



January 9, 2017

To: Allison Fryer, PhD, Associate Dean for Graduate Studies
Cc: John Hunter, MD, Interim Dean, School of Medicine
George Mejicano, MD, Senior Associate Dean for Education
From: Robert Duvoisin and the creativeIDEAS committee (Steven Bedrick, David Edwards, Bill Hersh, Peter Kurre, Owen McCarty, Teresa Nicolson, Tawnya Peterson, Diane Stadler, Matt Thayer, Jessica Walter, Jackie Wirz)
Re: creativeIDEAS Committee Report

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Summary

The creativeIDEAS committee (for Innovating Doctoral Education for Aspiring Scientists) was tasked with creating a vision for PhD graduate training in the SoM that prioritizes flexibility, is scalable, and permits integration of current programs as well as new areas of study. The team was further tasked to identify the skills, knowledge, and characteristics that our students should possess at graduation and to propose the best, innovative approach to ensure that PhD recipients leave OHSU prepared for the future.

Nationally, the landscape of scientific practice is changing: interdisciplinary approaches are required to tackle difficult problems, students are increasingly seeking non-academic careers, and traditional funding streams are limited. At OHSU, recruitment of leaders in basic science departments and institutes is bringing new research areas to the university. Additionally, philanthropy has driven faculty recruitment through the formation of institutes (e.g., Knight Cancer Institute, Knight Cardiovascular Institute). Similarly, the current ONWARD fundraising campaign promises to further expand research opportunities. Doctoral training must be adapted to embrace these changes and harness the talent that graduate students bring to academic biomedical research.

The creativeIDEAS committee proposes that graduate students' coursework be tailored to maximize their individual potential for innovation and creativity. We urge that a harmonized curricular structure be developed across the SoM allowing students access to all graduate courses (and whereby tuition logically follows the students). We recommend multi-mentor teams comprised of an academic mentor, a research mentor, and a peer mentor to support student progress. Finally, we propose the formation of research training hubs to provide educational environments with shared research interests for students and their mentors.

The creativeIDEAS committee recommends its proposal be implemented, evaluated, and continuously improved upon over the next five years. This continued evaluation and refinement will be supervised by a new Doctoral Education Steering Committee, with guidance from an External Advisory Board.

Background

The OHSU School of Medicine (SoM) has a strong history of educating PhD graduate students, with more than 230 students currently enrolled in 16 different PhD programs. Our outcomes are excellent. Upon graduation 65% of graduates obtain postdoctoral research positions and 27% obtain positions in industry, government and as educators. Over the past 5 years, none were unemployed, except by choice.

We recognize that to maintain our success, doctoral education within SoM will need to adapt to remain competitive and attract graduate students who are creative, confident, and persistent problem solvers.

Four key factors framed the committee's thinking in regards to envisioning the PhD for the future:

1. **Science is changing.** New technologies, such as genomics and imaging, generate massive data sets, that require new and complex analytical approaches. Interdisciplinary teams are increasingly needed to explore scientific questions from a range of approaches.

2. **Knowledge is expanding rapidly.** Students need to know how to find relevant content, evaluate and understand it, and integrate knowledge into their thinking and research approaches.
3. **Science careers are changing.** Biomedical PhDs recipients are undertaking careers in industry, biotech, startups, contract research organizations, intellectual property and technology transfer, law, government and science policy, non-profits, teaching, communication, and outreach. Beyond rigorous training in scientific research design and execution, students need training in a range of transferable professional skills.
4. **Funding is changing.** These changes are happening at a difficult time, with flat NIH research funding and more targeted funding by industry and disease-specific foundations. Although we remain in the top 30 academic institutions in the country for NIH funding, OHSU's rank has declined. Philanthropy may provide an opportunity to stabilize or strengthen graduate education.

