RECONSTRUCTIVE & REGENERATIVE MEDICINE AREA OF CONCENTRATION

The Reconstructive and Regenerative Medicine (RRM) Area of Concentration (AOC) is a multidisciplinary, four-year curricular offering for students interested in clinical and research skill development in the broad categories of reconstructive surgical procedures and related regenerative medicine and tissue engineering strategies for restoring function. The primary aim of this AOC is to offer UPSOM medical students earlier and more intentional exposure to the principles of surgical reconstruction through a dedicated RRM AOC journal club, pre-selected coursework available through cross-enrollment at CMU, and structured surgical shadowing (in fields involving surgical reconstruction such as Plastic Surgery, ENT, Orthopaedics, and Urology). Additionally, focused regular clinical seminars, as well as an option for a funded research year in a sub-discipline of reconstructive technology and/or regenerative medicine and tissue engineering strategies related to functional restoration will be offered. All student RRM AOC participants will be required to complete original research pertaining to reconstructive and regenerative fields under the guidance of pre-approved faculty mentors in order to receive a certificate of completion at graduation. On completing the AOC, it is expected that students will be highly competitive applicants in the match process as well as having a foundation of strong research in their chosen fields.

CORE COMPETENCIES

On completion of the AOC, students will possess:

- An understanding of best practices and future directions for reconstructive surgery, in fields such as Plastic Surgery, Urologic Surgery, Orthopaedic Surgery, Otolaryngology, etc.
- Comfort and familiarity in emerging technologies in reconstructive and regenerative medicine
- Appreciation for the multidisciplinary nature of regenerative medicine and research
- Consciousness of the social determinants of health and the principles of surgical justice, especially as it relates to access to care

PROGRAM REQUIREMENTS

- Select a faculty mentor to guide student through scholarly work and provide general career advice
- Maintain and annually submit portfolio containing the following:
    - Minimum of at least one LRP-level scholarly project (updates will be included annually in portfolio)
    - Shadow a minimum of 10 unique procedures in pre-clinical years. The student must be “scrubbed in” for the experience to qualify (recommended minimum of shadowing in three separate departments)
        - Portfolio will contain a one paragraph description of the procedure and the student’s role plus a research question formed based on the procedure.
    - Attendance at a minimum of one personal enrichment course in a reconstructive field.
    - Attendance at a minimum of 15 credit hours of didactic presentations (including lunch talks).

    - Attendance at a minimum of five grand rounds in reconstructive fields (students will be given access to listservs upon receipt of registration).
    - Attendance at a minimum of one research symposium or conference (presentation of original research preferred).
    - Attend a minimum of three reconstructive workshops (though attendance at all of these is recommended).
        - Basic suturing course (any)
        - Advanced suturing course (Head and Neck recommended)
        - Intro to microsurgery
        - Surgical technology/robotics (any)
        - Cleft repair simulation
    - Pass the "Tissue Engineering" offered every semester at CMU/Pitt (recommended).
    - Enroll in a research month or individualized clinical course in a reconstructive field.
    - Enroll in reconstructive surgical sub-internship.
- Maintain ongoing successful academic performance
- Meet with AOC co-directors biannually to discuss progress

RESEARCH EXPERIENCE GOALS:

In addition to completion of an LRP-level, publication-quality scholarly project in reconstructive and/or regenerative medicine, the RRM AOC expects the following research competencies from its certificate-eligible students:

- Understanding of the research methodologies used to produce the current state of knowledge in reconstructive practice.
- A demonstrated ability to think creatively and analytically in research settings as judged by the faculty mentor.
- Understanding of the role of collaboration in surgical and research undertakings within reconstruction, especially as it relates to translational advances in reconstructive practice.
- Students will collaborate with peers and mentors to form a collegial environment as they undertake activities in the Reconstructive & Regenerative Medicine AOC.

CLINICAL EXPERIENCE GOALS:

Each student will have the opportunity to choose a clinical area of interest within the following domains: Plastic Surgery, Otolaryngology, Orthopaedic Surgery, and Urologic Surgery, with a unifying emphasis on the technical and patient care challenges involved in reconstructive procedures. To achieve the clinical experience learning objective, students can:

- Work in the operating room, emergency room, or inpatient unit seeing patients, and as applicable, follow this up with continuity visits (e.g., aftercare) on a regular basis.
    - As an addendum to this point, we expect the student to take an active role in patient care, not only shadowing the attending surgeon, but also actively conducting or assisting with patient interviews, exams, and procedures.
- Generate one-paragraph summaries and a research question pertaining to the observed reconstructive procedure, to be emailed to the faculty mentor within 48 hours of the clinical experience.
    - This experience, write-up, and original research question inspired by clinical observation will be included in the student's portfolio.

