

Student
Research
Opportunities
2016–17



Washington
University in St. Louis

SCHOOL OF MEDICINE

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Foreword

Washington University School of Medicine is an internationally recognized institution where an outstanding faculty directs compassionate patient care and world-class research. Consistently ranked as one of the best medical schools in the country, Washington University offers stimulating and challenging educational opportunities.

Although many students come to Washington University for the superb clinical training the school offers, approximately 95 percent of each year's graduates of the School of Medicine report having been involved in research. During the Washington University fiscal year ending June 30, 2015, the School of Medicine received \$352.3 million from the National Institutes of Health (NIH).

The vast size and broad scope of the research activities at Washington University provide many opportunities for any medical student who has an interest in pursuing research into any aspect of modern medicine.

This brochure provides a brief description of the following research opportunities: Summer Research Opportunities, One-Year Research Opportunities, the Medical Scientist Training Program (MSTP), and Fourth-Year Research Electives. Additional information covers financial considerations, length of programs, eligibility requirements, application instructions, and contact information.

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Summer Research Opportunities for Medical Students

Summer research opportunities for medical students involve participation in two to three months of full-time research in the following programs: National Heart, Lung, and Blood Institute (NHLBI)/Dean's Summer Research, Clinical Research Training Center (CRTC) Predoctoral Clinical Research Training Program TL1–Summer, National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK), Otolaryngology/NIH, Mallinckrodt Institute of Radiology, and Alvin J. Siteman Cancer Center. Approximately 95 students participate in summer research each year.

National Heart, Lung, and Blood Institute (NHLBI)/Dean's Summer Research Program

Objectives: To provide medical students with hands-on research experience. This can be a first-time experience or a project related or unrelated to research conducted as an undergraduate. Excellent mentors from a broad range of basic and clinical sciences are available. A Washington University Summer Research Fellowship can provide a strong background for applications to the yearlong and MD/PhD (MSTP) degree programs, lead to abstracts at meetings and to publications, and enhance applications for competitive residencies.

Length of Program: Students work full-time on their research project for 2.5 months during the period from late May until classes start in August.

Funding: Fellowships provide a stipend. Support is provided through the NHLBI and Washington University School of Medicine Dean's Fellowships.

Eligibility: Applicants must be full-time medical students at Washington University School of Medicine and in good academic standing without encumbrances. All research is conducted under the direction of a full-time faculty member of the School of Medicine.

Research Interests: Students may consult a list of faculty research interests at dbbs.wustl.edu and medicine.wustl.edu/directory/academic-departments/. Students should visit prospective mentors to discuss possible projects and background reading.

Requirements: Students are required to write a one- to three-page research proposal by March 15, to write an abstract and present a poster at the annual Research Training Symposium and Poster Session in the fall, and to

write a research report in August. Research must have appropriate human or animal committee approvals, and students are required to attend a Research Ethics Seminar and the Friday Summer Seminar Series. No academic credits may be earned from the Summer Research Program.

Stipend: Students receive \$1,948 per month.

Application: Deadline is March 15. Interested students may request an application or obtain additional information by contacting:

Koong-Nah Chung, PhD
Associate Dean for Medical Student Research
Director of the Office of Medical Student Research
Admissions Subcommittee Chair
Instructor of Cell Biology and Physiology
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email: omsr@wustl.edu

Roz Robinson
Program Coordinator
Office of Medical Student Research
voice: (314) 362-6857
email: robinsonrb@wustl.edu

Clinical Research Training Center Predoctoral Clinical Research Training Program TL1 — Summer

Overview: The Clinical Research Training Center (CRTC) Predoctoral Clinical Research Training Program TL1 — Summer provides medical and allied health students with a two-month (June and July) mentored clinical or translational research experience, didactic course work, and career development seminars. As a core educational component of the Institute of Clinical and Translational Sciences (ICTS) at Washington University, the CRTC Predoctoral Program strives to:

- Promote clinical and translational research training for medical and allied health care predoctoral students
- Create an efficient entry into a variety of clinical research careers
- Allow flexibility to develop novel and unique clinical and translational research projects

Objectives: The CRTC Predoctoral Program TL1 — Summer is an introductory program that supports a select group of trainees and exposes them to excellent patient-oriented researchers. In addition, the program will instruct students to:

- Design and conduct clinical research
- Analyze data
- Consider relevant ethical and legal issues
- Give oral presentations
- Develop and present scientific posters

Eligibility and Requirements: Doctoral-degree students in medicine, physical therapy, occupational therapy, biomedical engineering, pharmacy, audiology and communications sciences, and other allied health professions who wish to learn more about academic careers in clinical and translational research are eligible. No prior clinical or translational research is required. Trainees accepted into the program must be able to commit full-time effort to the program for the two-month duration of the appointment (June and July), successfully complete all course work, attend the Research Ethics Seminar and the Friday Summer Seminar Series, and participate in the annual Research Training Symposium and Poster Session in October following the trainees' appointment.