Our graduate students are aware of these external changes and ask that our educational programs adapt to ensure their success in an increasingly competitive job market. Candidates applying to graduate school seek programs whose curriculum will provide them with the highest quality education and with research training opportunities to support their future career choices.

Aims

The goal of the creativeIDEAS committee was to envision the future of PhD student education in the SoM. Our recommendations build upon OHSU's strengths with the following aims:

1. Enhance research and collaborations across OHSU

Graduate students play a key role in designing and carrying out biomedical research, making them a critical component of the research and education missions of OHSU. Thus, enhancing graduate student performance and training opportunities is an investment in OHSU's capacity for innovative and collaborative research projects.

We propose funding the first 4 years of graduate student stipends and tuition through institutional training grants, individual fellowships, and SoM funds. This financial model will give students greater scientific and training independence. It will also enhance opportunities for collaborative projects at OHSU and allow faculty mentors to reassign research grant funds now dedicated to stipends to the support of scientific research, thus increasing OHSU's return on investment.

2. Enhance training in transferable skills

We must provide our students with the training and skills needed to take the next appropriate step after graduation. We recommend that career & professional development activities begin earlier in their education and be integrated into the whole PhD curriculum.

3. Attract ambitious students to OHSU

Enhancing our students' research training, their fiscal independence, and their acquisition of transferable skills will raise the caliber of our applicants and enhance career prospects for enrolled students. To communicate these efforts and improve the visibility of our graduate programs, we recommend a substantial and sustained marketing effort, including a much-improved presence on the web and social media. We also recommend an enhanced and centralized tracking of student progress and performance with a goal of improving academic efficiency and reducing students' time-to-degree.

Key features

To achieve these aims the cIDEAS committee recommends a three-component plan, to be realized and improved upon over the next five years. The first component is to create a common curricular structure, the second is to form multi-modal mentoring teams, and the third is to create research training hubs, that provide supportive scientific communities and enhanced research training environments for graduate students. These elements are described here:

1. Individualized curriculum

OHSU graduates need to possess a breadth of core knowledge in the biomedical sciences, a depth of knowledge in their subject area, and a set of transferable skills that include the ability to design and perform experiments, analyze scientific data, statistics, critical thinking, and scientific communication. Since each PhD student's training needs are different, their education should be tailored to their goals. We propose a model that provides enough structure and support for a student to successfully master the rigor expected of doctoral education with enough flexibility for them to successfully pursue their research question and do so efficiently.

Coordinated curriculum

We propose that coursework be harmonized across the SoM to allow students in any program to access any course that fulfills the goals set in their individualized curriculum. To achieve this, a comprehensive and updated course catalog is essential, and a mechanism that allows tuition to follow the students must be developed.

