.

The final exam will include a discussion of the experimental results that have been completed since permission to write was granted, and an evaluation of the dissertation as a whole. The specific format of the final exam may differ for each student. It is therefore recommended that the student meet with the committee chairperson beforehand to discuss any additional expectations for the exam. If the committee judges the dissertation to be satisfactory, the dissertation can be approved at this meeting, although final corrections, revisions, or editing may be requested. The committee's decision is recorded on the "[Committee Report on Examination of Candidate for the Degree of Doctor of Philosophy](#)" form. Possible outcomes are an unqualified pass, a conditional pass requiring no re-examination, a mandatory re-examination, or a failure to pass the exam. At the conclusion of the exam, the completed form must be signed by each committee member and returned to the IBiS program office.

### Dissertation Submission

If the student receives an unqualified pass on the final exam, the student and their advisor must carefully proofread the dissertation. If a conditional pass is granted, all conditions must also be addressed and approved by the committee. Once proofread, both the student and the advisor must sign the "[Certificate of Careful Editing](#)" and submit it to the IBiS office. At this point, the dissertation may be submitted to The Graduate School.

The Graduate School has additional [requirements for doctoral degree completion](#). **Please note that the IBiS "Committee Report..." form replaces the TGS Final Exam form.** However, the student should:

1. complete and submit the Application for a Degree form through GSTS.
2. submit the dissertation via ProQuest. The dissertation must conform to all TGS formatting standards. Note that it is possible to delay the publication of the dissertation. This is a useful option if the dissertation contains sensitive data that will be included in patents or peer-reviewed journals in the near future.

### Public Seminar

Once the student has received a pass, a public seminar can be scheduled, with committee approval. This is a formal seminar presented to IBiS program members and invited guests. The seminar must be arranged through the IBiS office, and will typically take place on Fridays at 3:00 p.m. The program staff will assist in advertising the public presentation. It is recommended that the arrangements be made at least 14 days prior to the presentation.

### Exit Interview

After the student has passed their final exam and before they leave Northwestern, they should schedule an exit interview with the IBiS office.

## SECTION 12 – CAREER & PROFESSIONAL DEVELOPMENT PROGRAMS

### CAREER AND PROFESSIONAL DEVELOPMENT PROGRAMS

The IBiS program is committed to providing its graduate students with the tools they need to embark on rewarding science careers after completing their training. To that end, IBiS, in conjunction with other life sciences programs, has developed a comprehensive set of career and professional development programs for life scientist trainees, called BioProfessionals. Additional programming and resources are available through the Searle Center for Advancing Learning & Teaching, The Graduate School, and Northwestern Career Advancement.

#### **BioProfessionals**

To foster the career development of graduate students training in the life sciences at Northwestern University, the IBiS Graduate Program co-sponsors [BioProfessionals](#), which includes BioOpportunities, BioSurvival Skills, and Pathway to the Professoriate.

BioOpportunities regularly invites alumni and other professionals to talk about the variety of careers available in areas such as biotechnology, science communication, intellectual property, consulting, *etc.*, to those with Ph.D.s in the life sciences. BioSurvival Skills is a series of workshops on topics such as presentation skills, grant and CV writing, networking, and job hunting. Pathway to the Professoriate focusses on issues important for successful academic careers including choosing a postdoc, applying for faculty positions, startup package negotiations, and the tenure process.

#### **Searle Center for Advancing Learning & Teaching**

The [Searle Center for Advancing Learning & Teaching](#) is a valuable resource for students interested in improving their teaching skills in preparation for an academic career. IBiS supports teaching development opportunities for advanced graduate students in collaboration with the Searle Center and the Program in Biological Sciences by opening course sections for students to co-teach, such as a biology-related Freshman Seminar or BIOL SCI 164 Genetics and Evolution. Since the IBiS Program is only able to guarantee a few teaching spots each year, students need to [apply to IBiS](#) for these opportunities.

#### **The Graduate School**

The Graduate School's [professional development](#) program is a collaborative effort with faculty and staff across campus to offer a comprehensive series of events that contribute to the professional development of graduate students.

#### **Northwestern Career Advancement**

[Northwestern Career Advancement](#) (NCA) provides comprehensive career services to all life sciences graduate students considering non-academic as well as academic careers. Career counselors assist students with career decision-making by helping them explore and re-clarify interests, values, and skills through one-on-one counseling meetings and career assessments.

