Educational Structure

The PI supervisor and the hosting research group are expected to closely mentor and support the CCRC students. We envision that pertaining feedback and advice will be provided at least on a weekly basis and be complimented by regular lab and TAC meetings. We also strongly encourage joint lab meetings between different participating groups to better generate scientific discussion, interdisciplinary thinking, and broader understanding across research fields.

CCRC students will join a superordinate Graduate Program, either GSfBS (student of biological sciences), IPMM (Physicians or biological sciences) or GSHZ (medical students).

While it is essential that our PhD/MD students become specialists in their chosen research field, we also aim for a broader education to ensure the overall research horizon is not too narrow as well as to better foster interdisciplinary thinking. To achieve this goal, the CCRC RTG will offer a variety of additional medical-oriented and research-related activities and training modules. These include CCRC-specific modules as well as more general training elements provided by the umbrella structures of the UoC.

For example, a regular weekly CCRC lecture series, where students will be taught about various aspects of molecular cardiology in disease-related processes, and an annual 2-day CCRC RTG retreat are planned. Moreover, a comprehensive study program comprising a lecture series on general aspects of molecular medicine as well as a number of research-related and career development workshops will be on offer via the up-and-running activities of the core programs of both the IPMM and GSfBS. Here, PhD/MD students may choose from a diverse and wide variety of options, including paper and grant writing, poster design, presentation, statistical analysis, and data visualization – to name but a few. Within the proposed RTG program, PhD/MD students will be expected to accrue a total of 20 credit points over their 3- to 4-year PhD program (1 credit = 30 hours workload). These credit points can also be gained by active participation in retreats and conferences as well as skills building activities, e.g. inviting and hosting international guest speakers or meetings organizations.

Overview Central Offices

Introduction Phase

To achieve the educational aim and to ensure a structured, high-level, and quality-controlled scientific education as well as a successful completion of the PhD/MD research projects, there is a core curriculum of the RTG, which intends to (1) give students the opportunity to find the topic for their thesis which best suits their main interest, (2) optimally promote their research
and education, and (3) ensure their development in a framework and schedule that helps them to keep track of their scientific achievements, but make necessary adjustments within their research projects (Table 1).

The introductory phase, which will last for approximately 5 weeks, will facilitate the student’s arrival in Cologne and start in the program, and will include a 3-day “Meet & Greet” event, a one week Training Module given by the CCRC PI’s and associated researchers, and 1-day visits to the laboratories of the participating PI’s as well as the core facilities.

**Introduction Week as Training Module**

Students will be offered a compact lecture series that will give the incoming PhD/MD students a scientific introduction and overview to the areas of research offered by the CCRC. The lectures will be held by the participating PIs, and the associated researchers representing the core facilities. Furthermore, this training module will also contain an introductory seminar on “Good Scientific Practice”.

**Lab visits**

The Training Module will be followed by 1-day lab visits to the labs of each of the participating PIs, as well as the core facilities. This will facilitate personal communications and getting to know each other, and further inform the incoming students about ongoing research in the participating labs and technical facilities. Additionally, students will be offered a 1-day tour through the clinics and medical facilities at the UoC Heart Center to get accustomed to the local structures in cardiovascular medicine and to learn about the clinical relevance of their research.

The RTG will have a three-pronged approach to ensure outstanding research training for its participants by (1) ensuring high quality in cardiovascular PhD/MD training, (2) promoting international visibility and selecting the best PhD/MD students, and (3) offering a diverse arrange of medical-oriented, research-related, and career development activities and training modules.

**Supervision as regular meetings and written reports**

This CCRC recognizes that performing an outstanding PhD can be a challenge. Therefore, to better help facilitate this process in terms of educational and training experience, scientific productivity, and ultimately, career success, all PhD projects will be assessed internally to ensure innovative and cutting-edge projects which can be realistically performed within the three (four)-year timeframe.

