CIEI中国教育国际交流研修学院
国际化拔尖创新人才培养计划
INNOVATION BEYOND BOUNDARIES

国际化拔尖创新人才培养计划

课程介绍

2026 年秋季学期

中国教育国际交流研修学院

“国际化拔尖创新人才培养计划”项目办公室

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国际化拔尖创新人才培养计划课程

一、 课程列表

一级学科	二级学科	课题名称	教授	来自院校
工科类	人工智能/机器人学	人工智能与机械工程:机器人视觉、多传感器融合与自动驾驶	Wang	帝国理工学院
	计算机科学/人工智能	人工智能：机器学习在决策系统、网络安全与计算机集群中的应用	O.Y.	卡内基梅隆大学
	计算机科学/人工智能	数据科学与人工智能：深度学习在自然语言处理中的应用	P.H.	哥伦比亚大学
	计算机科学/人工智能	人工智能：大规模数据分析与机器学习模型中的算法优化	Xu	芝加哥大学
	计算机科学/人工智能	人工智能：科学化数据分析与机器学习应用	G.R.	麻省理工学院
	人工智能/生物医学工程	人工智能算法在生物医学领域的应用	Choi	帝国理工学院
	电子工程	电子工程与人工智能：脑机接口的微电子设计与信号处理原理	N.B.	帝国理工学院
	机械工程	机械工程：新型车辆动力总成控制系统与机械结构优化设计方法	D.H.	卡内基梅隆大学
	环境工程/环境科学	环境工程：PFAS等新型污染物的动态调控与水资源循环处理工艺	J.M.	卡内基梅隆大学
理科类	心理学	人格心理学：个体差异对亲密关系与人类行为的影响探究	V.Z.	康奈尔大学
	心理学	认知心理学与神经科学：大脑思维与记忆之间的关联机制分析	D.C.	康奈尔大学
	物理学	物理学：从广义相对论探索宇宙起源	E.P.	剑桥大学
	数学	应用数学：融合机器学习与统计建模的数值计算方法	A.R.	哥伦比亚大学
	数据科学	商业分析与数据科学：数字化转型时代的智能洞察、优化与决策	C.A.	南加州大学

	生物学	生物学：阿尔茨海默症等脑神经疾病中的分子生物学研究	S.K.	哈佛大学
	生物学/医学	生物学：疫苗、免疫系统与抗肿瘤创新药研究	A.P.	普林斯顿大学
	材料科学与工程	材料科学与能源储存：化学能源与储能系统中的材料结构与性能	J.R.	加州理工学院
	公共卫生/医学	健康治理：行星健康视角下的环境变迁与人类健康研究	K.S.	布朗大学
经管类	经济学	计量经济学：统计机器学习在因果推断与政策优化中的应用	D.R.	剑桥大学
	经济学	土地经济与城市规划：智慧城市解决方案与区域资源布局探究	P.A.	剑桥大学
	金融学	金融学：公司治理、股权结构与资本市场运作分析	R.R.	剑桥大学
	金融学	金融经济学：时间序列建模、GARCH波动率分析与数据预测方法	O.L.	剑桥大学
	金融工程	金融科技：量化投资与人工智能在智慧金融领域的应用	J.R.	伦敦政治经济学院
	管理学	管理学：创业管理中的市场机遇探寻与创新策略	M.G.	剑桥大学
	管理学	体育管理：数据分析在职业联赛IP运营与商业价值评估中的应用	L.M.	南加州大学
人文及其他类	语言学	语言学：文字符号系统与认知神经科学的跨学科逻辑关联	A.N.	伦敦大学
	区域研究	探源“一带一路”历史渊流：丝绸之路沿线古代文明的交流与发展	R.P.	芝加哥大学
	教育学	教育学：K-12儿童驱动学习的创新教学策略与教育政策	S.K.	宾夕法尼亚大学
	传播学	传播学：数字时代的智能传媒与信息传播机制研究	S.M.	马里兰大学

备注：*本课程列表及授课教授在开课前有一定的调整可能性，请具体详询项目办人员*

二、 课程介绍

1. 工科类

课程一《人工智能与机械工程:机器人视觉、多传感器融合与自动驾驶》

Robot Perception, Localization and Navigation

学科方向: 人工智能/机器人学

1.课程介绍

本课程全面介绍机器人技术,涵盖从机器人系统基础到高级导航和学习技术的核心内容。学生将学习机器人运动学、运动规划、传感与感知、多传感器融合等关键知识,同时掌握机器人操作系统(ROS)的概念与编程技能。课程深入探讨同步定位与建图(SLAM)、机器人视觉及自主导航,并结合深度学习在机器人视觉和自主系统中的最新应用,帮助学生掌握前沿技术。

This course provides a comprehensive introduction to robotics, covering key topics from robotic system fundamentals to advanced navigation and learning techniques. Students will learn about robot kinematics, motion planning, sensing, perception, and multi-sensor fusion. The course also introduces the Robot Operating System (ROS), enabling hands-on experience in robot programming. Topics such as Simultaneous Localization and Mapping (SLAM), robot vision, and autonomous navigation will be explored in depth. The course concludes with discussions on the latest advancements in robotics, including deep learning applications in robot vision and autonomous systems.

2.课程大纲

1.机器人概述

2.机器人操作系统(ROS)

3.机器人姿态、坐标和变换

4.机器人运动学和运动

5.机器人感知和感知

6.状态估计和多传感器融合

7.SLAM: 概念和应用

8.机器人视觉

9.自主导航

10.机器人学习和未来发展

1.Overview of Robotics

2.Robot Operating System (ROS)

3.Robot Pose, Coordinates and Transformation

4. Robot Kinematics and Motion

5. Robot Sensing and Perception

6. State Estimation and Multi-Sensor Fusion

7. SLAM: Concepts and Applications

8. Robot Vision

9. Autonomous Navigation

10. Robot Learning and Future Developments

3. 教授介绍



Wang

帝国理工学院

- 帝国理工学院电子电气工程系的机器人与自主系统终身教授
- 帝国理工学院 Sense Robotics 实验室主任
- 帝国理工学院人工智能应用与创新硕士课程的创始主任
- 2024 年度机器人领域最具影响力学者奖荣誉提名

Wang 教授是帝国理工学院电子电气工程系的机器人与自主系统教授，同时担任 Sense Robotics 实验室主任，领导该实验室专注于机器人、自主系统、计算机视觉和机器学习等领域的研究，致力于开发能够在复杂、动态环境中自主运行的智能机器人技术。作为帝国理工学院电子电气工程系和跨学院人工智能旗舰计划 I-X 的一部分，Wang 教授的工作促进了人工智能技术在机器人领域的应用和创新。此外，他也是人工智能应用与创新硕士课程的创始主任。他的研究涉及机器人学、计算机视觉和机器学习的交叉领域，特别关注机器人如何通过概率和学习方法理解并在未知、动态环境中自主操作。主要研究方向包括机器人定位、自动导航、SLAM（同步定位与地图构建）、机器人视觉、机器人学习等技术，并将其应用于实际机器人系统，以应对如气候变化和医疗健康等全球性挑战。Wang 教授还领导团队开发了用于自主检测海上能源基础设施的水下传感和机器人技术，成功完成了 EDF Blyth 海上风电场首个自主风电基础设施检测。此外，他获得了 2024 年度机器人领域最具影响力学者奖荣誉提名，并曾担任《IEEE 自动化科学与工程学报》、 《IEEE 机器人与自动化学报》、国际机器人与自动化大会（ICRA）和国际机器人与自动化系统会议（IROS）的副主编。

Prof. Wang is a Senior Lecturer (Associate Professor) in Robotics and Autonomous Systems in the Department of Electrical and Electronic Engineering at Imperial College London. He is also the Director of the Sense Robotics Lab, which is part of both the Department of Electrical and Electronic Engineering and I-X, Imperial's cross-college flagship initiative in AI. Additionally, he is the Founding Director of the MSc in Artificial Intelligence Applications and Innovation. His research sits at the intersection of robotics, computer vision and machine learning, driving robots and intelligent machines to understand and operate autonomously in unstructured, dynamic environments through probabilistic and learning approaches. His main research areas include robot localisation, autonomous navigation, SLAM, robot vision, robot learning and their application on real-world robot systems to help tackle the challenges we face in our society, from climate change to healthcare. Prof. Wang has led his research team in developing underwater sensing and robotic technologies for autonomous inspection of offshore energy infrastructure, successfully carried out the first autonomous wind farm foundation inspection at EDF's Blyth Offshore Wind Farm. He was awarded the 2024 AI Most Influential Scholar

Award Honourable Mention in Robotics. He has also served as Associate Editors for the IEEE Transactions on Automation Science and Engineering, IEEE Robotics and Automation Letters, ICRA and IROS.

课程二《人工智能：机器学习在决策系统、网络安全与计算机集群中的应用》

Machine Learning for Decision-Making and Optimization

学科方向：计算机科学/人工智能

1.课程介绍

这门课程深入探讨机器学习、在线学习、强化学习以及物联网等领域的前沿技术，旨在为学生提供从理论到实践的全面能力。内容涵盖最大似然估计(MLE)与最大后验估计(MAP)、假设检验与分类、在线学习与多臂赌博机、强化学习、以及大规模计算集群的管理等核心议题。学生还将学习如何将机器学习应用于网络安全，提升入侵检测与防御能力，以及如何在人工智能驱动的物联网环境中设计智能设备和优化决策。

This course provides an in-depth exploration of cutting-edge topics in machine learning, online learning, reinforcement learning, and the Internet of Things (IoT). The curriculum covers key concepts such as Maximum Likelihood Estimation (MLE) and Maximum A Posteriori (MAP) estimators, hypothesis testing and classification, multi-armed bandits, reinforcement learning, and the management of large-scale computing clusters. Students will also learn how to apply machine learning to enhance cybersecurity, including intrusion detection and defense, as well as how to design intelligent systems and optimize decision-making in AI-driven IoT environments.

2.课程大纲

1.MLE / MAP 估计器

2.假设检验/分类

3.在线学习/Bandits 1

4.在线学习/Bandits 2

5.强化学习 1

6.强化学习 2

7.管理服务器群/计算集群 1

8.管理服务器群/计算集群 2

9.网络安全中的机器学习

10.人工智能时代的物联网

1. MLE / MAP Estimators

2. Hypothesis Testing / Classification

3. Online Learning / Bandits Part 1

4. Online Learning / Bandits Part 2
5. Reinforcement Learning Part 1
6. Reinforcement Learning Part 2
7. Managing Server Farms / Computing Clusters Part 1
8. Managing Server Farms / Computing Clusters Part 2
9. Machine Learning in Cybersecurity
10. Internet of Things in the Era of Artificial Intelligence

3.教授介绍



O.Y.

卡内基梅隆大学

- 卡内基梅隆大学电气与计算机工程系教授
- 卡内基梅隆大学 CyLab 安全与隐私研究所核心成员
- 卡内基梅隆大学计算机科学学院的软件与社会系统系学院代理
- 多次荣获卡内基梅隆工程学院院长的早期职业奖学金
- 电气与电子工程师协会（IEEE）的高级会员

O.Y.教授是卡内基梅隆大学电气与计算机工程系的教授，并且是 CyLab 安全与隐私研究所的核心成员。他同时担任计算机科学学院软件与社会系统系的学院代理。他在网络科学、无线通信和物联网安全等领域作出了重要贡献，致力于优化复杂网络系统的设计与安全性。O.Y.教授的卓越研究多次获得卡内基梅隆工程学院院长的早期职业奖学金认可。他还是电气与电子工程师协会（IEEE）的高级会员，体现了他在学术和工程研究领域的显著成就和国际影响力。

O.Y. is a Professor in the Department of Electrical and Computer Engineering at Carnegie Mellon University and a core member of CyLab Security and Privacy Institute. He also serves as the Faculty Director of the Software and Societal Systems Department within the School of Computer Science. O.Y. impactful work in network science, wireless communications, and IoT security has led to the optimization and enhancement of complex network systems. His outstanding research achievements have been recognized multiple times with the Carnegie Mellon College of Engineering Dean's Early Career Fellowships. Additionally, he is a Senior Member of the Institute of Electrical and Electronics Engineers (IEEE), underscoring his significant contributions and influence in the fields of engineering and academic research.

课程三《数据科学与人工智能：深度学习在自然语言处理中的应用》

Data Science: Machine Learning and Natural Language Processing

学科方向：计算机科学/人工智能

1. 课程介绍

机器学习和自然语言处理是两个快速发展的领域，将机器学习应用于自然语言处理，已经推动了人工智能领域的巨大进步。本课程系统介绍了机器学习与自然语言处理（NLP）的基础理论与实践方法，重点讲解如何利用 Python 语言构建高效的数据处理与文本分析系统。课程从编程基础、数据清洗、文本特征提取出发，逐步深入情感分析、文本摘要与主题建模等前沿 NLP 任务，并结合机器学习模型进行性能优化与评估。通过课程，学生将掌握如何构建智能文本分析系统，支持信用评估、市场舆情预测、商业决策优化等关键任务。课程强调实用技能训练，帮助学生为未来的 AI、数据科学与语言技术领域打下坚实基础。

Machine learning and natural language processing are two fast-growing fields, and applying machine learning to natural language processing has driven huge advances in artificial intelligence. This course provides a systematic introduction to the foundational theories and practical applications of machine learning and natural language processing (NLP), with a focus on building efficient data handling and text analysis systems using Python. Starting from programming essentials and data preprocessing, the course advances into core NLP tasks such as sentiment analysis, text summarization, and topic modeling. Students will explore how to apply machine learning techniques to real-world language data, optimize models, and evaluate performance. By the end of the course, students will be equipped to build intelligent text analysis systems that support credit assessment, market sentiment forecasting, and data-driven business decision-making. Emphasis is placed on hands-on skills to prepare students for careers in AI, data science, and language technologies.