## SECTION 13 – RESEARCH CENTERS & TRAINING PROGRAMS

### RESEARCH CENTERS AND TRAINING PROGRAMS

#### Centers

IBiS faculty members participate in many research centers at Northwestern University. These centers provide additional training opportunities for IBiS students through conferences, symposia, and workshops. The list below includes some of the centers with which our faculty and students are currently involved.

#### **CENTER FOR CELL AND DEVELOPMENTAL SYSTEMS BIOLOGY**

*Curt Horvath, Director*

The goal of the [Center for Cell and Developmental Systems Biology](#) is to provide the ability for Center labs to embark on new directions for research, and provide the organizational and material support to make those visions a reality. In addition, the Center provides support for collaborations between labs within CDSB, with their colleagues at Northwestern University, with their counterparts in the region, and around the world. Its mission is to make the fundamental new discoveries that expand knowledge and provide the basis for medical therapies in this new century.

#### **CENTER FOR REPRODUCTIVE SCIENCE**

*Francesca Duncan and J. Julie Kim, Co-Directors*

Established in 1987 in recognition of Northwestern's strength in reproductive biology, the [Center for Reproductive Science](#) (CRS) is an interdisciplinary collaboration of medical and science scholars at the forefront of reproductive research, medicine, and technology. The Center's mission is to enhance and enable research in reproductive science and medicine across disciplines, to apply state-of-the-art research and technologies to human reproductive health, and to train the next generation of research, clinical, and thought leaders in our field.

#### **CENTER FOR STRUCTURAL BIOLOGY**

*Alfonso Mondragón, Director*

The mission of the [Center for Structural Biology](#) is to foster leading-edge research in this exciting interdisciplinary field. Center researchers carry out fundamental studies on the structures, dynamics, actions, and interactions of important biological macromolecules. The Center's research space fosters collaborative and interdisciplinary research through open, interconnected laboratories and shared space for instrumentation. Center researchers have access to state-of-the-art major instrumentation, including a 600 MHz NMR facility and a beamline for macromolecular crystallography at the Advanced Photon Source (at nearby Argonne National Laboratory), which is the most powerful X-ray source in the world.

#### **ROBERT H. LURIE CANCER CENTER**

*Kathleen Green, Associate Director for Basic Sciences Research*

The [Robert H. Lurie Comprehensive Cancer Center](#) is a National Cancer Institute-designated Center with programs in basic and clinical sciences. The IBiS faculty participate in the four basic science programs of tumor invasion, metastasis and angiogenesis; signal transduction in cancer; cancer cell biology; and cancer and physical sciences. Through its grants program, the Center funds research projects, the purchase of equipment, and graduate student travel to national meetings.

The Center also supports the operations of shared facilities for transgenic mice, two-dimensional gel electrophoresis, oligonucleotide synthesis, histology, cell imaging, tissue culture supplies, and DNA and protein sequence analysis. Another important function of the Center is education. The Center hosts two annual symposia, one on basic science and one on clinical oncology, which bring scientists from around the world to speak at Northwestern. In addition, Cancer Center laboratories present their work at a yearly poster session.

## SECTION 13 – RESEARCH CENTERS & TRAINING PROGRAMS

### CHICAGO REGION PHYSICAL SCIENCES-ONCOLOGY CENTER

*Thomas O'Halloran, Principal Investigator*

Using non-traditional, physical sciences-based approaches to better understand the molecular changes leading to cancer, the [Chicago Region Physical Sciences-Oncology Center](#) represents a new strategy in the quest to overcome one of mankind's leading killers. Animated by a mission that emphasizes discovery, innovation, multi-disciplinary collaboration, and education, the Center seeks both to generate new bodies of knowledge and to train the next generation of researchers working at the intersection of the physical sciences and cancer biology. The CR-PSOC receives its funding from the National Cancer Institute and is the product of a partnership between the Robert H. Lurie Comprehensive Cancer Center and the Chemistry of Life Processes Institute.