TL1 Predoctoral Summer Program Required Courses:

- Analysis of Clinical Data (M17-5881, Summer, 1 credit)
- Designing Outcomes and Clinical Research Workshop (M17-504, Summer, 1 credit)

Stipend: Students receive the equivalent to the current NIH predoctoral stipend level (\$1,948 per month in 2016).

Application: Applications to the CRTC Predoctoral Program TL1 — Summer are accepted online at crtc.wustl.edu. Applications open in late fall of each year, and close in early spring of the following year. Prospective trainees are responsible for completing all required steps of the application, admission and enrollment process.

More Information: For more information, including specific application and course work requirements, please visit the program website at crtc.wustl.edu or contact:

Jay Piccirillo, MD, FACS
CRTC Predoctoral Program Director
voice: (314) 362-8641
email: piccirilloj@ent.wustl.edu

Clinical Research Training Center — Predoctoral Program
Washington University School of Medicine
Campus Box 8051
660 S. Euclid Ave.
St. Louis, MO 63110
email: crtcpredoc@dom.wustl.edu

Trans-NIDDK Short-Term Training Program for Medical Students

Overview: The goal of the Trans-NIDDK Short-Term Training Program for Medical Students is to introduce medical students to career opportunities in basic or clinical research related to diabetes, obesity, endocrine disorders, metabolic diseases, nutritional disorders, digestive and liver diseases, and kidney or urologic disorders. Sixteen medical students may participate for up to three months of the summer. The program is particularly interested in recruiting minority students both from this institution and outside institutions.

Medical students entering this program will pair with faculty on this training grant to develop a three-month summer research experience. They will participate in a weekly series of talks devoted to developing academic skills. Medical students participating in this program will be encouraged to continue their project and undergo further training in basic or clinical research by entering the yearlong and/or the Medical Scientist Training Program.

Stipend: Students receive \$1,948 per month.

Application: Applications are due March 15. For more information, contact:

Thomas J. Baranski, MD, PhD
Associate Professor
Internal Medicine and Developmental Biology
Washington University School of Medicine
Campus Box 8127
660 S. Euclid Ave.
St. Louis, MO 63110
voice: (314) 747-3997
email: baranski@wustl.edu

Development of Clinician/Researchers in Academic ENT/Summer Research for Students (Otolaryngology T32 Training Program)

Objectives: The overall goal of the Otolaryngology T32 training program is to introduce outstanding predoctoral medical students to the excitement and challenges of research so as to stimulate within them a lifelong curiosity to seek answers to important health-related questions.

The specific aim of the Otolaryngology T32 training program is to provide research experience with mentors conducting basic, clinical, translational, or population health research in diseases and conditions related to deafness and other communication disorders.

The predoctoral medical students will receive a two-month mentored research experience during the summer after their first year of medical school with the immediate goal of encouraging early interest in research, especially in diseases of deafness and other communication disorders.

Length of Program: The two predoctoral students will spend two months in the research laboratory of one of the program faculty. The mentored research experience will be appropriate to his/her short-term appointment.

Requirements: The students will participate in summer courses such as Designing Outcomes and Clinical Research Workshop and Analysis of Clinical Data, all taught at the Clinical Research Training Center. The students will also be expected to present the results of the short-term research as a poster at the annual Research Training Symposium and Poster Session held each fall.

Application: Applications are due February 15. For more information and an application form, contact:

Jay Piccirillo, MD, FACS
OTO T32 Program Director
voice: (314) 362-8641
email: piccirilloj@ent.wustl.edu

Cara Medlock
OTO T32 Program Coordinator
voice: (314) 362-7511
email: medlockc@ent.wustl.edu

Mallinckrodt Institute of Radiology Summer Research Program (MIRSRP)

Overview: For many years, the Mallinckrodt Institute of Radiology Summer Research Program (MIRSRP) has offered undergraduate and medical students an excellent introduction to current radiological sciences research. The wide variety of ongoing research programs include:

- Cardiovascular imaging
- Contrast agent development
- Diagnostic radiology
- Digital imaging
- Magnetic resonance imaging
- Magnetic resonance spectroscopy
- Molecular pharmacology
- Neuroscience imaging
- Nuclear medicine
- Optical imaging
- Positron emission tomography
- Radiopharmaceutical development
- Ultrasound
- X-ray computed tomography

The start and finish dates of the program are flexible. To view the requirements or to download an application, visit mir.wustl.edu and choose Education/Training Programs/Summer Research Program. The direct URL is mir.wustl.edu/research/summer-research-program. Information on research may be found at mir.wustl.edu/research/research-laboratories, which includes descriptions of the various MIR research labs and individual faculty's research interests.

Stipend: Applicants selected to the Summer Research Program will receive \$5,000 for a 10-week summer research period.

Application: Late January prior to the summer research period. Official deadline can be checked online.

Application forms may be found online (available in November), or you may contact Mary Gass at (314) 362-9359 or gass.mary@wustl.edu.

