



Academic Catalog  
2016-2017

August 1, 2016



**TABLE OF CONTENTS**

INTRODUCTION .....	5
Mission.....	5
Philosophy .....	5
Core Competencies .....	6
ACADEMIC PROGRAM.....	7
Graduation Requirements for a PhD Degree.....	7
Graduation Requirements for a MS Degree .....	15
Physician-Scientist Training Programs .....	18
COURSE LIST AND DESCRIPTIONS .....	20
ACADEMIC CALENDAR.....	23
ACADEMIC POLICIES.....	24
Admissions.....	25
Credit Hour Allocation and Requirements Policy .....	26
Full-Time Student Status.....	26
Academic Advising.....	26
Assessment .....	27
Transfer of Academic Credit.....	28
Remediation.....	29
Probation and Dismissal.....	29
Honor Code.....	30
Tuition .....	30
Course Auditing.....	30
Grievance.....	30
Outside Employment.....	30
Religious Observance .....	31
Student Verification for Online Assignments.....	31
Non-discrimination and Equal Opportunity Policy (EEO) .....	31
LEGAL STATUS .....	31
Authority.....	31
Accreditation .....	31
Governance .....	31
VAIGS Board of Directors .....	32
Administration .....	32
FACULTY AND STAFF LISTING .....	32
Current VAIGS Faculty.....	33
Faculty Committees .....	35



Reference to Faculty Bylaws .....	36
VAIGS Staff.....	36
AMENDING AND REVISING THIS CATALOG .....	37



## VAIGS ACADEMIC CATALOG

### INTRODUCTION

Van Andel Institute (VAI) was founded by Jay and Betty Van Andel in 1996 with a vision to enrich and enhance the lives of this and future generations through medical research and education. VAI comprises the Van Andel Education Institute (VAEI) and the Van Andel Research Institute (VARI). Each organization has a charitable trust agreement with the State of Michigan. Van Andel Institute Graduate School (VAIGS) is a part of VAEI and is incorporated in the State of Michigan with authority to grant PhD and MS degrees.

VAIGS is supported by VAI, VAEI and VARI. VAI administrative offices provide finance, information technology, human resource, facilities support, fundraising (through grants and private philanthropy) and public awareness services. VARI, a biomedical research organization, has a mission to improve human health with current projects focused on cancer, Parkinson's disease, bone biology, cardiac regeneration, and epigenetics. VARI conducts research in cellular and molecular biology and genetics to identify and understand the function of genes and their protein products and the ways to apply this knowledge to diagnosis and therapy (translational research). VAEI, provides complementary education through programs that enhance science education for K-12 students through improved conceptual models, classroom methods, and professional development for teachers.

### Mission

The mission of VAIGS is to prepare biomedical research scholars through an intense problem-focused graduate program in cell and molecular genetics, with emphasis on translation of this knowledge and technology to improve human health and well-being. We fulfill this mission by:

- Guiding doctoral students to think and act like research leaders through innovative, problem-based learning
- Developing both laboratory research and leadership skills
- Integrating doctoral students into the professional networks and culture of science

The educational goals of VAIGS include general goals common to higher education and the scientific research community, and specific goals that distinguish the VAIGS graduate program. VAIGS graduates will know current biomedical science, its historical context, and clinical medicine related to genetics. They will be prepared to conduct original research: design appropriate experiments, be expert in techniques of the life sciences, and think scientifically and analytically. They will be able to translate basic science to address problems of health and society; work collegially; communicate effectively verbally, in writing, and graphically; and practice the highest ethical and professional standards. VAIGS expects to develop graduates who are creative and confident in exploring new areas and techniques in biomedical research.

### Philosophy

The fundamental philosophy underlying the VAIGS graduate program is that the students should act and think like scientists, and thus the activities undertaken by students should prepare them for the work they will do as professional scientists. Our goal is to foster their development as scholars whose work is to generate new knowledge, to conserve and critique the knowledge already gained within the field, and to apply the skills of the discipline to



transform the world around us. We anticipate our graduates will be the future stewards of the discipline as they embark on careers as scientists.

Every PhD is inherently a research degree. VAIGS students will be engaged in scientific research from matriculation to graduation. The core curriculum has been shaped by a problem-based learning (PBL) structure to reflect the way scientists conduct research. This approach gives students the responsibility for their development and supports the growth of the intellectual skills and tools to ask and answer original research questions. Through this approach, we expect that our students will master the core concepts of genetics, cell biology, biochemistry, bioinformatics, and pathobiology. To achieve this goal, they will also learn how to find key information when they need it; to digest the quality and relevance of that information; to place that information into a coherent conceptual framework; and to make use of that information to tackle a new scientific problem or test a novel hypothesis.

Although the central tasks of a professional scientist are to design, execute and interpret experiments, other responsibilities and roles are also important. These include writing and reviewing grant proposals and manuscripts of research publications, managing the financial support of a research program, and selecting and supervising a laboratory research team. VAIGS prepares its students for these roles through classroom activities, seminars, and periodic workshops.

Science is a human endeavor that occurs within a complex and fascinating intellectual community. VAIGS seeks to foster the effective integration of our students into that community. Students learn how to work effectively in a local research team and with external collaborators. Students will also learn how to effectively communicate in written and oral form and how to critically evaluate the work of others. Students are encouraged (and supported) to attend a national or international scientific conference or workshop each year.

VAIGS promotes a culture of freedom and creativity that encourages individuals to achieve their research goals with excellence and integrity. That culture includes an emphasis on effective mentoring. The mentoring team includes the Thesis Adviser, other VAIGS faculty, and other external advisory committee members, whose objective is to develop in VAIGS students both essential research skills and their own effective mentoring skills.

The VAIGS graduate program and curriculum is continually evaluated and revised. This process is appropriate for scientific education because it mimics the daily work of scientists: asking questions, gathering and analyzing data, applying the new results to previous paradigms, and integrating the new with the old in order to establish a better model and to improve outcomes.

## **Core Competencies**

The VAIGS *core competencies* are the foundational learning goals for the graduate program in cell and molecular biology. These were compiled to explicitly illuminate the path to becoming an independent scientist. The core competencies focus on the following areas:

### Knowledge:

- Describe key concepts in biomedical science
- Place core concepts in the relevant clinical context
- Know scientific literature relevant to the research area

**Research:**

- Define sound rationale/ identify gap in knowledge
- Frame an appropriate hypothesis
- Apply creative and appropriate experimental design
- Use controls appropriately
- Execute experiments with technical skill
- Demonstrate critical analysis and thinking
- Integrate results into relevant model

**Communication:**

- Speak effectively
- Write effectively
- Communicate to diverse audiences

**Ethical/Professional Practice:**

- Manage data with scientific integrity
- Engage in best authorship practices
- Address ethical problems in scientific research
- Comply with safety and regulatory standards in laboratory activities
- Display appropriate lab citizenship
- Work collegially and effectively as a team/ collaborator

## **ACADEMIC PROGRAM**

VAIGS offers admission to a single doctoral program leading to the PhD degree in Cell and Molecular Genetics.

VAIGS is also authorized to confer master's degrees in cell and molecular genetics, but does not admit students explicitly for the master's degree. Master's degrees may be conferred upon students who elect not to complete the doctoral degree, with the approval of the Dean. The requirements for the master's degree are described in the second section under this heading.

### **Graduation Requirements for a PhD Degree**

The essence of a PhD degree is the conduct of original and significant research relevant to that field. The research is described in a dissertation comprising published or publishable accounts of the work conducted by the student. The preparation and defense of the dissertation is the principal requirement for the PhD degree. This research is conducted under the supervision of a faculty member serving as the Thesis Adviser, with additional guidance and encouragement from a Thesis Advisory Committee.

Courses help provide the foundation and context for the conduct of this research. For VAIGS, course requirements include a set of core courses, typically completed in the first year, with additional and elective courses in the subsequent years. VAIGS requires a minimum of 80 credit hours and a minimum grade point average (GPA) of 3.0 for a PhD degree.

A comprehensive examination, typically taken in the second year, evaluates the student's foundation in knowledge and research skills to determine whether further pursuit of the doctoral degree should be recommended.



## Course Requirements for a PhD Degree

The following courses are required for the PhD degree. A complete course list and course descriptions are found in a subsequent section of this Catalog.

Strategic Approaches to Biomedical Research (SABR) (2 semesters, 18 credits)  
Four two-credit courses and a one-credit final examination are offered in each of the first two semesters. Each course and exam carries an independent course number.

Historical Perspectives in Molecular Biology (1 semester, 2 credits)

Translational Research (1 semester, 2 credits)

Responsible and Effective Conduct of Research (1 semester, 1 credit)

Journal Club (4 semesters, 4 credits)

Research in Progress (RIP) (4 semesters, 4 credits)

VARI Seminar Series (2 semesters, 2 credits)

Additional Professional Development courses (8 total credits, minimum)

Special Topics Courses (6 credits)

One- or two-credit courses provide advanced study on a focused topic in basic or clinical research, typically taken in years two through four. Topics reflect particular needs of the students and interests of the faculty member who leads the course.

Laboratory Rotations (minimum 3 rotations, 6 credits)

Three rotations of seven weeks duration, completed during the first two semesters; two credits for each rotation.