### Training Programs

Training programs that have recently supported IBiS students include:

- Cellular and Molecular Basis of Disease Training Program
- Biotechnology Predoctoral Training Program
- Chemistry of Life Processes Predoctoral Training Program
- Molecular Biophysics Training Program
- Carcinogenesis Training Program
- Training Program in Oncogenesis and Developmental Biology
- Training Program in Reproductive Science, Medicine, and Technology
- Training Grant in Circadian and Sleep Research
- Physical Genomics Training Program
- Medical Scientist Training Program (M.D./Ph.D. Program)

## SECTION 14 – GENERAL PROGRAM INFORMATION

### GENERAL PROGRAM INFORMATION

#### IBiS Program Office

The IBiS program office will assist you during your graduate education. Contact the office for any curricular or registration questions. Financial questions regarding payroll, paycheck, registration holds, *etc.*, are best directed to the financial assistant(s) of your department. The Molecular Biosciences and Neurobiology departments' financial office is Life Sciences Financial Services (LSFS). The Chemistry, ChBE, and BME departments have their own financial assistants. If you are unsure where to go for help, check with the IBiS program office.

The IBiS program office should receive originals of any academic paperwork (rotation agreements, thesis advisor agreement, annual reviews, *etc.*) to be put into your file. You should inform the office of any academic changes (lab, thesis committee members, *etc.*) While you are a student, please make sure that the IBiS program office has your current contact information. Every quarter, the IBiS program office distributes the latest NU contact information. When you graduate, stay in touch, providing us with your most recent contact information, so we can add you to our alumni database.

#### Financial Information

- The stipend for 2021-22 is \$34,176 for 12 months.
- IBiS stipend and tuition support for first-year students is for 9 months, September 1-May 31. Further support is contingent upon formal admission to the IBiS program.
- The payday is the last working day of every month. Pay statements are available in myHR two days prior to each paycheck date. You can access [myHR](#) through Human Resources from both work and home. To view your direct deposit statement, log in and click the "Pay" link.
- Questions regarding your pay can be addressed to the financial assistant of your department. For the Molecular Biosciences and Neurobiology departments, inquiries can be made of the Life Sciences Financial Services staff in room 2-150 Hogan during regular business hours (8:30 a.m. - 5:00 p.m.)

#### Health and Dental Insurance Benefit Overview

Northwestern University requires all full-time students to maintain health insurance that meets the University's standards. This requirement is designed to protect students from extraordinary medical expenses that could result from an injury or illness. For those students who do not have minimally acceptable health insurance through an outside source, the University has currently contracted with the Aetna Student Health insurance plan.

**All students must enroll in this plan or indicate they have equivalent health insurance through another source.**

## SECTION 14 – GENERAL PROGRAM INFORMATION

The Graduate School pays the health insurance premium for the student plan offered by Northwestern University in full. Yearly coverage runs from September 1<sup>st</sup> – August 31<sup>st</sup>. IBiS graduate students may also be reimbursed for [dental plans offered through Delta](#). The Graduate School and the IBiS program do not subsidize any other insurance plan premiums.

*IBiS is not responsible for your enrollment in an insurance plan or your premium payment. You are responsible for ensuring you are properly enrolled in a health and dental insurance plan and paying any premiums in a timely manner.*

Detailed information regarding Northwestern's health program through Aetna can be found on the [Aetna website](#). You will also find insurance information for TGS students on the [Student Health Insurance](#) website.

### **Student Grants**

The following [internal grants](#) are available to students to support their training:

The IBiS Travel Award enables students to present their work at research meetings, conferences and symposia. Awardees will acknowledge the IBiS Travel Award in their posters or oral presentations and will also present at poster sessions during the IBiS retreat and recruitment visits.

The Rappaport Award for Research Excellence recognizes scientific achievement of advanced graduate students in the biological sciences.

The IBiS Career Support Grant assists with the costs of dependent-child care for IBiS graduate students who are attending learned society meetings, academic conferences, workshops, and other scientific activities related to their research projects, as well as professional development events.

### **Other Degree Programs or For-Credit Coursework**

Enrollment in any formal degree program (J.D., M.B.A., *etc.*) or participation in for-credit coursework outside of the IBiS curriculum requires prior approval from the program director and your advisor. Requests will be considered on an individual basis and are not automatically granted.

