# BSC BIOMEDICAL STATISTICS 应用统计学


XJTLU | ACADEMY OF LIFE AND NATURAL SCIENCES 生命与自然科学学院

## CAREERS

There is and will continue to be a growing demand for diversely skilled biomedical statistics professionals from a wide array of companies, hospitals, scientific research institutions, and government agencies. In general, students pursuing a BSc degree in biomedical statistics (with a concentration in biostatistics) have access to a number of exciting career options:

- Pursue advanced degrees in related fields at XJTLU or prestigious universities overseas;
- Join a global or local pharmaceutical firm such as Pfizer, Novartis, AstraZeneca, Jiangsu Hengrui Medicine, and Innovent Biologics as a statistical analysis professional
- Join a contract research organisation, such as Covance and IQVIA, or a biomedical company, such as Boston Scientific and Royal Phillips;
- Join a hospital or a scientific research institution as a researcher;
- Work for a public health institution such as a regulatory agency for food and drugs, a centre for disease control and prevention, a community health care organisation, or an inspection and quarantine agency;
- Join a financial institution or an insurance company to provide technical expertise in statistics, data analysis and data forecasting to a wide variety of sectors.

**START DATE**
Every September

**SCHOOL**
Academy of Life and Natural Sciences

**DURATION**
Four years

**QUALIFICATION**
**XJTLU**
BSc Applied Statistics

**2+2 STUDY**
Currently not available

**University of Liverpool**
BSc Biomedical Statistics

**LOCATION**
Suzhou

**ATTENDANCE**
Full time

## MODULES

### YEAR ONE

In the UK, undergraduate programmes typically last three years, whereas in China, they normally span four years. Accordingly, at Xi'an Jiaotong-Liverpool University (XJTLU), students who have already obtained the required credits and qualifications may be admitted directly into Year 2 of their chosen programme. The majority of students, however, enter Year 1, where they take foundation courses that include language training, basic mathematics, and subject-specific preparatory modules.

### YEAR TWO

**Core Modules**

- BIOSTATISTICS AND R PROGRAMMING
- SURVEY SAMPLING
- ARTIFICIAL INTELLIGENCE IN HEALTHCARE & PHARMACEUTICAL RESEARCH
- PHARMACEUTICAL LEADERSHIP: FROM CONCEPT TO MARKET
- INTRODUCTION TO PROGRAMMING IN JAVA
- INTRODUCTION TO THE METHODS OF APPLIED MATHEMATICS
- ADVANCED LINEAR ALGEBRA
- INTRODUCTION TO PROBABILITY AND STATISTICS
- ANALYSIS 1
- ANALYSIS 2

### YEAR THREE

**Core Modules**

- SAS FOR DATA ANALYSIS
- STATISTICS FORECAST AND DECISION MAKING
- EPIDEMIOLOGY AND EVIDENCE-BASED MEDICINE
- PHARMACOKINETICS AND PHARMACODYNAMICS
- PRACTICAL BIOINFORMATICS
- INTRODUCTION TO OPERATIONAL RESEARCH
- STATISTICAL DISTRIBUTION THEORY
- NUMERICAL ANALYSIS

### YEAR FOUR

**Core Modules**

- FINAL YEAR PROJECT
- REGULATORY SCIENCES AND PROJECT MANAGEMENT
- APPLIED PROBABILITY
- LINEAR STATISTICAL MODELS
- APPLIED MULTIVARIATE STATISTICS

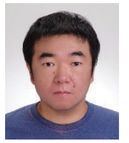
**Optional Modules**

- STATISTICAL METHODS FOR CLINICAL TRIALS
- ARTIFICIAL INTELLIGENCE IN HEALTHCARE
- SURVIVAL ANALYSES
- BIO-COMPUTATION
- BIG DATA ANALYTICS
- MACHINE LEARNING

Xi'an Jiaotong-Liverpool University 西交利物浦大學

# BSC BIOMEDICAL STATISTICS

Biomedical Statistics is a magical and fascinating discipline. It allows data to speak and reveals the philosophies behind data. The big data revolution is bringing unprecedented innovation and development to all walks of life in modern society (including life sciences and pharmaceutical industries). Biomedical Statistics is the magic wand that helps us understand the causes of diseases, guides public health, medical diagnosis and new drug development. It is also the key to opening the door of data science. I hope all experts can gather here to share and appreciate the beauty of data!



Programme Director:
Dr Mengfei Ran
Mengfei.Ran@xjtlu.edu.cn


## KNOWLEDGE AND SKILLS

- This four-year program will provide students a strong foundation in mathematics and statistics, as well as acquired knowledge in related subject matters such as biomedical sciences. Additionally, students will gain proficiency in computer programming and the use of mainstream software programs for conducting data analysis. The training and technical expertise provided will lay a strong foundation for students as they continue their journeys in their chosen fields.

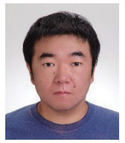
## WHY SHOULD I STUDY BIOMEDICAL STATISTICS AT XJTLU?

- Biomedical statistics (biostatistics) professionals play key roles in drug research and development
- Graduates of this programme will have broad-ranging employment prospects and a highly favourable career market due to chronic industry shortages for biostatistics professionals
- The design of the curriculum tightly corresponds to the needs of both society and enterprise by combining advanced theoretical knowledge with applied practical skills
- We have a strong academic team composed of international experts with profound knowledge of biomedical statistics and life sciences, as well as adjunct staff with solid industry experience
- XJTLU Academy of Life and Natural Sciences has established strategic cooperative relations with more than 10 well-known enterprises in biomedical fields in China. We are located near SIP BioBay which boasts more than 400 pharmaceutical companies that can provide extensive internship opportunities.