Precandidacy Research (typically 3 semesters, 3-6 credits/semester)

Dissertation research conducted after selecting a thesis adviser and prior to successful completion of the Comprehensive Exam.

Thesis Research (minimum 27 credits)

## Thesis Research

### Thesis Adviser

Thesis Adviser selections are made after three laboratory rotations have been completed (typically in February of the first year). Regular faculty members of VAIGS who hold a terminal degree and are appointed as head of a VARI laboratory may serve as Thesis Adviser for a VAIGS doctoral student. The student may request assistance from the Academic Adviser in selecting a Thesis Adviser. After a mutual agreement is reached between the student and the Thesis Adviser, the student must notify the Dean in writing for approval and recording.



The relationship with the Thesis Adviser is central for a successful research project, intellectual development, and the completion of the graduate degree. The student and Thesis Adviser should strive to create a productive and ethical research environment with suitable rapport. The laboratory should engage in research of specific interest to the student and should have an atmosphere conducive to student development and training.

#### Thesis Advisory Committee (TAC)

*Assignment of TAC members:* By the end of the first year, and after consulting with the Thesis Adviser and student, the Dean will appoint a TAC. The TAC will consist of at least four members including the Thesis Adviser, two VAIGS faculty, and one outside expert on the thesis proposal topic. Additional members (internal or external) may be appointed if a specific benefit can be anticipated from their participation.

*TAC Meeting Frequency:* To monitor and support student progress toward completion of their degree, students must meet with the TAC for Annual Summary or Progress Report meetings on a semi-annual basis (i.e, every six months) until their dissertation defense. . Students who do not fulfill this expectation may be subject to academic probation.

*TAC Responsibilities:* The TAC provides both advice on and supervision of the thesis research conducted by a student. The TAC will review the initial thesis proposal to gauge whether the scope and focus of the project are appropriate for a doctoral dissertation. The TAC will meet with the student and Thesis Adviser on a semi-annual basis to evaluate progress toward the degree and to provide continuing advice on the dissertation research project. Following each meeting, the TAC will submit a Thesis Advisory Committee Meeting Report to the Enrollment and Records Administrator (ERA). The two VAIGS Faculty members of the TAC will participate in the comprehensive examination. All members of the TAC will participate in the dissertation defense. TAC members may be asked to provide letters of recommendation when the student pursues subsequent positions or applies for a predoctoral fellowship.

*Student Responsibilities:* Following the approval of a Thesis Adviser, the student and Thesis Adviser will explore topics for the student's thesis research. At the end of the first year, the student will submit a 3-5 page written thesis proposal to the TAC with a copy to the ERA. With the advice and input of the TAC, the student will outline a set of research objectives to be met in the next year.

The initial Annual Summary meeting will convene one year after the Comprehensive Exam. Future Annual Summary meetings will convene on or before the anniversary of the Comprehensive Exam. Students will present the TAC with both a written Annual Summary of her/his research (with copy to the ERA) and a formal oral presentation. The TAC will advise the student on her/his progress toward fulfilling the requirements of the program.

Progress Report meetings convene approximately six months after each Annual Summary meeting (typically near the beginning of each academic year),



with the initial meeting occurring approximately six months after successful completion of the Comprehensive Exam. Students will present the TAC (with copy to the ERA) with a brief report outlining the progress that has been made toward achieving the objectives established at prior TAC meetings. If adequate progress toward the objectives has been met, a new set of objectives for the next year will be established. If the TAC finds inadequate progress toward the objectives, they will provide recommendations with a new set of objectives.

*VAIGS Responsibilities:* Transcripts will be provided to students at the completion of each semester. The Student Performance Review Committee will evaluate overall yearly progress based on academics, research, conferences and workshops, papers, and presentations in addition to the reports submitted by the student's TAC. Based on evaluation by the Student Performance Review Committee, the Dean will provide a letter, to each student, summarizing his/her progress and status in the program.

### **Comprehensive Examination**

The goal of the Comprehensive Exam (also known as the PhD candidacy exam or preliminary exam) is to evaluate the student's potential and ability to explicitly identify and define a specific, testable hypothesis. This will be based on evaluating the relevant literature, drafting a testable and important hypothesis, proposing critical experiments to rule out or prove the hypothesis, and interpreting the experimental outcome. The student will be expected to demonstrate his/her knowledge of basic concepts as well as current and relevant scientific literature.

The Comprehensive Exam is typically taken in February or March of the second year. Exceptions may be made for students who have experienced a leave of absence or comparable changes to their academic program. The implementation of the Comprehensive Exam is described in detail in the *Guidelines for the Comprehensive Examination*. Another document, *Preparing for the Comprehensive Examination*, is intended to help students effectively anticipate and prepare for this exam. A brief summary is provided here.

The exam will have three principal components:

- 1) A written proposal of the thesis research project prepared in the style of a National Institutes of Health (NIH) grant application;
- 2) A research proposal on a topic in an area different than the student's chosen field of research; and
- 3) An oral defense of the two written proposals together with an examination on the underlying concepts, principles, and research skills.

### **Comprehensive Exam Committee**

After consulting with the Thesis Adviser and student, the Dean will appoint a Comprehensive Exam Committee. The Comprehensive Exam Committee will comprise four members including two VARI members of the TAC, one VAIGS faculty member not on the TAC, and one outside expert on the non-thesis proposal topic. The Thesis Adviser may attend but does not participate in the examination. The exam will be chaired by a member of the Comprehensive Examination Organizing Committee, who also does not vote on the examination.



## Comprehensive Exam Outcomes

Passing the Comprehensive Exam requires satisfactory completion of all three principal components, based on a majority vote of the examining committee. The Comprehensive Exam Committee will decide on one of three possible outcomes:

*Pass:* No further work is required on the Comprehensive Exam. The Comprehensive Exam Committee may make recommendations for areas in which improvement should be sought or expected.

*Failure with opportunity to remediate:* If the Comprehensive Exam Committee identifies weaknesses in a limited number of areas and believes that these deficiencies can be corrected with specific actions, the student may be offered the opportunity to remediate those portions of the Comprehensive Exam. The Comprehensive Exam Committee will define explicitly the conditions for remediation. The remediation should be completed within three months of the initial examination date. If the remediation efforts are deemed satisfactory, the student will have passed the Comprehensive Exam. If the remediation efforts are deemed unsatisfactory, the student will have failed the Comprehensive Exam and the student will be asked to leave the doctoral program.

*Failure:* If the student fails one or more components of the Comprehensive Exam, with deficiencies beyond the scope deemed remediable within three months, the student will not be offered the opportunity to remediate, and will be asked to leave the doctoral program.

Upon successful completion of both the written and oral exams, the student will work full-time in the laboratory on his/her thesis project. The student must submit a predoctoral grant application to an external agency, to be considered for funding (typically as a predoctoral fellowship), within one year from the date of his/her Comprehensive Exam. To document completion of this requirement, the student should submit to the Enrollment and Records Administrator both a .pdf copy of the submitted proposal and the VAI transmittal sheet for that proposal.

## **Dissertation Preparation and Defense**

### Dissertation Scope and Preparation

A key requirement for the degree of Doctor of Philosophy (PhD) is the submission and successful defense of a dissertation. The dissertation is a compilation of a student's research on an original and significant question in the field.

The dissertation submitted for the PhD degree must be based on original research that makes a significant contribution to our understanding of cell, molecular, or genetic biology relevant to human disease. The design, execution and presentation of the dissertation research must demonstrate that the candidate can perform independent research of a quality consistent with that published in refereed journals of the relevant disciplines. In most circumstances, it is expected that substantial portions of the thesis research will have been



published or submitted for publication. The thesis and oral defense should provide clear evidence of the candidate's capacity to function as a professional scientist, including a broad knowledge of the research topic; ability to draft hypotheses and design effective tests of those hypotheses; ability to execute experiments accurately; ability to interpret results critically; and ability to communicate the research project effectively. Elements for the student evaluation can include, but are not limited to, a polished presentation that clearly communicates the science; a clear statement of well-grounded hypothesis and logical specific aims; the potential clinical significance and beneficiaries of the proposed research; evidence of effective experimental design and proficient execution; appropriate data-gathering and analysis; logical and insightful derivation of experimental conclusions that address the hypothesis; adjustments in experimental design (if any) with clear rationale; insightful discussion of the work in the context of the field; and the future direction or application of this research.

Students are required to prepare a detailed written dissertation conforming to VAIGS requirements as outlined in the Dissertation Preparation Manual. Prior to preparing the dissertation, each graduate student must meet with his/her TAC to discuss future career plans and obtain permission to begin writing the thesis.

#### Dissertation Defense Committee (DDC)

When the student, Thesis Adviser and TAC agree that the student is ready to prepare and defend the dissertation, a DDC will be formed to evaluate the graduate student's doctoral dissertation.

The DDC will consist of all members of the TAC, including the Thesis Adviser (in a non-voting capacity); two additional VAIGS faculty members; and the external member of the TAC, all of whom have provided ongoing advice to the student throughout his/her thesis project. In addition, the DDC will include one additional external reviewer. The DDC will be chaired by a member of the Comprehensive Exam Organizing Committee .

The Thesis Adviser will attend the dissertation defense as a non-voting member and does not question the student during the dissertation defense. The Thesis Adviser may answer questions of the DDC for clarification. The Thesis Adviser has a vested interest in the success of the student in that the Thesis Adviser's research is logically intertwined.