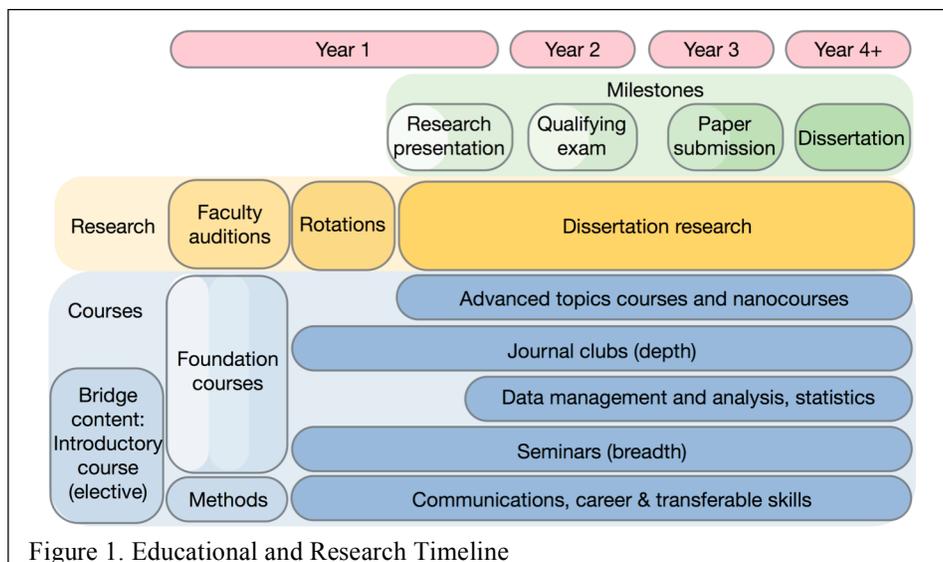


Figure 1. Educational and Research Timeline

We recommend that the fall term of all first year graduate students consist only of coursework. Students will select three one-month-long *Foundation* courses¹ that emphasize the theory (scientific principles, research design, critical thinking, data and information literacy) and practice (research approaches, laboratory methods, data analysis and computational tools) of science. It is expected that different disciplines will require different core curriculum. The fall term coursework will be fast-paced and taught at a high level. To support student success, we propose offering optional bridge content in Summer B to allow students to gain prerequisite skills and knowledge.

In winter term, students will rotate through labs to identify and confirm their research mentor by the beginning of spring term, although experience will tell if longer rotations should be accommodated.

Individualized, advanced coursework will be taken as needed for the duration of training. These courses could include short courses, nano-courses, workshops, or advanced courses offered by OHSU or other institutions (e.g. MBL-Woods Hole or Cold Spring Harbor Laboratories) to provide deeper specific knowledge. Further depth will come from participation in weekly research journal clubs, while knowledge breadth will come from participation in a weekly seminar series featuring external speakers. Pre-seminar preparation sessions will prepare students to better understand the content of the presentation and to actively engage in the discussion.

Milestones

We recommend a common set of annual milestones: Research presentation, qualifying exam, paper submission, and dissertation. Each milestone is focused on the student's research, and is preceded by a preparatory course. For example, prior to the qualifying exam, which includes developing and defending their dissertation research proposal, students will complete a grant writing course.

¹This approach was recently piloted by the Neuroscience Graduate Program (NGP).

2. Mentoring team

We propose that each student be guided by a multi-mentor team comprised of an academic mentor, a research mentor, and a dissertation advisory committee. Additionally, students will have a peer mentor:

Academic mentors

Each student will be assigned an academic mentor upon enrollment. Academic mentors, who are selected and will receive training, help the student select coursework, determine research rotations, choose a research mentor, and identify training activities, including career and professional skills development with the goal of ensuring student success and appropriate progress.

Each academic mentor will advise students with different research interests and career aspirations, and at various states in their program of study thus forming a multi-level, cross-disciplinary research community. We propose this mentoring group meet weekly during summer terms for research presentations and for an interdisciplinary journal club to enhance biomedical knowledge and opportunities for collaborative projects across OHSU.

Because academic mentors are responsible for multiple students, with a significant time commitment, this role should be recognized and compensated.

Research mentors

The Principal Investigator of the laboratory chosen by the student for their dissertation research will serve as the student's research mentor. Research mentors will be Graduate Faculty actively engaged in research and having membership in at least one training hub. The research mentor will participate in guiding course selection.

Dissertation advisory committee (DAC)

Comprised of graduate faculty, this committee will be formed by the student in consultation with their research and academic mentors. The research mentor and the DAC will be responsible for ensuring that the student makes good progress on their dissertation research project(s). The DAC will report to the academic mentor.

Peer mentors

Each entering student will be assigned a peer mentor, selected from among the senior students who share the same academic mentor. Peer mentors will provide junior students with a welcoming environment and training in how to be a good mentee. Peer mentoring will provide senior students with experience in mentoring, a skill requested by OHSU graduates during exit interviews.

3. Research training hubs

Faculty, graduate students, and optionally postdocs with shared scientific interests will be organized into research training hubs. The organization and function of each hub is modeled on T32 and similar institutional training programs. Each student's dissertation research will be done in the laboratory of a faculty member who belongs to a research training hub.

