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.

NIH-Sponsored Training Programs

The PRIDE Summer Institute in Cardiovascular Genetics and Epidemiology (CVD-CGE) with a focus on cardiovascular and other heart, lung, blood and sleep disorders in an all-expense-paid summer institute that continues in the summer of 2019 with funding from the NHLBI. The goal is to mentor junior faculty from underrepresented minorities and/or faculty with disabilities into independent research careers in biomedical sciences. For more information, visit the PRIDE-CGE website (https://biostatistics.wustl.edu/education/pridecge) or email the program administrator (biostat-pride-cge@email.wustl.edu).

The Division holds a postdoctoral T32 training grant in cardiovascular genetic epidemiology from the NIH. This training grant is available to PhDs and MDs with a background on cardiovascular and other quantitative sciences or cardiovascular sciences or with experience in statistical genetics and genetic epidemiology. Candidates must be U.S. citizens or permanent residents to be eligible. For more information, visit our Research Training (https://biostatistics.wustl.edu/education/post-doctoral-research-training-in-genetic-epidemiology) webpage, contact the program administrator at 314-362-3697, or send an email to post-doc-search@wubios.wustl.edu.

For more information about our Genetic Epidemiology training programs, including the Master of Science in Genetic Epidemiology (GEMS) or the certificate, please visit the Degrees & Requirements (p. 1) section of this page.

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 on 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 in learning more information may email 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, Rooms 500-508.

Additional Information

Degrees & Requirements

Since genetic epidemiology is a multidisciplinary field, we expect applicants to come from a variety of backgrounds. However, most who apply to this program have earned terminal degrees, 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:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSB 503</td>
<td>Statistical Computing with SAS</td>
<td>2</td>
</tr>
<tr>
<td>MSB 506</td>
<td>Introduction to R for Data Science</td>
<td>2</td>
</tr>
</tbody>
</table>
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:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSB 503</td>
<td>Statistical Computing with SAS (summer)</td>
<td>2</td>
</tr>
<tr>
<td>MSB 560</td>
<td>Biostatistics I (summer)</td>
<td>3</td>
</tr>
<tr>
<td>MSB 506</td>
<td>Introduction to R for Data Science (summer)</td>
<td>2</td>
</tr>
<tr>
<td>MSB 570</td>
<td>Biostatistics II (fall)</td>
<td>3</td>
</tr>
<tr>
<td>MSB 515</td>
<td>Fundamentals of Genetic Epidemiology (fall)</td>
<td>3</td>
</tr>
<tr>
<td>MSB 550</td>
<td>Introduction to Bioinformatics (fall)</td>
<td>3</td>
</tr>
<tr>
<td>MSB 5483</td>
<td>Human Genetic Analysis (fall)</td>
<td>3</td>
</tr>
<tr>
<td>Total Units</td>
<td></td>
<td>19</td>
</tr>
</tbody>
</table>

Research

Research activities of the division span a wide range of topics relevant to a number of disease areas, and they 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 involve the 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 the identification of the genetic basis of risk factor domains such as lipids, obesity, blood pressure and hypertension, and insulin resistance and diabetes; the exploration of gene-gene and gene-environment interactions; and multivariate associations among multiple risk factors.

Our current and recent collaborative research projects include the following:

- 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 of the effectiveness of a weight loss treatment implemented in primary care
- A coordinating center for a multicenter NETWORK study of 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 the incorporation of gene-environment interactions (Gensalt)
- The coordinating center for the PRIDE program, with the goal of mentoring junior faculty from underrepresented minorities and/or faculty with disabilities into independent research careers in the 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 in NHGRI T32s that concentrate on genomics and genetics
- Important collaborative studies through support roles as biostatistics cores for 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 Sporotriasis Center, the Washington University Intellectual & Developmental Disabilities Research Center, and Childhood Obesity Treatment
- In addition, we play a significant role in studies that focus on lung transplants, asthma, chronic obstructive pulmonary disease, pediatric heart disease and ischemic heart disease. We are also part of 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 after 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.
Amber Salter Albright, BS1, PHD, M PH
Assistant Professor of Biostatistics (primary appointment)
Assistant Professor of Neurology
BS1 University of Texas Austin 2002
PHD University of Alabama-Birmingham 2015
M PH University of North Texas Heal 2005

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

Charles William Goss, PHD, MS
Instructor in Biostatistics (primary appointment)
Instructor in Medicine
BA University of Michigan 2018
BS University of Michigan 2003
PHD Ohio State University 2014
MS Florida International 2018

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

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

J. Philip Miller
Professor of Biostatistics (primary appointment)
Professor of Medicine
Tenure Held At-Large in the Medical School
BA Washington Univ in St. Louis 1965

Dabeeru C Rao, PHD, MS
Professor of Biostatistics (primary appointment)
Director of the Division of Biostatistics
Professor of Biostatistics in Genetics
Professor of Biostatistics in Psychiatry
Professor of Mathematics
Tenure Held At-Large in the Medical School
BS Indian Statistical Institute 1967
PHD Indian Statistical Institute 1971
MS Indian Statistical Institute 1968

Treva Kay Rice, MA, PHD
Professor of Biostatistics (primary appointment)
Professor of Psychiatry
MA University of Colorado Boulder 1984
PHD University of Colorado Boulder 1987
BS University of Texas Arlington 1981

Kenneth B Schechtman, PHD, MS, MA
Professor of Biostatistics (primary appointment)
Professor of Medicine
Tenure Held At-Large in the Medical School
PHD Washington Univ in St. Louis 1978
MS Purdue University 1971
MA Washington Univ in St. Louis 1978
BS City University of New York 1967

Yun Ju Sung, PHD
Associate Professor of Biostatistics (primary appointment)
Associate Professor of Psychiatry
PHD University of Minnesota 2003

Guoqiao Wang, MA, MS, PHD
Assistant Professor of Biostatistics (primary appointment)
Assistant Professor of Neurology
MA University of Alabama-Tuscaloo 2010
MS Yunnan University 2007
PHD University of Alabama-Birmingh 2014

Chengjie Xiong, PHD, MS
Professor of Biostatistics (primary appointment)
Professor of Mathematics
Professor of Neurology
BS Xinjiang University 1983
PHD Kansas State University 1997
MS Peking University 1989

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