Xi'an Jiaotong-Liverpool University
西交利物浦大学

# 应用统计学

**统计学是一门神奇而充满魅力的学科，它让数据发声，揭示数据背后的哲理。大数据革命使得现代社会各行各业（包括生命科学和医药产业）正在经历着前所未有的革新和发展。应用统计学正是帮助我们看到疾病成因，指导公共卫生、医学诊断和新药开发的魔术师之手，也是我们开启数据科学之门的钥匙。但愿诸贤集廊庙，共享数据之美！**




**专业负责人：**
**冉梦飞博士**
**Mengfei.Ran@xjtlu.edu.cn**



## 知识与技能

经过四年的系统学习，本专业毕业生将具备以下知识和能力：

- 掌握数学、统计学、医学、药学、流行病学等学科的基础知识，具有较坚实的数学理论功底和较强的统计分析能力；
- 系统地掌握统计学的基本理论和知识，了解统计学在生物医药领域的作用，熟悉本专业方向所涉及领域的发展现状和趋势；
- 具备较强的分析、解决实际问题的能力和初步的科研能力；
- 熟悉我国药事管理、药物临床试验等的相关法律法规、方针和政策，具有较全面的药事管理、药物临床试验管理和决策的理论基础；
- 掌握必要的计算机、软件和编程技能，熟练应用计算机编程语言，具备使用专业统计软件进行数据处理和分析的职业能力。

## 专业特色

应用统计学本科专业注重培养学生的数理基础和对统计学科的深度理解，也注重培养学生关于数据分析，计算机编程和人工智能方面的能力，本专业还注重培养学生对生物医药产业的专业/职业认知水平。

- 药物研发各个阶段不可或缺的重要角色之一：应用统计学人才是新药研发的核心角色之一，在药物研发的各个阶段均不可或缺。
- 广阔的就业前景：统计学人才稀缺，毕业生就业前景及市场广阔。
- 产学研深入合作、课程兼具理论与实用性：学院与政府、企业深度合作，创新的课程设计和内容体系呼应社会和企业需求，兼具学科先进性与知识技能实用性。
- 国际化师资团队：拥有由统计及生命科学各领域学术专家和具备深厚行业经验的企业教授组成的国际化师资团队。
- 一线实习机会：学院已与六十余家国内生物医药领域知名企业建立战略合作关系，毗邻苏州生物医药产业园，有500多家医药科创企业可提供广泛的实习机会。

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## 就业

随着医药行业的发展和市场的规范化，越来越多的企业、医院、科研院所和国家政府机构的人才梯队建设都对应用统计学专业人才的配备提出了更多要求。一般来说，应用统计学专业的本科毕业生可以：

- 选择本校应用统计硕士专业、或赴其他海内外名校相关专业继续深造；
- 进入企业从事统计分析工作：医药企业每年都需要吸纳大量应用统计学人才，为新药研发的各个环节和阶段提供数据分析和预测支持；此外，一些CRO公司和一些生物医学器械公司也需要应用统计学专业人才。
- 进入医院或科研院所从事科研类工作；
- 进入食品药品监督管理机构、疾病控制中心、社区卫生机构、检疫机构等公共卫生部门；
- 进入其他非生物医药行业（如金融和保险行业等），因为所掌握的统计技能、数据分析和预测判断能力可以在各行业通用。

应用统计学专业的毕业生在医药、生物技术、医院、科研机构、政府部门等领域均有广阔的就业前景。特别是近年本土创新药企、CRO和生物技术公司的发展，也会进一步增加这些企业对应用统计学专业人才的需求。

**开始时间**
每年9月

**学院**
生命与自然科学学院

**2+2 留学模式**
不可选

**学位证书**
**西交利物浦大学**
应用统计学
**利物浦大学**
BSc Biomedical Statistics

**学制**
四年

**学习地点**
苏州

**教学形式**
全日制

## 课程

### 第一学年

在英国，本科阶段学习学制三年，而中国本科阶段学制为四年。因此，对于已获得相应学分、证书的学生，在我校可以直接升入二年级进行专业学习；大多数学生则是进入一年级进行基础课学习，主要课程包括语言课程、基础数学课程和专业相关的预备课程。

### 第二学年

**必修课：**

- 生物统计与R语言
- 抽样调查
- 医疗健康和药物研发中的人工智能
- 医药行业领导力：从概念到市场
- Java编程概论
- 应用数学方法导论
- 高级线性代数
- 概率与统计入门
- 数学分析1
- 数学分析2

### 第三学年

**必修课：**

- SAS数据分析
- 统计预测与决策
- 流行病学与循证医学
- 药代动力学
- 实用生物信息学
- 运筹学导论
- 统计分布理论
- 数值分析

### 第四学年

**必修课：**

- 毕业设计
- 监管科学和项目管理
- 应用概率论
- 线性统计模型
- 应用多元统计

**选修课：**

- 临床试验统计分析
- 医疗人工智能
- 生存分析
- 仿生计算
- 大数据分析
- 机器学习

# XJTLU

**UNDERGRADUATE**

**BSc**
**Biomedical Statistics**
**应用统计学**

**As one of the indispensable research tools applied in the area of biomedicine, biomedical statistics plays a key role in every stage of biomedical research. Following China's National Heath Industry Strategy, the biomedical industry is growing at a rapid pace, and biomedical statistics will be one of the industry's key factors in strengthening that growth.**

**随着国家大健康产业战略的提出，我国的生物医药领域的发展日益蓬勃。作为生物医药领域不可或缺的研究手段之一，应用统计学在研究的各个阶段均发挥着关键的作用，是寻找肿瘤或其他疾病危险因素、判断医学检测的诊断准确度、确定新药的有效性、推断患者存活率等研究的关键研究方法和工具。**