External review strengthens the quality of the doctoral degree and the graduate program as a whole. The additional external reviewer, who is not a member of the TAC, provides an independent assessment of the research. The additional external reviewer further validates the independent nature of the student's work. The TAC will nominate independent investigators as external reviewers who have the appropriate expertise and who have no conflict of interest with the student's or Thesis Adviser's current research. Recommendations will be submitted to the Dean for selection of a single independent external reviewer as a fourth voting member of the DDC.



A member of the VAIGS Comprehensive Examination Organizing Committee (CEOC) will act as DDC chair and will ensure adherence to VAIGS standards and policies, monitor for potential conflicts of interest, and enhance consistency between different DDCs. The Dean's Representative will not vote on the outcome of the examination.

Conflict of interest is created when scientific or personal relationships between the student and/or advisers significantly skew the ability to have unbiased scientific objectivity during the evaluation process. DDC members should be evaluated for collaborations or interactions with the Thesis Adviser such that the degree of collaboration does not introduce a conflict of interest which may provide an unfair or disfavored advantage for the student. The degree of conflict must be determined and approved by the Dean.

### Dissertation Defense

The student will deliver a written dissertation to all members of the DDC at least two weeks prior to the defense date. The dissertation defense will consist of an oral presentation and an oral examination. The oral presentation is an open public seminar. The student will prepare and deliver a 40-45 minute presentation of the dissertation research and then field questions from the audience. The oral examination is closed and is conducted by the DDC following the presentation.

### Defense Outcomes

Following the examination, the DDC will convene in private to discuss the student's dissertation, oral presentation, and performance in the oral examination. After deliberation, the DDC will make a recommendation to the Dean of whether or not to grant the PhD degree. A simple majority vote (at least three votes) from the four voting members of the DDC will be required to recommend to the Dean to grant the student a PhD degree.

The DDC may require additional revisions or amendments to the written dissertation. Such requirements must be completed before the PhD degree is conferred. The DDC chair will provide in writing, to the VAIGS Dean, a concise summary of the required changes as approved by the DDC. The DDC Chair and the Thesis Adviser together will monitor the accomplishment of these revisions and will certify to the Dean when the revisions have been accepted.

The successful student must provide the Enrollment and Records Administrator with a copy of the completed and final version of the dissertation in both electronic form (as a single .pdf file) and bound paper form. Details for the preparation of the electronic and hard-copy documents will be included in the guidelines for formatting theses and dissertations. The Graduate School will pay the binding costs for the one bound copy that will be archived in the VARI Library. The student is responsible for costs of other bound copies for their own use or for their thesis adviser.



## Typical Program of Study for a PhD Degree

The list and diagram that follows illustrate the typical academic plan for a VAIGS doctoral student. Students enrolled in the graduate program are expected to complete the requirements for the PhD degree within five years.

### Year One

Fall semester (late-August to mid-December – 16 weeks)

- Strategic Approaches to Biomedical Research courses, exam (9 credits)
- Historical Perspectives in Molecular Biology (2 credits)
- 2 Laboratory Rotations (2 credits each - 4 credits)
- Research in Progress (1 credit)
- Journal Club (1 credit)
- VARI Seminar Series (1 credit)

Winter semester (January to May – 16 weeks + 1 week for thesis integration)

- Strategic Approaches to Biomedical Research courses, exam (9 credits)
- Translational Research (2 credits)
- Responsible and Effective Conduct of Research (1 credit)
- 1 Laboratory Rotation (2 credits)
- Select a Research Adviser at the end of 3<sup>rd</sup> Rotation
- Research in Progress (1 credit)
- Journal Club (1 credit)
- VARI Seminar Series (1 credit)

Summer semester (mid-May to mid-August – 14 weeks)

- Precandidacy Research (6 credits)

### Year Two

- Initial Thesis Advisory Committee meeting (August / September)
- Thesis Research (Precandidacy and Doctoral Candidate) (up to 6 credits / semester)
- Comprehensive Exam (February)
- Journal Club (1 credit)
- Research in Progress (1 credit)
- Additional Professional Development courses (1 or 2 credits each)
- Special Topics Course(s) (1 or 2 credits each)
- Other Learning Opportunities and Experiences

### Year Three and Year Four

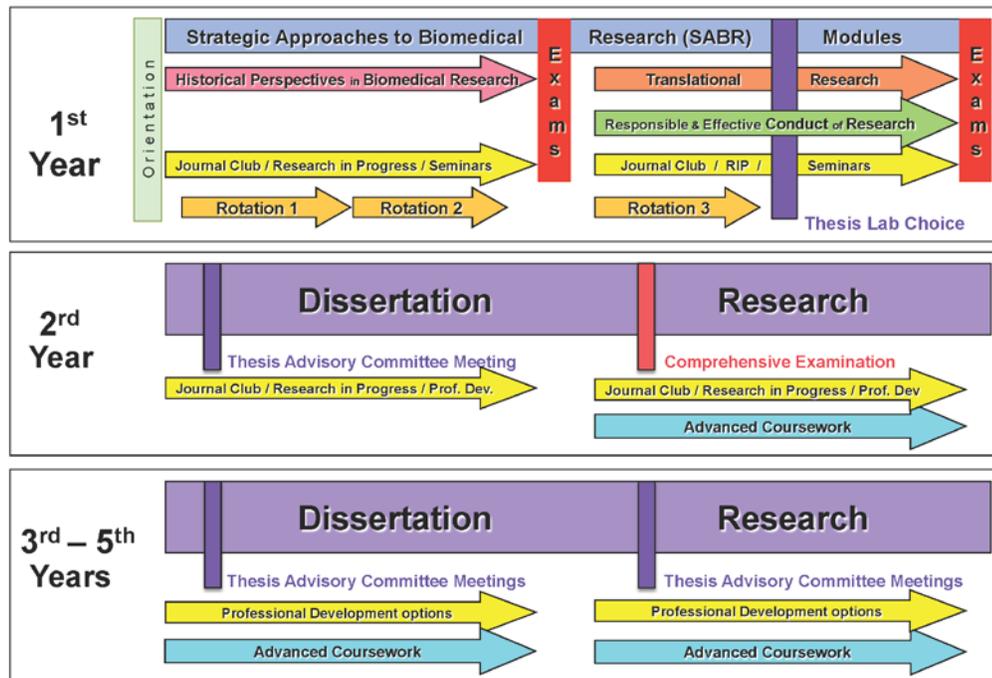
- Doctoral Candidate Thesis Research (up to 6 credits / semester)
- Teaching opportunity, if desired
- Semi-annual meetings with Thesis Advisory Committee
- Additional Professional Development courses (1 or 2 credits each)
- Special Topics Course(s) (1 or 2 credits each)
- Other Learning Opportunities and Experiences

### Year Five

- Doctoral Candidate Thesis Research (up to 6 credits / semester)
- Final Thesis Advisory Committee meeting(s)
- Dissertation Preparation
- Dissertation Defense



# VAIGS Curricular Overview



## Graduation Requirements for a MS Degree

The VAIGS charter from the State of Michigan authorizes VAIGS to confer both doctoral and master's degrees. VAIGS recruits, admits, and enrolls students exclusively for the doctoral program. VAIGS does not recruit, admit or enroll students whose primary objective is a master's degree. Nonetheless master's degrees may be conferred upon students who, for various reasons and circumstances, elect not to complete the doctoral degree. This decision to pursue a master's degree rather than the PhD must be approved in writing by the student's Thesis Adviser and by the Dean.

The requirements for the master's degree includes all of the core course requirements defined for the PhD program, including successful completion of the comprehensive exam, except that the number of credits for Special Topics and seminar-style courses and thesis research are reduced. VAIGS requires a minimum of 60 credits, and a minimum average grade point average (GPA) of 3.0, for a master's degree.

A thesis providing evidence of the student's competence to perform research in the relevant discipline is required. The thesis research is conducted under the supervision of a faculty member serving as the Thesis Adviser, with additional guidance and encouragement from a Thesis Advisory Committee.

## Course Requirements for a MS Degree

The following courses are required for the MS degree. A complete course list and course descriptions are found in other sections of this catalog.

Strategic Approaches to Biomedical Research (SABR) and exam (2 semesters, 18 credits)



Four two-credit courses and a one-credit final examination are offered in each of the first two semesters. Each course and exam carries an independent course number.

Historical Perspectives in Molecular Biology	(1 semester, 2 credits)
Translational Research	(1 semester, 2 credits)
Responsible and Effective Conduct of Research	(1 semester, 1 credit)
Journal Club	(4 semesters, 4 credits)
Research in Progress (RIP)	(4 semesters, 4 credits)
VARI Seminar Series	(2 semesters, 2 credits)
Additional Professional Development courses	(4 credits)
Special Topics Courses	(4 credits)
One- or two-credit courses providing advanced study on a focused topic in basic or clinical research, typically taken after completion of the first year. Topics reflect particular needs of the students and interests of the faculty member who leads the course.	
Laboratory Rotations	(minimum 3 rotations, 6 credits)
Three rotations of seven weeks duration, completed during the first two semesters; two credits for each rotation.	
Precandidacy Research	(up to 6 credits / semester)
Thesis Research	(up to 6 credits / semester;)

### **Thesis Research**

Students who receive a MS degree from VAIGS will conduct thesis research under the supervision of a VAIGS faculty member serving as Thesis Adviser. The roles of the Thesis Adviser and TAC are the same as those defined for the PhD student. Students will be expected to meet semi-annually with their TAC, for both Annual Summary and Progress Report meetings. The reports from these meetings will be submitted to the Enrollment and Records Administrator to be included in the student's academic record.

