**About the Department**

**Biostatistics at the University at Buffalo**

The Department of Biostatistics of the State University of New York at Buffalo was formed within the School of Public Health and Health Professions (SPHHP) in June 2003. The formation of the Department followed the opening of the SPHHP in January 2003. This new organization allowed for the development of graduate programs in biostatistics and for a more centralized coordination research activities of applied and theoretical instruction. The Department includes biostatisticians at the Roswell Park Cancer Institute, the Research Institute on Addictions, and the Women and Children's Health Research Foundation. These affiliations, in addition to collaborations with researchers in the Center of Excellence in Bioinformatics, the College of Dentistry, the College of Medicine and Biomedical Sciences, and the School of Public Health and Health Professions, provide a rich environment for the education and training of statisticians and biostatisticians. In addition to their classroom studies, the Department's students have opportunities to gain practical training through mentored, hands-on data analyses in the context of important biological and health science research projects. It is a thriving environment and an exciting time for biostatistics at the University at Buffalo.

**Mission of the Department**

The mission of the Department of Biostatistics is to educate and train biostatistical scientists; to collaborate with researchers in the clinical and public health sciences; to conduct methodological research; to collaborate with local, state, or national health institutions; and to serve our University and the statistics and public health professions.

**Teaching Philosophy**

Our philosophy of education is that students learn what they apply. The Department seeks to provide opportunities for students to communicate their knowledge to others through classroom presentations and student seminars.

Faculty bring a philosophy to the classroom and to their mentoring that is consistent with the Department's goals to promote and extend the proper use of statistics in the health sciences, to contribute substantively and methodologically to the advancement of knowledge in health related disciplines, and to aid the advance of evidenced-based medicine, healthcare, public health practice and policy making. This emphasis brings a high degree of relevance to the classroom and enhances students’ opportunities to work as apprentices with faculty. Faculty and students together work with collaborators in the School of Public Health and Health Professions, the School of Medicine and Biomedical Sciences, and at the Roswell Park Cancer Institute.

We believe in a holistic approach to education. The Department is dedicated to providing a wide variety of educational, research, and collaborative opportunities to students in a friendly, respectful, nurturing, and stimulating environment that promotes intellectual and professional development.
Research Activities
The Departmental faculty engages in theoretical, methodological, and applied statistical research. This work is often motivated by their collaborations with health science researchers. There is ongoing involvement in medical informatics and bioinformatics, cancer research, maternal and child health, research on addictions, and epidemiology. Projects span a wide range of topics such as biosurveillance, metabonomics, microarray data analysis, pattern recognition and classification, proteomics, statistical genetics, clinical trials to assess the efficacy of cancer treatments, epidemiologic studies of environmental risk factors, and outcomes research.

Contact Information

Department Phone Number: (716) 829-3690
Department Fax Number: (716) 829-2200
Email address: sphhp-biostat@buffalo.edu

Personnel: Faculty

Interim Chair and Professor
Gregory E. Wilding, PhD  
University of Rochester  
Vice-Chair of Biostatistics at Roswell Park Cancer Institute and Co-Director of the Biostatistics Shared Resource

Research interests: clinical trial design, permutation tests, resampling techniques, goodness-of-fit tests, distributional characterizations, copulas, tests of independence, biostatistics.

Graduate Director and Professor
Lili Tian, PhD  
University of Rochester
Research interests: goodness-of-fit testing; skewed data analysis; order-restricted inference; inverse Gaussian models; design of clinical trials; longitudinal data analysis; survival analysis; analysis of medical expenditure data; generalized variable approach; statistical genetics; cancer research; behavioral studies; health policy studies.

Professor
Marianthi Markatou, PhD  
Pennsylvania State University  
Statistical Sciences (Statistics and Biostatistics): Problems in model assessment and selection, robustness, mixture models, statistical distances, biomarker development and ROC analysis, high dimensional data analysis, large databases data analysis, surveillance in large databases, methods for the analysis of observational data. Interdisciplinary: Machine
learning and data mining, text data mining, biomedical informatics, emerging safety sciences relevant to health, study of dependence in microarrays and proteomics data, comparative safety and comparative effectiveness research.

**Undergraduate Director**

Dietrich Kuhlmann, PhD

University of Missouri

**Research Professor**

John Blessing, PhD

University at Buffalo

Clinical trials, Biostatistics Data Center Administration

Mark Brady, PhD

University at Buffalo Clinical Trials, drug development, time to failure analyses, screening trials

Alan D. Hutson, PhD.

University of Rochester

Biostatistics, clinical trials design, epidemiological modeling, Bioinformatics, computational methods and order statistics

Martin Thomas Morgan, PhD

University of Chicago

Calyampudi Radhakrishna Rao, PhD

Purdue University

National Medical of Science Winner

PhD received at ScD at Cambridge University

Recipient of 27 honorary doctoral degrees in 16 countries

David Tritschler, PhD

University of Toronto

Statistical Analysis of DNA microarrays, statistical genomics, design & analysis of genetic studies, graphical models, casual inference, Bayesian networks, meta-analysis, statistical computation.