Vijay Sharma, PhD
Associate Professor of Radiology, of Neurology, and of Biomedical Engineering
Program Director, MIR Summer Research Program (MIRSRP)
ICCE Institute, Molecular Imaging Center
Washington University School of Medicine
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St. Louis, MO 63110
voice: (314) 362-9358
fax: (314) 362-0152
email: sharmav@wustl.edu

The Leah Menshouse Springer Summer Opportunities Program at Siteman Cancer Center at Barnes-Jewish Hospital and Washington University School of Medicine

Overview: The Alvin J. Siteman Cancer Center at Barnes-Jewish Hospital and Washington University School of Medicine provides opportunities for undergraduate, graduate, and medical students currently enrolled at Washington University or other accredited universities to apply to work on cancer-focused research projects during the summer. Opportunities range from basic laboratory research to clinical research to prevention/control and population research. Past research project titles include:

- Evaluation of CCL Ligand Expression in Colorectal Cancer
- Dual Affinity Retargeting Agents for the Novel Treatment of AML
- Role of SNAIL1 in Proneural-Mesenchymal Transformation in GBM
- The Role of AXL in Endometrial Cancer
- Creating Personalized Immune Therapies for Melanoma
- Quarters & Pennies: Untold Story of Financial Burden as a Barrier to Healthcare

Stipend and Program Dates: Applicants selected for the program will receive a stipend for a 10-week summer research period from May 30 through August 4, 2017, though some flexibility is available.

Application: Requirements and the application will be available in November via the Summer Opportunities Program webpage on the Siteman Cancer Center website. For further information, please contact SCCSummerOpportunities@wudosis.wustl.edu.

Summer Opportunities Abroad Program (SOAP) — Forum for International Health and Tropical Medicine (FIHTM)

Overview: The SOAP's aim is to provide first-year medical students with practical, engaging international health experience. All aspects of international health are possible focuses of a student's experience, including but not limited to clinical exposure; public health research and implementation; tropical medicine; basic, clinical, or translational research in any topic; volunteer service; cultural or anthropological studies; or health care system comparisons.

Students will arrange their projects with their mentors prior to applying. In order to find a project, students may review previous SOAP projects documented on FIHTM's website, find their own mentor or outside program, or speak with Gary Weil, MD, or Cynthia Wichelman, MD, faculty advisors to FIHTM for SOAP projects, for guidance in finding a project or mentor.

Two faculty who accept first-year students each year are Joaquin Barnoya, MD, MPH, who oversees chronic illness public health research in Guatemala, and Mark Manary, MD, founder of Project Peanut Butter, who oversees malnutrition research in Malawi. Students interested in these programs should contact Barnoya or Manary prior to applying for SOAP.

Stipend: Maximum of \$3,500 each for eight students, with preference given to students with longer rotations. Students can also supplement this with Summer Research Program funding through the Office of Medical Student Research.

Eligibility: First-year medical students planning on completing the project during the summer before second year. Summer fellowships must be a minimum of 8 weeks and must not be in locations that are under a federal travel warning.

Application: Applications are due in early February in order to allow students to consider an alternative summer experience if they are not a recipient. For more information, please contact:

Dr. Gary Weil
Director of SOAP
email: gary.j.weil@wustl.edu

Julia Kolodziej
FIHTM 2015-2016 Student President
email: kolodziejj@wustl.edu
website: fihtm.wustl.edu

Summer Research Opportunities for Undergraduate Students

Summer Research Opportunities for undergraduate students involve participation in two to three months of full-time research in the following programs: Biomedical Research Apprenticeship Program (BioMedRAP), Amgen Scholars Program, BP-ENDURE St. Louis Neuroscience Pipeline Program, Opportunities in Genomics Research, Summer Research Program at the Mallinckrodt Institute of Radiology, and Summer Student Opportunities at the Siteman Cancer Center.

Biomedical Research Apprenticeship Program at Washington University in St. Louis

Overview: The Biomedical Research Apprenticeship Program (BioMedRAP) is a 10-week summer research internship for exceptional students interested in pursuing biomedical research careers. The program is designed to provide a rigorous, in-depth research experience to prepare participants for top-quality PhD and MD/PhD programs in the biomedical sciences.

As a BioMedRAP participant, you will:

- Conduct independent research with outstanding faculty mentors
- Work in a cutting-edge science and technology environment
- Gain exposure to some of the nation's finest biomedical investigators and an extensive variety of research topics
- Receive individualized career counseling and develop your career interests
- Participate in workshops, seminars, and journal clubs
- Build a social network with student peers and faculty
- Prepare to apply to the best PhD and MD/PhD programs in the United States

Eligibility: BioMedRAP selects participants based on academic achievement, leadership, and commitment to diversity. We seek applicants who have challenged themselves and excelled academically; demonstrate experience overcoming substantial educational, cultural or economic obstacles; are first-generation college students, or can demonstrate a strong interest in bringing diverse people together. We encourage

applications from individuals who come from rural or inner-city areas and individuals from groups traditionally underrepresented in biomedical research — specifically African Americans, Hispanic Americans, Native Americans, Pacific Islanders, women, and students with disabilities. Applications are also encouraged from international students currently pursuing a bachelor's degree in the United States. Individuals who have earned a baccalaureate degree and students who are not currently enrolled at a U.S. institution are not eligible to apply.