### **Comprehensive Examination**

The goal of the Comprehensive Exam is to evaluate the student's potential and ability to explicitly identify and define a specific testable hypothesis. Students who receive a MS degree from VAIGS must have passed the Comprehensive Examination based on the same criteria and standards as applied to PhD students. The scope and format of the Comprehensive Examination are described above and in documents cited there.



## Thesis Preparation and Defense

### Thesis Scope and Preparation

A key requirement for the master's degree is the submission and successful defense of a thesis in which is compiled the evidence of a student's competence to conduct research in cell and molecular genetics. The thesis submitted for the MS degree is smaller in scope than is a dissertation for the PhD degree, and represents a body of work appropriate for at least one publishable paper. In most circumstances, it is expected that substantial portions of the thesis will be or will have been published or submitted for publication. The thesis and the oral defense should provide clear evidence of the candidate's capacity to function as a professional scientist, including broad knowledge of the research topic; ability to draft research questions, hypotheses and design effective tests of those hypotheses; ability to execute experiments accurately; ability to interpret results critically; and ability to communicate the research project effectively.

The master's thesis should conform to VAIGS requirements as outlined in the Thesis and Dissertation Preparation Manual. Prior to preparing the thesis, the student must meet with her/his TAC to confirm that the progress is sufficient to justify writing the thesis.

### Thesis Defense Committee (TDC)

When the student, Thesis Adviser, and TAC agree that the student is ready to prepare and defend the thesis, a TDC will be formed to evaluate the graduate student's doctoral thesis.

The TDC will consist of all members of the TAC, including the Thesis Adviser (in a non-voting capacity); two additional VAIGS faculty members; and the external member of the TAC, all of whom have provided ongoing advice to the student throughout their thesis project. The Thesis Adviser will attend the thesis defense as a non-voting member and does not question the student during the examination. The Thesis Adviser may answer questions of the TDC for clarification. A member of the VAIGS Comprehensive Examination Organizing Committee (CEOC) will chair the TDC.

### Thesis Defense

The student will deliver the written thesis to all members of the TDC at least two weeks prior to the scheduled defense date. The thesis defense will consist of a 40-45 minute oral presentation and an oral examination. The oral presentation may be open to public or not, at the discretion of the candidate and Thesis Adviser. The oral examination will be administered by the TDC and will be closed to the public. The closed examination will be chaired by the Dean's Representative. Based on the reading of the thesis, the oral presentation, and the oral examination, the TDC may require additional revisions or refinements to the written thesis. Any such requirements must be completed prior to the conferral of the master's degree. Upon completion of the defense, the TDC will make a recommendation to the Dean of whether or not to grant the master's degree. A simple majority (at least two votes from the three voting members of the TDC) in favor of a successful thesis defense will be required to recommend to the Dean to grant the candidate a master's degree.



The successful candidate must provide to the Enrollment and Records Administrator a copy of the completed and final version of the thesis in both electronic form (as a single .pdf file) and in bound paper form. Details for the preparation of the electronic and hard-copy documents will be included in the guidelines for formatting theses and dissertations.

### **Physician-Scientist Training Programs**

VAIGS offers several innovative opportunities for training physician-scientists who will be well-positioned to combine clinical and research training in the pursuit of effective translational research.

#### MD-PhD dual degree program (with Michigan State University or with Western Michigan University)

This program combines medical training through the MSU College of Human Medicine or the WMU Homer Stryker MD School of Medicine with research training through VAIGS, culminating in both MD and PhD degrees. The first two years develop the basic science foundation needed for clinical practice. The PhD training includes all components of the VAIGS program on a somewhat condensed timeline, accompanied by integrated clinical experiences. After completing the doctoral dissertation, students undertake their clinical clerkships with a continuing integrated research experience. Admission to the dual degree program requires approval of both the cognizant medical school and VAIGS. More information is available at [mdadmissions.msu.edu/MDPhD/](http://mdadmissions.msu.edu/MDPhD/) or at [med.wmich.edu/](http://med.wmich.edu/).

#### Residency-PhD program (with Grand Rapids Medical Education Partners (GRMEP))

This novel program combines medical residency training (in Internal Medicine, Orthopaedic Surgery, or other specialties) with research training in cell and molecular biology, culminating in a PhD and licensure and board eligibility in the medical specialty. The training program for each participant will be developed on an individual basis depending on prior research experience, time of entry into the program, and requirements of the clinical residency. Typically, participants will complete two years of clinical rotations followed by PhD program coursework and dissertation research. Clinical training and research experience may be intertwined during portions of the training period.

#### Pediatric Hematology/Oncology Fellowship – PhD program (with GRMEP and Helen DeVos Children's Hospital)

This program links subspecialty training in pediatric hematology and oncology with research training in cell and molecular genetics. The training program for each participant will include all components of the VAIGS doctoral program, including courses and dissertation research, although the timelines may be adjusted to meet clinical responsibilities of the clinical fellowship. Clinical training and research experience may be intertwined during portions of the training period. Details of the programs combining the VAIGS PhD with medical school or the clinical fellowship and residency training are articulated in memoranda of understanding with the partner organizations. These memoranda are available upon request.



## Other Learning Opportunities and Experiences

### Community Service

All students are required to perform a minimum of four hours of community service to VAI per academic year during their time in the program. This can take the form of assisting in the VAI education program, summer intern or incoming graduate student peer mentoring, service at a local school, local hospital, or other medical-related facility, or working at an institutional-sponsored event. The student will provide documentation of community service by updating the online Student Annual Progress Checklist.

### Oral Presentations

Training and experience in oral communication of scientific information and research results are important formative activities for VAIGS students. Once they have selected their thesis lab, first year students will present a selected journal article from current scientific literature in a Journal Club session of the Graduate Student Seminar Series. Beginning in the second year after successful completion of their Comprehensive Exam, students will also report on the progress of their dissertation research in the Research in Progress sessions of the Graduate Student Seminar Series. Students will be given training on presentation skills prior to their presentations and will be evaluated by VAIGS faculty and student peers.

### Poster Presentations

Beginning in the second year, all students are required to present a poster at the annual VARI retreat.

### Attendance at Scientific Meetings

Students are encouraged and expected to attend a national or international scientific meeting, conference, or workshop each year. First-year students normally attend a conference after the end of the second semester. Advanced students (third year and beyond) are expected to present their work at such a conference. VAIGS will provide financial support up to \$2,000 per student, per academic year (September through August), to attend these events. Students are required to submit a short report within one week of their return, describing the impact of the conference on their scholarly or professional development. (See policy: [VAIGS Student Travel Allowance](#))

### Host a Student-Sponsored Speaker

Each year, as a group, the graduate students will have the opportunity to invite and host at least one outside seminar speaker of their choice through the VARI Seminar Series. Students are also frequently invited to attend luncheons with many of the outside seminar speakers hosted by VARI. Students are strongly encouraged to take advantage of these opportunities to interact with these distinguished visitors.

### Career Development

VAIGS and the Graduate School Association collaborate with VARI Office of Postdoctoral Affairs and the Postdoctoral Association to provide workshops and seminars on career development for successful scientists. These include writing and reviewing manuscripts and grants, financial and project management, and conflict



resolution. Additional workshops, information and activities will be coordinated by the VAIGS Student Affairs Specialist. VAIGS faculty have developed a set of expectations to clarify the transition from Graduate School to postdoctoral fellowship. These expectations will be presented to each senior level student mid-way through the fourth year.

### **Membership in Scientific Societies and Organizations**

All students are encouraged to join a scientific society of their choice. Students may pay for these memberships from their own funds or (at the discretion of their Thesis Adviser) from the laboratory support funds provided by VAIGS.

### **Teaching Opportunities**

Opportunities may be available for teaching classes or courses outside of VAI. Interested students should discuss these opportunities with their Academic or Thesis Adviser. VAIGS has established no formal requirement to participate in outside teaching opportunities. However, VAIGS and/or the graduate student's Thesis Adviser reserves the right to institute such a requirement. A decision as to whether or not a student will utilize these opportunities will be decided on a case-by-case basis, by mutual agreement of the student and Thesis Adviser with final approval by the Dean. The External Activities policy describes the ground rules for such experiences and the process for obtaining approval.

## **COURSE LIST AND DESCRIPTIONS**

### **Strategic Approaches to Biomedical Research (SABR) (2 semesters, 18 credits)**

In a progressive series of four-week modules, students develop research plans to address current hypotheses, questions or problems relevant to human disease. In the course of developing these plans, students learn core and current concepts in biochemistry, cell biology, molecular biology, genetics, bioinformatics, and pathobiology. This “problem-based learning” approach best simulates how professional scientists attack new research problems. Students emerge with a strong foundation in core concepts in the relevant disciplines, an understanding of experimental design principles, and experience in crafting research plans. The Fall and Winter semesters of SABR each comprise four two-credit modules and a one-credit cumulative final examination. The first module is graded on pass/fail; all other modules and exams are graded on a 4.0 scale.