As a community of faculty and trainees with shared interests, hubs will be organized at a minimum around a journal club, and may also host a seminar series, a symposium, or a retreat. They will be more nimble in responding to changes in scientific emphasis than existing graduate programs, whose accreditation requirements limit adaptability.

Note, the cIDEAS committee could not reach a

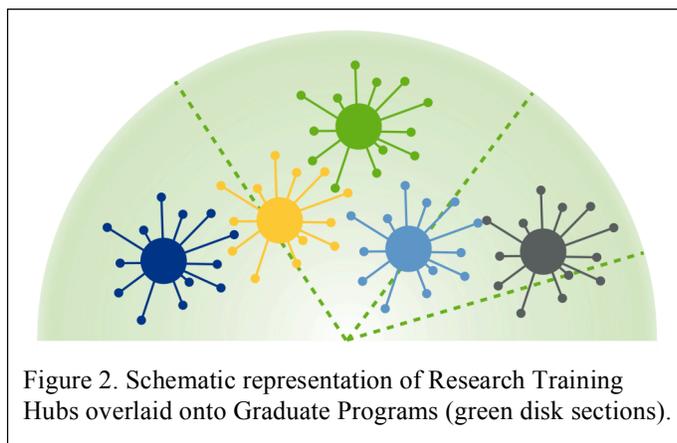


Figure 2. Schematic representation of Research Training Hubs overlaid onto Graduate Programs (green disk sections).

consensus on an ideal number of ‘graduate programs’ or ideal number of students in a program, but did agree that hubs and graduate programs need to maintain a certain enrollment to provide the critical mass to create effective training environments.

Research training hubs will independently establish expectations and review their faculty regarding participation in graduate education activities and research productivity. Hubs will be actively involved in the recruitment and admission of new students, and their performance will be reviewed by the Doctoral Education Steering Committee (see below).

Financial model

One of the major challenges facing graduate programs—not only within the SoM but also across the university, and much of the country—is variability, instability, and lack of sustainability among financial models. At OHSU, this variability currently reduces access to specific courses, hinders the development of cross-disciplinary courses, and sets up inequities in how programs are supported. While the cIDEAS committee has not explored or recommended funding models, this dimension is critical to our ability to develop a strong, stable, and fiscally sustainable PhD education environment.

The cIDEAS committee proposes that through institutional training grants, individual student fellowships, and central funding, all student stipends, tuition and fees be covered for the first 4 years, with support beyond year 4 provided by the research mentor.

Ultimately, a major philanthropic effort will be needed to implement this proposal.

Direction, coordination, and assessment of training

Doctoral education steering committee

A **doctoral education steering committee** (DESC) will provide oversight to and support for doctoral education in the SoM. This committee will review applications and renewals for hubs, gather information for accreditation purposes, and prepare communications and reports for the external advisory board. The DESC should include representatives from academic mentors and hub directors, as well as an academic coordinator, student, and alumni.

External advisory board

The cIDEAS committee proposes the formation of a **doctoral education external advisory board** (EAB) as a means to gain feedback and fresh ideas as part of our effort for continuous assessment, evaluation, and improvement, as well as to publicize the work being done through doctoral education at OHSU. Ideally, the EAB will consist of two faculty members from other universities (one with outstanding research credentials, one with extensive graduate administration experience), one scientist in industry, and one scientist from policy/NGO/government (e.g. Gates Foundation, Alan Alda Institute, etc.). The EAB will initially meet annually with students, academic mentors, hub directors, and the DESC, and is available for advice as needed. In future years, the EAB will meet in person every two to three years. The EAB will provide written reports to the Associate Dean for Graduate Studies and to Graduate Council, and that will be included in university review of the program.

Best regards,



Robert Duvoisin, on behalf of the creativeIDEAS Committee