Benefits of Participation: BioMedRAP participants receive a generous research stipend for 10 weeks of residence in the program. Additionally, on-campus housing and travel to and from St. Louis are covered at no cost to the participants.

Application: The online application is available every year beginning November 1. Early application is recommended. Completed applications must be received no later than February 1.

A Diverse Community of Scholars: Washington University is committed to fostering diversity in the biomedical research community — both at our institution and beyond. By bringing together people of different backgrounds, perspectives, and talents, programs such as BioMedRAP enrich the learning experience, intellectual exchange, and pursuit of scientific discovery for all members of the academic community.

For more information, please contact:

Rochelle Smith, MA
Assistant Provost of Diversity, Director of Outreach
Director, Diversity, Summer Programs and Community Outreach
Division of Biology and Biomedical Sciences
email: dbbs-summerresearch@wusm.wustl.edu

Ebony Page
BioMedRAP Admissions
direct: (314) 362-7456
toll free: (800) 852-9074
email: dbbs-summerresearch@wusm.wustl.edu
website: dbbsummerresearch.wustl.edu

The Amgen Scholars Program at Washington University in St. Louis

Overview: The Amgen Scholars Program at Washington University in St. Louis is designed to recruit exceptional students interested in careers in biological and biomedical sciences with an intensive 10-week summer laboratory experience at one of the top research institutions in the nation. Scholars will engage in an independent research project under the mentorship of faculty at Washington University in St. Louis.

Successful applicants are not required to have had prior research experience. We will select scholars based on their academic record, ability and potential to understand scientific principles, and intellectual curiosity that will likely make them successful in a research career. Students from backgrounds historically underrepresented in the sciences are strongly encouraged to apply. We also encourage students from economically disadvantaged backgrounds and those who attend small liberal arts colleges to apply.

Eligibility: Applicants must be a U.S. citizen or permanent resident undergraduate student enrolled in a four-year college or university in the U.S., Puerto Rico, or other U.S. territory. Prior research experience is not necessary for a successful application. Rather, we will focus on the applicant's demonstrated aptitude in math and science, letters of recommendation, and interest in PhD or MD/PhD training in preparation for a career in biomedical research. Applicants must be a sophomore with four quarters or three semesters of college experience, a junior, or a non-graduating senior who is returning in the fall to continue their undergraduate studies.

Benefits of Participation: Amgen Scholars participants receive a generous research stipend for 10 weeks of residence in the program. Additionally, on-campus housing and travel to and from St. Louis are covered at no cost to the participants along with an all-expenses paid trip to participate in the annual National Amgen Scholars Symposium. A free public transportation pass for travel within the St. Louis metropolitan area also is provided.

Application: The online application is available every year beginning November 1. Early application is recommended. Completed applications must be received no later than February 1.

For more information, please contact:

Rochelle Smith, MA
Asst. Provost of Diversity, Director of Outreach
Director, Diversity, Summer Programs and Community Outreach
Division of Biology and Biomedical Sciences
email: dbbs-summerresearch@wusm.wustl.edu

Ebony Page
Amgen Scholars Program
direct: (314) 362-7456
toll free: (800) 852-9074
email: dbbs-summerresearch@wusm.wustl.edu
website: dbbsummerresearch.wustl.edu

BP-ENDURE St. Louis Neuroscience Pipeline Program at Washington University

Overview: The St. Louis Neuroscience Pipeline program is an NIH-funded Blueprint Program for Enhancing Neuroscience Diversity through Undergraduate Research Education (BP-ENDURE). The Pipeline program is a two-year path to graduate school for exceptional individuals interested in neuroscience, and is a two-summer and academic year commitment. This unique program includes 10-week summer research experiences and academic/professional activities. During the academic year, students participate in the one-credit “Neuroscience Futures” course, which analyzes neuroscience research seminars, either in person or via video conference. Pipeline scholars also continue independent research at their home institutions in the fall and spring. Upon completion of the Pipeline curriculum, participants should be prepared for the rigor of top neuroscience graduate programs.

Eligibility: Applicants must intend to pursue a PhD or MD/PhD in the neurosciences or a related field. The Pipeline program is open to U.S. citizens or permanent residents that are enrolled in a U.S. four-year college or university. Individuals from low income or first generation college backgrounds and groups traditionally underrepresented in neuroscience (African Americans, Native Americans, Hispanic Americans, Pacific Islanders and students with disabilities) are especially encouraged to apply. All levels of undergraduates are eligible and prior research experience is not required.