### **Historical Perspectives in Molecular Biology (1 semester, 2 credits)**

This course examines the historical context of current molecular and cell biology research. Students study classic papers in biomedical research and discuss how the work represented in those papers changed the models or paradigms that prevailed at the time the research was done. Topics include foundations of modern biology, mechanisms of genetic change, analysis of biological macromolecules, gene splicing and rearrangement, tumor viruses, oncogenes and tumor suppressor genes, and organisms used as important experimental models. This course is graded on a 4.0 scale.

**Translational Research****(1 semester, 2 credits)**

This course reviews the process of scientific discovery at the bench through the steps of translation and implementation to the bedside. This course will begin with the discovery of biomarker characteristics required to meet clinical utility with discussion on the development of drugs for therapeutic targets. The process of for translational research will review the onerous process of moving a drug target into the clinic and through the organization of clinical trials. Students will review elements of regulation, clinical trial biostatistics, correlative science, and entrepreneurship and review use-case examples of the steps from discovery to translation. This course is graded on a 4.0 scale.

**Responsible and Effective Conduct of Research****(1 semester, 1 credit)**

This course addresses effective laboratory management practices including protection of human and animal subjects, scientific integrity, conflicts of interest, collaboration, authorship, peer review, data management, mentoring, communication, societal impacts, human resource management, grants and contracts, and fiscal responsibility. The course provides training and direction on how to recognize, address and prevent ethical dilemmas that arise during the course of conducting scientific research. This course is graded on a 4.0 scale.

**Journal Club****(1 credit per semester)**

Students present recently published research papers on topics of general interest and importance to the field of biomedical research. Students will develop logical arguments and determine when arguments have sound foundation; understand the variety of experimental approaches (i.e. methods), compare approaches, and provide rationale for the approaches presented in the publication; and challenge the outcomes and paradigms of published work. Non-presenting students will submit written reflections and evaluations of the papers and talks given by others. This course is graded on pass / fail basis.

**Research in Progress (RIP)****(1 credit per semester)**

In weekly or biweekly sessions (respectively), VARI faculty and VAIGS students will present the current state of their research projects. Non-presenting students will submit written reflections and evaluations of these talks, in which they define the “gap in knowledge” and experimental approach; critique the organization and logic of the presentation; question the presenter in order to better understand the research outcomes; and organize their own presentations better as a result of critiquing the logic of others’ talks. This course is graded on pass / fail basis.

**VARI Seminar Series****(1 credit per semester)**

This course is based on Invited seminars presented by scientists external to VARI. Students attend at least ten seminars per semester and submit a written reflection and evaluation following each seminar. This course is graded on pass / fail basis.

**Professional Development Courses****(1-2 credits per course)**

These courses help build student skills in communication, laboratory management, business, and organization. Courses complement the Journal Club, Research in Progress, and VARI seminar courses. Recent offerings include Technical Writing, Lab Leadership, and Scientific Conference Organization. Enrollment in professional development courses should be done in consultation with Thesis Adviser acting as Academic Adviser and with notification to the Enrollment and Records Administrator. These courses are graded on a 4.0 scale.

**Special Topics Courses****(1-2 credits per course)**

These courses provide advanced study on a focused topic in basic or clinical research, and are typically taken in the second, third, and fourth years. Each course engages students in the study and discussion of the current scientific literature and concepts of the topic selected. Topics and specific content vary with each semester. Each VARI Center is responsible for offering a special topics course to students on a rotating basis (Epigenetics, Fall of even-numbered years; Neurodegenerative Sciences, Winter of odd-numbered years; Cancer and Cell Biology, Fall of odd-numbered years; Core Laboratories, Winter of even-numbered years). Additional courses may also be offered depending on student and faculty interest. Enrollment in special topics courses should be done in consultation with Thesis Adviser acting as Academic Adviser, and with notification to the Enrollment and Records Administrator. These courses are graded on a 4.0 scale.

**Laboratory Rotations****(minimum 3 rotations, 6 credits)**

Laboratory rotations in the first year provide early research experiences that are important in the development of students. These laboratory rotations assist students in their choice of a thesis adviser, laboratory, and dissertation project. Students will complete at least three rotations; in rare circumstances, a fourth rotation may be needed before an appropriate thesis adviser and dissertation laboratory can be selected.

During the orientation for incoming students, faculty will present their research interests to the new matriculants. Students are encouraged to visit the laboratories and become acquainted with faculty, lab managers, research technicians, and other researchers in order to see first-hand the approaches, methodologies, and collaborations that take place. Students shall send their rotation preferences to the Dean, who will confirm that this intention is consistent with the faculty member's plans before confirming the placement.

The activities of the rotation should be planned to give the student a rich and deep understanding of the questions being addressed, the approaches and experimental methods employed, the mentoring and leadership style of the laboratory head, and the relationships with other members of the laboratory team.

Students should expect to spend as much time in the laboratory as their course work will allow (typically 25-30 hours per week). Following each rotation, students will submit a "Student Evaluation of Rotation Experience" form to the Enrollment and Records Administrator. The rotation mentor (faculty member) will also evaluate the student's performance in the rotation, which will be discussed with the student before being submitted to the Enrollment and Records Administrator. Lab rotations are graded on a 4.0 scale.

**Independent Study** **(credits vary depending on effort)**

Students may petition the Curriculum Committee for approval of VAIGS academic credit for a course or workshop taken at another institution (whether in-person or on-line), or for learning experiences at VAIGS / VARI that are not incorporated into existing courses. In some cases, Independent study courses may fulfill requirements for Special Topics or Professional Development courses. A plan for oversight of the student's activity and performance by a VAIGS faculty member should be included in the proposal. An recommendation by the Curriculum Committee, with concurrence from the Enrollment and Records Administrator, will be forwarded to the Dean for final approval.

**Precandidacy Research** **(credits vary depending on effort)**

Students who have selected a thesis adviser but have not yet passed their comprehensive exams will acquire academic credit for their thesis or dissertation research. Students enroll in this course for three to six credits per semester, depending on the number of other credits taken in the given semester.

**Doctoral Candidacy Research** **(credits vary depending on effort)**

Students who have passed their comprehensive exams will acquire academic credit for their thesis or dissertation research. Students enroll in this course for three to six credits per semester, depending on the number of other credits taken in the given semester.



## ACADEMIC CALENDAR

The following academic calendar pertains to the 2016-2017 academic year. Calendars for previous and future years can be found on the VAIGS SharePoint site.

### Fall Semester: August – December 2016 (16 Weeks)

#### Strategic Approaches to Biomedical Research Problems

Aug. 29 - Sep. 23:	Module 1 = 4 weeks
Sep. 26 - Oct. 21:	Module 2 = 4 weeks
Oct. 24 – Nov. 18:	Module 3 = 4 weeks
Nov. 21 - Dec. 16:	Module 4 = 3.6 weeks

#### Historical Perspectives in Molecular Biology

Aug 30 – Dec. 13: 16 weeks

#### VARI seminars / Journal Club/ Research in Progress

Aug. 31 - Dec. 16 16 weeks

#### Laboratory Rotations:

Sep. 6 - Oct. 21:	Rotation 1 = 7 weeks
Oct. 24 – Dec. 9:	Rotation 2 = 7 weeks

#### Exams:

Dec. 20-21

[Winter Break: Dec. 22-Jan. 8]

### Winter Semester January-May 2017 (17 Weeks)

#### Strategic Approaches to Biomedical Research Problems

Jan. 9 – Feb 3:	Module 5 = 4 weeks
Feb. 6 – Mar 3:	Module 6 = 4 weeks
<b>[Thesis Lab Integration Week: Mar. 6-Mar. 10]</b>	
Mar. 13 – Apr. 7:	Module 7 = 4 weeks
Apr. 10 – May 5:	Module 8 = 4 weeks

#### Responsible and Effective Conduct of Research

Jan. 10 – May 2: 16 weeks

#### Translational Research

Jan. 12 – May 4: 16 weeks

#### VARI Seminars / Journal Club/ Research in Progress

Jan. 11- May 5: 17 weeks

#### Laboratory Rotations:

Jan. 9 – Feb. 24:	Rotation 3 = 7 weeks
Select Thesis Mentor / Laboratory by March 3	

#### Exams:

May 9-10

### Summer Semester: May 15 – August 18, 2017 (14 Weeks)

VARI Scientific Retreat: tba



## ACADEMIC POLICIES

This section provides summaries of key academic policies for VAIGS students. In most cases, complete policy statements and the forms relevant to those policies are available at the VAIGS SharePoint site. Students are also responsible for adhering to all relevant VAI policies, which are available at the VAI SharePoint site.

### Admissions

The graduate program is intended for students seeking a PhD in Cell and Molecular Genetics that prepares them for leadership positions in research or clinical laboratories. VAIGS is interested in matriculating persons with excellent academic preparation and performance, competence in skills important to scientific work (e.g., writing and critical thinking), and good moral and ethical character. The program is open to all applicants irrespective of race, gender, ethnic or national origin, religion, or age. International students (non-U.S. citizens or permanent residents) are welcome and encouraged to apply. International students may be admitted to VAIGS under the visiting scholars program (J1 visa) administered through VAI.

