

PROGRAMS: SCHOOL OF MEDICINE

Undergraduate

- Anatomical Sciences, Minor
- Biochemistry, BA
- Biochemistry, BS
- Biochemistry, Minor
- Bioethics and Medical Humanities, Minor
- Environmental Nutrition, Food Systems Sustainability, and Health, Minor
- Nutrition and Lifestyle Medicine, Minor
- Nutrition, BA
- Nutrition, BS
- Nutrition, Minor
- Nutritional Biochemistry and Metabolism, BA
- Nutritional Biochemistry and Metabolism, BS
- Public Health, Minor
- Sports Nutrition, Minor

- Molecular Medicine, PhD
- Molecular Virology, PhD
- Neurosciences, PhD
- Nutrition for Health Care Professionals, Graduate Certificate
- Nutrition, MS
- Nutrition, PhD
- Pathology, MS
- Pathology, PhD
- Pharmacology, MS
- Pharmacology, PhD
- Physician Assistant Studies, MSPAS
- Physiology and Biophysics, PhD
- Physiology, MS
- Public Health Nutrition, MS
- Public Health, Graduate Certificate
- Public Health, MPH
- Readiness Instruction for Biomedical Education (PRIME), Post-Baccalaureate Certificate
- Regenerative Medicine and Entrepreneurship, MS
- Systems Biology and Bioinformatics, MS
- Systems Biology and Bioinformatics, PhD
- Translational Pharmaceutical Science, MS

Graduate/Professional

- Aerospace Physiology, Graduate Certificate
- Aerospace Physiology, Graduate Certificate (Online)
- Aerospace Physiology, MS
- Aerospace Physiology, MS (Online)
- Anesthesia, MSA
- Applied Anatomy, MS
- Biochemistry, MS
- Biochemistry, PhD
- Bioethics, PhD
- Biomedical and Health Informatics, MS
- Biomedical and Health Informatics, PhD
- Biotechnology, MS
- Cell Biology, PhD
- Clinical Research, MS
- Clinical Translational Science, PhD
- Epidemiology and Biostatistics, MS
- Epidemiology and Biostatistics, PhD
- Experimental Biotechnology, Graduate Certificate
- Genetic Counseling, MS
- Genetics, PhD
- Health Informatics, Graduate Certificate
- Interschool Quantitative Biosciences, Graduate Certificate
- Maternal and Child Nutrition, Graduate Certificate
- Medical Physiology, MS
- Medical Physiology, MS (Online)
- Medicine (Lerner College Program), MD
- Medicine (WR2/University Program), MD
- Molecular Biology and Microbiology, PhD

Dual Degrees

- Aerospace Physiology, MS (Online)
- Anthropology, MA/Medicine, MD
- Anthropology, MA/Public Health, MPH
- Anthropology, PhD/Medicine, MD
- Anthropology, PhD/Public Health, MPH
- Applied Anatomy, MS/Medicine, MD
- Biochemistry, MS/Business Administration, MBA
- Biochemistry, MS/Law, JD
- Biochemistry, MS/Patent Practice, MA
- Bioethics and Medical Humanities, MA/Genetic Counseling, MS
- Bioethics and Medical Humanities, MA/Law, JD
- Bioethics and Medical Humanities, MA/Medicine, MD
- Bioethics and Medical Humanities, MA/Nursing, MSN
- Bioethics and Medical Humanities, MA/Public Health, MPH
- Bioethics and Medical Humanities, MA/Social Work, MSW
- Biomedical Engineering, MS/Medicine, MD
- Business Administration, MBA/Medical Physiology, MS
- Business Administration, MBA/Medicine, MD
- Business Administration, MBA/Public Health, MPH
- Clinical Research, MS/Medicine, MD
- Dental Medicine, DMD/Public Health, MPH
- Law, JD/Medicine, MD
- Medical Scientist Training Program (MSTP), PhD/Medicine, MD
- Medicine, MD/Oral and Maxillofacial Surgery, Professional Certification
- Nutrition, MS/Medicine, MD
- Nutrition, MS/Public Health, MPH

- Pathology, MS/Medicine, MD
- Pharmacology, MS/Medicine, MD
- Programs Toward Graduate or Professional Degrees
- Public Health, MPH/Law, JD
- Public Health, MPH/Medicine, MD

School of Medicine Certificates

Certificate programs in the School of Medicine offer an alternative way to take a deeper dive into a targeted subject area allowing you to advance your career, enhance your credentials, or prepare for graduate or professional school. These programs allow students to strengthen their academic transcripts and gain the foundational knowledge needed for future success!