2. 大纲介绍

1.语法、变量、运算符、正则表达式

2.集合、字典、列表、循环、I/O 读写

3.数据整理、数据清洗、降维、归一化、插补

4.自然语言处理

5.特征选择

6.文本摘要

7.情感分析

8.网格搜索、验证与评估、性能指标

9.自然语言处理中的主题建模：LDA

10.用于情感分析的高级机器学习模型

1. Syntax, Variables, Operators, Regex, Datetime, Escape Characters, GitHub

2. Sets, Dictionary, Lists, For, While, Do, I/O Read/Write

3. Data Wrangling, Cleaning Data, Dimension Reduction, Normalization, Imputation

4. Natural Language Processing: Text Tokenization, Stemming, Feature Matrix, Introduction

5. Feature Selection: TF-IDF, Feature Vector, N-gram methods

6. Text Summarization: Text summarization and Extraction, Topical modeling and key phrase extraction

7. Sentiment Analysis: Lexicon and Machine Learning, Model Selection

8. Grid Search, Validation and Evaluation, Performance Metrics

9. Topic Modeling in Natural Language Processing: Latent Dirichlet Allocation (LDA)

10. Advanced Machine Learning Models for Sentiment Analysis

3. 教授介绍



P.H.

哥伦比亚大学

- 哥伦比亚大学数据科学教授
- 阳狮传媒集团高级决策副总裁
- 美国 B2B 客户数据平台 CaliberMind 数据科学家
- Quantheta 的联合创始人
- 超过 14 年半导体行业专业咨询经验
- 主导咨询工程数额超过五亿美金
- 拥有上百篇在软件系统设计和数据分析领域的论文

P.H.教授是哥伦比亚大学数据科学教授，他在斯蒂文斯理工学院获得了金融工程博士学位。同时他也是阳狮传媒集团高级决策副总裁，阳狮集团是法国最大及世界第三大的广告与传播集团。除此以外，他还是美国 B2B 客户数据平台 CaliberMind 数据科学家和金融数据分析公司 Sentiquant 的联合创始人。P.H.教授拥有超过 14 年半导体行业专业咨询经验，主导咨询工程数额超过五亿美金，发表过上百篇在软件系统设计和数据分析领域的论文，如《利用社交媒体预测资产价格的持续和反转》，《情绪分析和期权数量能否预测未来收益？》。

P.H. is a professor of data science at Columbia University. He earned his PhD in financial engineering from Stevens Institute of Technology. He is also Senior Vice President for decision-making at Publicis Media Group, the largest advertising and communications group in France and the third largest in the world. He is also a data scientist at the US-Based B2B customer data platform CaliberMind and the co-founder of Sentiquant, a financial data analytics company. P.H. has more than 14 years of professional consulting experience in the semiconductor industry, led consulting projects in excess of $500 million. He has published hundreds of papers in the areas of software system design and data analysis, such as Leveraging Social Medial to Predict Continuation and Reversal in Asset Prices, and Can Sentiment Analysis and Options Volume Anticipate Future Returns.

课程四《人工智能：大规模数据分析与机器学习模型中的算法优化》

Algorithms for Big Data

学科方向：计算机科学/人工智能

1. 课程介绍

本课程聚焦于算法在大数据与人工智能时代中的核心作用，从博弈论、线性规划等优化理论出发，系统讲授在线算法、乘法权重方法、梯度下降与反向传播等关键算法机制。课程进一步引导学生深入理解机器学习经典模型与现代生成式对抗网络（GANs），掌握深度神经

网络（DNN）、卷积神经网络（CNN）、递归神经网络（RNN）以及变压器（Transformer）等主流架构的原理与应用，尤其在计算机视觉领域的落地实践。通过理论讲授与实战训练相结合的方式，学生将建立对算法与模型之间“精准匹配”机制的系统认知，理解算法如何驱动大数据分析、用户建模与智能系统设计，培养解决复杂信息环境中实际问题的能力。

This course explores the pivotal role of algorithms in the era of big data and artificial intelligence. Starting with foundational topics such as game theory and linear programming, it covers key algorithmic techniques including online computation, multiplicative weights, gradient descent, and backpropagation. The course transitions into machine learning and deep learning, introducing both classical models and modern architectures like Generative Adversarial Networks (GANs), Deep Neural Networks (DNNs), Convolutional Neural Networks (CNNs), Recurrent Neural Networks (RNNs), and Transformers. Special emphasis is placed on practical applications in computer vision. Through a combination of theoretical insights and hands-on implementation, students will develop a solid understanding of how algorithms facilitate accurate information-user matching, support large-scale data analysis, and power intelligent systems in complex environments.

2. 大纲介绍

1.博弈论与优化基础

2.线性规划与凸优化方法

3.在线学习与流数据处理

4.乘法权重法与提升方法

5.优化方法：梯度下降机制

6.反向传播算法详解

7.机器学习模型与生成对抗网络

8.深度神经网络与卷积神经网络

9.循环神经网络与 Transformer 模型

10.计算机视觉中的深度模型应用

1.Game Theory and Optimization Fundamentals

2.Linear Programming and Convex Optimization

3.Online Learning and Streaming Data

4.Multiplicative Weights and Boosting Methods

5.Optimization Techniques: Gradient Descent

6.Backpropagation Algorithm Explained

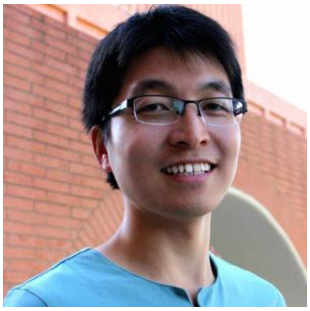
7.Classical Machine Learning Models and GANs

8.Deep Neural Networks and Convolutional Neural Networks

9.Recurrent Neural Networks and Transformer Models

10.Deep Learning Applications in Computer Vision

3. 教授介绍



Xu

芝加哥大学　计算机科学系终身教授

- 芝加哥大学机器代理战略智能研究实验室(SIGMA)负责人
- 2020 年获得谷歌学院研究奖
- 2019 年获得 ACM SIGecom 最佳论文奖，荣誉奖
- the Games journal 特邀编辑
- 2022 年 IDEAL 数据经济学特别会议组织者之一
- 中科大华罗庚精英项目成员

Xu 是芝加哥大学计算机科学系副教授，领导机器代理战略智能（SIGMA）实验室。他研究数据和机器学习的经济学，包括为多代理决策设计学习算法，以及为数据和 ML 算法设计市场。海峰定期在领先的机器学习和计算经济学会议上发表论文，并担任 ICML、EC、AAAI、IJCA 等顶级会议的领域主席或高级程序委员会委员。他的研究获得了多个奖项，包括 AI2050 Early Career fellow、IJCAI Early Career Spotlight、Google Faculty Research Award、ACM SIGecom Dissertation Award（荣誉奖）、IFAAMAS Distinguished Dissertation Award（亚军）以及多个最佳论文奖；他的工作得到了多个机构的慷慨支持，包括 NSF、ARO、ONR、Schmidt Science 和 Google Research。

Xu is an associate professor in the Department of Computer Science at UChicago, where he directs the Strategic IntelliGence for Machine Agents (SIGMA) lab . He studies the economics of data and machine learning, including designing learning algorithms for multi-agent decision making and designing markets for data and ML algorithms. Xu publishes regularly at leading machine learning and computational economics conferences, and serves as area chair or senior program committee for premier venues such as ICML, EC, AAAI, IJCA, etc. His research has been recognized by multiple awards, including the AI2050 Early Career fellow, IJCAI Early Career Spotlight, Google Faculty Research Award, ACM SIGecom Dissertation Award (honorable mention), IFAAMAS Distinguished Dissertation Award (runner-up), and multiple best paper awards; his works have been generously supported by varied agencies including NSF, ARO, ONR, Schmidt Science, and Google Research.

课程五《人工智能：科学化数据分析与机器学习应用》

Data Analysis and Machine Learning

学科方向：计算机科学/人工智能

1. 课程介绍

人工智能与数据科学已经成为处理复杂实验数据和科学研究中不可或缺的工具。本课程系统讲解从数据采集、分析到模型应用的完整流程。内容涵盖 Python 编程基础、数据分析与统计方法、数据可视化与大规模数据处理、多元分析与机器学习基础，并深入介绍 Scikit-learn 工具库、监督学习与无监督学习的经典模型，以及强化学习（包括马尔可夫决策过程与 Q 学习）和深度学习（CNN、RNN、GAN）的应用。课程通过理论与实践结合，使学生掌握将先进 AI 技术应用于科学研究、实验数据处理及复杂系统分析的能力。

Artificial intelligence and data science have become essential tools for processing complex experimental data and scientific research. This course provides a systematic introduction to the full workflow from data collection and analysis to model deployment. Topics include Python programming, data analysis and basic statistics, data visualization and handling large datasets, multivariate analysis, and fundamentals of machine learning. The course further covers the Scikit-learn library, classical models for supervised and unsupervised learning, reinforcement learning (including Markov Decision Processes and Q-learning), and deep learning applications such as CNNs, RNNs, and GANs. By integrating theory with hands-on practice, students will develop the skills to apply advanced AI techniques to scientific research, experimental data processing, and complex system analysis.

2. 大纲介绍

1.Python 编程导论

2.数据分析与基本统计

3.数据可视化与大型数据集

4.多元分析导论

5.机器学习导论

6.Scikit-learn

7.监督学习及经典模型

8.无监督学习及经典模型

9. 强化学习：马尔可夫决策过程、 Q 学习

10. 深度学习：CNN、RNN、GAN

1.Introduction to Programming in Python

2.Data Analysis and Basic Statistics

3.Essential Python Libraries for Data analysis

4.Data Visualization and Working with Large Datasets

5.Introduction to Multivariate Analysis

6.Introduction to Machine Learning

7. Supervised Learning in Scikit-learn

8. Unsupervised Learning

9. Reinforcement Learning

10. Deep Learning

3. 教授介绍



G. R.

麻省理工学院

- 麻省理工学院物理系终身教授
- 麻省理工学院重离子研究组领头人
- 麻省理工学院重离子研究组等 7 个研究小组联合领导人
- CMS 重离子出版委员会主席
- 量子物理实验计划 sPHENIX 计划负责人之一
- Member, Annual Rev. Nucl. Part. Phys 编辑委员会成员

G. R. 教授从法兰克福 Kernphysik 研究所获得博士学位，于 2000 年 9 月从欧洲核子研究中心加入麻省理工学院物理系重离子小组，并担任该小组的科学助理。教授现在担任麻省理工学院重离子研究组等 7 个研究小组联合领导人。此外教授还担任 CMS 重离子出版委员会主席；量子物理实验计划 sPHENIX 计划负责人；Member, Annual Rev. Nucl. Part. Phys 编辑委员会成员等职务。

G. R. joined the Heavy Ion Group in the MIT Department of Physics in September 2000 from CERN, where he was a Scientific Associate. G. R. currently serves as the joint leader of seven research groups, including the Massachusetts Institute of Technology Heavy Ion Research Group. Additionally, he holds positions such as Chair of the CMS Heavy Ion Publications Committee, Project Leader for the quantum physics experiment sPHENIX, and Member of the Annual Review of Nuclear and Particle Physics Editorial Committee.

课程六《人工智能算法在生物医学领域的应用》

Machine Learning in Biomedical Sciences and Bioengineering

学科方向：人工智能/生物医学工程

1. 课程介绍

该课程的重点是学习生物医学科学和生物工程中的应用，为理论学习与实际应用之间架起桥梁，为学生提供机器学习的基础知识，包括其原理、操作和算法的执行。学生们将学习数学和编码，以开发和实施机器学习解决方案。从基础知识开始，我们将进入生物医学科学和生物工程的案例研究，展示机器学习如何解决这些领域的复杂问题。课程的目标是让学生精通机器学习--理解它、讨论它并应用它。课程结束时，学生将能够审视生物医学和生物工程领域中的问题，并确定哪些机器学习工具可以创建有效的解决方案。如果你渴望将机器学习添加到您的工具包中，并将其应用于生物医学和生物工程的动态领域，那么本课程就是为你量身打造的。

Join our 10-week Machine Learning course focused on applications in Biomedical Sciences and Bioengineering. This practical course bridges the gap between theory and real-world application, giving you the foundational knowledge of machine learning, including its principles, operations, and the execution of algorithms. You'll engage with both mathematics and coding to develop and implement machine learning solutions. Starting with the basics, we'll then move into case studies from biomedical sciences and bioengineering, showing how machine learning can solve complex problems in these fields. Our goal is for you to become proficient in machine learning—to understand it, discuss it, and apply it. By the end of the course, you'll be able to look at issues within the biomedical and bioengineering landscape and determine which machine learning tools can create effective solutions. If you're keen to add machine learning to your toolkit and apply it to the dynamic areas of biomedicine and bioengineering, this course is for you.