Each MD/PhD student will be guided, mentored, and supported by a Thesis Advisory Committee (TAC), consisting of the respective PI of the project, two independent senior scientists with complementary expertise, and a postdoctoral fellow. The inclusion of a postdoctoral fellow at TAC meetings is a new measure aimed at broadening his/her scientific education in general and enhancing their supervision and mentoring skills in particular as a first step to greater scientific independence. This will allow us to establish a collaborative supervisinal approach in which each student will have access to two PIs to discuss problems and progress on a regular basis. Finally, to ensure that the project is suitably advancing, each student will have regular meetings with his/her Thesis Advisory Committee (TAC). In addition to regular TAC meetings, PhD students are asked to submit regular progress reports.
Quality control measures and Management Committee
The CCRC RTG will be embedded in the established structured programs of the IPMM and GSfBS for which stringent quality control (QC) measures are already in place. To maintain these high levels of education, this RTG will set up a Management Committee that will consist of the CCRC RTG’s coordinator, all participating PIs, two PhD/MD student representatives, a part-time CCRC central management officer, and the IPMM and GSfBS coordinators. A central management and service office headed by the CCRC RTG’s coordinator will provide administrative support for all aspects of the program, such as recruiting, facilitating the assessment process of applicant eligibility and selection, supporting the admissions process, monitoring of research progress, as well as scheduling and organizing training activities, etc.

CCRC Seminar Series
The CCRC Seminar Series specifically focuses on cardiovascular science and is held on a monthly basis. Currently, we invite both internal as well as external guest speakers from other institutes. In the future, we intend to expand our activities for external guest speakers, by sending our PhD/MD students an abstract and a list of publications to allow them to more fully prepare for and participate in the post-seminar discussion. Our aim is to facilitate fruitful scientific discussion within our program and to promote better networking. All seminars are followed by a get-together to promote further discussion and networking.

Participation is mandatory for CCRC students.

All CCRC Seminar Series are listed under the CMMC LifeScience Calendar. This calendar contains many interesting upcoming seminars.

CCRC Journal Club
Each CCRC student will be expected to give one literature club seminar per year to promote the interchange and discussion of the latest advances in cardiovascular research. A secondary aim is to also encourage critical and analytic thinking skills as well as build confidence for presentation technique.

Participation is mandatory for CCRC students

Clinical Insights in Cardiovascular Medicine (Clinical Stay)

Once a year, our CCRC students will spend two days in a clinical setting with the expressed aim of better understanding cardiovascular medicine in a patient-oriented environment. We anticipate that our CCRC students will gain rich insights and fresh perspectives about patient-specific issues, technical procedures, and front-line medical needs, and thereby, encourage more translational cardiovascular science thinking.

Participation is mandatory for CCRC students.

CCRC Retreat
CCRC students will be asked to organize an annual 2-day off-site CCRC RTG retreat in which they will present their work (current results and future research plans) to the whole Managing
Committee and the other members of the RTG. Here, progress of the projects can be critically reviewed, constructive feedback given about possible next research steps and direction, as well as network building and scientific exchange. Alumni members will also be invited to give career talks to the new members of the CCRC RTG. Specifically, this annual retreat will foster interaction, scientific discussion, and active intellectual engagement between PhD/MD students and PIs from different research groups as well as alumni.

Participation is mandatory for CCRC students

Cologne Conference on Cardiovascular Disease

A 2-day cardio-vascular disease conference was established over 20 years ago at the UoC Campus and focuses on bridging the gap between molecular and translational cardiovascular science. This bi-annual event normally attracts over 200 participants from across the globe. Many of these attendees are national and international leading scientists within this field. The next conference is planned for 2019 and will focus on heart failure and pulmonary hypertension.

Participation is mandatory for CCRC students

Cologne Cardiovascular Summit

This 2-day cardiovascular summit was established in 2013 and focuses on clinical and translational aspects of cardiovascular medicine, including lectures on newly emerging topics by renowned scientific and medical experts in the field as well as live cases from the operations room. It is routinely attended by over 200 participants.

Participation is mandatory for CCRC students.

IPMM

In close proximity to the CCRC, the IPMM (Interdisciplinary Program Molecular Medicine) at the University of Cologne will host additional events. CCRC students are highly encouraged to join the events to foster further collaborations and interactions among other researchers and students. CCRC students joining the IPMM need to fulfil certain requirements during the PhD phase to get accepted to the PhD thesis.

GSfBS

In close proximity to the CCRC, the GSfBS (Graduate School for Biological Sciences) at the University of Cologne will host additional events. CCRC students are highly encouraged to join the events to foster further collaborations and interactions among other researchers and students. CCRC students joining the GSfBS need to fulfil certain requirements during the PhD phase to get accepted to the PhD thesis.

GSHZ

In close proximity to the CCRC, the GSHZ (Graduiertenschule Human- und Zahnmedizin) at the University of Cologne will host additional events. CCRC students are highly encouraged to join
the events to foster further collaborations and interactions among other researchers and students. CCRC medical students need to fulfil certain modules to get accepted for the promotion (Dr. med.).