

MD / PhD in Biomedical Engineering Program

Program Description

The dual Doctor of Philosophy (PhD) in Biomedical Engineering (BME) and Doctor of Medicine (MD) program is a **physician-engineer training program** (PET) providing advanced education and training in engineering research and medicine. It is a joint program from the Department of Biomedical Engineering (BME), Henry Rowan College of Engineering (HRCOE), and the Cooper Medical School of Rowan University (CMSRU). The mission is to educate leaders in the medical profession that can utilize their engineering and research skills as independent investigators to develop innovative solutions to pressing medical problems. The program has an integrated framework with an emphasis on integrating medical and graduate engineering education and training.

Curriculum Model

The program has two tracks (Track 1 and 2) depending on which program, the medical program (gray highlight) or engineering program (yellow highlight), is started in the first year in residence. All requirements for each program will be met with minor overlap. Of 10 courses in BME PhD curriculum, Advanced Biology will be adequately addressed by the CMSRU Phase 1 curriculum consisting of integrated biomedical sciences (Anatomy, Physiology, Pharmacology, Pathology, etc.). Scholars Workshop (SW) extends across all four (4) CMSRU years, but capstone project requirement can be fulfilled by BME research/dissertation.

TRACK 1

Year 1

Medical School Yr1 (MSYr1)

End of Yr 1 - Pick PhD Research Advisor via Selection Process

Summer Yr 1 - (8 Wks) Enter PhD Program & Start PhD Research (S1)

Year 2

Medical School Yr 2(MSYr2)

Year 2 will end with the completion of all coursework. Year 3 clinical will not begin as usual in the summer and will be postponed until summer between years 5-6 of the program.

Summer Yr 2 – PhD Research (S2)

\$30K Stipend/Yr and PhD Tuition Paid (Starts Summer)

Pick Dissertation Committee

Boards

Year 3

PhD Coursework & Research (PhDYr1)

Summer Yr 3 - Continue PhD Research (S3)

\$30K Stipend/Yr and PhD Tuition Paid

Complete Preliminary Exam Early Fall

Year 4

PhD Coursework & Research (PhDYr2)

Summer Yr 4 - Continue PhD Research (S4)
\$30K Stipend/Yr and PhD Tuition Paid
Complete Qualifying Exam Early Fall

Year 5*

PhD Research (PhDYr3)

\$30K Stipend/Yr and Tuition Paid
PhD Defense at End of Spring Semester

Year 6

Medical School Yr3 (MSYr3)

Summer Yr5
Third year of medical school to start with clinical rotations in the summer.

Year 7

Medical School Yr4 (MSYr4)

PhD Degree Program – 3 Academic Years (Fall/Spring) and 4 Summer Semesters
MD Degree Program – 4 Years

* If Dissertation Defense Not Completed, Yr 6 of the PhD BME/MD program will be used to complete the PhD degree with Medical School (MSYr3) being Deferred for 1 Year. If PET student successfully defends dissertation by Yr 5, they may start Yr 3 of medical school (MSYr3) and submit their final dissertation submission to the University early in Yr 6 of the PhD BME/MD Program. PET students will only be allowed to matriculate into the 3rd year of medical school if all defense paperwork has been signed by their Dissertation Committee, indicating a complete written dissertation, a successful defense, and all PhD credit requirements completed. Only dissertation changes requested by the committee may need to be completed by the PET students before final dissertation submission to the University as well as submitting additional peer-reviewed publications and conference presentations.

TRACK 2

Year 1

Enter PhD Program & Start PhD Research (S1)

Pick PhD Research Advisor Via Selection Process
PhD Coursework & Research (PhDYr1)
\$30K Stipend/Yr and PhD Tuition Paid
Pick Dissertation Committee
Complete Preliminary Exam Early Spring
Summer Yr 1 - PhD Research (S2)

Year 2

Medical School Yr1 (MSYr1)

Summer Yr 2 - (8 Wks) PhD Research (S3)

Year 3

Medical School Yr2 (MSYr2)

Year 2 will end with the completion of all coursework, Year 3 clinical will not begin as usual in the summer and will be postponed until summer between years 5-6 of the program.