2. 大纲介绍

1.人工智能模型背后的核心数学原理

2.监督学习与非监督学习

3.线性回归与逻辑回归

4.多变量回归

5.神经网络概念与生物医学案例

6.非监督学习与生物医学案例

7.深度神经网络

8.卷积神经网络

9.循环神经网络

10.Transformer 模型与案例分析

1.Core Mathematical Principles Behind AI Models

2.Supervised and Unsupervised Learning

3.Linear Regression and Logistic Regression

4.Multivariate Regression

5.Neural Network Concepts and Biomedical Case Studies

6.Unsupervised Learning and Biomedical Case Studies

7.Deep Neural Networks

8.Convolutional Neural Networks

9.Recurrent Neural Networks

10.Transformer Models and Case Analysis

3. 教授介绍



Choi

帝国理工学院

- 帝国理工学院生物工程学院终身教授
- 帝国理工学院无创手术和生物检验实验室创始人
- 美国 Zeta Surgical（外科机器人与混合现实公司）负责人
- 帝国理工学院智能医学影像博士培训项目负责人
- 曾任帝国理工学院癌症技术硕士研究生项目主任
- 曾获弗雷德里克·利齐奖（国际治疗超声学学会最高的早期职业奖项之一）
- 曾获弗雷德里克·V·亨特声学博士后研究奖学金（美国声学学会最高的博士后奖项之一）

Choi 教授是伦敦帝国理工学院生物工程系的终身教授，同时担任帝国理工学院智能医学影像博士培训项目负责人。作为帝国理工学院无创手术和生物检验实验室创始人，他率领团队致力于开发微创手术设备和方法，解决了神经退行性疾病和脑肿瘤等领域的难题，为治疗阿尔茨海默病、胶质母细胞瘤和弥漫性髓母细胞瘤等疾病提供了全新的方法，并荣获多项国际知名奖项。他的实验室在硬件、算法、物理、生物学和翻译等方面展开研究，通过跨学科合作，为将科研成果转化为实际应用提供了坚实的基础。Choi 教授目前的研究兴趣主要集中在生物医学工程-非侵入性设备无创显微技术、脑部药物供给以及活体组织与病理学诊断。

Choi is a tenured professor in the Department of Bioengineering at Imperial College London and serves as the head of the Imperial College Smart Medical Imaging Doctoral Training Programme. As the founder of the Non-Invasive Surgery and Biomedical Testing Laboratory at Imperial College, he leads a team dedicated to developing minimally invasive surgical devices and methods, addressing challenges in the fields of neurodegenerative diseases and brain tumors. His work has provided innovative approaches for treating diseases such as Alzheimer's, glioblastoma, and diffuse medulloblastoma, earning him numerous prestigious international awards. His laboratory conducts research in hardware, algorithms, physics, biology, and translation, and through interdisciplinary collaboration, lays a solid foundation for translating scientific research into practical applications. Choi's current research interests are primarily focused on biomedical engineering, specifically non-invasive devices and microtechnologies, brain drug delivery, and the diagnosis of living tissues and pathology.

课程七《电子工程与人工智能：脑机接口的微电子设计与信号处理原理》

Brain/Machine Interfaces: Artificial Intelligence, Signals, & Circuits

学科方向：电子工程

1. 课程介绍

在本课程中，学生将被引入脑机接口（Brain/Machine Interfaces）领域，并学习人工智能（AI）和机器学习（ML）如何革新我们解读大脑信号的能力。课程首先将讲解实现人脑与电子、机械系统交互的基础技术，随后深入探讨各类人工智能、机器学习及信号处理方法如何帮助我们理解来自大脑的信号。前几次课程将介绍学生理解该领域所需的基础概念，主题包括：信号处理入门、脑机接口中的人工智能技术基础系列讲座、基础电子电路、微电子学与集成电路。此外，学生还将学习人脑与神经系统的基本原理，了解神经系统如何利用电

信号在体内的感觉与运动通路上传递信息。随后，课程将回顾脑机接口中涉及的各种技术，包括：非侵入式技术（EEG 脑电图、EMG 肌电图、MEG 脑磁图以及基于成像的方法）；半侵入式技术（ECoG 皮层电图）；侵入式技术（植入式电极系统）。在这些部分中，我们将重点讲解用于分析不同类型神经信号的各种人工智能/机器学习算法与信号处理方法。最后，课程将概述脑机接口领域的前沿研究与最新应用，介绍这些技术目前正在探索的广泛应用场景。

In this course, students will be introduced to the exciting field of Brain/Machine Interfaces and will learn how the fields of Artificial Intelligence and Machine Learning are revolutionizing our ability to interpret signals from the brain. We will first study the basic technologies that make interfacing the human brain with electronic and mechanical systems possible, and will then delve into how various artificial intelligence/machine learning and other signal processing techniques are allowing us to interpret signals we receive from the brain. The first several lectures will cover basic foundational concepts that the students will require to understand the field. Topics will include an introduction to signal processing, an in-depth series of lectures on the basics of artificial intelligence techniques for brain/machine interfaces, basic electronic circuits, microelectronics and integrated circuits. Students will also learn fundamentals of the human brain and nervous system, and how the nervous system uses electrical signals to communicate over the sensory and motor pathways in the body.

We will then review the various technologies involved in brain/machine interfaces. These will include lecture material and readings on the non-invasive technologies (EEG, EMG, MEG, and imaging-based techniques), semi-invasive technologies (ECoG), and invasive technologies (implanted electrode systems). We will focus heavily in all of these lectures on the various artificial intelligence/machine learning and other signal processing techniques used to analyze neurological signals of different types. Finally, we will review the current state-of-the-art in brain/machine interfaces, introduce the broad set of applications being explored for these technologies.

2. 大纲介绍

1. 脑机接口概述
2. 人工智能与机器学习导论
3. 脑机接口中的信号处理导论
4. 脑机接口的神经科学基础导论
5. 脑机接口的高级人工智能与机器学习
6. 基于成像与代谢的脑机接口类型
7. 基于电位的脑机接口技术
8. 脑机接口的硬件、电路与系统
9. 有效科研计划书写作与论文结构
10. 脑机接口的未来展望与人工智能的作用

1.Overview of Brain/Machine Interfaces

2. Introduction to Artificial Intelligence and Machine Learning

3. Introduction to Signal Processing for Brain/Machine Interfaces

4. Introduction to the Neuroscience of Brain/Machine Interfaces

5. Advanced Artificial Intelligence and Machine Learning for Brain/Machine Interfaces

6. Imaging- and Metabolism-Based Brain/Machine Interface Types

7. Electric Potential-Based Techniques for Brain/Machine Interfaces

8. Hardware, Circuits, and Systems for Brain/Machine Interfaces

9. Writing Effective Research Proposals and the Structure of a Research Paper

10. Future Outlook for Brain/Machine Interfaces and the Role of AI

3. 教授介绍



N. B.

帝国理工学院

- 帝国理工学院生物工程系客座教授
- 博伊西州立大学教授
- 博伊西州立大学电气与计算机工程系主任
- 欧洲工商管理学院人工智能、创新和数字转型高等教育教授
- 犹他大学放射科系教授
- 伦敦超高场磁共振成像项目（LOCUS）帝国理工学院负责人
- 曾任微软战略业务发展经理、麦肯锡高级顾问

N. B. 于 2018 年加入帝国理工学院，担任生物工程教授，专注于医学成像（特别是 MRI）、人工智能与机器学习、大数据/数据分析以及信号处理。作为伦敦协作超高场扫描仪（LOCUS）项目的帝国理工学院负责人，他领导着由伦敦国王学院、帝国理工学院、伦敦大学学院和癌症研究所共同参与的超高场磁共振成像联合项目。他还是伦敦 EFG 资产管理公司未来领袖小组的人工智能专家，并与帝国人工智能网络和计算、认知与临床神经影像实验室有密切联系。N. B. 教授在加州大学伯克利分校获得物理学学士学位，随后在斯坦福大学获得电气工程硕士和博士学位。他曾在威尔科克斯公司担任软件开发工程师，并共同创立了数据可视化软件公司 Visualize。毕业后，他在麦肯锡公司工作，随后在微软担任高级业务开发和战略业务发展经理，其后又在广告技术公司 Reactrix 担任产品管理副总裁。2006 年，他重返学术界，成为斯坦福大学放射学实验室的研究员。目前，N. B. 教授的研究兴趣包括开发用于超高磁场强度下的磁共振成像的新型脉冲序列，机器学习在医疗影像和健康护理中的应用，以及数据、人工智能和相关技术在生物科学和其他行业中的前景与局限性。他在设立英国生物银行神经影像研究（一个大规模健康研究项目）方面发挥了重要作用，并与斯坦福大学、牛津大学、剑桥大学、癌症研究所、犹他大学、布莱根杨大学、伦敦国王学院和西门子医疗等机构有积极的研究合作。

N. B. joined Imperial in February 2018 as Associate Professor of Bioengineering, where he specialises in medical imaging (with a focus on MRI), artificial intelligence and machine learning, big data/data analytics, and signal processing. He is also the Imperial lead of the London Collaborative Ultra-High Field Scanner (LOCUS) project, a joint venture for ultra-high field MR imaging between King's College London, Imperial, University College London, and the Institute for Cancer Research. He serves on the Future Leaders Panel for EFG Asset Management in London

as their Artificial Intelligence expert, and is affiliated with the Imperial Artificial Intelligence Network and the Computation, Cognitive, and Clinical Neuroimaging Laboratory. N.B. received a Bachelor's degree in Physics from U.C. Berkeley, and received his Master's and Ph.D. degrees in Electrical Engineering from Stanford University. He spent several years as a software developer for metrology company Wilcox Associates prior to graduate school, and co-founded data visualization software company Visualize. He returned to academia in 2006 as a researcher in Stanford's Radiological Sciences Laboratory. His current academic interests include the development of novel pulse sequences for magnetic resonance imaging at ultra-high magnetic field strengths, the application of machine learning to a variety of problems in medical imaging and healthcare, and the promises and limitations of data, artificial intelligence, and related technologies in the biosciences, healthcare, and other industries.

课程八《机械工程：新型车辆动力总成控制系统与机械结构优化设计方法》

Machine Component Design

学科方向：机械工程

1. 课程介绍

本课程通过消费类汽车的实例来教授机械部件设计的基础知识，汽车是大众最常使用的机械之一。这些机械通过动力来执行动作，从而施加所需大小和方向的力以实现受控运动。工程师们通过机械部件设计来应对确保汽车及其生产线安全、有效且耐用的挑战。作为实现这些目标的入门课程，本课程对动力传动、齿轮、轴承、润滑、离合器、制动器、轴、螺钉、载荷分析、疲劳和材料选择等概念进行了概述。

This course teaches the fundamentals of machine component design through examples of consumer automobiles, which are among the most common machines used by the general population. These machines are powered to perform actions, such that they apply the desired magnitude and direction of forces for controlled movement. Engineers take on the challenge of ensuring both the automobile and the product line they are made on are safe, effective, and long-lasting through machine component design. As an introduction to achieving these goals, this course provides a survey of concepts in power transmission, gears, bearings, lubrication, clutches, breaks, shafts, screws, load analysis, fatigue, and material selection.

2. 大纲介绍

1. 导论：机械部件设计入门
2. 机械部件：齿轮、轴、链接、轴承
3. 动力传输：扭矩、旋转、速度、功、功率
4. 故障模式和预防：静态、可变、疲劳
5. 连接：紧固件、耦合器、焊接、粘合剂

6. 材料选择：金属、塑料、陶瓷、木材

7. 领域前沿：复杂材料的发明应用

8. 车辆燃油经济效应

9.车辆自动化和电气化

10. 新型动力系统

1. Community Building. Introduction to Machine Component Design.

2. Machine Components – Gears, Shafts, Links, Bearings.

3. Power Transmission – Torque, Rotation, Velocity, Work, Power.

4. Failure Modes and Prevention – Static, Variable, Fatigue

5. Joining – Fasteners, Couplers, Welding, Adhesives

6. Material selection – Metals, Plastics, Ceramics, Wood

7. New frontiers and 1. Intro to Machine Component Design, Community Building, Gear Types

2. Rotational Motion – torque, velocity, work, power;Power Transmission – gearsets

3. Power Transmission – simple and compound geartrains

4. Vehicle Transmission – manual and automatic

5. Failure Modes and Prevention – static, dynamic, stress, strain

6. Failure Modes and Prevention – strength, deformation, shear

7. Materials – selecting for desired functionality and inventing complex materials

8. Assemblies – links, bearings, shafts

9. Joinery – fasteners, couplers, welds, adhesives

10. New Powertrain Technology – vehicle automation and electrification

3. 教授介绍



D.H.

卡内基梅隆大学

- 卡内基梅隆大学工程学院机械工程专业教授
- CMU TechSpark 工程实验室导师
- 曾任能源产业 Chart Energy & Chemicals 机械工程师
- 重点研究极端环境下的金属和纳米聚合物表现和测试

D.H.教授现任职于卡内基梅隆大学，担任工程学院机械工程专业终身教授，并领导新的创客生态系统项目 Maker Ecosystem。此外，D.H.还是卡内基梅隆大学 TechSpark 教职委员会主席/教育总监、美国工程教育协会委员，通过她在各个组织和委员会的积极参与，以及对教育和创新的执着追求，为推动科技教育和 STEM 领域的发展做出了重要贡献。D.H.的研究方向包括 3D 打印、机械工程、工程设计，并重点研究开发金属和聚合物纳米复合材料，以提高其在极端环境下的性能，为此她设计、制造和构建了各种定制的测试设备用于这些独特材料的测试。

D.H. is currently a tenured professor in the Department of Mechanical Engineering at Carnegie Mellon University, where she leads the new Maker Ecosystem project. Additionally, D.H. serves as the chair and director of education for the TechSpark faculty committee at Carnegie Mellon University and is a member of the American Society for Engineering Education. Through her active participation in various organizations and committees, as well as her dedication to education and innovation, D.H. has made significant contributions to promoting technology education and the development of STEM fields. Her research focuses on 3D printing, mechanical engineering, and engineering design, with an emphasis on developing metal and polymer nanocomposites to enhance their performance in extreme environments. For this purpose, she has designed, manufactured, and constructed various custom test equipment for testing these unique materials.

