Genetic Epidemiology

Division of Biostatistics

The Division of Biostatistics offers two training programs in Genetic Epidemiology, a postdoctoral master's degree (GEMS) and a certificate program. These programs provide a multidisciplinary educational opportunity for people who want to work at the dynamic nexus of genetics and medicine. There are growing needs for scientists with this training both in academia and industry. With the wealth of data from the Human Genome Project and the availability of powerful new computational approaches, abundant opportunities are now available to explore and characterize the interplay between genes and the environment that affect the biological processes that underlie disease.

The Division of Biostatistics includes world-renowned scientific leaders in their respective areas. D.C. Rao, PhD, director of the Division of Biostatistics and the program director, is one of the founding fathers of the field.

Academic Calendar

Training programs begin approximately July 1 each year with preparatory workshops, followed by intensive summer semester courses. For the fall courses, the programs follow the calendar of the College of Arts & Sciences.

Prospective Students

Those interested in applying for a training program or to learn more information may contact the program manager (biostat-msibs@email.wustl.edu).

Location

The program is located in the Division of Biostatistics on the fifth floor of the Bernard Becker Medical Library (660 S. Euclid Ave.), Rooms 500-508.

Additional Information

Degrees & Requirements

Since genetic epidemiology is a multidisciplinary field, we expect applicants to come from a variety of backgrounds, but primarily those who have earned a terminal degree such as physician scientists and other clinical investigators, particularly postdoctoral fellows and people with terminal degrees in other (related) disciplines who seek to gain expertise in genetic epidemiology. All prospective students must provide evidence of basic skills in genetics, mathematics and computer programming through course work, documented experience or by passing a proficiency exam.

Master of Science in Genetic Epidemiology

An option for those who have completed a doctoral degree (PhD, MD, or equivalent) is to pursue a postdoctoral Master of Science in Genetic Epidemiology (GEMS) degree. The 30-credit-hour program can be pursued either full time or part time but must be completed within three years.

The GEMS program for postdoctoral students has eight core courses, listed below, as well as 6 credits of approved electives:

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<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>MSB 503</td>
<td>Statistical Computing with SAS</td>
<td>2</td>
</tr>
<tr>
<td>MSB 506</td>
<td>R Primer</td>
<td>2</td>
</tr>
<tr>
<td>MSB 515</td>
<td>Fundamentals of Genetic Epidemiology</td>
<td>3</td>
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<tr>
<td>MSB 550</td>
<td>Introduction to Bioinformatics</td>
<td>3</td>
</tr>
<tr>
<td>MSB 5483</td>
<td>Human Linkage and Association Analysis</td>
<td>3</td>
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<tr>
<td>MSB 560</td>
<td>Biostatistics I</td>
<td>3</td>
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<tr>
<td>MSB 512</td>
<td>Ethics in Biostatistics</td>
<td>2</td>
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<tr>
<td>MSB 600</td>
<td>Mentored Research</td>
<td>6</td>
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Total Units: 24

Certificate in Genetic Epidemiology

The 19-credit-hour certificate program is designed to prepare students to work at the interface of genetics, biostatistics, epidemiology and computing. The Certificate in Genetic Epidemiology is earned after successful completion (with a minimum of a B average) of seven core courses plus labs that are normally offered to master's candidates in Biostatistics. To earn the certificate, these courses may be taken over one or two consecutive years:

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<tr>
<td>MSB 503</td>
<td>Statistical Computing with SAS</td>
<td>2</td>
</tr>
<tr>
<td>MSB 506</td>
<td>R Primer (summer)</td>
<td>2</td>
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Research activities of the division span a wide range of topics dealing with a number of disease areas and provide research opportunities at both theoretical and applied levels. Several research projects involve close interaction and collaboration with a number of research groups at the Washington University Medical Center. Independent research programs of the division deal with genetic epidemiology of cardiovascular and metabolic diseases, bioinformatics and statistical issues in imaging sciences and Alzheimer's disease. A number of theoretical and applied problems are addressed, including nature-nurture resolution and identification of the genetic basis of risk factor domains such as lipids, obesity, blood pressure and hypertension, and insulin resistance and diabetes; exploration of gene-gene and gene-environment interactions; and multivariate associations among multiple risk factors. Current and recent collaborative research projects include: a coordinating center for a multicenter study to assess the genetic basis of response to exercise training (HERITAGE); a coordinating center for a multicenter study on the effectiveness of a weight loss treatment implemented in primary care; a coordinating center for a multicenter NETWORK study on the genetics of hypertension (HyperGEN), and the Family Blood Pressure Program (FBPP); coordinating centers for a multicenter study to assess the genetic basis of response to intervention through incorporation of gene-environment interactions (Gensalt); the coordinating center for the PRIDE program with the goal of mentoring junior faculty in underrepresented minorities and/or faculty with disabilities into independent research careers in biomedical sciences; the coordinating center for the Data Analysis and Coordinating Center (DACC), which tracks the education and careers of people who have participated in the NHGRI Diversity Action Plan (DAP) and NHGRI T32s that concentrate on genomics and genetics; important collaborative studies through support roles as biostatistics cores on the Washington University Institute of Clinical and Translational Sciences, the Alzheimer's Disease Research Center, the Adult Children's Study, Healthy Aging and Senile Dementia (HASD), the Dominantly Inherited Alzheimer Network (DIAN), the Alvin J. Siteman Cancer Center, the Silent Infarct Transfusion Study, the Optimization of Chemotherapy for Control and Elimination of Onchocerciasis, the Washington University Spotrias Center, the Washington University Intellectual & Developmental Disabilities Research Center and Childhood Obesity Treatment. We also have a significant role on studies that focus on lung transplants, asthma, COPD, pediatric heart and ischemic heart disease and on several epidemiological research projects developing methods for increasing public awareness and utilization of measures that are known to decrease the likelihood of developing heart disease and for encouraging behaviors that will improve prognosis following a heart attack.

Faculty

Division Director
Dr. Dabeeru Rao, PhD
Visit our website for more information about our faculty (https://biostatistics.wustl.edu/faculty-staff) and their appointments.

A
Amber Sailer Albright, PhD, M PH, BS1
Assistant Professor of Biostatistics (primary appointment)
Assistant Professor of Neurology
PHD University of Alabama-Birmingham 2015
M PH University of North Texas Heal 2005
BS1 University of Texas Austin 2002

C
Ling Chen, PhD, MS, MPH
Assistant Professor of Biostatistics (primary appointment)
Assistant Professor of Medicine
BS Beijing Medical University 1996
PHD University of MO Columbia 2009
MS Beijing Medical University 1998
MPH University South Carolina 2003

G
Chi Gu, PhD, MS
Associate Professor of Biostatistics (primary appointment)
Associate Professor of Genetics
PHD Washington Univ in St. Louis 1992
BS Nanjing Medical University 1982
MS Nanjing Medical University 1985

L
Lei Liu, PhD, MS2, MS1, BS1
Professor of Biostatistics (primary appointment)
PHD University of Michigan 2017
MS2 Virginia Tech 1998
MS1 ZHEJIANG UNIVERSITY 1997
BS1 ZHEJIANG UNIVERSITY 1994

M
J. Philip Miller
Professor of Biostatistics (primary appointment)
Professor of Medicine
Courses

For course information, please visit the Biostatistics page (http://bulletin.wustl.edu/medicine/departments/biostatistics/#courses) of this Bulletin.