### **Outside Employment**

Outside employment of any type is not allowed. Exceptions can be made by the program director for advanced students only when the employment directly helps the professional development of the student. Employment is limited to 15 hours per week and students must have approval from their advisor and the program director.

## SECTION 14 – GENERAL PROGRAM INFORMATION

### Stipend Supplements

Stipend supplements are generally not permitted, with the exception of extramural funding as described below. Any other supplement to a stipend must be approved by the program director, your advisor, and The Graduate School.

IBiS students who receive prestigious extramural awards (as determined by the IBiS program, *e.g.*, NSF, NRSA, AHA, *etc.*) will receive a one-time achievement bonus that is equivalent to 10% of the first year's award (salary + discretionary/research funds, tuition excluded).

### Facilities

A lounge is available for student use. It is located on the sixth floor of the Hogan building, Room 6150, and contains computers and printers for the use of all IBiS students.

IBiS student mailboxes are located across from the IBiS office, in Hogan 2-108.

The [Life Sciences Scheduling System](#) is used to reserve rooms and equipment within the Life Sciences departments. If you do not have an account, you may request one on the login page. "Username" is your NetID and "Password" is your current NetID password. Specific questions can be addressed to the Molecular Biosciences program assistant.

## SECTION 14 – GENERAL PROGRAM INFORMATION

### **IBiS Student Organization**

IBiS students come from diverse backgrounds, participate in unique combinations of rotations and interdisciplinary coursework, and carry out thesis work on fundamental problems in the life and biomedical sciences using a broad range of interdisciplinary cutting-edge approaches. The [IBiS Student Organization \(ISO\)](#) provides a forum through which IBiS students can learn from one another, and benefit from each other's expertise, throughout their PhD studies and beyond.

The ISO sponsors Casual Science Fridays, a graduate student series that allows students to present their thesis research in an informal “work in progress” format without faculty present, in order to get input and feedback from their peers. The ISO also sponsors regular social events to promote interactions outside the lab, not only among IBiS students, but also graduate students and faculty from other departments. The organization also sponsors the yearly Excellence in Leadership and Engagement Award which recognizes student(s) who are dedicated to diversity and outreach.

### **Diversity in Biological Sciences Council**

The [Diversity in Biological Sciences \(DiBS\) Council](#) was established to serve graduate students from diverse backgrounds within the IBiS program. Specifically, DiBS aims to cultivate a lasting network and community of students for underprioritized groups, including BIPOC, LGBTQ+ individuals, international students, and other URM groups within IBiS, by advocating for the student population through inclusive community building, providing professional development, connecting with other graduate programs, and contributing to diversity recruitment. DiBS is led by a board of four graduate students in addition to council members who play critical roles in facilitating candid discussions and advocating for an inclusive campus environment. Recurring events hosted by DiBS and available to all graduate students include quarterly coffee chats, where students can connect to discuss topics surrounding diversity in STEM and their shared experiences, financial workshops, book discussions involving STEM, alumni connections, and career workshops highlighting academic and non-academic career paths. DiBS works alongside the ISO to enhance all IBiS students' graduate careers.

### **Diversity, Equity and Inclusion (DEI) Committee**

As an interdisciplinary graduate program, IBiS is uniquely situated to serve diverse students on a variety of career trajectories and, in doing so, shape the future generation of leaders in the scientific community. To complement departmental committees, the IBiS DEI committee will function as a student-focused committee to foster an inclusive, healthy, and equitable training environment driven by student ideas and concerns. The IBiS DEI committee will focus its efforts on recruiting, serving, and supporting IBiS students of diverse identities related to, but not limited to, race, socio-economic background, religion, sexual orientation, gender, culture, nationality, ability, and educational background. Through these efforts, the committee will prioritize empowering diverse students to pursue their professional goals as their authentic selves, ultimately enriching the broader scientific community.

## SECTION 15 – GENERAL UNIVERSITY INFORMATION

### GENERAL UNIVERSITY INFORMATION

#### Academic Calendar

Please refer to the [academic calendar](#) on the Registrar's webpage.

#### ID Card/WildCARD

The [WildCARD](#) gives you access to all University facilities (e.g., the libraries, the Sports and Aquatic Center, etc.) and identifies you as a member of the Northwestern University community. The WildCARD office is located in the Norris University Center on the underground level. It is open from 8:30 a.m. - 5:00 p.m., Monday through Friday. The phone number is 7-NUID (847-467-6843).

