Program goal
The doctoral program in clinical and translational sciences offers a general curriculum, an interdisciplinary concentration in psychiatric, behavioral and statistical genetics and a concentration in cancer and molecular medicine.

Students who pursue the doctoral program in clinical and translational sciences will be grounded in a relative substantive area and be prepared to integrate data from multiple disciplines, have strong communication and computational skills and be sufficiently flexible to easily move among different projects and research venues.

Student learning outcomes
Students who complete the program should achieve the following core competencies:

1. Understand, integrate and apply relevant discipline-specific biomedical concepts and theoretical frameworks in research, written and oral communication
2. Comprehend, assess and apply appropriate theories and/or experiments to address issues in the literature, research and in oral communication
3. Comprehend and assess context, methodology and data of scientific articles
4. Comprehend what is being measured, theoretical knowledge on how measurement occurs, be able to compare outcome to homologous types of data
5. Be able to define, identify and express weaknesses in research or content as an effort for further investigation or suitable explanation
6. Plan, incorporate and use appropriate terminology for orally imparting research findings and theories
7. Use writing as a vehicle to impart or explain research findings and theories in a discipline- or audience-specific manner

VCU Graduate Bulletin, VCU Graduate School and general academic policies and regulations for all graduate students in all graduate programs
The VCU Graduate Bulletin website documents the official admission and academic rules and regulations that govern graduate education for all graduate programs at the university. These policies are established by the graduate faculty of the university through their elected representatives to the University Graduate Council.

It is the responsibility of all graduate students, both on- and off-campus, to be familiar with the VCU Graduate Bulletin as well as the Graduate School website (http://www.graduate.vcu.edu/) and academic regulations in individual school and department publications and on program websites. However, in all cases, the official policies and procedures of the University Graduate Council, as published on the VCU Graduate Bulletin and Graduate School websites, take precedence over individual program policies and guidelines.

Visit the academic regulations section for additional information on academic regulations for graduate students. (http://bulletin.vcu.edu/academic-regs/)

Degree candidacy requirements
A graduate student admitted to a program or concentration requiring a final research project, work of art, thesis or dissertation, must qualify for continuing master’s or doctoral status according to the degree candidacy requirements of the student’s graduate program. Admission to degree candidacy, if applicable, is a formal statement by the graduate student’s faculty regarding the student’s academic achievements and the student’s readiness to proceed to the final research phase of the degree program.

Graduate students and program directors should refer to the following degree candidacy policy as published in the VCU Graduate Bulletin for complete information and instructions.

Visit the academic regulations section for additional information on degree candidacy requirements. (http://bulletin.vcu.edu/academic-regs/grad/candidacy/)

Graduation requirements
As graduate students approach the end of their academic programs and the final semester of matriculation, they must make formal application to graduate. No degrees will be conferred until the application to graduate has been finalized.

Graduate students and program directors should refer to the following graduation requirements as published in the Graduate Bulletin for a complete list of instructions and a graduation checklist.

Visit the academic regulations section for additional information on graduation requirements. (http://bulletin.vcu.edu/academic-regs/grad/graduation-info/)

Apply online today. (https://www.vcu.edu/admissions/apply/graduate/)

Admission requirements

<table>
<thead>
<tr>
<th>Degree</th>
<th>Semester(s) of entry</th>
<th>Deadline dates:</th>
<th>Test requirements:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ph.D.</td>
<td>Fall (preferred);</td>
<td>Applications received by Jan 10 receive priority</td>
<td>GRE, TOEFL if relevant</td>
</tr>
<tr>
<td></td>
<td>rolling admissions</td>
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<td></td>
</tr>
</tbody>
</table>

In addition to the general admission requirements of the VCU Graduate School (http://bulletin.vcu.edu/graduate/study/admission-graduate-study/admission-requirements/) all applicants must provide the following:

1. A statement of purpose for application to the program. The document should be 1.5 or double-spaced with one-inch margins, in a font height no smaller than 11 points. The statement of purpose should cover the following issues in two to five pages:
   a. Why the applicant wishes to pursue a Ph.D. in the Clinical and Translational Sciences with a concentration in cancer and molecular medicine
b. Background experience relevant to pursuing a Ph.D. in the
classification in cancer and molecular medicine

c. Research interests and potential faculty mentors with whom the
individual would want to work

3. Description of the applicant’s career goals

2. Scores from the Graduate Record Examination.
Applicants must score at the 75th percentile or above in all sections
of the GRE.