EDUCATIONAL EXPERIENCE GOALS:

Each student will have the opportunity to attend a variety of educational events designed to broaden and deepen their knowledge and skills in reconstructive and regenerative medicine.Understanding of the research methodologies used to produce the current state of knowledge in reconstructive practice.

- AOC Journal/Reading Club – Scholars and selected faculty will meet regularly to review journal articles, book chapters, or other articles that are relevant to developing an appreciation of

reconstructive and regenerative medicine.

- Community Social Gatherings – The program will have frequent informal social gatherings to allow Scholars to form relationships with other Scholars, Mentors, and invited guests.
- Workshops – Scholars will cultivate essential skills through workshops. These skills will assist Scholars as they pursue their scholarly project and clinical work.
- Regional and National Conferences – Scholars are expected to attend regional and national meetings to present their work, meet with faculty outside of our institution, and establish relationships with peers from other institutions. Mentors can arrange informal meetings between scholars and individuals at these events.

Year	Progress Markers
MS1	• Submit an online AOC declaration form to Student Affairs. • Participate in AOC-RRM activities on joining (earlier if desired). • Meet with an AOC-RRM co-director to create a personalized plan. • Secure an approved RRM faculty mentor for a scholarly project. • Summer research in RRM, if desired.
MS2	• Continue attending AOC-RRM events. • Keep a record of all AOC-RRM activities in a dedicated AOC log. • Submit a scholarly research project proposal and begin proposed research. • Meet with selected faculty mentor once per semester. • Meet with an AOC-RRM co-director EOY to discuss your progress.
MS3	• Same as MS2 • Enroll in dedicated electives
MS4	• Same as MS2 & MS3 • Complete scholarly research project and final report by February. • Review recorded AOC-RRM experiences with co-director to ensure all completion requirements are satisfied. • Attend the AOC-RRM graduation and receive the certificate.

STUDENT EVALUATION

The progress of the student/faculty mentor team will be reviewed each year by the AOC Faculty Co-Directors, and any areas of concern will be addressed by members of the Reconstructive & Regenerative Medicine Steering Committee. The student/faculty mentor team will provide the AOC Co-Directors with an annual review of their portfolio and a timeline to fulfill all remaining goals and requirements. Certificates will be awarded by the Steering Committee based on satisfactory completion of the goals of the AOC.

FACULTY & PROGRAM EVALUATION

Student scholars will complete a yearly evaluation form that will be reviewed by the Reconstructive & Regenerative Medicine Steering Committee.

RECRUITMENT & ACCEPTANCE OF AOC-RRM SCHOLARS

- A description of the AOC-RRM will be given to prospective students and a description will be posted to UPSOM's website
- AOC-RRM scholars will answer questions and distribute information during Second Look, the activity fair, and during orientation.
- Students will apply to the AOC-RRM using the standard application form and a short personal statement. The AOC-RRM Steering Committee will review applications and issue acceptances.

ADDENDUM:

Possible additional CMU/Pitt courses to supplement AOC didactic learning experiences:

Bionanotechnology (27-514)

Introduction to Biomaterials (42-610)
Engineering Biomaterials (42-611)
Polymeric Biomaterials (42-613)
Microfluidics (42-643)
Engineering Molecular Cell Biology (42-620)

Surgery for Engineers (42-661)
Bioinstrumentation (42-664)
Biomaterial Host Interactions in Regenerative Medicine (42-670)
Stem Cell Engineering (42-673)
Bio-nanotechnology: Principles and Applications (42-676)
Introduction to Neural Engineering (42-688)

Nanoscale Manufacturing Using Structural DNA Nanotechnology (42-692)
Integrated Systems Technology: Micro/Nano Biomedical Devices (42-693)
Medical Devices (42-744)
Applied Nanoscience and Nanotechnology (42-772)

CO-DIRECTORS

J. Peter Rubin, MD, MBA, FACS
Chair of the Department of Plastic Surgery
UPMC Endowed Professor

Kacey Marra, PhD
Vice Chair for Research in the Department of Plastic Surgery
Professor of Bioengineering at the University of Pittsburgh

FACULTY STEERING COMMITTEE MEMBERS

Mark Kubik, MD
F. Johannes Plate, MD, PhD
Paul J. Rusilko, DO
Mario G. Solari, MD

STUDENT LEADERS

Nicolás Kass, MS2
Joseph Mocharnuk, MS2