课程九《环境工程：PFAS 等新型污染物的动态调控与水资源循环处理工艺》

Water Treatment and Sustainable System for Water Resource Recovery

学科方向：环境工程/环境科学

1. 课程介绍

如何高效、经济和环保地处理各类废水,已成为全球范围内亟待解决的问题。生物法、膜法以及其他高新技术以其高效、节能和自动化等优点,被广泛应用于城市与工业水处理。生物技术、纳米技术与信息技术等高新技术的发展,为水污染治理开辟了新的途径。与此同时,膜分离技术、生物接触氧化等工艺的使用,也使污水与废水处理的自动化、无人值守运转成为可能。

How to efficiently, economically and environmentally friendly treat various types of waste water has become an urgent problem to be solved worldwide. Biological method, membrane method and other high-tech are widely used in urban and industrial water treatment due to their advantages of high efficiency, energy saving and automation. The development of high and new technologies such as biotechnology, nanotechnology and information technology has opened up new ways for water pollution control.

2. 大纲介绍

1. 水体微塑料与多氟物质处理
2. 水质与水化学
3. 水体软化技术
4. 污染物混凝技术
5. 过滤技术
6. 吸附和氧化技术
7. 生物技术原理与应用

8. 固体污染物. 生命周期评估

9. 高级氧化处理技术

10. 饮用水处理的替代性方案

1. PFAS. Plastics

2. Water Chemistry. Water Quality

3. Softening

4. Coagulation

5. Filtration

6. Adsorption and Oxidation Technology

7. Modeling Biotech

8. Wastewater Solids Tertiary Treatment. LCA

9. Bios Advanced Oxidation

10. Alternative Drinking Water Treatment

3. 教授介绍



J.M.

卡内基梅隆大学

- 土木与环境工程学院教授
- 美国化学学会第 252 届全国会议环境化学分会优异奖
- 美国国家科学院与工程院科学与工程大使
- 美国国家科学基金会科研基金得主

J.M.博士于 2006 年获得 Wabash 学院生物学（法语）学士学位，并在 2012 年和 2017 年分别获得卡内基梅隆大学土木（及环境）工程硕士和博士学位。他的研究主要关注微生物和纳米技术的交互作用，尤其是纳米粒子对微生物群落的影响。J.M.博士的研究方法结合了环境微生物学和纳米科技。他目前的研究重点是开发和应用新技术来评估和解决环境问题，特别是在水和废物处理方面。J.M.博士的研究兴趣包括环境工程、纳米技术在环境中的应用。

J.M. received his B.S. in Biology (in French) from Wabash College in 2006 and his M.S.and Ph.D. in Civil (and environmental) Engineering from Carnegie Mellon University in 2012 and 2017, respectively. His research focuses on the interaction of microbes and nanotechnology, particularly the effects of nanoparticles on microbial communities. J.M.'s approach combines environmental microbiology and nanotechnology. His current research focuses on the development and application of new technologies to assess and solve environmental problems, particularly in water and waste treatment. J.M.'s research interests include environmental engineering, the use of nanotechnology in the environment, and the mechanisms by which microbial communities respond.

2. 理科类

课程一《人格心理学：个体差异对亲密关系与人类行为的影响探究》

Introduction to Personality Science and Research

学科方向：心理学

1. 课程介绍

“个性”是什么?如何科学地研究和测量它?生物、社会和文化因素在多大程度上塑造了个性人格?人格是我们基因组成和生物学的表现，社会影响的顶点，两者的相互作用，还是随机事件的结果?在本课程中，我们将回顾人格心理学的主要理论范式，讨论当代研究、理论和方法论，并学习在“人格”研究中关键的历史争论。

What is ""personality""? How can we scientifically study and measure it? To what extent do biological, social, and cultural factors shape an individual′s personality? Is personality a manifestation of our genetic makeup and biology, the pinnacle of social influence, the interplay between the two, or the result of random events? In this course, we will review the major theoretical paradigms in personality psychology, discuss contemporary research, theory, and methodology, and delve into key historical debates in the study of ""personality."

2. 大纲介绍

1. 人格心理学与其研究方法
2. 从人格特质到气质的分析
3. 对不同人格的判断力
4. 人格魅力与气质的表达
5. 神经科学层面
6. 心理动力学-动机层面
7. 行为条件层面
8. 现象学中个体的意识体验层面
9. 社会认知层面
10. 人格心理学知识整合与应用

1. Introduction to this course
2. The Trait-dispositional level A
3. The Trait-dispositional level B
4. The Biological level
5. Psychodynamic-motivational level
6. The Behavioral-conditioning level
7. The Phenomenological level
8. Social cognitive level
9. Integration

10. Future directions

3. 教授介绍



V.Z.

康奈尔大学

- 康奈尔大学心理学终身教授
- 康奈尔大学人格，依恋和控制研究实验室主任
- 康奈尔大学心理学荣誉课程主席
- 实验社会心理学学会核心成员
- Google 特邀访问科学家
- 美国心理协会高级功能磁共振训练机构研究员
- 著有《成人依恋的基础:从大脑到思想再到行为》等心理学书籍

V.Z.教授是康奈尔大学心理学系的终身教授，拥有华盛顿大学的心理学博士学位，研究领域包括社会认知、依恋、关系和社会排斥等。她曾获得多项荣誉，包括 2020-2021 年的莱诺尔·安登堡与沃利斯·安登堡传播奖学金、2018 年的杰出指导奖和 2016 年的“最受钦佩学者”称号。V.Z.教授在学术界享有盛誉，担任多本学术期刊的编辑工作，曾担任《社会心理学与人格科学》和《前沿心理学》的主编，以及《人格与社会心理学杂志（ASC）》的咨询编辑。此外，V.Z.教授在学术界发表了多篇重要论文，如探讨个体依恋风格与社会排斥关系的“Attachment and Social Rejection: The Role of Individual Differences”，以及分析第一印象影响的“Impact of First Impressions on Interpersonal Relationships”。她还合编了多部学术著作，如《Risky Decisions in Relationships: An Empirical Investigation》，对成人依恋与风险决策的关系进行了深入研究，推动了相关领域的发展。

V.Z. is a tenured professor in the Department of Psychology at Cornell University. She holds a Ph.D. in Psychology from the University of Washington. Her research interests include social cognition, attachment, relationships, and social rejection. V.Z. has received numerous honors and awards, including the Lenore Annenberg and Wallis Annenberg Fellowship in Communication (2020–2021), the Outstanding Advising Award (2018), and the “Most Admired Scholar” designation (2016). She is widely recognized in the academic community and serves on the editorial boards of several leading journals. She has held the position of Editor-in-Chief for Social Psychological and Personality Science and Frontiers in Psychology, and has served as an Advisory Editor for the Journal of Personality and Social Psychology: Attitudes and Social Cognition (ASC). In addition, V.Z. has published many influential papers, including “Attachment and Social Rejection: The Role of Individual Differences” and “Impact of First Impressions on Interpersonal Relationships.” She has also co-edited several scholarly volumes, such as Risky Decisions in Relationships: An Empirical Investigation, which provides in-depth research on the relationship between adult attachment and risk decision-making, thereby advancing the development of related fields.

课程二《认知心理学与神经科学：大脑思维与记忆之间的关联机制分析》

Human Brain & Mind: An introduction to cognitive neuroscience

学科方向：心理学

1. 课程介绍

认知能力是人们成功的完成活动最重要的心理条件。知觉、记忆、注意、思维和想象的能力都被认为是认知能力。认知能力，是人脑加工、储存和提取信息的能力，即人们对事物的构成、性能、与他物关系、发展动力、发展方向以及基本规律的把握能力。人们的认知特点对于社会经济状况都有显着的影响,增强认知能力也已经被发现与财富增长和预期寿命的增加有关。而一直以来，人们普遍认为，像数学和阅读这样的能力，是具有家族性的，但影响这些性状基因的复杂系统在很大程度上却不为人们所了解。

Cognitive ability is the most critical psychological condition for successfully carrying out activities. Abilities such as perception, memory, attention, thinking, and imagination are all considered cognitive abilities. Cognitive ability refers to the brain's capacity to process, store, and extract information, allowing individuals to comprehend the composition, properties, relationships with other things, driving forces, developmental directions, and fundamental principles of things. People's cognitive characteristics significantly impact their socioeconomic status, and enhancing cognitive abilities has been found to be associated with increased wealth and life expectancy. However, it has long been believed that abilities like mathematics and reading are hereditary traits, yet the complex systems of genes influencing these traits are not well understood by people to a large extent.

2. 大纲介绍

1. 我们大脑到底是不是一台数字计算机
2. 特定模式模拟的思维模型 I
3. 特定模式模拟的思维模型 II
4. 语言、行为与思维的抽象概念与理论 I
5. 语言、行为与思维的抽象概念与理论 II
6. 不同身体特质对认知与语言思维的影响 I
7. 不同身体特质对认知与语言思维的影响 II
8. 情境模型与特定模态模拟模型的关联性
9. 身体与思维的相互影响
10. 身体与情绪的关系：手语交流形式研究

1. The mind as a digital computer
2. Thinking as modality-specific simulation, part one
3. Thinking as modality-specific simulation, part two
4. In what sense are abstract concepts embodied, part one
5. In what sense are abstract concepts embodied, part two
6. Body-specificity of language and thought, part one
7. Body-specificity of language and thought, part two

8. Situation models with or without simulation

9. Bodies and minds affect each other

10. Expressing thoughts with the hands

3. 教授介绍



D.C.

康奈尔大学

- 康奈尔大学心理学终身教授
- 曾获得心理科学期刊实验心理学领域年度最佳文音奖
- 美国心理学科协会 2015 年度杰出研究贡献奖
- 美国心理学会 2015 年度杰出心理师荣誉获得者
- Frontiers in Neuroscience 副主编
- Frontiers in Psychology 副主编
- PLOS ONE 学术编辑

D.C.教授在 Oberlin College 完成了英语文学和声乐表演的学士学位，并在 Massachusetts Institute of Technology 获得了脑与认知科学的博士学位。现任 Cornell University 人类发展系，心理学系和芝加哥大学的心理学系担任研究副教授职务。他的研究涉及语言、文化以及身体如何共同塑造心理过程。D.C.教授撰写了 100 多篇学术文章，也担任七种期刊（Frontiers in Neuroscience 副主编，Frontiers in Psychology 副主编，PLoS ONE 学术编辑等）的编委会成员，并且是剑桥大学出版社跨学科期刊 Language and Cognition 的创始编辑，该期刊在语言学和认知科学领域具有较高的影响力和声誉，其发表的研究成果广泛被学术界引用和参考。

D.C. completed his B.A. in English Literature and Vocal Performance at Oberlin College and his Ph.D. in Brain and Cognitive Sciences at Massachusetts Institute of Technology. He currently holds research associate professorships in the Department of Human Development and the Department of Psychology at Cornell University and the Department of Psychology at the University of Chicago. His research involves the ways in which language, culture, and the body work together to shape mental processes. D.C. has authored more than 100 articles, and he serves on the editorial boards of seven journals (Associate Editor, Frontiers in Neuroscience, Associate Editor, Frontiers in Psychology, and Academic Editor, PLoS ONE, among others), and was the founding editor of the interdisciplinary journal Language and Cognition at Cambridge University Press.

课程三《物理学：从广义相对论探索宇宙起源》

An introduction to Exoplanets and Cosmology

学科方向：物理学

1. 课程介绍

该课程从弗里德曼-勒梅特-罗伯逊-沃克的膨胀宇宙学模型开始，简单介绍宇宙历史上的主要时代和重要发现、重点回顾大爆炸模型及其粒子内容、探讨当前宇宙的主要组成部分，包括可见（重子）物质、暗物质和暗能量。学生们将通过该课程更好地理解宇宙膨胀、加速度原理以及红移现象等，进而能够预测宇宙未来的演变趋势和命运。

The course begins with the Friedman-Lemait-D.R.-Walker inflationary cosmology model, a brief introduction to the major epochs and discoveries in the history of the universe, a review of the Big Bang model and its particle content, and a discussion of the main components of the current universe, including visible (baryonic) matter, dark matter, and dark energy. Students will be able to better understand the expansion, acceleration and redshift of the universe, so that they can predict the future evolution and fate of the universe.

2. 大纲介绍

1. 太阳系与系外行星理论
2. 系外行星探测方法
3. 宇宙膨胀与行星诞生 ；行星探测历史
4. 宇宙组成；宇宙学红移；弗里德曼方程
5. 流体与状态方程；单组分与多组分宇宙
6. 暗物质模型；宇宙学距离
7. 暗物质、暗能量、加速膨胀
8. 星系团、旋转曲线、引力透镜
9. 宇宙微波背景；热历史
10. 事件视界与曲率；暴胀；原始扰动

1. Theory of the Solar System and Exoplanets
2. Methods for Exoplanet Detection
3. Cosmic Expansion and Planet Formation; History of Planet Detection
4. Composition of the Universe; Cosmological Redshift; Friedmann Equations
5. Fluids and Equations of State; Single-component and Multi-component Universes
6. Dark Matter Models; Cosmological Distances
7. Dark Matter, Dark Energy, and Accelerated Expansion
8. Galaxy Clusters, Rotation Curves, Gravitational Lensin
9. Cosmic Microwave Background; Thermal History
10. Event Horizons and Curvature; Inflation; Primordial Perturbations

3. 教授介绍



E.P.

剑桥大学

- 剑桥大学应用数学和理论物理系教授

- 剑桥大学卡弗里宇宙学研究所研究员
- 康奈尔大学高能物理专业博士后
- 曾任乌得勒支大学理论物理系教授、高级研究员
- 曾任普林斯顿大学研究员
- 曾获荷兰研究委员会 (NWO) 授予的最佳科研奖 (Vidi grant)

E.P.教授任职于剑桥大学应用数学和理论物理系、剑桥大学广义相对论研究中心，主要从事宇宙学、量子场论、弦理论和广义相对论等领域的研究，包括通货膨胀、大尺度结构、宇宙微波背景等。在此之前，他曾是康奈尔大学高能物理专业博士后、普林斯顿大学研究员、乌得勒支大学理论物理系教授及高级研究员。他的研究成果在理论物理领域具有重要意义，被广泛发表在学术期刊上，并在国际学术界产生了广泛影响。

E.P. is a professor of the theoretical physicist at the Department of Applied Mathematics and Theoretical Physics and part of the General Relativity research group at the University of Cambridge. He primarily engages in research in fields such as cosmology, quantum field theory, string theory, and general relativity, covering topics like inflation, large scale structures, and the cosmic microwave background. Previously, he served as a postdoctoral fellow in high-energy physics at Cornell University, a research associate at Princeton University, and a professor and senior researcher at Utrecht University's Department of Theoretical Physics.