3. International applicants must also provide, to the VCU Global
Education Office, scores from the Test of English as a Foreign
Language or International English Language Testing System.

Degree requirements
All students are expected to be actively engaged in research throughout
the duration of the Ph.D. program. Students are generally admitted under
a mentorship model, meaning that they will begin research under the
supervision of faculty advisers to whom their research interests most
closely align. Other didactic experiences include the weekly seminar
series (both at the VIPBG and in external departments) as well as
participation in workshops and scientific meetings of relevance to the
student’s research area.

The curriculum provides a strong grounding in fundamental concepts
while emphasizing aspects of research design and technology that
are broadly applicable across disciplines in industrial, government and
academic settings. A series of elective courses will then provide an
advanced base of knowledge focused on a student’s areas of interest.

In addition to general VCU Graduate School graduation requirements
(http://bulletin.vcu.edu/academic-regs/grad/graduation-info/), students are
required to meet the following:

1. Credit hour requirements: Students are required to complete course
work in core and elective courses and to conduct significant research.
In order to earn the Ph.D., students must complete a minimum of 54
credit hours: 32 core and elective courses as well as 22 in directed
and dissertation research that provide a sound foundation in clinical
and translational research principles. Students will also participate
in seminar and workshop experiences that place them in the midst of
the research process from theoretically based hypothesis generation
through grant writing, study conduction, and, ultimately, data analysis
and manuscript preparation. This program also includes a rigorous
interdisciplinary research component comprising directed research
and dissertation hours.

2. Transfer and M.S. credit hours: Graduate-level course work completed
prior to matriculation into the program, including course work taken in
another program at VCU or at another institution, shall be evaluated
to determine whether it can be used to fulfill degree requirements of
this program. Transfer of credit hours will be limited to those allowed
by the university. A minimum grade of B is required for credit hours to
transfer.

3. Grade requirements: Degree applicants must achieve an overall GPA
of 3.0 (B) with a grade of C in no more than two courses per the
VCU Graduate Bulletin. The GPA for graduation shall be based on
all graduate courses attempted after acceptance into the program.
Students who receive a grade lower than a B in any of the required
core courses will be subject to remedial action as determined by
their advisory committee in conjunction with the program director to
ensure that there is adequate mastery of the material. All remedial
action must be undertaken and completed to the committee’s
satisfaction before the student is eligible to begin their qualifying
exams.

4. Research advisers and committee: The director of the CCTR
education program or the director’s designee will assist the student
with initial course selection and provide advice concerning the
program. All students should select their master’s or doctoral co-
advisees and finalize the composition of their research advisory
committee prior to the end of the second semester of study.

5. The student’s co-advisors shall provide each student enrolled in the
master’s or doctoral program with individualized recommendations
regarding course work selection, workshop experiences and the
direction of their research. It is essential that each student be
comprehensively assessed in the area of their methodological and
research background. Particularly in the case of those pursuing the
Ph.D., recommendations will be made to ensure that each
student has acquired the needed substantive research background
necessary for doctoral-level work. Thus, the total credit hours required
for graduation will be determined on a case-by-case basis by the
individual student’s research advisory committee.

6. The committee will consist of a minimum of five members, all
of whom must be members of the VCU graduate faculty. Note:
Individuals who are not already graduate faculty members must
apply to the dean of the Graduate School for temporary affiliate
membership. The composition of the research advisory committee
shall be such that the significant areas of the student's research
focus are represented. To foster the interdisciplinary intent of this
degree program, at least one member of the committee shall be from
a school other than those of the student’s co-advisers. Final approval
of each student’s advisory committee membership shall rest with the
CCTR Education Program committee.