Departmental Certificate in Cancer Biology

216.368.1994

Stanton Gerson, MD, Director

Damian J. Junk, PhD, Assistant Director Cancer Training and Education, Case Comprehensive Cancer Center

The Clinical Oncology Research Career Development Program (CORP) provides interdisciplinary training in clinical and translational oncology research for clinical oncology junior faculty physicians who are interested in pursuing academic research careers as physician-scientists. This training addresses the need for clinician investigators to translate fundamental cancer research discoveries into medical care of cancer patients. Eligible candidates are physicians (MD, DO or MD/PhD) with a clinical training background in one of a number of oncology disciplines, including medical, surgical, pediatric, dermatological, gynecological and radiation oncology. Scholars select one of three areas of concentration:

- Mechanism Based Therapeutics and Clinical Trials
- Stem Cell Biology and Hematopoietic Malignancy Clinical Trials
- Prevention, Aging and Cancer Genetics and Clinical Trials

The Scholars' individual training plan consists of a 2-year certificate program which includes a didactic curriculum designed to provide basic background and highly individualized advanced training in both clinical and methodological components of clinical and translational cancer research.

Each Scholar is co-mentored by both a basic or behavioral scientist and a clinical investigator. A mentoring committee comprised of faculty in the Scholar's focus of oncology research provides additional guidance and support. During the period of mentored laboratory training, the Scholars develop original hypothesis-based experiments related to disease mechanisms at a molecular or cellular level. As the Scholars build on their laboratory conclusions to create and implement clinical trials, they are mentored by clinical investigators. Clinical trials are aimed at developing new methods for diagnosis and testing promising ideas for novel therapeutic interventions. These components come together with the Scholar's presentations at a national conference, publications in peer review journals and application for independent funding as a physician-scientist.

This two-year certificate program is administered through the Case Comprehensive Cancer Center. The overall goal of the K12 CORP certificate program is to foster interdisciplinary training in clinical

and translational oncology therapeutic research for physicians. Upon completion of this 15-19 hour two-year training, scholars will earn the K12 CORP Certificate.

The formal didactic program includes a course in responsible conduct IBMS 500 or CRSP 603; CNCR 501 ; and one elective (1-3 credit hours). Additional required activities include Clinical Protocol Tutorials, Intensive Mentored Research Project, Ongoing seminars, Meetings and Presentations; and applications for independent funding.

Formal Didactic Curriculum Coursework:

Code	Title	Credit Hours
Required Courses:		
IBMS 500	On Being a Professional Scientist: The Responsible Conduct of Research	1-2
or CRSP 603	Research Ethics and Regulation	
CNCR 501	Translational Cancer Research A ^a	1
<i>Choose one of the following:</i>		
CRSP 401	Introduction to Clinical Research Summer Series	3
CRSP 406	Introduction to R Programming	3
CRSP 412	Communication in Clinical Research - Grant Writing	1
CRSP 413	Communication in Clinical Research - Oral Presentation, Posters, and the Mass Media	1
CRSP 500	Design and Analysis of Observational Studies	3
CRSP 501	Team Science - Working in Interdisciplinary Research Teams	1

a All four modules required, one each semester of the program (501-1, 501-2, 501-3, 501-4)

Departmental Graduate Certificate in Global Health

Daniel Tisch, PhD, Director

216.368.0875

The Certificate in Global Health is awarded in recognition of a student's interest and preparation for continued involvement and a potential career in global health. The certificate will highlight the student's global health focus and ability to work across disciplines. The requirements for the certificate differ by discipline, but emphasize discipline-specific and interdisciplinary coursework and/or projects that reinforce skills and promote a broad understanding of global health issues. A certificate entails the completion of the course INTH 301/INTH 401: Fundamentals of Global Health, a minimum of 2-3 additional courses that relate directly to international or health issues, a project related to global health and successful completion of a major or discipline. Students may also substitute coursework for a project with permission of faculty.

The certificate is the centerpiece of the Framework for Global Health Curricula. This is a group of professors across the Case Western Reserve University campus whose objective is to promote education in global health issues. Nearly every department at CWRU offers multiple educational activities in global health.

Rather than attempt to own all of these activities, the group at CWRU (representing the departments of Anthropology, Bioethics, Biology, Biostatistics/Epidemiology, Mathematics, Medicine, Nursing, and Engineering) elected to develop a structure within which each department could develop independently while taking advantage of what the others

had to offer. The organizing structure for this became the certificate program rather than a separate degree. This approach enables students to graduate within a recognized discipline and to recognize a student's focus, time and effort in training. Each student in the certificate program will be grounded in global health by a core course (INTH 301/INTH 401) that will allow them to understand concepts and vocabulary across disciplines and that will facilitate meaningful communication with others based in a different discipline. In addition to the certificate, the Framework for Global Health Curricula has identified and is annotating all global health-related courses at CWRU. It has supported the recent revival of Medical Spanish and new courses and electives in global health.