课程四《应用数学：融合机器学习与统计建模的数值计算方法》

Numerical Models, AI and Machine Learning, and their Applications

学科方向：数学

1. 课程介绍

本课程提供了可以在计算机上使用 Python/Matlab 解决的数值建模和机器学习的例子。具体来说，教学主题包括介绍数值模型的本质和它们与分析模型的区别，数值方法和模型的历史，关键概念如离散化，插值和曲线拟合，数值微分和积分以及基本稳定性分析。我们简要介绍了人工智能模型，特别是机器学习，神经网络，聚类和决策树。

This course provides examples in Numerical Modeling and Machine Learning that can be solved using Python/Matlab on a computer. Specifically, instruction topics include an introduction into the nature of numerical models and their difference from analytical models, the history of numerical methods and modeling, key concepts such as discretization, interpolation and curve fitting, numerical differentiation and integration and basic stability analysis. We offer a brief introduction in Artificial Intelligence models and in particular Machine Learning, neural networks, clustering and decision trees.

2. 大纲介绍

1.数值建模概述与定义

2. 线性方程与矩阵代数概念

3. 数值优化原理

4. 插值、曲线拟合、微分和自适应积分

5. 常微分方程（ODEs）及实际应用举例
6. 机器学习和人工智能
7. 数值建模中的统计方法
8. 时间序列分析与预测
9. 数值建模中概率与统计的实际应用
10. 数值方法在不同领域的应用

1. Overview and Definition of Numerical Modeling
2. Concepts of Linear Equations and Matrix Algebra
3. Principles of Numerical Optimization
4. Interpolation, Curve Fitting, Differentiation, and Adaptive Integration
5. Ordinary Differential Equations (ODEs) and Practical Application Examples
6. Machine Learning and Artificial Intelligence
7. Statistical Methods in Numerical Modeling
8. Time Series Analysis and Forecasting
9. Practical Applications of Probability and Statistics in Numerical Modeling
10. Applications of Numerical Methods in Various Fields

3. 教授介绍



A.R.

哥伦比亚大学

- 哥伦比亚大学应用物理与应用数学系教授
- NASA 戈达德太空研究所研究员
- 曾任美国大西洋经向翻转环流(AMOC)研究组成员
- 曾受邀参加美国地球物理学会NASA海洋生物学和生物地球化学项目会议
- 参与撰写空间地球科学与应用的年代际调查

A.R.教授是哥伦比亚大学应用数学与应用物理系教授。她在1999年获得佛罗里达州立大学物理海洋学博士学位。同时她也是美国国家航空航天局(NASA)戈达德太空研究所(GISS)的研究学者。GISS是NASA的地球太阳探险分支的部门实验所，是哥伦比亚大学地球机构的一个单位。教授目前的研究内容包括全球碳循环与气候、海洋大尺度环流、气候变率。教授参与了关于地球科学与空间应用的十年调查，提供了海洋生物学和生物地球化学社区对国家研究委员会为下一个环境监测和地球科学及应用的十年调查发布的RFI的初步投入。NASA及其合作伙伴要求国家研究委员会(NRC)每十年一次展望未来10年或更长时间，并优先考虑研究领域、观测和进行这些观测的名义任务。

A.R. is an Adjunct Professor of Applied Physics and Applied Mathematics in Columbia University, and a Research Scientist of NASA Goddard Institute for Space Studies. She earned a Ph.D. in Physical Oceanography, Florida State University in 1999. Her research interests are in Global carbon cycle and climate, large-scale circulation of the oceans, and climate variability. She also participated in the Decadal Survey for Earth Science and Applications from Space to research the Ocean Biology and

Biogeochemistry community's initial input to the RFI issued by the National Research Council towards the next Decadal Survey for environmental monitoring and Earth science and applications. NASA and its partners ask the NRC once each decade to look out 10 or more years into the future and prioritize research areas, observations, and notional missions to make those observations.

课程五《商业分析与数据科学：数字化转型时代的智能洞察、优化与决策》

AI-Driven Business Analytics

学科方向：数据科学

1. 课程介绍

本课程通过真实商业数据和管理案例，系统介绍人工智能在商业分析中的应用方法与实践技巧。学生将学习机器学习的核心方法，包括回归分析、分类模型、集成学习与聚类分析，并在 Google Colab 中进行动手操作，实践数据清洗、特征探索、模型构建与结果解读。课程重点在于分析结果的理解、商业洞察的提炼与策略性应用，无需编程基础即可上手。通过完成各类案例练习和作业，学生将掌握将 AI 分析转化为可落地商业策略的能力，提高数据驱动决策、市场分析和战略规划的实践水平，并能够在真实商业场景中提出有效、可操作的建议。

This course provides a practical introduction to AI-driven business analytics using real-world datasets and managerial applications. Students will learn foundational machine learning methods and apply them through guided, hands-on exercises in Google Colab. No prior coding experience is required.

The course emphasizes interpretation, decision-making, and strategic application rather than mathematical derivation. Students will implement regression, classification, ensemble learning, and clustering models while developing the ability to translate analytical results into clear business recommendations.

2. 大纲介绍

1.人工智能基础与编程入门
2.数据处理与探索性分析
3.线性回归在商业预测中的应用
4.逻辑回归与分类分析
5.决策树模型与业务洞察
6.集成学习与随机森林
7.提升算法原理与应用
8.模型验证与选择
9.聚类分析与市场细分
10. AI 战略整合与治理准则
1.AI Foundations and Google Colab
2.Data Preparation and Exploratory Analysis

3.Linear Regression for Business Predictions
4.Logistic Regression and Classification
5.Decision Trees for Business Insights
6.Bagging and Random Forest
7.Boosting Techniques
8.Model Validation and Selection
9.Clustering for Segmentation
10. AI Strategy, Ethics, and Governance

3. 教授介绍



C.A.

南加州大学

- 南加州大学马歇尔商学院教授
- 南加州大学成像服务研究中心副主任
- Thermo Fisher Scientific 投资组合和企业战略经理
- 曾在卡尔蔡司公司负责管理学术和对接科学机构客户
- 南加州大学生物医学工程博士、生物医学工程硕士
- 罗马大学能源与环境工程博士、医学工程硕士

C.A.教授现任南加州大学马歇尔商学院数据科学与运营系教授,是一位兼具科研与产业经验的多学科学者。他的研究与教学跨越生物与生物化学、光学与物理、数据科学与人工智能、以及商业与运营管理等多个领域。C.A.教授拥有能源与环境工程博士、生物医学工程博士以及以商业分析和供应链优化为方向的 MBA 学位，学术背景极为多元。

在科研上，C.A.教授专注于人工智能与机器学习在商业决策与流程优化中的应用，重点探索数据驱动的商业模式、企业运营效率与医疗技术创新。他拥有超过二十年的跨领域研究与工程经验，曾主导或参与光学显微成像、生物组织代谢成像、以及人工智能算法在生物医学与商业系统中的应用项目。在教学与产业实践中，C.A.教授曾在赛默飞世尔（Thermo Fisher Scientific）担任战略经理，及蔡司显微（Zeiss Microscopy）担任科研成像方案经理，深度参与企业战略与技术创新。他在 USC 马歇尔商学院开设多门数据挖掘、商业分析、项目与运营管理以及机器学习课程，注重用实证数据与智能算法解决真实商业问题。他的课程以跨学科视角和高度实用性著称，兼具科学严谨性与商业战略思维，为学生提供通往未来数据智能时代的系统化训练。

C.A.is a multidisciplinary scientist and scholar with a breadth of knowledge spanning the fields of biology and biochemistry, physics and optics, statistics and data science, electronics, biomedical imaging, and business, project and operations management. He holds a Ph.D. in Energy and Environmental Engineering, a Ph.D. in Biomedical Engineering, and an MBA with concentrations in business analytics and operations and supply chain optimization.

Currently, C.A.is an assistant professor of Clinical Data Sciences and Operations at USC Marshall School of Business, where he teaches several undergraduate and graduate courses in data mining and business analytics, project and operations management, spreadsheet modeling and ML/AI applied to business processes. Moreover, C.A. has several years of industry experience. He worked for ThermoFisher Scientific as Strategy Manager for about three years, and for Zeiss Microscopy as Account Manager for about one and a half years.

课程六《生物学：阿尔茨海默症等脑神经疾病中的分子生物学研究》

Molecular Biology of Memory and Memory Diseases

学科方向：生物学

1. 课程介绍

记忆（Memory）是人类大脑的核心功能之一，也是构成我们自我身份的关键。想一想：当人类失去记忆时（如阿尔茨海默症患者），他们也会逐渐失去自我认同。从进化的角度看，记忆使动物能够从经验中获益——无论这些经验是好是坏——从而更好地生存并将遗传信息传递给下一代。在本课程中，我们将探讨“记忆”这一主题——什么是记忆、大脑如何学习并储存记忆，以及大脑如何利用记忆来指导行为。那么，什么是记忆？

记忆并不是我们经历的完整记录，而是大脑对经验的片段化选择：例如一个面孔的特征、一段事件的快照，或是一种伴随的情绪（毕竟，记忆既可以是愉快的，也可能是痛苦的）。我们以细胞与分子层面的变化形式，将记忆储存在大脑的“神经回路”中。神经回路的改变——尤其是在突触（即神经元之间的连接）处——会影响神经元之间的通讯方式，从而改变我们的思想与行为。事实上，基于神经生物系统的计算模型构成了目前最成功的人工智能算法的理论基础。本课程将以整体性的视角研究记忆科学。我们将从大脑的分子与细胞生物学基础知识入手，接着探讨神经可塑性（neural plasticity）的概念，以及信息与经验在大脑结构中的储存机制，即记忆的生物学本质。

Memory is a central capability of our brains and critical to who we are as people. Consider: as humans lose their memories, as happens in Alzheimer’s Disease, they also suffer a progressive loss of self-identity. From an evolutionary perspective, memory allows animals to benefit from experience, whether the experiences are good or bad, and thus be better able to survive and pass on their genetic information to the next generation. In this course we will study memory – what it is, how the brain learns and stores memory, and how the brain uses memory to direct behavior.

So, what is memory? Rather than a complete record of experience, our brains select fragments of experiences, like specific features of a face, a snapshot of an event and, often, an associated emotion (memories, after all, can be pleasant or painful). We store memory as a cellular and molecular change in the ‘neural circuits’ of our brains. An alteration in neural circuits, specifically at synapses (the connections between neurons), changes communication between neurons and thus alters our thoughts and behavior. Computations modeled on neurobiological systems underlie the most successful artificial intelligence algorithms. This course will take a holistic approach to the science of memory. We begin with basic knowledge of the molecular and cellular biology of the brain. The course then turns to the concepts of neural plasticity and the storage of information and experience as ‘memory’ within the context of the brain’s anatomy.

2. 大纲介绍

1.记忆的行为定义

2.神经元、突触和神经回路

3.记忆与大脑

4.记忆器官:海马体

5.Hebbian 理论, 可塑性

6.突触可塑性的机制

7.记忆的分子生物学

8.预测错误记忆与基于记忆的算法

9.成年神经发生;干细胞与类器官

10.跨代记忆;阿尔茨海默病

1. Behavioral Definitions of Memory – Memory is a Multifaceted Phenomenon Studied in Humans and Animal Models. We begin by learning how memory is defined and measured.

2. Neurons, Synapses and Circuits – Nuts and Bolts of the Brain: Here's what you need to know.

3. Memory and the Brain – Where Do We Find Memory in the Brain? A first look at brain structure and finding the 'engram'.

4. Hippocampus, a Memory Organ – Spatial and Other Representations in the Hippocampus: Place Cells and Grid Cells – How we Find Memory Neurons

5. Hebbian Plasticity – Measuring Synaptic Change for Long-Term and Short-Term Memory – Hebb's Molecule

6. Synaptic Mechanisms of Plasticity – Molecular Basis of Fast Local Changes in Synaptic Function

7. The Molecular Biology of Memory – Signaling Between Synapse and Nucleus – Memory and the Genome – Cell Biological Correlates of Memory

8. Prediction Error Memory and Memory-Based Algorithms – Brain Networks that Update Memory by Measuring the Difference Between Expectation and Reality. – Neural Networks for Reinforcement Learning

9. Special Topic Lectures: Adult Neurogenesis; Stem Cells and Organoids – New Neurons in Old Brains; Their roles in memory and psychiatric disorders – Making Brains in Dish

10. Special Topic Lectures: Trans-Generational Memory; Alzheimer's Disease – Memory Transfer Between Generations; The role of small RNA molecules – Possible Causes and Treatments for Alzheimer's Disease

3. 教授介绍



S.K.