7. Admission to candidacy for the Ph.D. Before admission to candidacy
for the Ph.D., students must have:

a. Completed all required course work (as noted above, through
a comprehensive screening process students will have been
evaluated to assure that they have grounding in a relevant
substantive content area and have taken the needed course work
in statistics, methodology and research so that they are able to
pursue doctoral-level research)

b. Successfully completed an oral examination

8. Oral examination: Upon successful completion of all required didactic
course work, not including seminars and workshops and submission
and acceptance of a research proposal, students shall take an
oral examination administered by the student’s research advisory
committee. The exam shall be based on a defense of the student’s
proposed dissertation research project, which shall be constructed
in the format of an NIH grant submission and all other subject areas
deemed appropriate by the committee. All advisory committee
members must vote on the student’s performance as either Pass or
Fail. A student may pass the exam with no more than one negative
vote. Upon successful completion of the oral examination, the
student is officially entered into candidacy and permitted to refine
their proposed dissertation research and submit it for final committee
approval before initiating the project (see below). An unsuccessful
oral examination shall require re-examination within a time period
determined by the committee. Only one oral re-examination is
permitted.

9. Dissertation research/proposal: Students must propose and conduct
a substantial original clinical and/or translational investigation under
the supervision of the research advisers and advisory committee.
The student can refine the research proposal which served as the
foundation of their oral examination in consultation with the research advisers and advisory committee or propose a new novel research proposal. The proposal, which shall be constructed in the format of an NIH grant submission, should include information on the general purpose of the research, background information on the research topic (including a review of the relevant literature), a rationale for the project, a statement of the hypotheses to be investigated or research questions to be answered, and proposed methods and statistical analyses. Once the student has received the committee’s approval, they can initiate their dissertation research.

10. Dissertation research project: The research project should represent a significant contribution to the body of knowledge in its field and should be deemed publishable in refereed journals. The emphasis of the research conducted by students in this program shall be on clinical and translational interdisciplinary research, incorporating two or more disciplines as well as a systems approach. This emphasis will be fostered by the requirement of having at least one faculty member on the research advisory committee from a school or college different from that of the research advisers, thereby exposing students to different perspectives on the same problem and assisting students in developing multidisciplinary approaches to their research.

11. Dissertation defense: Students shall prepare a written dissertation describing the completed research using a format approved by the VCU Graduate School. An oral defense of the dissertation, under the direction of the research advisory committee and open to all faculty members, shall be scheduled to examine the student’s research, dissertation documentation and underlying fundamental knowledge across the disciplines encompassed by the student’s research. An announcement of the oral defense, including the candidate’s name, dissertation title and the day, place and time of the defense, shall be made at least 10 working days in advance of the defense. Following the defense, all committee members shall vote on the acceptability of the dissertation. A student may pass the oral defense, signifying that the research advisory committee has accepted the dissertation, with no more than one negative vote. Upon successful completion of the defense and dissertation, the student may apply for graduation from Virginia Commonwealth University with the degree of Doctor of Philosophy in Clinical and Translational Sciences.

**Research advisers and committee**

Each student in the program will have both a research and a clinical mentor (these could be the same or different faculty members). This team-based mentoring approach will facilitate the translational aspects of the Ph.D. students’ projects and may actually serve to stimulate new translational projects and collaborations at VCU. The research mentors in the program will be chosen based on demonstrated research expertise in the area of cancer or molecular medicine, excellent mentoring skills, and research funding to support the Ph.D. student. Clinical mentors will be chosen based on clinical expertise and mentoring excellence. Through the clinical mentor, the trainee will have opportunities to be exposed to clinical practice, including clinics and surgeries, clinical laboratories, the complexities of clinical trials, and other clinical activities. The clinical activities are expected to consist of approximately one hour/week on average for Ph.D. students, but would be more intensive for M.D./Ph.D. students, in keeping with the existing requirements for that program.