Benefits of Participation: Participants receive a generous stipend, summer housing and free travel to and from St. Louis. The pipeline program also funds a second summer at Washington University or another research-intensive school. In addition to conducting independent research with outstanding faculty mentors, students receive individualized career counseling, full support to attend the Society for Neuroscience meeting, and more.

Application: The online application is available every year beginning November 1. Completed applications must be received no later than February 1.

For more information, please contact:

Erik Herzog, PhD
Director, NINDS BP-ENDURE: St. Louis Neuroscience Pipeline
voice: (314) 935-8635
email: herzog@wustl.edu
website: dbbssummerresearch.wustl.edu

Opportunities in Genomics Research (OGR) — Undergraduate: Scholars Program at The Elizabeth H. and James S. McDonnell III Genome Institute

Overview: The Opportunities in Genomics Research (OGR) program sponsored by McDonnell Genome Institute is designed to prepare bright, innovative, and talented students for careers in genomics and related fields. This eight-week summer program provides students with an intensive, mentored research experience. Students will be part of an excellent lab team led by one of the established scientists at Washington University School of Medicine. At the end of the program, all participants will give an oral presentation of their summer research findings. The program includes enrichment activities such as a Kaplan GRE course, journal club, career counseling/workshops, and presentation/writing skills workshops.

Provisions of the Program: Competitive stipend, on-campus housing, and travel to/from program

Requirements: Must be a sophomore, junior, or senior at a four-year institution at the time of entry into the program

GPA Requirements: Competitive or highly competitive GPA

Residency: Must be a U.S. citizen or a permanent resident

Major: Science, technology, engineering, or mathematics fields
(some exceptions)

All OGR programs are funded by the NHGRI-Diversity Action Plan, which seeks to increase the number of underrepresented students in genomics. These groups include: African-Americans, Native Americans (including Alaska Natives), Native Pacific Islanders, and Hispanics, Latinos and Chicanos. It also includes students from socioeconomically or culturally disadvantaged backgrounds and students with learning and/or physical disabilities.

For more information, contact:

Cherilynn R. Shadding, PhD
Director of Outreach, Assistant Professor, Genetics
McDonnell Genome Institute
Campus Box 8501
4444 Forest Park Blvd.
St. Louis, MO 63108
voice: (314) 286-1897
email: cshadding@wustl.edu
website: genome.wustl.edu/outreach

Summer Research Program at the Mallinckrodt Institute of Radiology

See Summer Research Opportunities for Medical Students, page 9.

The Leah Menshouse Springer Summer Opportunities Program at Siteman Cancer Center

See Summer Research Opportunities for Medical Students, page 10.

One-Year Research Degree Opportunities for Medical Students

One-year research degree opportunities for medical students involve participation in one year of full-time research in the following programs: MA/MD, Master of Science in Clinical Investigation (MSCI), Master of Population Health Sciences (MPHS), and One-Year Research Without Degree (MD5).

MA/MD Degree Program

Overview: Created in 1982, the master's degree program allows medical students to participate in cutting-edge basic biomedical research or hypothesis-driven clinical research and earn a master of arts degree in preparation for a career in academic medicine. The program is highly flexible, with an objective of providing students with an individualized research experience in an excellent environment.

Eligibility: Applications to the program will be accepted from students who are in the first three years of the medical curriculum and in good standing without encumbrances at Washington University School of Medicine.

Degree Requirements: Full-time research for one year culminating in a presentation before the research advisory committee, submission of a publication-quality manuscript of the presentation, and participation in a research ethics seminar. No academic credit toward the MD degree will be given.

Funding: Fellowship stipends and other support are available through:

Howard Hughes Medical Institute (basic science or clinical research)

hhmi.org/grants/individuals/medfellows.html

Those applying for HHMI funding are strongly encouraged to submit their MA/MD application no later than December 1. The MA/MD Committee will provide an initial review/feedback before the HHMI application is submitted.

Deadline for prior feedback from MA/MD Committee: December 1
HHMI application deadline: early January

**Clinical Research Training Center Predoctoral Program
(clinical research)**

crtc.wustl.edu

Application Deadline: mid-February

**National Institute of Diabetes and Digestive and Kidney
Diseases (diabetes, endocrinology, GI, hepatology, nutrition,
and nephrology research)**

Contact: Thomas Baranski, MD, PhD, at (314) 747-3997 or
baranski@wustl.edu

Application Deadline: early March

Institutional Funding

Contact: Liz Bayer at (314) 362-7190 or bayere@wustl.edu

Application deadline: January

MA/MD Application: All applicants must apply to the program regardless of funding source. For an application or additional information, contact:

Liz Bayer

Washington University School of Medicine

Campus Box 8226

660 S. Euclid Ave.

St. Louis, MO 63110

voice: (314) 362-7190

email: bayere@wustl.edu

website: mamd.wustl.edu

Master of Science in Clinical Investigation Degree Program

Overview: The Master of Science in Clinical Investigation (MSCI) Program provides high-quality, multidisciplinary training in clinical research to promote the successful career development of clinical investigators. The MSCI is available to postdoctoral scholars, junior faculty, and predoctoral students enrolled in established clinical research training programs. Postdoctoral scholars and junior faculty must be within the medicine and allied health professions, conducting clinical research at Washington University or with an affiliated program. Predoctoral students in medicine, psychology, biology and biomedical sciences, social work, audiology, physical therapy, occupational therapy, and related disciplines in the Graduate School of Arts & Sciences who have completed or are enrolled in the intensive Predoctoral Interdisciplinary Clinical Research Training (PICRT) Program are also eligible.