哈佛大学

- 哈佛大学分子与细胞生物学终身教授
- 哈佛大学神经生物学学位课程委员会委员
- 哈佛大学生化科学导师委员会委员

- Pew 生物医学科学基金学者项目获得者
- Damon Runyon-Walter Winchell 基金会专项资金获得者
- 荣获专利“调节记忆的成分和方法” （60/726，318）26,318

S.K.教授是哈佛大学分子与细胞生物学终身教授。他于1988年毕业于麻省理工学院，获得遗传学博士学位。教授目前的研究包括成人视觉系统的功能和可塑性，这个项目的目的是确定这些记忆被编码的位置和方式。另一项研究着眼于参与突触可塑性的蛋白质是如何在局部合成的，以应对产生记忆的环境输入。教授的学术成就闻名国际，在生物学领域深耕四十多年，已在多个顶级学术期刊发表论文并拥有一项专利：调节记忆的成分和方法（专利号：60/726,318）。教授还曾获得过Damon Runyon-Walter Winchell 基金会专项资金并且在哈佛拥有以自己名字命名的实验室（Kunes Laboratory）。

S.K. is a Professor of Molecular and Cellular Biology at Harvard University. He earned a PhD in Genetics in M.I.T. in 1988. His laboratory uses the Drosophila melanogaster as a system of choice to examine how behavior is modulated by the nervous system's functional plasticity, and to illuminate the relationship between genetic control and the evolutionary divergence of behavior. With respect to the function and plasticity of the adult visual system, the aim of this project is to determine where and how such memories are encoded. Another study looks at how a protein involved in synaptic plasticity is synthesized locally in response to environmental inputs that produce a memory. He won the Damon Runyon-Walter Winchell Cancer Fellowship, and he has his own named Laboratory at Harvard (Kunes Laboratory).

课程七《生物学：疫苗、免疫系统与抗肿瘤创新药研究》

Molecular & Cellular Immunology

学科方向：生物学/医学

1. 课程介绍

在医学领域，免疫学作为一个关键的领域，致力于研究人体免疫系统的功能、调节机制以及免疫应答对于疾病的影响。随着科学技术的发展，免疫学逐渐融合于许多医学领域，特别是在疫苗研发、免疫治疗和抗肿瘤药物方面取得了显著进展。这门课程涉及了哺乳动物免疫系统的基本方面，包括其组成和功能。涵盖的主题包括先天免疫系统和获得性免疫系统的基本免疫系统特征，免疫系统的多样性，抗原呈递，T细胞、B细胞以及免疫效应功能，并在课程结束时对健康与疾病中的免疫功能和失调进行了概述。学生应积极参与课堂，并提出基于免疫学的临床案例研究，随后讨论案例及其中涉及的一般概念。

In the field of medicine, immunology plays a pivotal role in studying the functionality, regulatory mechanisms, and immunological responses of the human immune system in relation to diseases. With the advancement of scientific technologies, immunology has integrated into various medical disciplines, particularly making significant strides in vaccine development, immunotherapy, and anti-tumor drugs.

This course deals with the basic aspects of the mammalian immune system in terms of components and their function. Topics covered included basic immune system

features of both the innate and acquired immune system, immune system diversification, antigen presentation, T cell, B cell and immune effector function and concluded with an overview of immune function and dysfunction in health and disease. Students are expected to actively participate in class and to present an immunology-based clinical case studies, followed by discussion of both the case and the general concepts covered in the case.

2. 大纲介绍

1.免疫学导论；先天免疫：第一道防线

2.先天免疫及其诱导反应：补体系统

3.B/T 细胞受体的抗原识别；抗原受体

4.T 淋巴细胞的抗原呈递

5.MHC 及其功能,免疫系统受体信号传递

6.B/T 细胞的发育

7.胸腺选择；淋巴细胞归巢和启动

8.T 细胞效应功能；B 细胞活化

9.Ig 的分布和功能；Fc 受体；免疫记忆

10.适应性免疫的动态；癌症免疫

1. Intro into immunology; Innate immunity: first lines of defense

2. Innate immunity: the complement system; Induced responses of innate immunity: Pattern recognition by cells of the innate IS; Induced innate responses to infection

3. Antigen recognition by B cell and T cell receptors; The generation of lymphocyte antigen receptors: Ig and TCR gene rearrangement

4. The generation of lymphocyte antigen receptors: Ab subclasses & diversification of the antibody repertoire; Antigen presentation to T lymphocytes

5. MHC and its function; Signaling through immune system receptors – part I

6. Signaling through immune system receptors – part II; B&T cell development

7. Thymic selection; survival and maturation of lymphocytes in the periphery; Lymphocyte homing and priming

8. T cell effector functions; B cell activation

9. The distribution and functions of Ig classes; Fc receptors; Immunological Memory

10. Dynamics of adaptive immunity; Immunity to cancer

3. 教授介绍



A.P.

普林斯顿大学

- 普林斯顿大学分子生物系终身教授
- 拥有个人命名实验室 A.P. Lab
- 曾获普林斯顿大学知识产权突出贡献奖

- 美国科学促进会（AAAS），美国传染病协会（IDSA）等权威协会专家成员
- Virus 等著名期刊副主编及编委会成员
- 博士学位师从 2020 诺奖得主 Charles M. Rice

A.P.目前为普林斯顿大学分子生物系终身教授，拥有个人命名实验室 A.P. Lab。A.P.教授在德国图宾根大学（University of Tübingen）获得了生物化学学士和硕士学位，并在西雅图华盛顿大学霍华德-休斯医学研究所（Howard Hughes Medical Institute）和德国海德堡德国癌症研究中心（German Cancer Research Center）接受了培训，在康奈尔大学获得免疫学博士学位。他的研究重点是人类传染病的免疫反应和发病机制，包括肝炎病毒、相关黄病毒和疟疾。他的研究小组将组织工程学、分子病毒学/发病机理和动物构造相结合，创造并应用创新技术，包括人源化小鼠模型，用于研究和干预人类肝病感染。 A.P.教授获得了金伯利-劳伦斯癌症研究发现基金奖（Kimberly Lawrence Cancer Research Discovery Fund Award）、美国传染病学会颁发的阿斯特拉青年研究员奖（Astella's Young Investigator Award）、美国肝脏基金会颁发的肝脏学者奖（Liver Scholar Award）、美国微生物学会颁发的默克-欧文-西格尔纪念奖（Merck Irving Sigal Memorial Award）、 德国病毒学学会洛夫勒-弗洛什奖、西奥博尔德-史密斯学会青年研究员奖、美国癌症学会研究学者奖以及伯勒斯威康基金会发病机制研究员奖。另外， A.P.教授是新泽西州癌症研究所基因组不稳定性和肿瘤进展项目的成员

A.P. is currently a tenured professor in the Department of Molecular Biology at Princeton University, where he leads the A.P. Lab. He completed his Bachelor's and Master's degree in biochemistry at the University of Tübingen, Germany including additional training the Howard Hughes Medical Institute at the University of Washington, Seattle, and at the German Cancer Research Center in Heidelberg, Germany. A.P. completed his Ph.D. in Immunology at Memorial Sloan-Kettering Cancer Center/Cornell University and postdoctoral training at the Rockefeller University. Prior to joining the Department of Molecular Biology at Princeton University in 2013 he was a research associate professor at the Center for the Study of Hepatitis C at the Rockefeller University. His research focuses on immune responses and pathogenesis to human infectious diseases, including hepatitis viruses, related flaviviruses, and malaria. His group combines tissue engineering, molecular virology/pathogenesis, and animal construction, to create and apply innovative technologies including humanized mouse models for the study and intervention of human hepatotropic infections. In recognition of his work he received the Kimberly Lawrence Cancer Research Discovery Fund Award, an Astella's Young Investigator Award from the Infectious Disease Society of America, a Liver Scholar Award from the American Liver Foundation, the Merck Irving Sigal Memorial Award from the American Society of Microbiology, the Löffler-Frosch Prize from the German Society of Virology, the Young Investigator Award from the Theobald Smith Society, the Research Scholar Award from the American Cancer Society, and an Investigator in Pathogenesis Award from the Burroughs Wellcome Fund. A.P. is a member of the Genomic Instability and Tumor Progression Program at the Cancer Institute of NJ.

课程八《材料科学与能源储存：化学能源与储能系统中的材料结构与性能》

Fundamentals of Materials Science

学科方向：电池材料/储能系统

1. 课程介绍

材料科学致力于提升电池的安全性、降低成本、延长使用寿命，并寻找更加环保的材料解决方案，以促进绿色能源的普及。本课程聚焦于聚焦于电池与能量存储材料的基本原理与材料行为。课程从材料科学的基础概念出发，介绍材料的基本力学性质，并将这些知识应用于电池材料体系中。帮助学生理解材料在能量存储过程中的作用。课程以锂离子电池和固态电池为主要案例，更强调材料的结构－性能关系以及材料视角下的电池工作机理，为后续材料、能源或电池相关课程奠定基础。

Materials science is dedicated to enhancing the safety of batteries, reducing costs, extending their lifespan, and seeking more environmentally friendly material solutions, in order to promote the widespread adoption of green energy. This course focuses on the fundamental principles and material behaviors of batteries and energy storage materials. Starting from the basic concepts of materials science, the course introduces the basic mechanical properties of materials and applies this knowledge to battery material systems. It helps students understand the role of materials in the energy storage process. The course mainly uses lithium-ion batteries and solid-state batteries as case studies, emphasizing the relationship between material structure and performance as well as the battery working mechanism from a material perspective, laying the foundation for subsequent courses related to materials, energy, or batteries.

2. 大纲介绍

1.储能技术导论：材料科学视角下的电池

2.材料科学基础

3.化学势作为一种材料概念

4.离子运输

5. 表面与界面

6.电池简介

7.锂离子电池材料

8.固态电池

9.电池中的材料力学

电池系统与材料展望

1.Energy storage technologies: batteries as materials systems

2.Fundamentals of Materials Science

3.Chemical potential as a materials concept

4.Ion Transport

5. Surfaces and Interfaces

6.Introduction to Batteries

7.Lithium-ion Battery Materials

8.Solid-state Batteries

9.Mechanics of Materials in Batteries

10.Battery Systems and Materials Outlook

3. 教授介绍



J.R.

加州理工学院

- 加州理工学院工程与应用科学终身教授
- 加州理工学院应用物理与材料科学执行主任
- 加州理工学院卡弗里纳米科学研究所所长

J.R.教授的研究聚焦于创制与表征具有多尺度微结构层次的材料体系，这类材料通常融合三维架构与纳米尺度诱导的材料特性。其团队通过三维光刻、纳米制造及增材制造等技术，开发微纳米架构材料的制备与合成方法，并系统研究其力学、电化学、机电、生化及光子学性质与材料架构、组成成分及微结构特征的关联规律。Julia R. Greer 教授获得了首届 AAAFM-希格奖（2019），并被美国国防部授予范尼瓦-布什教员研究员称号（2016）及 CNN 的 20/20 远见者（2016）。研究成果被麻省理工学院《Technology Review》（2015）评为十大突破性技术之一，被《Fast Company》评为“100 位最具创造力人物”之一，并被世界经济论坛评为“全球青年领袖”(2014),并获得了多项职业奖项:Kavli(2014)、Nano Letters、SES 和 TMS（2013）；NASA、美国机械工程师学会（ASME，2012）、大众机械突破奖（2012）、能源部（DOE，2011）、DARPA（2009）以及技术评论的 TR-35（2008）。自 2007 年起担任加州理工学院教授，同时也是《Extreme Mechanics Letters》和《Nano Letters》的副主编。

J.R.’s research focuses on creating and characterizing classes of materials with multi-scale microstructural hierarchy, which combine three-dimensional (3D) architectures with nanoscale-induced material properties. We develop fabrication and syntheses of micro- and nano-architected materials using 3D lithography, nanofabrication, and additive manufacturing (AM) techniques, and investigate - among others - their mechanical, biochemical, electrochemical, electromechanical, and thermal properties as a function of architecture, constituent materials, and microstructural detail. We strive to uncover the synergy between the internal atomic-level microstructure and the nano-sized external dimensionality, where competing material- and structure-induced size effects drive overall response and govern these properties. Specific topics include applications of 3D architected materials in in chemical and biological devices, ultra lightweight energy storage

systems, damage-tolerant fabrics, additive manufacturing, and smart, multi-functional materials.

课程九《健康治理:行星健康视角下的环境变迁与人类健康研究》

Planetary Health

学科方向：公共卫生/医学

1. 课程介绍

一个更温暖的世界会是一个更病态的世界吗？生物多样性对我们的健康有益吗？我们如何养活不断增长的人口？我们如何将城市转变为健康和可持续发展的城市？这些问题构成了本次课程的基础。行星健康是一个新的跨学科领域，研究人类活动对地球自然系统造成的干扰对人类健康的影响。本课程通过 10 次课程向学生介绍行星健康的历史、概念和应用，其中融合了行星健康联盟案例集锦中的案例研究，以及《行星健康：人类世中保护人类健康和环境》中的课程内容。学生们将探讨气候变化、生物多样性丧失、食品系统、传染病、非传染病、污染、能源转型以及通向更健康、更可持续未来的途径等关键主题。案例研究将通过全球各地的实际案例来阐释理论概念。到课程结束时，学生们将能够批判性地评估环境变化对人类健康的影响，并阐述在 21 世纪保护福祉的方法。

Will a warmer world be a sicker world? Is biodiversity good for our health? How will we feed a growing population? How do we transform cities for health and sustainability? These and related questions form the foundation of Introduction to Planetary Health. Planetary health is a new interdisciplinary field that examines the human health implications of human-caused disruptions to Earth's natural systems. This course introduces students to the history, concepts, and applications of planetary health through 10 lectures that incorporate case studies from the Planetary Health Alliance Case Study Anthology, and lessons from Planetary Health: Safeguarding Human Health and the Environment in the Anthropocene. Students will explore key themes such as climate change, biodiversity loss, food systems, infectious disease, non communicable diseases, pollution, energy transitions, and pathways toward healthier, more sustainable futures. Case studies will ground theoretical concepts in real-world examples from around the globe. By the end of the course, students will be able to critically assess how environmental change impacts human health and articulate approaches for safeguarding well being in the 21st century.