#### Parking Permits

If you plan to park on campus, you will need a parking permit, which can be obtained from [Parking Services](#), located at 1841 Sheridan Road, between 8:00 a.m. - 4:00 p.m., Monday through Friday. You will need a valid WildCARD, driver's license, vehicle registration and proof of address. Less expensive parking is also available at Ryan Field. Please check with the parking office for current fees.

#### Payroll and Taxes

Stipends are automatically deposited to your bank account on the last day of each month. For questions about your paycheck, contact the Financial Assistant of your department. See the [Human Resources FAQ](#), or contact the IRS for answers to specific tax questions.

#### Social Security Card

International students without a social security card should obtain one as soon as possible, typically in mid-October. The nearest Social Security office is located at 2116 Green Bay Road, Evanston. To apply for a card, you will need to obtain a letter from the IBiS office. Please visit the [Office of International Student and Scholar Services](#) for further requirements.

#### Student Leave of Absence Policy

Please refer to The Graduate School website for further information on [student leaves of absence](#).

The following is the leave of absence policy available to all IBiS students in good standing:

- Parental leave for birth or adoption of a child – 12 weeks with pay
- Family leave to attend to a sick family member (child, spouse, parent) – 6 weeks with pay
- Medical leave – up to 2 quarters with pay
- General leave of absence – up to one year without pay

Except in the case of a one-year leave of absence, additional leave may be negotiated between a student and their advisor.

## SECTION 15 – GENERAL UNIVERSITY INFORMATION

### **Student Counseling Services**

Free and confidential counseling services are available to all students from [Counseling and Psychological Services](#) (CAPS). If you need CAPS services, call (847) 491-2151.

### **Tech Support: Email and NetID**

New students will receive NetID and email account information upon acceptance of the offer of admission. Your NetID will be used to access the University student services system (CAESAR), your email, and many other University web sites. Information regarding NUIT Support is available via the [NUIT web site](#). For more information, contact 1-HELP (847-491-4357), or visit the NUIT Support Center in the University (Main) Library.

### **TGS Activity Fee**

The Graduate School has implemented a mandatory activity fee of \$125 per quarter (\$500 for 4 quarters) to support services for full-time students of The Graduate School. The services include:

- [U-Pass](#), a special fare card to be used on all Chicago Transit Authority transportation (the “el” and CTA buses) for all full-time graduate students in The Graduate School
- [Legal services](#) from an attorney to assist with issues such as landlord, credit or debt problems, and traffic violations
- Funding of [Student associations](#)

## SECTION 16 – IBiS STAFF & FACULTY COMMITTEES

### IBiS Staff and Faculty Committees

The administrative staff of IBiS is a valuable resource for information on stipends, taxes, registration, teaching, and program activities. A partial listing of the staff is found below; many are located on the second floor of the Hogan building.

Cathy Prullage	IBiS Asst Director	(847) 491-4301	c-prullage@northwestern.edu
Deborah Klos Dehring	IBiS Assoc. Director	(847) 467-0451	d-klos@northwestern.edu
Jason Brickner	IBiS Director	(847) 467-0210	j-brickner@northwestern.edu
Ginger Gilmore	LSFS Business Admin.	(847) 491-5764	g-gilmore@northwestern.edu

#### Fall Retreat Committee

Rosemary Braun	(847) 467-0736	rbraun@northwestern.edu
Keara Lane	(847) 491-4107	keara.lane@northwestern.edu

#### Graduate Advisory Committee

Sadie Wignall (Chair)	(847) 467-0386	s-wignall@northwestern.edu
Erik Andersen	(847) 467-4382	erik.andersen@northwestern.edu
Shelby Blythe	(847) 491-4062	shelby.blythe@northwestern.edu
Yuan He	(847) 491-8526	yuanhe@northwestern.edu
Chris Petersen	(847) 467-3553	christian-p-petersen@northwestern.edu

#### Graduate Admissions Committee

Erik Andersen (Chair)	(847) 467-4382	erik.andersen@northwestern.edu
Yuan He	(847) 491-8526	yuanhe@northwestern.edu
Keara Lane	(847) 491-4107	keara.lane@northwestern.edu
TBA		