Summer Yr 3 – PhD Research (S4)
Boards

Year 4

PhD Coursework & Research (PhDYr2)

Summer Yr 4 - Continue PhD Research (S5)
\$30K Stipend/Yr and PhD Tuition Paid
Complete Qualifying Exam Spring

Year 5*

PhD Coursework & Research (PhDYr3)

Continue PhD Research
\$30K Stipend/Yr and PhD Tuition Paid
PhD Defense At End of Spring Semester

Year 6

Medical School Yr3 (MSYr3)

Summer Yr 5

Third year of medical school to start with clinical rotations in the summer.

Year 7

Medical School Yr4 (MSYr4)

PhD Degree Program – 3 Academic Years (Fall/Spring) and 5 Summer Semesters

MD Degree Program – 4 Years

* If Dissertation Defense Not Completed, Yr 6 of the PhD BME/MD program will be used to complete the PhD degree with Medical School (MSYr3) being Deferred for 1 Year. If PET student successfully defends dissertation by Yr 5, they may start Yr 3 of medical school (MSYr3) and submit their final dissertation submission to the University early in Yr 6 of the PhD BME/MD Program. PET students will only be allowed to matriculate into the 3rd year of medical school if all defense paperwork has been signed by their Dissertation Committee, indicating a complete written dissertation, a successful defense, and all PhD credit requirements completed. Only dissertation changes requested by the committee may need to be completed by the PET student before final dissertation submission to the University as well as submitting additional peer-reviewed publications and conference presentations.

Financial

The PET student pays tuition to medical school at CMSRU and the last two years may receive partial stipend/support from their PhD advisor, if they have successfully defended their dissertation and are making satisfactory progress toward both degrees (i.e., continuing to work with/write/present/publish with their doctoral advisor). PET students will only be allowed to matriculate into the 3rd year of medical school if all defense paperwork has been signed by their Dissertation Committee indicating a successful defense, a completed written dissertation, and all PhD credits completed. For the engineering doctoral program, the PET student receives a \$30K stipend per year in the engineering PhD program with tuition paid, if also making satisfactory progress toward both degrees. This is typical in the graduate doctoral program in BME as the stipend and tuition are the responsibility of the PhD advisor. All student fees from both programs will be paid by the student.

Operational Oversight

The program will be directed by a steering committee consisting of two permanent members of the committee - the Department Head of Biomedical Engineering and the Dean of Medical Education or designee, CMSRU. Two additional faculty members, who will be appointed for three (3) year periods, will be members of the steering committee consisting of one member from the HRCOE Department of Biomedical Engineering and one faculty member from CMSRU. The committee members will be chosen by their respective colleges, with the Department Head of Biomedical Engineering and the Dean of CMSRU or designee designating the members serving from their College/School. The Department Head of Biomedical Engineering will serve as Chair of the committee.

Admissions

Each applicant must be accepted to each respective program to gain admission to the dual MD/PhD in Biomedical Engineering program. The steering committee will serve as the defacto dual program admission committee until a formal admission committee is formed. This committee will work with each program to assure an effective and timely admission process. The Department of Biomedical Engineering will lead the recruitment efforts being the point source for external communication regarding the program. The application for the dual program will be developed by the admissions committee, which will work to include elements from both programs admission paperwork and streamline the application and process, where appropriate. Points of entry will include applying and entering as a dual degree student in both programs or entering one program and then applying to the dual degree program at a later time. Recruiting candidates for the combined MD-PhD program will occur via program announcements, website information, etc. The program may be available to either PhD candidates who wish to pursue MD and/or MD candidates who wish to pursue PhD, but the main focus will be those applicants who know they want a combined program during the initial admission process.

Degree Progress

If a PET student is not making satisfactory progress in the dual-degree program, with Biomedical Engineering and CMSRU each separately defining satisfactory progress for their programs, then the PET student may be removed from the PET program by the program steering committee. It is not guaranteed that the student can continue in one of the programs alone, and they must petition either the Biomedical Engineering Department or the Cooper Medical School to continue in only one program.