2. 大纲介绍

1.行星健康导论

2.变化中的地球

3.气候变化与人类健康

4.粮食与营养

5.传染病

6.非传染性疾病

7.海洋健康

8.人口迁徙与冲突

9.城市与能源

10.星球健康的未来

1.An Introduction to Planetary Health

2.A Changing Planet

3.Climate Change and Human Health

4.Food and Nutrition

5.Infectious Disease

6.Non Communicable Disease

7.Ocean Health

8.Migration and Conflict

9.Cities and Energy

10.Future of Planetary Health

3. 教授介绍



K.S.

布朗大学

- 布朗大学生物学与医学学部终身教授

K.S.教授是布朗大学医学科学副教授及生物教育高级副院长。她是生物与医学学部院长领导委员会的成员，也是该学部本科、硕士及博士教育的行政负责人。K.S.教授拥有传染病生态学与生物地理学背景，负责本科、硕士及博士教育的统筹管理。自 2008 年加入布朗大学以来，其研究聚焦于行星健康与STEMM 教育领域，成果发表于 Science、Ecology Letters、One Health、Conservation Biology 等国际同行评审期刊。史密斯博士为本科生及医学生讲授行星健康课程，并共同主持沃伦·阿尔珀特医学院行星健康课程整合委员会。她曾获生物科学学院本科教学、指导与导师制卓越奖，分别获得新墨西哥大学生物学学士及加州大学圣塔芭芭拉分校生态、进化与海洋生物学博士学位。

K.S. is Associate Professor of Medical Science and Senior Associate Dean of Biology Education. She is a member of the Division of Biology and Medicine Dean's leadership council and administrative leader of undergraduate, master's and doctoral education in the Division. With training in infectious disease ecology and biogeography, Dean Smith joined the University in 2008. Her scholarship focuses on planetary health and STEMM education. Her work has been published in peer-reviewed journals such as Science, Ecology Letters, One Health and Conservation Biology. Dean Smith teaches courses on planetary health to undergraduate and medical students and co-chairs the Planetary Health Curriculum Integration Committee at The Warren Alpert Medical

School. She is recipient of the Dean's Award for Excellence in Undergraduate Teaching, Advising and Mentoring in the Biological Sciences. She earned her BS in biology from The University of New Mexico and a PhD from the Department of Ecology, Evolution and Marine Biology from The University of California Santa Barbara.

3. 经管类

课程一《计量经济学：统计机器学习在因果推断与政策优化中的应用》

Data Analysis for Economics and Policy

学科方向：经济学

1. 课程介绍

本课程以宏观经济政策评估为主线，贯穿模型对比与动态模拟的完整分析流程。学生将学习使用编程工具自动化获取并清洗如 CPI、GDP、利率等宏观指标，掌握多源数据整合方法，并构建交互式可视化仪表板，借助滞后变量与移动平均等特征工程，深化对经济变量的时空演变理解。课程将在多个实证案例中融合传统计量经济学方法（如性别工资差异的 OLS 与工具变量分析、警力投入与犯罪率的联立方程模型）与统计机器学习技术（LASSO、Elastic Net、决策树等），引导学生比较不同方法在预测精度与可解释性方面的差异。同时，通过航天器故障检测（Logistic 回归）与零售市场需求建模（ARDL）等任务，强化分类与预测的完整操作流程。课程后期将深入探讨深度学习与因果机器学习在宏观预测与政策评估中的前沿应用，包括 LSTM、Transformer 网络在通胀率与利率等时间序列建模中的实践，以及对货币紧缩或财政刺激政策在不同行业和人群中的异质性效应挖掘。

This course centers on macroeconomic policy evaluation within an integrated workflow of model comparison and dynamic simulation. Students will learn to automate the retrieval and cleaning of key indicators (CPI, GDP, interest rates) using programming tools, master mult-source data integration techniques, and build interactive visualization dashboards that leverage lagged variables and moving averages to illuminate temporal and spatial patterns. Through hands-on case studies, from gender wage-gap regression (OLS & IV) and simultaneous equations for policing and crime rates to spacecraft anomaly detection (logistic regression) and retail demand forecasting (ARDL)—participants will compare traditional econometric methods with statistical ML approaches (LASSO, Elastic Net, decision trees) in terms of predictive accuracy and interpretability. In the final modules, the course explores frontier applications of deep learning and causal ML: implementing LSTM and Transformer architectures for inflation and interest rate forecasting, and deploying Causal Forests to uncover heterogeneous effects of monetary tightening or fiscal stimulus across sectors and populations.

2. 大纲介绍

1.统计推断与假设检验：通胀预测案例

2.回归模型与预测：工资、性别与教育

3.多元回归与结构模型

4.正则化、主成分分析与模型构建

5.内生性与工具变量:市场需求案例

6.因果推断: RCT 与 DiD 评估就业

7.人工智能中的分类模型

8.模型选择与惩罚回归方法

9.时间序列分析与股市预测

10.政策模拟与实时经济动态分析

1.Foundations of Inference and Hypothesis Testing

2.Regression Models and Prediction: Wages, Gender, and Education

3.Multiple Regression and Structural Models

4.Model Building and Feature Engineering

5.Endogeneity and Instrumental Variable Estimation

6.Causal Inference: RCTs and DiD

7.Classification Problems and Models as AI

8.Model Selection and Penalized Regressions

9.Time Series Analysis and Stock Market Prediction

10.Forecasting Models and Real-Time Economic Dynamics

3. 教授介绍



D.R.

剑桥大学

- 剑桥大学经济学系终身教授
- 英国剑桥大学 Pembroke College 经济学系主任
- 曾多次为英国银行、政府部门撰写专题报告
- 连续十六年担任英国高校研究生项目外聘考官
- 著有 Applied Economic Forecasting Techniques 等

D.R.教授现任剑桥大学经济学终身教授，同时担任研究生及博士项目主任。他在剑桥大学长期担任重要领导职务，包括博士和 MPhil 硕士研究型课程主任、经济学课程主任，以及在多个核心委员会任职，如经济学系委员会、研究生委员会、招生委员会，以及彭布罗克学院的财务、规划与投资委员会。他的研究聚焦于流动性约束、经济波动与金融自由化，并获得包括 Leverhulme Trust 在内的多项重要科研资助支持。

D.R.教授还积极参与全球学术活动，例如伦敦政治经济学院（LSE）国际宏观经济与金融中心和经济表现中心，并曾在意大利佛罗伦萨欧洲大学学院担任让·莫奈学者。他还为多所顶尖院校的研究生项目提供学术指导与评审，包括伦敦商学院 MBA 项目、伯明翰商学院、伦敦大学学院经济学硕士项目以及萨塞克斯大学经济学硕士项目。此外，D.R.教授还为多家政府部门和专业机构提供专门的经济学与计量经济学培训，包括英国财政部、国际发展部、贸易与工业部、人力资源经济办公室、民航局以及经济学人智库（Economist Intelligence Unit）。

D.R. is a Professor of Economics and the Director of Graduate Studies and the PhD Programme at the University of Cambridge, where he has held key leadership roles including PhD and MPhil Course Director, Director of the Diploma in Economics, and member of several influential committees such as the Faculty Board, Graduate Studies Committee, Admissions Committee, and Pembroke College Finance, Planning, and Investment Committees. His research focuses on liquidity constraints, economic fluctuations, and financial deregulation, supported by prestigious grants including the Leverhulme Trust.

D.R. has been actively engaged with leading academic institutions worldwide. He serves as a Research Associate at both the Centre for International Macroeconomics and Finance and the Centre for Economic Performance at the London School of Economics (LSE). In 2000, he was a Jean Monnet Fellow at the prestigious European University Institute in Florence, Italy. He has also contributed to the development of top graduate programs as an external examiner for the MBA program at London Business School (1997–2003; 2010–present), Birmingham Business School (2001–2004), MSc Economics at University College London (2000–2001), and MSc Economics at Sussex University (2006–2009).

He has also provided specialized economics and econometrics training to leading government departments and professional institutions, including HM Treasury, the Department for International Development, the Department for Trade and Industry, the Office for Manpower Economics, the Civil Aviation Authority, and the Economist Intelligence Unit.

课程二《土地经济与城市规划：智慧城市解决方案与区域资源布局探究》

Urban Planning and Land Economy

学科方向：经济学

1. 课程介绍

世界有一半以上的人口居住在城市，我们希望城市是清洁、公平、绿色、可持续、安全、健康和宜居的。“智慧城市”会帮助我们实现这些愿望，还是破坏这些愿望？

本课程深入探讨全球城市面临的关键挑战，涵盖从可持续发展到智慧科技的应用等多个方面，旨在探索如何在快速变化的世界中实现城市的平衡发展与经济韧性。鉴于全球已有超过一半的人口居住在城市，掌握有效规划与管理城市空间的方法变得尤为重要，这直接关系到促进经济与社会的长远健康发展。通过本课程，学生将学习城市规划与土地经济的核心理论及实践技巧，深入了解住房供给、环境保护、城市更新等现实议题。此外，课程还将提供构建可持续且充满活力的城市发展策略所需的专业知识与实践能力，使学生能够在未来的城市规划与管理中发挥关键作用，应对气候变化、技术创新等带来的新挑战，为创造更加宜居、繁荣的城市环境贡献力量。

This course offers an in-depth exploration of the critical challenges facing cities globally, spanning topics from sustainable development to the implementation of smart technologies. We aim to investigate how to foster balanced development and economic resilience in a rapidly changing world. Given that more than half of the

global population resides in urban areas, it has become essential to master effective planning and management of urban spaces to support the long-term economic and social well-being of societies.

Through this course, students will engage with the core theories and practical skills in urban planning and land economy, with a focus on pressing issues such as housing provision, environmental protection, and urban renewal. Additionally, the course provides the expertise and practical abilities needed to formulate sustainable and vibrant urban development strategies, equipping students to play a key role in future urban planning and management. Students will learn to address emerging challenges posed by climate change and technological innovation, ultimately contributing to the creation of more livable and prosperous urban environments.

2. 大纲介绍

1.概述:城市发展框架和资源配置

2.规划理论及其演变

3.土地利用与管理路径

4.住房管理与城市发展

5.软性空间与区域治理

6.智慧城市与新兴技术

7.可持续土地利用与环境政策

8.城市复兴与经济多元化

9.城市规划的全球调整

10.未来城市规划:应对气候与技术变革

1. Overview of urban planning and land economy

2. Planning theory and its evolution

3. Land use and management

4. Housing and urban development

5. Soft space and regional governance

6. Smart cities and technological impact on planning

7. Sustainable land use and environmental policy

8. Urban regeneration and economic impacts

9. Global challenges in urban planning

10. Planning the future city

3. 教授介绍



P.A.

剑桥大学

- 剑桥大学土地经济学终身教授

- 剑桥大学人文社会科学学院院长
- 伦敦大学副校长
- 伦敦大学土地经济学教授
- 欧洲知名院校巴黎 Forward College 首席学术官
- 论文引用次数超过 10000 次，谷歌学术因子高达 h-index 45 & i10-index 86!

P.A.教授是国际知名的土地经济与城市规划专家，现任伦敦大学土地经济学教授兼副校长。他曾在剑桥大学担任多个高级管理职位，包括土地经济学教授、该系主任和人文学科与社会科学学院副院长以及副校长顾问，推动了学院的学术卓越与行政发展。他还是巴黎 Forward College 的首席学术官和巴斯大学副校长，展现了其在国际学术界的领导力和影响力。Allmendinger 教授出版了多部重要学术著作，并发表了大量研究论文，为空间规划与土地政策领域做出了深远贡献。他在剑桥大学克莱尔学院担任院士多年，积极指导学生，并作为副校长顾问致力于提升大学的区域事务与影响力。

P.A. is an internationally renowned expert in land economy and urban planning. He currently serves as Professor of Land Economy as well as the Pro Vice Chancellor at the University of London. During his 28 years in higher education Professor Allmendinger has held a host of senior leadership positions, including as a Deputy Vice-Chancellor and a Head of School (Dean) of the Humanities and Social Sciences at the University of Cambridge and Deputy Vice-Chancellor at the University of Bath. He has most recently been the Chief Academic Officer at Forward College, Paris, one of the University's Recognised Teaching Centres. He has most recently been the Chief Academic Officer at Forward College, Paris, one of the University's Recognised Teaching Centres. He has published numerous significant academic works and research papers, making profound contributions to the fields of urban planning and land theory.

课程三《金融学：公司治理、股权结构与资本市场运作分析》

Financial Valuation

学科方向：金融学

1. 课程介绍

本课程是一门系统性的公司金融与估值基础课程，围绕企业在实际经营中所面临的核心财务决策问题展开。课程从金融市场运行机制与公司经营目标出发，梳理企业价值创造的基本逻辑，进而引导学生理解公司在融资、投资与风险管理中的关键决策框架。

在具体内容上，课程将系统讲解货币时间价值、利率体系及各类金融工具（债券、股票与指数）的定价原理，并进一步延伸至投资组合的收益与风险分析、公司及项目估值方法，以及资本结构与资本成本的核心理论。同时，课程还将介绍金融衍生品的基础定价逻辑，帮助学生建立更加完整的金融分析框架。

通过本课程的学习，学生将能够从企业决策者的视角出发，综合运用估值与分析工具，对企业投融资决策、项目选择及价值评估等实际问题进行系统分析与判断。

This course serves as a foundational introduction to financial valuation. The course aims to establish a connection between the financial markets and the economy, as well as how companies are organized and developed. This leads to the core content of the course: identifying the key challenges in corporate finance and understanding

how to address them. Specifically, the course will educate students on interest rates, investment portfolios, methods of valuing companies and projects. Ultimately, students will be encouraged to adopt the perspective of corporate decision-makers and apply the acquired knowledge to solve real-world business issues.