Applicants must have earned a Bachelor of Arts or Science (BA or BS) degree or equivalent from an accredited college or university prior to enrolling at VAIGS. The usual preparation is in the natural sciences with a range of courses in chemistry, biochemistry, biology, physics, and mathematics. The Admissions Committee seeks to identify those students with the most promise for superior achievement in our program, using a comprehensive review of all credentials. Consideration is given for each applicant's overall qualifications, as demonstrated by academic record, test scores, research experience, and letters of recommendation.

VAIGS has not established minimum cut-off values for most of the required application materials but the following criteria will be considered. Advanced training in cell biology, molecular biology, genetics, and statistics is strongly recommended. A grade point average of 3.5 or better, during the last two full years of undergraduate study in courses pertinent to the pursuit of a career in science, is also recommended. Applicants with other academic backgrounds may be considered if they perform well on the Graduate Record Examination (GRE) and give appropriate evidence of excellent training, qualifications, and motivation. For applicants seeking admissions to VAIGS as part of a dual degree (MD – PhD) program, MCAT scores may be used in lieu of GRE scores. International applicants must exceed TOEFL scores of 220 for the computer based test, 80 for the internet based test, or 560 for the paper based test. The IELTS score must be a 6.5 or above. Applicants judged to have a deficient academic preparation will be required to successfully complete certain courses before enrolling in courses at VAIGS.

In order to ensure full consideration, the application and supporting documents for admission should be received by January 5 of the year the student plans to matriculate. The application packet should include:

- A completed online application
- Official transcripts of academic record received directly from the home institution
- Official GRE general exam scores, MCAT scores, TOEFL and / or IELTS scores
- Three letters of reference, including at least two from faculty members who know the applicant and the applicant's academic work and, if applicable, who supervised independent study or research



- A personal statement of purpose indicating area of interest, long-term goals, and research experience
- A personal resume or curriculum vitae
- A sample of scientific or academic writing (e.g., research report)
- A cover letter stating the applicant's interest in the VAI Graduate School

Domestic applicants with the strongest credentials will be interviewed in person, typically during a visit to VAI. International applicants may be interviewed via videoconferencing or Skype communication.

Those application packets completed by the deadline (January 5<sup>th</sup>) will receive the most thorough and timely consideration. Typically, interviews are scheduled for late January and February. Decisions are generally conveyed to applicants in March.

### **Credit Hour Allocation and Requirements Policy**

VAIGS offers courses on a semester basis, and the credits earned from VAIGS courses are deemed to be semester credits. Each VAIGS course will be allocated a specific number of credits based upon the number of instructional contact hours and study hours required each week per semester. These credit allocations are made by the VAIGS Curriculum Committee upon review of the syllabus and calendar for any proposed course.

For classroom-based courses, including core instructional courses, special topics courses, professional development courses, and graduate seminar courses, one credit hour is allocated for an expected activity of at least forty-five (45) hours of instructional and study time. Typically, one credit hour will be allocated for a minimum of fifteen (15) instructor-student contact hours per semester along with a minimum expectation of two preparation or study hours for each contact hour. The balance of direct instructional hours and study or preparation time may vary as befits a given course.

For research-based courses, including first year laboratory rotations, pre-candidacy research, and doctoral candidate thesis research, one credit hour is allocated for a minimum of ninety (90) hours devoted to research activities, research-related meetings (with lab members or thesis advisor), and in preparation or study for these research activities and meetings. (See [Credit Hour Allocation and Requirements Policy](#))

### **Full-Time Student Status**

VAIGS students are expected to devote their full professional effort toward the pursuit of the PhD. First year students are considered full-time students if they enroll for at least 12 credits in each of the Fall and Winter semesters. Continuing students who are enrolled for at least six credits during each semester are considered full-time students. (see [Enrollment policy](#))

Some individual academic plans may require blending VAIGS academic activities with other professional development activities (e.g., medical residencies or fellowships). These will be established on a case-by-case basis with the approval of the Dean.

### **Academic Advising**

The aim of VAIGS is that students obtain their doctoral degrees within five years. To facilitate the five year goal, student progress is monitored frequently throughout the program. Progress on fulfillment of requirements will be tracked by the use of the Student Annual



Progress Checklist. The Dean serves as the Academic Adviser for all first year students to orient the student to the program and to monitor their progress through the core curriculum and laboratory rotations. Once a Thesis Adviser and TAC have been appointed, the Thesis Adviser serves as the primary academic adviser. Progress on fulfillment of all program requirements will be reviewed by the TAC at each semi-annual meeting. This review will be recorded using the Thesis Advisory Committee Meeting Report filed after each meeting. These reports and other indicators of progress towards the degree are reviewed annually by the Student Performance Review Committee.

### **Assessment**

Student work is evaluated for progress toward fulfilling the goals of the graduate program and also to assist the student in measuring progress toward fulfilling the graduation requirements. The faculty expect the students to make satisfactory progress and will assist them toward that goal. Satisfactory progress includes passing all courses and completing the graduation requirements on a schedule that aims toward completion of all requirements for the degree within five years. Each student will be provided a Student Annual Progress Checklist to track his/her progress through the program. Student progress will also be monitored annually by the Student Performance Review Committee of the faculty.

Students are expected to complete their degrees in five years and every effort will be made to assist them in meeting appropriate milestones. Failure to make sufficient progress in the program is grounds for dismissal. Extension beyond five years will be allowed if the Dean determines there are extenuating circumstances (comparable to those defined for employees under the Family Medical Leave Act). Rarely will there be an extension beyond six years.

Students whose native language is not English must show fluency in oral and written English by satisfactory performance in courses, seminars and scientific writing. Failure to achieve fluency by the end of the second year may result in dismissal.

Students will be evaluated in the following ways:

### **Courses**

The instructors assess student performance in courses, provide written evaluation of the work, and evaluate students on a 4.0 grade scale (for most courses) or a Pass/Fail decision (for certain specified courses). A grade of 3.0 or better is considered a passing grade. A grade of 2.5 or below will be considered a failing grade. Only grades of 2.5 in required courses are considered for potential remediation. The accumulation of two failing grades in the graduate program provides grounds for dismissal.

### **Rotations**

Following each laboratory rotation, students will summarize their findings and suggest further directions for the rotation project by writing a short (1-2 page) report using the Student Evaluation of Rotation Experience form. Simultaneously, rotation mentors will complete the Faculty Evaluation of Student Performance (Rotation).

### **Core Competencies**

VAIGS has defined a set of Core Competencies to describe the outcomes expected for successful PhD graduates of this program. The competencies are grouped



in four major areas: knowledge, research, translation, and ethical and professional conduct. A rubric describing stages of development for each of the competencies is a useful guide for students to understand those expectations and for monitoring progress in achieving those expectations. The Core Competencies rubric (available through the SharePoint site) should be used at least once a year by the student and thesis adviser, for formative evaluation of the student's progress and for making plans to address any areas with deficiencies. Anonymous (de-identified) results of the Core Competencies evaluations are also used each year by the VAIGS staff to monitor general program outcomes. Students and faculty are expected to support this essential program review activity.

### **Comprehensive Exam**

The Comprehensive Exam shall be completed in February or March of the second year. The format and potential outcomes for the Comprehensive Exam are defined in a prior section of this catalog and in the Guidelines for Comprehensive Exam.

### **Research and TAC Reports**

Students must meet with their TACs every six months. The student shall provide to the TAC members either a brief research Progress Report or a more comprehensive Annual Summary (on or about the anniversary of the comprehensive exam). Copies of these reports must be submitted to the Enrollment and Records Administrator. The evaluative reports of the TAC are also submitted to the Enrollment and Records Administrator.

### **Student Performance Review Committee**

A standing committee of faculty members will conduct an annual review of the progress of each student. The composition and mandate of this committee is defined in the Faculty Bylaws. This committee will consider course grades, thesis committee reports, oral presentations by the student, and other relevant information. The committee will make recommendations to the Dean regarding continued participation of each student including, where appropriate, recommendations for remediation of any deficiencies. A copy of this report will be provided to the student and her/his Thesis Adviser.

### **Thesis or Dissertation Defense**

Students are required to make a public presentation of their research results and thesis as well as successfully defend the thesis or dissertation before the Thesis or Dissertation Defense Committee. The process for the thesis or dissertation preparation and defense is detailed in prior sections of this catalog.

### **Transfer of Academic Credit**

Transfer of academic credit to another educational institution will be initiated by a request from the participating student and will be executed by the VAIGS Enrollment and Records Administrator based on articulation agreements established with the external institution. VAIGS offers no guarantee that external institutions will grant academic credit for courses taken under this policy. VAIGS students may take graduate courses offered at other institutions for up to four credit hours toward the VAIGS PhD. (See [Transfer Credits for VAIGS Courses Policy](#))



## Remediation

VAIGS students are expected to obtain a 3.0 grade or better (on a 4.0 scale) in each class in order to receive degree credit. Circumstances arise, however, where student performance in isolated areas within a required course does not meet standards for a passing grade (3.0). In these rare cases, remediation may be recommended by the Course Director.