**Research Associate Professors**

Song Liu, PhD

University at Buffalo

Vice-Chair of Roswell Park Cancer Institute Dept. of Bioinformatics

Research interests: developing computational and statistical methods to discover genetic risk factors and biomarkers for predicting some human diseases such as cancer using integrative analysis of multi-dimensional data from biomedical science such as microarray, high throughput sequencing, etc.
Michael Sill, PhD  
University of Pittsburgh  
Adaptive designs and inference, Phase I and II clinical trial development, exact methods for small sample sizes, translational research, differences between Bayesian & frequentist methods

**Associate Professors**

Changxing Ma, PhD  
Nankai University  
MPH Concentration Co-Director  
Statistical genetics and experimental design

Jeffrey Miecznikowski, PhD  
Carnegie Mellon University  
MS Program Co-Director  
Research interests: bio-technical image analysis, array comparative genomic hybridization (aCGH) analysis, microarray analysis, nonparametric statistics, bootstrap methods, and software development

Albert Vexler, PhD  
Hebrew University of Jerusalem, Israel  
Research interests: receiver operating characteristic curves analysis; measurement error; optimal designs; regression models; censored data; change point problems; sequential analysis; statistical epidemiology; biostatistics; applications of Bayesian approaches to tests; asymptomatic methods of statistics; forecasting; sampling; optimal testing; nonparametric tests; empirical likelihoods; renewal theory; tauberian theorems; time series; categorical analysis; multivariate analysis; multivariate testing of complex hypotheses; factor and principal component analysis

Jihnhee Yu, PhD  
Texas A & M University  
Research interests: stochastic processes and small clinical trials

**Assistant Professors**

Rachael Hageman Blair, PhD  
Case Western University  
Research interests: mathematical biology, optimization, numerical analysis, inverse problems, statistics and scientific computing, methodology development for mathematical modeling and simulation of metabolic and genetic networks, data analysis including microarray and quantitative trait loci.

Jiwei Zhao, PhD

**Research Assistant Professors**
Kristopher Attwood, PhD  
University at Buffalo  
Research interests: Clinical, observational and diagnostic studies, decision theory, research operations, and statistics education.

William Brady, PhD  
University at Buffalo  
Research interests: statistical methods research focuses primarily on phase I and II clinical trial design and the application of exact methods to binary data.

Kevin Hasegawa Eng, PhD  
University of Wisconsin-Madison  
Research interests: Translational genomics in ovarian cancer; Biomarker development and validation; and statistical genomics algorithms for personalized medicine

Virginia Filiaci, PhD  
University at Buffalo  
Gynecological Oncology Group, Roswell Park Cancer Institute

Terry Mashtare, Jr., PhD  
University at Buffalo

Jianmin Wang, PhD  
Iowa State University  
Roswell Park Cancer Institute

Austin Miller, PhD  
University at Buffalo  
Research interests: The design and analysis of experimental, clinical and observational studies, measurement error models and structural equations modeling

Yoram Shotland, PhD  
Hebrew University of Jerusalem, Israel

Jianmin Wang, PhD  
Iowa State University  
Roswell Park Cancer Institute

Lei Wei, PhD  
Roswell Park Cancer Institute  
University at Buffalo

Qianqian Zhu, PhD  
Roswell Park Cancer Institute  
University at Buffalo

Professors Emeriti

M.M. Desu, PhD  
University of Minnesota  
Nonparametric statistical methods and sample size methodology

Randy Carter, PhD  
Iowa State University  
Research interests: measurement error models, structural equation models, longitudinal data methods, risk assessment, biostatistics, radiation effects, epidemiological modeling, maternal and child health epidemiology
**Adjunct Professor**

Joseph Consiglio, PhD  
University at Buffalo

Leonid Khinkas, PhD  
Voronezh State Univ., Voronezh, USSR

Peter Rogerson, PhD  
Spatial Statistics and GIS Analysis  
University at Buffalo

Enrique E. Schisterman, PhD  
Senior Investigator at NICHD, Washington, DC  
University at Buffalo

**Adjunct Research Professor**

Calyampudi Radhakrishna Rao, PhD  
Purdue University

**Adjunct Associate Professor**

Joseph Lucke, PhD  
Research Institute on Addictions, Buffalo, NY  
University of Kansas

**Adjunct Assistant Professor**

Zihua Hu, PhD  
Center for Computational, Buffalo, New York  
University of Iowa

Tao Liu, PhD  
Institute of Bioinformatics, Chines Academy of Sciences

Pinaki Sarder, PhD

Yijun Sun, PhD  
University of Florida

Li Yan, PhD  
University of Rochester PhD in Physics and University at Buffalo PhD in Biostatistics

**Personnel: Staff**

Amy Barczykowski  
Data Manager, Population Health Observatory

Beth Ann Crvelin  
Assistant to the Chair

Noreen D. McGuire  
Graduate Program Coordinator

Teresa Sikorski  
Department Secretary
BA Statistics

From assessing public opinions through surveys to forecasting business trends to evaluating the effectiveness of medical treatments, there is and will continue to be a demand for individuals who can provide a statistical skill set.