Requirements: The master's program consists of 33 credits and includes the following core curriculum in clinical investigation:

- Designing Outcomes and Clinical Research or Epidemiology for Clinical Research
- Ethical and Legal Issues in Clinical Research
- Intermediate Statistics for the Health Sciences
- Intermediate Methods for Clinical and Outcomes Research
- Introduction to Statistics for Clinical Investigation

Scholars also:

- Conduct independent clinical research under the tutelage of a mentorship committee
- Participate in an ongoing seminar series to present and discuss research as a work-in-progress
- Take elective course work related to their research interests
- Submit a final thesis consisting of a clinical research manuscript submitted to a peer-reviewed journal for publication, or completion of a biomedical entrepreneurship related project

Advanced placement credit can be earned for past equivalent course work as determined on an individual basis up to 9 credit hours.

Tuition: Tuition for the 2016-17 academic year is \$1,250 per credit hour. Courses are open to all paying students. Trainees currently enrolled in other medicine and allied health programs should contact the program director or program coordinator to discuss entry into the MSCI program.

Location: Most courses and seminars are taught during late afternoon or early evening hours on the medical school campus.

Further Information: Visit our website at crtc.wustl.edu or contact Suzie Fragale, curriculum and evaluation coordinator, crtcmsci@dom.wustl.edu.

Master of Population Health Sciences Degree Program

Overview: The Master of Population Health Sciences (MPHS) offered by the School of Medicine is a 10-month, full-time degree program for medical students, residents, fellows and attendings seeking training in clinical research methods. The curriculum emphasizes the role of clinical epidemiology and biostatistics in approaching clinical effectiveness and outcomes research for all medical fields.

The MPHS does not require a research thesis upon completion of the program. Instead, the program uses applied course work to focus on the long-term mastery of skills. Using topics relevant to their careers and interests or research being done while in the program, MPHS students practice the art of developing research study protocols, performing systematic reviews, designing epidemiologic studies, writing grants, and much more. Many students go on to produce award-winning research using their applied coursework and skills learned in the program. Students looking for research project ideas can work with the MPHS Medical Student Mentor to find opportunities within Washington University.

MPHS students deepen their learning by choosing one of four concentrations: Clinical Epidemiology, Health Services, Quantitative Methods, or Psychiatric and Behavioral Health Sciences.

Prospective Students: Applicants should be in the process of completing a degree in a clinical training program at the doctoral level or should have completed such a degree. The pace of course work assumes students have familiarity with clinical medicine.

Program Format: For medical students, the MPHS program is a full-time, 10-month format. The maximum course load is 18 credit hours per semester.

Core MPHS Courses:

- Introduction to SAS for Clinical Research
- Introductory Biostatistics for Clinical Research
- Intermediate Biostatistics for Clinical Research
- Ethics in Population and Clinical Health Research
- Introductory Clinical Epidemiology
- Intermediate Clinical Epidemiology
- Applied Epidemiology

Information on elective courses is available at mphs.wustl.edu.

MPHS Program: The MPHS provides medical students with an opportunity to supplement their clinical training and course work with a quantitative approach to population health research. Students develop core skills in epidemiology and biostatistics, which can be applied to research in any clinical field, from primary to specialty care. The program is intended for medical students who plan to incorporate clinical effectiveness or outcomes research into their clinical careers. The program is not restricted to Washington University medical students; students from other medical schools are encouraged to apply. Most medical students obtain their MPHS degree after the second or third year of medical school.

Application: For the 2017-2018 academic year: January 13, 2017

Notification of Students of Admission Decision: February 24, 2017

Commitment Deadline: April 14, 2017

Further Information: The director of the MPHS program is Graham Colditz, MD, DrPH. Additional information can be obtained at mphs.wustl.edu or by emailing mphs@wustl.edu.

One-Year Research Without Degree Program (MD5)

Number of Participants: Available to all Washington University medical students at any point in the curriculum.

Length of Program: Completed in one year; in exceptional circumstances, a second year may be permitted.

Funding: None through Washington University School of Medicine, though students may receive a stipend from their research mentor. If a stipend is available, the primary university appointment must be as a full-time student. A secondary appointment as a predoctoral fellow or trainee, or as a graduate research assistant is acceptable. These appointments may imply stipend limits. Students are not eligible for employee benefits, but the department may elect to cover student health costs under separate payment. Tax liability and withholding will depend on the appointment and the individual's circumstances.