Remediation is restricted to focused areas of insufficient learning or substandard attainment of a small number of learning objectives. Only a grade of 2.5 may be considered for remediation. Opportunity to remediate will be made available by the Course Director when the initial grades are submitted to the Enrollment and Records Administrator. The Remediation Plan will define the nature of the deficiency, the scope of remediation expected, the timing of completion, and signatures indicating understanding and agreement by the student and Course Director. With the outcome of successful remediation (from 2.5 to 3.0) the faculty will submit a grade change form to the Enrollment and Records Administrator. (See [VAIGS Course Remediation Policy](#))

## Probation and Dismissal

Making errors is part of the learning process. Errors should generate feedback and lead to corrective actions. The nature of the feedback and corrective actions shall be determined by proportional response to the nature of error, the student's training needs, and the context of these issues. Therefore, processes for probation and dismissal operate on a case-by-case basis as established in the VAIGS Policy for Probation and Dismissal.

When students are not making adequate progress toward completion of courses or graduation requirements, as determined by their Academic or Thesis Adviser, the Student Performance Review Committee, and the Dean, they may be placed on academic probation. Grounds for probation include:

- Accumulation of two failing grades in course work, laboratory rotations, or research
- Failure to move through the program at an appropriate rate (e.g., failure to meet milestones throughout the degree program)
- Failure to meet with Thesis Advisory Committee in timely manner (approximately every six months)
- Unprofessional behavior (e.g., plagiarism, insubordination, violation of workplace policies)
- Poor performance on the Comprehensive Examination

Students and their Thesis Adviser will be given written notification of probation and written guidelines for removal of the probationary status. Should a student desire to withdraw from the program or take a leave of absence, such action is arranged in consultation with the Academic or Thesis Adviser and Dean. At the time of approval of the withdrawal or leave of absence, the student will be advised regarding the criteria for reinstatement.

Grounds for dismissal include:

- Three (or more) failing grades
- Failure to meet the terms of Student Probation Contract
- Failure to pass the Comprehensive Exam
- Failure to adhere to institutional standards in scientific integrity and research conduct, as defined in the VAI Research Misconduct Policy
- Violation of VAI policies regarding appropriate behavior in the workplace



## Honor Code

Scientific work requires honesty and integrity, and the scientific community has strict standards for the conduct of research. Students are governed by the VAI Research Misconduct Policy, which encompasses research and coursework. Students will also be asked to read and sign an honor code governing academic honesty and behavior at VAIGS. Academic dishonesty in coursework or in fulfillment of other requirements will result in failure on that specific requirement and is grounds for dismissal from the graduate program.

## Tuition

Tuition for a full academic year (three semesters, including summer) is \$25,000. For individual courses, tuition will be assessed at a rate of \$835 per credit hour. Tuition will be waived for students supported by VAIGS fellowships.

Enrollment of non-VAIGS students in VAIGS courses is permitted under certain conditions defined in the VAIGS Tuition Policy. Such enrollment typically requires full participation in course activities (course auditing is not permitted) and payment of tuition.

## Course Auditing

Course Directors design instructional activities according to the number and ability of registered students. Classroom engagement and preparedness are critical for learning in all settings at VAIGS. In keeping with the VAIGS mission to maximize learning of students in all content areas, auditing is not permitted. All courses will be attended by registered students and instructors, only. (See [VAIGS Course Auditing Policy](#))

## Grievance

Student grievances regarding coursework, grading, academic progress, and VAIGS policies or practices should be directed to the Academic or Thesis Adviser, if they cannot be resolved directly with the parties involved. If the grievance is still not resolved, the student should consult the Ombudsman (in most circumstances, the Vice President of Human Resources), who will advise the student and serve as a liaison with the faculty and administration. Unresolved issues or appeals should be presented to the Dean, in writing.

Grievances regarding research should first be directed to the Thesis Adviser. Should further resolution be necessary, the student can appeal to the TAC and the Dean in writing.

Students who experience or observe sexual harassment, racial or ethnic discrimination, or scientific misconduct should raise their grievance using VAI employment policies and procedures.

## Outside Employment

Students enrolled in VAIGS are presumed to be devoting their full professional efforts toward the pursuit of their PhD. However, the policy on external activities outlines parameters in which students can participate in outside work (See [VAIGS Policy on External Activities](#)). These activities typically must be approved by the thesis adviser and the Dean.



## Religious Observance

In accord with the VAI holiday policy, VAIGS holds that basic rights regarding religious preference should be extended to students. Therefore, every reasonable effort will be made to grant students time off to attend worship services or to celebrate holidays consistent with their faith. All requests for time off for observance of religious holidays or worship services should be submitted to the Thesis Adviser or the Dean at least 48 hours in advance. (See [VAIGS Religious Observance Policy](#))

## Student Verification for Online Assignments

The Higher Education Opportunity Act of 2008 and the rules issued by the US Department of Education include regulations regarding the verification of the identity of students in distance-education programs. The Higher Learning Commission, which is the accrediting body for VAIGS, requires its member institutions to demonstrate that their policies and practices support these regulations. The Student Verification for Online Assignments Policy describes VAIGS practices for meeting these regulations. (See [Student Verification for Online Assignments Policy](#))

## Non-discrimination and Equal Opportunity Policy (EEO)

Van Andel Institute and/or its affiliated organizations (VAEI and VARI), hereafter collectively called "the Institute", through its responsible managers, recruits, hires, upgrades, trains, and promotes in all job titles without regard to race, color, religion, sex, national origins, age, height, weight, marital status, disability, pregnancy or veteran status except when an accommodation is unavailable or it is a bona fide occupational qualification. The Institute's policy also covers the non-employee relationships with students, including admissions and enrollment, instruction and grading, student services, and financial support. (See [Equal Employment Opportunity Policy](#))

## LEGAL STATUS

### Authority

VAIGS is incorporated in the State of Michigan and is authorized to award the MS and PhD degrees.

### Accreditation

Accreditation for VAIGS is governed by the rules and procedures of the Higher Learning Commission. As of November 2013, VAIGS has been granted initial accreditation with the HLC. Further information about the HLC and the accreditation status of VAIGS can be found at [www.hlcommission.org](http://www.hlcommission.org).

### Governance

The corporate name of the school is Van Andel Institute Graduate School (VAIGS). A Board of Directors appointed by the Van Andel Education Institute (VAEI) Board of Trustees governs the school. The Board of Directors includes persons with distinguished careers in biomedical research, higher education, and clinical training. The VAIGS Board of Directors



normally meets twice each year, in the spring and fall. The President and Dean of VAIGS administers the school with advice from faculty committees.

### **VAIGS Board of Directors**

James B. Fahner, MD, Chief of Hematology/Oncology at DeVos Children's Hospital.  
 Mike Imperiale, PhD, Director of the Doctoral Program in Cancer Biology, University of Michigan.  
 Peter Jones, PhD, SciD, Chief Scientific Officer and Research Director, Van Andel Research Institute  
 Pamela Kidd, M.D., Medical Director of the Hematology and Flow Cytometry Laboratories of Spectrum Health and Helen DeVos Children's Hospital  
 Karen Klomparens, PhD, Special Adviser to the Provost, Michigan State University  
 Lynn Matrisian, PhD, Vice President for Scientific and Medical Affairs, Pancreatic Cancer Action Network.  
 Gordon L. Van Harn, PhD, Emeritus Provost and Professor of Biology at Calvin College; chair of the Board.

### **Administration**

Dr. Steven J. Triezenberg is the President and Dean of VAIGS. Dr. Julie Davis Turner is the Associate Dean of VAIGS. VAIGS is a wholly owned subsidiary of VAEI, which works in close association with VAI and VARI. VAIGS is strongly and broadly supported by the other partner institutes. The administration of these entities includes the following:

#### **VAI**

- David Van Andel, Chief Executive Officer
- Jana Hall, PhD, Chief Operations Officer
- Timothy Myers, Vice President and Chief Financial Officer
- Jerry Callahan, PhD, Vice President Innovations and Collaborations
- Linda Zarzecki, Vice President of Human Resources

#### **VAEI**

- Terra Tarango, Director of VAEI
- Jerry Callahan, PhD, interim Director of VAEI National Impact Initiative
- Jim Nicolette, Associate Director of VAEI

#### **VARI**

- Peter Jones, PhD, VARI Chief Scientific Officer, and Director of the Center for Epigenetics
- Patrik Brundin, MD, PhD, VARI Associate Director and Director of the Center for Neurodegenerative Sciences
- Bart Williams, PhD, Director of the Center for Cancer and Cell Biology
- Scott Jewell, PhD, Director of Core Technologies

### **FACULTY AND STAFF LISTING**

The faculty of VAIGS are persons appointed as VARI faculty and laboratory heads. Appointment to VARI as a faculty member typically requires a PhD, MD, or equivalent academic degree, plus a distinguished record of scholarship and contributions to the scientific community. Faculty appointment to VAIGS for non-VARI faculty is made by nomination to the Graduate Program Committee and requires a vote of the full VAIGS faculty.



Adjunct faculty members of VAIGS supplement the permanent faculty. Adjunct faculty members participate in VAIGS as cooperating instructors for VAIGS courses, as members of VAIGS Thesis Advisory or Defense Committees, or as facilitators of professional development programs. Typically, adjunct faculty members are practicing professionals or faculty members from local colleges/universities.

### **Current VAIGS Faculty**

Arthur S. Alberts, Professor; Center for Cancer and Cell Biology, Program in Molecular Oncology and Pre-Clinical Therapeutics; Director, Flow Cytometry. PhD (1993), University of California, San Diego.