Both the research and clinical mentor would be on the thesis committee, which would comprise a total of five faculty members, at least three of whom are CaMM faculty members. For M.D./Ph.D. students, their clinical mentors will be the same faculty member serving as their Foundations of Clinical Medicine preceptors. The students’ mentors and thesis committee will advise the students as they prepare career development plans in the second year in the program. The career development plan will be required because translational science is by definition an interdisciplinary and novel career path for students.

**Qualifying examination**

Students in good academic standing who have completed all of their required academic core course work will spend the summer after the second year preparing for the qualifying exam. The qualifying exam will consist of writing a review paper of no more than 30 double-spaced pages, excluding references. In keeping with the interdisciplinary nature of the program, the review paper must demonstrate mastery across the core areas represented in CaMM. The topic of the review paper should be developed by students in consultation with their advisers. The title of the review paper, along with a short abstract (no longer than one single-spaced page) describing the proposed content should be submitted to the concentration program director by June 15 for review by the qualifying exam committee. The QEC will review the proposal to ensure that the topic of the review paper is appropriate in that it allows the student to demonstrate command of the literature and interdisciplinary breadth. The committee will make decisions about adequacy of the review paper and, if necessary, work with the student to make revisions within approximately 14 days. Once the topic has been approved by the QEC, the student may begin writing. The review paper must be the student’s own work. Drafts may not be reviewed by the student’s adviser or other faculty, fellows or students. The final review paper must be submitted to the advisory committee by Aug. 1.

An oral examination of the paper administered by the student’s advisory committee and the QEC must be scheduled to take place approximately two weeks after submission to evaluate the student’s command of the material and to give the committee opportunity to ask questions and provide feedback. A pass/fail decision will be made at that time. Unsuccessful completion of the qualifying exam will require re-examination within a period of time determined by the committee and the program director. The content of the re-examination will also be determined by the committee and program director on an individual basis. In some cases this could involve a revision of the review paper or particular sections; in other cases, it may involve a repeat of the entire process including selection of a new topic and submission of a new review paper and/or repeat of the oral defense. Only one reattempt to pass qualifying exams is permitted. Students who do not pass their qualifying exams upon their second attempt will be dismissed from the program. Upon successful completion of the oral examination, the student is then officially entered into candidacy for the Ph.D. and permitted to refine their proposed dissertation research and submit it for final committee approval before initiating the project (see below).

**Admission to Ph.D. candidacy**

Students will have written and oral qualifying examinations, based on writing a grant proposal describing their proposed thesis research and orally defending the proposal with their thesis committee. Before admission to candidacy for the Ph.D., students must have (1) completed all required course work as described above and (2) successfully completed a qualifying exam.

**Dissertation proposal defense**

Students who have completed the qualifying exam and the second year project are eligible to propose and defend their dissertation. The proposal should be constructed in the format of an NIH grant submission. The proposal must consist of an original research idea generated by the student in consultation with their adviser. The dissertation proposal
Curriculum requirements

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
</table>
| Required courses
| ANAT 620   | Scientific Grantsmanship              | 2     |
| BIOS 543   | Graduate Research Methods I           | 3     |
| or STAT 543| Statistical Methods I                 |       |
| CCTR 520   | Fundamentals of Research Regulation   | 2     |
| CCTR 630   | Design Implications in Clinical Trials| 3     |
| or BIOS 571| Clinical Trials                       |       |
| CCTR 631   | Adaptive Clinical Trials              | 1     |
| CCTR 640   | Team Science: Theories and Practice   | 2     |

Electives

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CCTR 690</td>
<td>Research Seminar in Clinical and Translational Sciences (one-credit course repeated for four credits)</td>
<td>4</td>
</tr>
<tr>
<td>CCTR 801</td>
<td>Clinical Practicum (one-credit course repeated for two credits)</td>
<td>2</td>
</tr>
<tr>
<td>OVPR 601 or OVPR 602 or OVPR 603</td>
<td>Responsible Scientific Conduct</td>
<td>1</td>
</tr>
</tbody>
</table>

Total Hours 54

Course must be taken for a minimum of 22 credits.

The minimum total of graduate credit hours required for this degree is 54.

Contact

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