Requirements for Certificate in Global Health

Anthropology Undergraduate

Code	Title	Credit Hours
INTH 301	Fundamentals of Global Health	3
ANTH 215	Health, Culture, and Disease: An Introduction to Medical Anthropology	3
ANTH 359	Introduction to Global Health	3
Approved ANTH elective		3

Graduate

Code	Title	Credit Hours
INTH 401	Fundamentals of Global Health	3
ANTH 459	Introduction to Global Health	3
ANTH 511	Seminar in Anthropology and Global Health: Topics	3
Approved ANTH elective		3

Bioethics

Code	Title	Credit Hours
INTH 401	Fundamentals of Global Health	3
Two approved BETH electives		6

Population and Quantitative Health Sciences

Code	Title	Credit Hours
INTH 401	Fundamentals of Global Health	3
PQHS 484	Global Health Epidemiology	1 - 3
One approved PQHS elective		3
Complete an epidemiology research project with global perspective (may be substituted with other coursework)		

Math/Applied Math specialization

Code	Title	Credit Hours
INTH 301 or INTH 401	Fundamentals of Global Health	3
PQHS 431 or PQHS 490	Statistical Methods I Epidemiology: Introduction to Theory and Methods	3
MATH 449	Dynamical Models for Biology and Medicine	3
Complete a heal related modeling project with global perspective (may be substituted with other course work).		

Medicine

Code	Title	Credit Hours
INTH 401	Fundamentals of Global Health	3
Complete two elective courses selected from list of approved electives in the Medicine Department		
Complete a global health related project (may be student's thesis or may be substituted with other course work)		

Nursing Undergraduate

Code	Title	Credit Hours
INTH 301	Fundamentals of Global Health	3
NURS 372	Health in the Global Community	3
NURS 394	Global Health Seminar	3
Complete a global health related project (may be substituted with other course work)		

Graduate

Code	Title	Credit Hours
INTH 401	Fundamentals of Global Health	3
PQHS 484	Global Health Epidemiology	1 - 3
NURS 394	Global Health Seminar	3
Complete a global health related project (may be substituted with course work)		

Biology

Code	Title	Credit Hours
INTH 301 or INTH 401	Fundamentals of Global Health	3
Approved BIOL electives		

Engineering

Code	Title	Credit Hours
INTH 301 or INTH 401	Fundamentals of Global Health	3
Approved electives Engineering related courses		

Mandel School of Applied Social Sciences

Code	Title	Credit Hours
INTH 401	Fundamentals of Global Health	3
Approved SASS elective		

Departmental Graduate Certificate in Clinical Research

James Spilsbury, PhD, Director
Center for Clinical Investigation
Contact Education Administrator
216.368.2601

This **11 credit hour program** provides the foundational training in clinical research methods to those individuals who are seeking an alternative to the Master of Science in Clinical Research. It is geared towards clinicians and other health-science professions who are interested in conducting

clinical research and/or collaborating with other clinician-scientists who are conducting clinical research. This program is also beneficial to health-science students, basic-science researchers, and other health science professionals who would like to enhance their skills in patient-oriented research.

The Clinical Research Certificate program is a four course, 11 credit hour program. Students who successfully complete the required coursework will receive a Certificate in Clinical Research. Coursework includes Introduction to Clinical and Translational Research; Study Design and Epidemiologic Methods; Advanced Statistics: Linear Models; and a course on Research Ethics and Regulation.

Admissions will be administered by the Clinical Research Scholars program in the Populations and Quantitative Health Science Department. Individuals who want to participate in the program will complete an online application form that includes a brief personal statement describing the reason(s) for seeking clinical research training and a recent CV or resume. Per CWRU School of Graduate Studies requirements, individuals who are not already graduate-degree-seeking students at CWRU must submit to the School of Graduate Studies a completed **non-degree application form**. Individuals who are not faculty, staff, or employees of CWRU must also submit a transcript or copy of their diploma, documenting completion of a baccalaureate degree. Once accepted into the Certificate program, participants will register for the courses through the Student Information System. The program will have rolling admissions, and students will be able to start taking courses in the summer or fall semester. The coursework for the Certificate will be listed on the official CWRU transcript. However, the Certificate in Clinical Research will be issued by the Department of Population and Quantitative Health Sciences, not the University, and will not appear on the official CWRU transcript.

Performance Standards: A grade of B or higher in each graded course will be required for successful completion of the Certificate program. It is the responsibility of the student to complete and submit a **Program Progress Checklist** after completion of each course.

Required Courses

Code	Title	Credit Hours
CRSP 401	Introduction to Clinical Research Summer Series	3
CRSP 603	Research Ethics and Regulation	2
NURS 630 or CRSP 431	Advanced Statistics: Linear Models Statistical Methods I	3
PQHS 490	Epidemiology: Introduction to Theory and Methods	3

Additional Requirement: All students are required to be certified (Continuing Research Education Credit, or CREC) in human subjects research before they can complete the program.

Exit Standards: Students who complete all required coursework and CREC certification will submit a checklist to the Clinical Research Scholars Program notifying the Education Administrator/Manager that all coursework has been completed. This administrator will verify with the registrar's office that all requirements have been met and will then issue a certificate to the enrollee, documenting completion of the program.

Departmental Graduate Certificate in Health Informatics

The 12 credit hour graduate certificate is granted from the Case Western Reserve School of Medicine, Department of Population and Quantitative Health Sciences, and is suited for some students, such

as medical fellows, who may only have time to take one course per semester over two years. The 12 credit hour certificate provides the background necessary to complete the competencies from the American Medical Informatics Association (AMIA). This certificate will not show on an official Case Western Reserve transcript, and is more flexible. For details on required classes, please contact Lauren Mazzagatti (lxm565@case.edu).