Stephen Baylin, Professor, Center for Epigenetics. MD (1968), Duke University, Durham, N.C.

Lena Brundin, Associate Professor, Center for Neurodegenerative Science. PhD (2001) and MD (2002), Lund University, Sweden.

Patrik Brundin, VARI Associate Director of Research; Professor and Director of the Center for Neurodegenerative Science; Jay Van Andel Endowed Chair in Parkinson Research. MD (1992) and PhD (1988), Lund University, Sweden.

Gerhard Coetzee, Professor, Center for Neurodegenerative Science. PhD 1977) University of Stellenbosch, South Africa.

Nicholas S. Duesbery, Adjunct Associate Professor, PhD (1996), University of Toronto, Canada.

Carrie R. Graveel, Research Assistant Professor, Center for Cancer and Cell Biology. PhD (2002), University of Wisconsin-Madison.

Patrick Grohar, Professor, Center for Cancer and Cell Biology. PhD (2001), MD (2003), Wayne State University.

Brian B. Haab, Professor, Center for Cancer and Cell Biology, Innovation and Integration Program. PhD (1998), University of California, Berkeley.

Galen Hostetter, Associate Director, Pathology and Biorepository Core. MD (1993), University of Pennsylvania.

Scott D. Jewell, Professor and Director, Core Technologies. PhD (1993), Ohio State University.

Peter Jones, Distinguished Professor and Director, Center for Epigenetics. PhD (1973), University of London.

Stefan Jovinge, Professor, Center for Epigenetics; Medical Director of Research, Frederik Meijer Heart and Vascular Institute. MD (1991) and PhD (1997), Karolinska Institute, Sweden.

Jeffrey Kordower, Professor, Center for Neurodegenerative Science. PhD (1984), City University of New York



Viviane Labrie, Assistant Professor, Center for Neurodegenerative Science. PhD, University of Toronto.

Peter Laird, Professor, Center for Epigenetics. PhD (1988), University of Amsterdam, Netherlands.

Huilin Li, Professor, Center for Epigenetics. PhD (1994), University of Science and Technology, Beijing, China

Xiaohong Li, Assistant Professor, Center for Cancer and Cell Biology, Program in Skeletal Disease and Tumor Microenvironment. PhD (2000), Chinese Academy of Sciences.

Wei Lu, Assistant Professor, Center for Cancer and Cell Biology, PhD (2010), University of Freiburg, Germany

Jiyang Ma, Professor, Center for Neurodegenerative Science. PhD (1997), University of Illinois, Chicago.

Jeffrey P. MacKeigan, Associate Professor, Center for Cancer and Cell Biology, Innovation and Integration Program. PhD (2002), University of North Carolina.

Karsten Melcher, Associate Professor, Center for Cancer and Cell Biology, Innovation and Integration Program. PhD (1990), Eberhardt-Karls University, Germany.

Darren Moore, Associate Professor, Center for Neurodegenerative Science. PhD (2001), University of Cambridge.

David Nadziejka, Instructor, Scientific Editor (VARI). MS (1980), University of Arizona.

Gerd Pfeifer, Professor, Center for Epigenetics. PhD (1984), Goethe University, Frankfurt, Germany.

James H. Resau, Adjunct Professor. PhD (1985), University of Maryland.

Scott Rothbart, Assistant Professor, Center for Epigenetics. PhD (2010), Virginia Commonwealth University.

Lorenzo Sempere, Assistant Professor, Center for Cancer and Cell Biology, Program in Skeletal Disease and Tumor Microenvironment. PhD (2004), Dartmouth.

Hui Shen, Assistant Professor, Center for Epigenetics. PhD (2013), University of Southern California.

Matthew R. Steensma, Assistant Professor, Center for Cancer and Cell Biology, Program in Skeletal Disease and Tumor Microenvironment. MD (2002), Wayne State University School of Medicine.

Piroska Szabo, Associate Professor, Center for Epigenetics. PhD (1992), Jozsef Attila University, Szeged, Hungary.



Steven J. Triezenberg, President and Dean, VAIGS; Professor, Center for Epigenetics; PhD (1984), University of Michigan.

Julie Davis Turner, Associate Dean, VAIGS. PhD (2000), University of Pennsylvania.

Jeremy Van Raamsdonk, Assistant Professor, Center for Neurodegenerative Science. PhD (2005), University of British Columbia.

George F. Vande Woude, Distinguished Scientific Fellow and Professor, Center for Cancer and Cell Biology, Program in Molecular Oncology and Pre-Clinical Therapeutics. PhD (1964), Rutgers University.

Bart O. Williams, Director, Center for Cancer and Cell Biology; Professor, Program in Skeletal Disease and Tumor Microenvironment. PhD (1996), Massachusetts Institute of Technology.

Mary Winn, Instructor; Manager, Bioinformatics and Biostatistics Core. PhD (2011), University of California, San Diego.

Ning Wu, Assistant Professor, Center for Cancer and Cell Biology, Innovation and Integration Program. PhD (2002), University of Toronto. H. Eric Xu, Professor, Center for Cancer and Cell Biology, Innovation and Integration Program. Distinguished Director, VARI/SIMM Research Center. PhD (1994), University of Texas Southwestern Medical Center.

Tao Yang, Assistant Professor, Center for Cancer and Cell Biology, Program in Skeletal Disease and Tumor Microenvironment. PhD (2001), Institute of Biochemistry and Cell Biology, Chinese Academy of Sciences (SIBCB, CAS).

## **Faculty Committees**

VAIGS faculty members are involved in the governance of VAIGS through appointed committees as defined in the Faculty Bylaws and described briefly as follows. Committee members will be appointed by the Dean to three-year terms, staggered to ensure continuity of experience.

### **Admissions Committee**

Composed of five faculty members and one graduate student member, this committee oversees the student recruitment process, reviews all applications, and makes recommendations to the Dean.

### **Comprehensive Examination Organizing Committee**

Composed of three faculty members, this committee supervises the preparation and administration of the comprehensive examinations and thesis and dissertation defenses.

### **Curriculum Committee**

This committee oversees the design, implementation and evaluation of the degree requirements, coursework, and grading policies of VAIGS. The committee assesses whether the course offerings provide adequate instruction in the core



disciplines for VAIGS. The committee approves special topics courses (graduate seminar courses). The committee comprises four faculty members and one postdoctoral associate or graduate student member, In addition, the Assistant or Associate Dean sits on the committee as an *ex officio* member.

### **Graduate Program Committee**

This committee recommends policy on graduation requirements, curriculum, admissions, and faculty. This committee also monitors the program and advises the Dean on administrative matters. This committee comprises four faculty members, in addition to the Dean who chairs the Graduate Program Committee as an *ex officio* member.

### **Student Performance Review Committee**

This committee annually assesses the progress of each student with respect to the requirements for completing the intended degree. This committee comprises three faculty members, in addition to the Dean who chairs the committee as an *ex officio* member.

### **Undergraduate and Internship Programs Committee**

This committee of four faculty members is responsible for design, implementation, and evaluation of VAIGS programs and related policies whose primary constituents are students enrolled in other educational institutions. These students include those enrolled in high schools, undergraduate colleges or universities, and medical or other professional schools. This may also include students enrolled in master's or doctoral degree programs at other institutions for whom the relationship with VAIGS or VARI is time-limited. The programs within the purview of this committee include internships, guest student relationships, and regional undergraduate research conferences.

### **Reference to Faculty Bylaws**

The Faculty Bylaws of VAIGS describe and define the organization of the Graduate School faculty and the procedures by which faculty fulfill their functions with respect to the Graduate School. The administrative structure of the Graduate School is further defined by the Articles of Incorporation (April 14, 2005) and the Bylaws of the Van Andel Institute Graduate School (July 14, 2004 or as amended). These faculty bylaws shall be in compliance with policies and bylaws of the Van Andel Institute (VAI), the Van Andel Education Institute (VAEI), and the Van Andel Research Institute (VARI). If, in any substantive manner, the VAIGS bylaws conflict with VAI, VAEI or VARI bylaws and policies, the latter shall take precedence.

### **VAIGS Staff**

- Steven J. Triezenberg, PhD, President and Dean, VAIGS
- Julie Davis Turner, PhD, Associate Dean
- Christy Mayo, Enrollment and Records Administrator II
- Patty Farrell-Cole, PhD, Evaluation Specialist
- Nancy Schaperkotter, MA, Student Affairs Specialist
- Kristie Vanderhoof, Executive Assistant



- Kathy Bentley, Senior Administrative Assistant II
- Michelle Love, Administrative Assistant II

### **AMENDING AND REVISING THIS CATALOG**

Any faculty member or graduate student may submit proposals to amend or revise the VAIGS Catalog. Amendments to be considered must be written and circulated to the faculty and graduate students not less than 14 days prior to the faculty meeting at which they are to be voted upon. Amendments must be passed by a majority of the "voting faculty". The VAIGS Catalog should be reviewed and re-approved at periodic intervals no greater than five years.

This document was originally approved by vote of the faculty on Feb. 23, 2007, and has been revised on the following dates: December 14, 2007, June 23, 2009, September 16, 2011, September 14, 2012, August 1, 2013, August 1, 2014, June 25, 2015, and.....June, 2016.