Project Guidelines and Eligibility: Students who wish to take advantage of this program should select a research mentor and obtain permission to work with him/her for one year. The arrangement should then be

approved by the mentor and by the Associate Dean for Medical Student Research through the application process.

Because this is a recognized program endorsed by the school, students are registered for the year for this course of study with a Pass/Fail grade option and are considered full-time students during that time. No tuition is charged. A nominal registration fee is charged, and the student health fee is charged if the research is performed at a local institution.

Requirements:

- An independent research project must be completed.
- The application process requires a completed application form and a research proposal due one month prior to the start of the research year.
- Students and mentors are expected to meet regularly throughout the year to ensure timely progress and benefit of mentor guidance and feedback.
- No thesis is required. However, a final research report must be submitted to the mentor and the Associate Dean for Medical Student Research at the completion of the research year.
- The mentor issues to the Associate Dean for Medical Student Research a final grade of Pass or Fail and an evaluation of the student's performance at the completion of the research year. This grade will be recorded on the student's permanent academic record.

Application: Due one month prior to the start of the research year. The application and the research proposal are submitted to the Associate Dean for Medical Student Research. Students interested in the program may obtain additional information and an application by contacting:

Koong-Nah Chung, PhD
Associate Dean for Medical Student Research
Director of the Office of Medical Student Research
Admissions Subcommittee Chair
Instructor of Cell Biology and Physiology
Washington University School of Medicine
Campus Box 8077
660 S. Euclid Ave.
St. Louis, MO 63110
voice: (314) 362-6844
email: omsr@wustl.edu
website: mdstudentresearch.wustl.edu

Roz Robinson
Program Coordinator
Office of Medical Student Research
voice: (314) 362-6857
email: robinsonrb@wustl.edu

One-Year Research Funding Opportunities for Medical Students

For the MA/MD and MSCI degree programs for medical students, stipends and other support are available through the following fellowships: Howard Hughes Medical Institute, Clinical Research Training Center Predoctoral Program, National Institute of Diabetes and Digestive and Kidney Diseases Training Grant, and the Institutional Funding for the MA/MD Program.

Howard Hughes Medical Institute

Overview: Basic science or clinical research — hhmi.org/grants/individuals/medfellows.html

Application Deadline: early January

Clinical Research Training Center Predoctoral Clinical Research Training Program TL1-Intensive

Overview: The Clinical Research Training Center (CRTC) Predoctoral Clinical Research Training Program TL1-Intensive provides medical and allied health students with a one-year mentored clinical or translational research experience, didactic course work, and career development seminars. As a core educational component of the Institute of Clinical and Translational Sciences (ICTS) at Washington University, the CRTC Predoctoral Program strives to:

- Promote clinical and translational research training for medical and allied health care predoctoral students
- Create an efficient entry into a variety of clinical research careers
- Allow flexibility to develop novel and unique clinical and translational research projects

This is a year-long, pull-out program.

Objectives: The CRTC Predoctoral Program supports a select group of trainees as they embark on careers as patient-oriented researchers by teaching them to:

- Analyze data
- Compete for research funding
- Consider relevant ethical and legal issues
- Develop and present scientific posters
- Design and conduct clinical research
- Write manuscripts and grants

Eligibility and Requirements: Doctoral-degree students in medicine, physical therapy, occupational therapy, biomedical engineering, pharmacy, audiology and communications sciences, and other allied health professions who wish to pursue academic careers in clinical and translational research are eligible. Trainees accepted into the program must be able to commit full-time effort to the program for the duration of the appointment (minimal duration is nine months), successfully complete all course work per the requirements of the individual courses, participate in the annual Research Training Symposium and Poster Session in October immediately following the trainees' appointment, and attend seminars. Trainees also have the opportunity, but are not required, to pursue a Master of Science in Clinical Investigation Degree.

TL1 Predoctoral Intensive Program Required Courses:

- Analysis of Clinical Data (M17-5881, Summer, 1 credit)
- Designing Outcomes and Clinical Research Workshop (M17-504, Summer, 1 credit)
- Designing Outcomes and Clinical Research (M17-513, Fall, 3 credits)
OR Epidemiology for Clinical Research (M17-588, Spring, 3 credits)
- Introduction to Statistics (M17-522, Fall, 3 credits)
- Scientific Writing and Publishing (M17-529, Spring, 2 credits)
- Ethical and Legal Issues in Clinical Research (M17-510, Spring, 2 credits)
- Predoctoral Interdisciplinary Clinical Research Training (PICRT) Seminar, 2 Semesters (M17-515, Fall and Spring, 2 credits per semester)

Stipend: Students receive the equivalent to the current NIH predoctoral stipend level (\$1,948 per month in 2016); intensive students' health-care costs through Washington University are covered.

Tuition: Full tuition funding is provided for courses required by the TL1 Program. Students may be responsible for any tuition needed for additional coursework to fulfill the requirements of a master's degree program.