With a bachelor's degree, you will:

- Gain a solid knowledge base in various aspects of statistical theory, methods and applications.
- Advance to graduate or professional study.
- Prepare for success across countless industries, the government and academia.

Requirements and Curriculum

This major requires a minimum of 51 credit hours of coursework. Additional credit hours are required for the bachelor's degree.

<table>
<thead>
<tr>
<th>Credits Required for Major</th>
<th>51</th>
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</thead>
<tbody>
<tr>
<td>Additional Credits Required for UB Curriculum</td>
<td>33</td>
</tr>
<tr>
<td>Additional Credits Required for Electives</td>
<td>36</td>
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<tr>
<td>Total Credits Required for Degree</td>
<td>120</td>
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Core Required Courses

- STA 119 Statistical Methods
- STA 301 Introduction to Probability
- STA 302 Introduction to Stat. Inference
- STA 403 Regression Analysis
- STA 404 Analysis of Variance

Elective Courses

At least three of the following:

- STA 406 Statistical Computing
- STA 409 Statistical Quality Control
- STA 411 Stochastic Processes
- STA 415 Distribution Free Inference
- STA 431 Methods of Survey Samples
- STA 461 Applied Time Series Analysis
One of the following can be substituted for an elective:

- MTH 311 Intro to Higher Mathematics
- Any CSE 300 – 400 level course

**Additional Required Courses**

Five courses from other departments (or their equivalents) are required. Students intending to pursue graduate work in statistics are strongly encouraged to take additional mathematics courses.

- PUB 101 Intro to Public Health
- MTH 141 College Calculus I
- MTH 142 College Calculus II
- MTH 241 College Calculus III
- MTH 309 Introductory Linear Algebra
- CSE 113 Intro to Computer Programming I

**Minor in Statistics**

Our department also offers a Minor in Statistics. Our program provides you with a calculus-based foundation in probability and statistics before progressing into numerous areas of application.

The minor requires seven courses for a total of 26 credits, and a minimum GPA of 2.5 in the first three prerequisite or lower-division courses. All University graduation requirements must be met as well.

**Lower-Division Courses**

These courses will introduce you to the statistical concepts developed in the upper-division courses.

- MTH 141, College Calculus I
- MTH 142, College Calculus II
- STA 119 Introduction to Statistical Methods

**Upper-Division Courses**

- STA 301 Introduction to Probability
- STA 302 Introduction to Statistical Inference
• STA 403 Regression Analysis
• STA 404 Analysis-of-Variance

Administrative Requirements
The Undergraduate Catalog (http://undergrad-catalog.buffalo.edu/) contains official
information regarding university policies. Please consult it for information regarding, for
example, University graduation requirements, course grade policies, academic dishonesty
policy, registration, student records, Application for Degree Form.

Questions about program requirements or curriculum?
Contact undergraduate advisement at sphp-oasa@buffalo.edu or (716) 829-5000.

Course Descriptions
Unless otherwise specified, courses are 3 credit courses.

STA 119 Statistical Methods (4)
Covers topics in descriptive statistics, probability, inference, and experimental design, all of which
are put together to draw conclusions from uncertainty through analysis of experimental data.
Although a general statistical methods course, the material (through examples) is geared towards
sciences majors, especially those in the health sciences. The underlying reasoning behind the
techniques will be explored.

STA 301 Introduction to Probability (4)
Provides students with probability and distribution theory necessary for the study of statistics.
Topics include axioms of probability theory, independence, conditional probability, random
variables, discrete and continuous probability distributions, functions of random variables,
moment generating functions, the Law of Large Numbers, and the Central Limit Theorem.

STA 302 Introduction to Statistical Inference (4)
Introduces principles of statistical inference. Introduces and develops classical methods of
estimation, tests of significance, the Neyman-Pearson Theory of testing hypotheses, maximum likelihood methods, and Bayesian statistics.

**STA 403 Regression and Design of Experiments I (3)**
Regression analysis and introduction to linear models. Topics: Multiple regression, analysis of covariance, least square means, logistic regression, and non-linear regression. This course includes a one hour computer lab and emphasizes hands-on applications to datasets from the health sciences.

**STA 404 Regression and Design of Experiments II (4)**
Presentation of statistical methods for comparing populations and estimating and testing associations between variables. Topics: Point estimation, confidence intervals, hypothesis testing, ANOVA models for 1, 2, and k way classifications, multiple comparisons, chi-square test of homogeneity, Fisher’s exact test, McNemar’s test, measures of association, including odds ratio, relative risks, Mantel-Haenszel tests of association, and standardized rates, repeated measures ANOVA, simple regression and correlation. This course includes a one hour computing lab and emphasizes hands-on applications to datasets from the health related sciences.