Application: Applications to the CRTC Predoctoral TL1-Intensive Program are accepted online at crtc.wustl.edu. Applications open in late fall of each year and close in the early spring of the following year. Prospective trainees are responsible for completing all required steps of the application, admission, and enrollment process.

More Information: For more information, including specific application and course work requirements, please visit the program's website at crtc.wustl.edu or contact:

Jay Piccirillo, MD, FACS
CRTC Predoctoral Program Director
voice: (314) 362-8641
email: piccirilloj@ent.wustl.edu

Clinical Research Training Center — Predoctoral Program
Washington University School of Medicine
Campus Box 8051
660 S. Euclid Ave.
St. Louis, MO 63110
email: crtcpredoc@dom.wustl.edu

National Institute of Diabetes and Digestive and Kidney Diseases

Overview: Diabetes, endocrinology, GI, hepatology, nutrition, and nephrology research

Application Deadline: early March

Contact: Thomas Baranski, MD, PhD, at (314) 747-3997
or baranski@wustl.edu

Institutional Funding for the MA/MD Program

Application Deadline: January

Contact: Liz Bayer at (314) 362-7190 or bayer@wustl.edu

Medical Scientist Training Program

Objectives: To prepare individuals for careers in academic medicine and biotechnology. Students complete Doctor of Medicine and Doctor of Philosophy degrees with research in a medically relevant field.

Number of Participants: 25 first-year students annually. Approximately 190 students at all levels of the program.

Length of Program: Students complete the first two years of the MD curriculum, a minimum of three years of original research toward a thesis, and at least 15 months of clinical training. The program may be completed in as little as six years, though seven or eight years is the norm.

Funding: Tuition and student health fees are paid, in addition to a stipend of \$29,500 per year. Funding is provided by the NIH, the Olin Foundation, the School of Medicine, and the Graduate School of Arts & Sciences. International students receive the same level of financial support as U.S. citizens.

Eligibility: Applicants must meet the requirements for admission to the School of Medicine. While no specific undergraduate coursework is required beyond that established by the School of Medicine, individuals should have extensive preparation in their field of interest. The GRE is not required. Competitive applicants will have spent the equivalent of four or more semesters in laboratory research. Although most individuals enter the program at the beginning of their medical studies, medical students in the first or second year at Washington University are encouraged to apply. Student performance is reviewed annually, and high scholastic achievement is expected.

Application: Students must complete the AMCAS and the Washington University School of Medicine secondary application. Direct inquiries to:

Brian Sullivan
Executive Director of MSTP
Washington University School of Medicine
Campus Box 8226
660 S. Euclid Ave.
St. Louis, MO 63110
voice: (314) 362-7458
fax: (314) 362-3369
email: briansullivan@wustl.edu
website: mstp.wustl.edu

Research Electives for Credit in Fourth Year for Medical Students

Number of Participants: Available to all fourth-year medical students.

Length of Program: Six to 12 weeks.

Funding: No remuneration is allowed for electives that are taken for academic credit. Payment or acceptance of a scholarship or stipend outside of a financial aid award for an elective for academic credit is prohibited.

Overview: To qualify for the doctor of medicine at Washington University School of Medicine, students are required to satisfactorily complete a minimum of 36 weeks of clinical or research electives in the fourth (final) year. Research electives must: a) be sponsored by a designated investigator who will outline the project, oversee the student's progress, and evaluate the student's performance; b) be accomplished while the student is enrolled at Washington University School of Medicine; and c) be a project in which the student has worked full-time for a total of at least six weeks. Research electives are on a full-time, daily basis. There is no thesis requirement. Research electives are graded credit/no credit.

Application: Students desiring research work should arrange this with the appropriate faculty member and must file a Research Elective Form with the Curriculum Office at least one month before the research is to begin. For questions relating to scheduling of fourth year plans, contact:

Melanie Smigielski
Manager, Curriculum Office
voice: (314) 747-3854
email: melanie_smigielski@wustl.edu
website: wusmdar1.wustl.edu/medstudents/eletvcat.nsf/ehome?openpage

Washington University encourages and gives full consideration to all applicants for admission, financial aid and employment. The university does not discriminate in access to, or treatment or employment in, its programs and activities on the basis of race, color, age, religion, sex, sexual orientation, gender identity or expression, national origin, veteran status, disability or genetic information. Inquiries about compliance should be addressed to the university's Vice Chancellor for Human Resources, Washington University, Campus Box 1184, One Brookings Drive, St. Louis, MO 63130. The School of Medicine is committed to recruiting, enrolling and educating a diverse student body.

Office of Medical Student Research
Washington University School of Medicine
660 S. Euclid Ave., CB 8077
St. Louis, MO 63110-1093
Phone: (314) 362-6857
Fax: (314) 362-4658
Email: omsr@wustl.edu

Visit **mdstudentresearch.wustl.edu**

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- Discover the right opportunity for you
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