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2. 大纲介绍

1.金融市场与公司经营目标

2.货币的时间价值

3.利率与债务工具与股票和指数的价值评估

4.计算投资组合的回报和风险

5.公司和项目估值

6.项目决策规则

7.类比公司估值

8.资本结构理论

9.资本成本计算

10.金融衍生品定价

1. Financial Market

2. Time Value of Money

3. Interest Rate & Debt Instruments & Valuing Stocks and Indices

4. Computing the Returns and Risk of Portfolios

5. Company and Project Valuation

6. Decision Rules for Projects

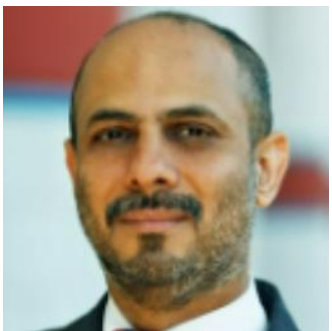
7. Capital Structure Theory

8. Advanced Capital Budgeting Techniques

9. Merger and Acquisition Valuation

10. Option Pricing and Financial Derivatives

3. 教授介绍



R.R.

剑桥大学

剑桥大学金融系终身教授

- 剑桥大学替代金融中心（CCAF）创始人及董事
- 欧洲金融协会前任主席
- 财务学权威期刊 Financial Management 前任编辑
- 担任 10 多家国际知名金融期刊担任副主编、顾问编辑
- 论文总引用 8300 多次，h 指数 30，i10 指数 56

R.R.教授是剑桥大学 Judge 商学院的金融系终身教授，也是剑桥金融中心(CCAF) 的创始人兼学术主任。在加入剑桥大学之前，R.R.教授曾在多所国际知名院校任教，包括加州大学伯克利分校、加州大学洛杉矶分校和普渡大学等。他的研究兴趣重点在投资者和企业如何获取和利用信息。他曾担任欧洲金融协会主席、2023 年金融管理协会在芝加哥的年会程序主席；曾任旧金山全球最大的资产管理公司巴克莱全球投资者(BGI)主管；是《企业金融杂志》等专业期刊的副编辑。R.R.教授在金融和经济学领域具有深远的影响力，其研究和论文被《纽约时报》、《华尔街日报》、《经济学人》和《金融时报》等顶级金融媒体多次引用和转载。他也被频繁受邀在全球各大研讨会和学术会议上发表主题演讲。

R.R. is a Professor of Finance at the Judge Business School at the University of Cambridge and a founding director of the Cambridge Centre for Alternative Finance. Before joining the University of Cambridge, R.R.was an academic in the US teaching at universities such as the University of California at Berkeley, the University of California at Los Angeles and Purdue University. His research interests include how investors and firms acquire and use information. He's a past president of the European Finance Association and was previously Principal at Barclays Global Investors, then the largest asset manager in the world, in San Francisco. He's also an Associate Editor of the Journal of Corporate Finance, among others. He is known for his research on market efficiency. R.R. has a profound influence in the field of finance and economics. His research has frequently been covered by the popular press including the New York Times, the Financial Times, the Wall Street Journal, and the Economist, among others. He is also frequently invited to deliver keynote speeches at major workshops and academic conferences around the world.

课程四《金融经济学：时间序列建模、GARCH 波动率分析与数据预测方法》

Financial Econometrics

学科方向：金融学

1. 课程介绍

本课程系统介绍金融经济学的核心理论与实证方法，旨在帮助学生通过数据驱动的分析理解金融市场的运行机制与行为规律。课程内容涵盖从有效市场假说、事件研究、资产定价模型到波动性与时间序列分析等关键主题，强调利用统计与计量工具对市场数据进行实证检验与模型构建。学生将学习如何应用 CAPM 模型、GARCH 模型及其他实证方法分析资产回报、风险溢价与市场效率。通过案例研究与实际数据操作，课程培养学生在投资决策、风险管理及政策分析中的数据分析能力和批判性思维，为未来从事金融研究与实务工作奠定坚实基础。

This course provides a systematic introduction to the core theories and empirical methods of financial econometrics, enabling students to understand the mechanisms

and behavioral patterns of financial markets through data-driven analysis. Covering key topics such as the Efficient Market Hypothesis, event studies, asset pricing models, and volatility and time-series analysis, the course emphasizes the use of statistical and econometric tools for empirical testing and model construction. Students will learn to apply models such as CAPM and GARCH to analyze asset returns, risk premiums, and market efficiency. Through case studies and hands-on data projects, the course develops students' analytical and critical thinking skills for investment decision-making, risk management, and policy analysis, building a solid foundation for both academic research and professional practice in finance.

2. 大纲介绍

1.金融市场基础与统计分析方法导论

2.投资组合理论与风险收益优化

3.回归分析方法与金融数据应用

4.时间序列基础与市场有效性检验

5.ARMA 模型：金融时间序列建模方法

6.时间序列预测与模型评估方法

7.多变量时间序列与动态回归分析

8.VAR 模型与冲击传导机制分析

9.波动率建模与金融风险度量

10.高频数据与连续时间金融建模

1.Finance and Statistics Background

2.Portfolio choice. Mean variance efficient frontier and Multivariate statistics

3.Linear Regression. Univariate linear regression and multivariate linear regression. OLS estimation. Standard errors and t statistics.

4.Time Series and autocorrelation.

5.Time Series ARMA models

6.Time Series Forecasting

7.Multivariate Time series and regression

8.Multivariate VAR models

9.Nonlinear time series models for time varying volatility. GARCH models

10.High frequency data and Realized volatility

3. 教授介绍



O.L.

剑桥大学

- 剑桥大学三一学院院士和政治经济学终身教授
- 剑桥大学经济系系主任
- 世界金融计量学会主席

- 英格兰银行计量经济学顾问
- 国际统计学会会士，计量经济学学会会士
- 中国人民大学特聘教授
- 曾就职于伦敦政经学院，耶鲁大学，牛津大学
- 三次获得 Econometric Theory 奖

O.L.教授因其在计量经济学和实证金融学方面贡献而闻名，他目前是剑桥大学政治经济学教授和剑桥大学三一学院院士。1983 年获得伦敦政治经济学院数学学士学位（一等）；于 1991 年获得加州大学伯克利分校经济学博士学位，1988 年获得耶鲁大学硕士学位，1986 年获得伦敦政治经济学院计量经济学和数理经济学硕士学位。1991 年至 1993 年，他以牛津大学纳菲尔德学院初级研究员的身份开始其学术生涯。之后，O.L.教授在耶鲁大学伦敦政治经济学院担任过多个职位，包括经济学、统计学和计量经济学教授。

O.L.教授的研究涉及计量经济学的多个领域，包括时间序列分析、非参数和半参数方法以及金融计量经济学。他开发了创新的统计技术来分析经济和金融数据，他的工作对该领域产生了重大影响。

在他的职业生涯中，O.L.教授在顶级学术期刊上发表了大量论文，为计量经济学和实证金融学领域做出了重大贡献。他的研究重点是开发用于分析经济和金融数据的统计方法，尤其侧重于非参数和半参数技术。

O.L. is a Professor of Political Economy at the University of Cambridge and a Fellow of Trinity College since 2011. He started his academic career as a Junior Research Fellow at Nuffield College, Oxford University, from 1991 to 1993. He earned his PhD in Economics from UC Berkeley in 1991, an MA from Yale University in 1988, an MSc in Econometrics and Mathematical Economics from LSE in 1986, and a BSc (1st Class) in Mathematics from LSE in 1983. Chair of the Faculty of Economics at Cambridge University since 2023. O.L. is known for his research in econometrics and empirical finance, focusing on developing statistical methods for analyzing economic and financial data. He has published extensively in top academic journals and has received several awards for his research contributions. Linton's Editorial Roles includes Associate Editor with Econometrica, Co-editor at Econometric Theory, Joint editor of the Royal Economic Society's Econometrics Journal.

课程五《金融科技: 量化投资与人工智能在智慧金融领域的应用》

Financial Mathmatics and FinTech

学科方向：金融工程

1. 课程介绍

本课程在系统讲解经典衍生品定价理论（包括二叉树模型、Black-Scholes 模型以及蒙特卡罗模拟方法）的基础上，进一步探索人工智能与金融工程的交叉应用。

课程前半部分聚焦于金融衍生品的基本概念与定价方法，涵盖无套利原理、看涨–看跌平价、多期二叉树模型，以及美式期权与亚式期权等奇异期权的定价。学生将通过 Python 实践掌握相关数值方法，并建立对经典定价框架的系统理解。

在课程后半部分，重点转向人工智能与深度学习在金融市场中的应用。学生将学习 AI 在交易与风险管理中的作用，并通过案例探讨其在衍生品定价、模型校准、对冲策略和投资组合优化等领域的实践应用。通过基于 Python 的实操练习，学生将构建并训练用于金融建

模的深度学习模型，从而理解其潜力与局限性，培养在量化投资与智慧金融中的前沿应用能力。

This course provides a rigorous introduction to classical derivatives pricing theory, covering the binomial tree model, the Black-Scholes framework, and Monte Carlo simulation, while extending toward the intersection of artificial intelligence and financial engineering.

The first half of the course focuses on the fundamentals of derivative valuation, including no-arbitrage principles, put-call parity, multi-period binomial models, and the pricing of exotic options such as American and Asian options. Students will apply Python to implement numerical methods and build a systematic understanding of traditional pricing frameworks.

The second half of the course turns to applications of AI and deep learning in modern financial markets. Topics include the use of machine learning in trading and risk management, as well as case studies on derivative pricing, model calibration, hedging strategies, and portfolio optimization. Through hands-on Python workshops, students will design and train neural network models tailored to financial scenarios, gaining practical insights into both the potential and the limitations of AI-driven approaches in quantitative finance.

2. 大纲介绍

1.金融市场与金融衍生品导论

2.金融中的 Python 应用与概率论

3.无套利原理与看涨-看跌平价

4.单周期二叉树模型

5.多期二叉树模型

6.亚式期权与美式期权定价

7.蒙特卡洛模拟定价

8.从二叉树到 Black-Scholes 模型

9.人工智能在交易与风险管理中的应用

10.深度学习在对冲中的应用

1.Introduction to Financial Markets and Financial Derivative

2.Python for Finance and basic probability theory via coin tosses

3.No-Arbitrage Principles and Put-Call Parity

4.The Binomial Tree Model: One-Period Case

5.Multi-Period Binomial Models

6.Exotic options including Asian and American options

7.Pricing via Monte Carlo

8.From Binomial Models to Black-Scholes

9.AI in Trading and Risk Management and Deep Learning for Derivative Pricing and Model Calibration

10.Deep Learning for Hedging

3. 教授介绍



J.R.

伦敦政治经济学院

- 伦敦政治经济学院数学系终身教授
- 伦敦政治经济学院金融数学项目主管
- 2018-2019 年伦敦政治经济学院优秀教师
- 前牛津曼定量金融研究所高级研究员
- 前伦敦大学学院数学系教员雇佣委员会、博士学位论文委员会委员
- 哥伦比亚大学 Howard Levene 出色教学奖
- 逾 30 家国际学术期刊审稿人
- 首届年度摩根士丹利金融市场卓越奖

J.R.教授现任伦敦政治经济学院（LSE）数学系终身教授，并担任 LSE 数据科学研究所副主任。他曾任普林斯顿大学运筹学与金融工程系与香港中文大学（深圳）数据科学学院访问教授，并在加入 LSE 之前，曾在牛津大学量化金融研究所（Oxford-Man Institute）担任高级研究员。

教授的研究方向涵盖机器学习与投资组合理论，曾荣获多项业界与学术大奖，包括摩根士丹利金融市场卓越奖（Morgan Stanley Prize for Excellence in Financial Markets）以及 Savvy Investor “2018 年最佳因子投资论文”殊荣。作为富布赖特学者（Fulbright Scholar），他还在哥伦比亚大学和 LSE 多次荣获教学奖项。此外，他还是 UCL 区块链技术中心的合作成员，担任 Applied Mathematical Finance 和 Stochastic Models 的期刊副主编，并曾受邀加入联合国环境规划署的专家委员会，参与企业信贷组合干旱情景压力测试项目。

J.R. is a full Professor at the London School of Economics (LSE) and a leading academic in mathematical finance. Currently, J.R. serves as the Deputy Director of LSE’s Data Science Institute. He has been a visiting professor at ORFE, Princeton University, and at the School of Data Science, CUHK Shenzhen. Before joining LSE, he served as a Senior Research Fellow at the Oxford-Man Institute of Quantitative Finance。

J.R. research interests include machine learning and portfolio theory. His has received several industry prizes including the ‘Morgan Stanley Prize for Excellence in Financial Markets’ and recognition from Savvy Investor recognition for one of the ‘Best Factor Investing Papers of 2018.’ J.R. work was featured in Risk Magazine. A Fulbright scholar, J.R. has also won multiple teaching awards at Columbia University and LSE. He has coauthored numerous research articles with practitioners and academics several teaching prizes at Columbia University and LSE. He has coauthored numerous research articles with practitioners and academics across disciplines such as Finance, Economics, and Operations Research.

J.R. is also an associated member at the UCL Centre for Blockchain Technologies and an associate editor of Applied Mathematical Finance and Stochastic Models. He served on the Expert Council for the ‘Pilot Project on Environmental Stress Testing -

Testing Corporate Loan Portfolios for Drought Scenario,' launched by the United Nations Environmental Programme. J.R. also served as Deputy Head of the LSE Mathematics Department and as director of the MSc programme in Financial Mathematics at LSE.

课程六《管理学：创业管理中的市场机遇探寻与创新策略》

Entrepreneurship: Evaluating Market Opportunities

学科方向：管理学

1. 课程介绍

在一个团队中，学生们将产生一个想法，使用商业建模技术来”充实”这个想法，并定义一个新的创业机会，对他们的新创业概念是否可行和值得追求进行基于研究的评估，并”推销”他们的想法。本课程的主题将包括:创意的产生、商业模式的发展、市场定义、客户发现、竞争分析、资源开发和风险分析。这门课程是为有兴趣学习如何研究一个新市场机会的想法的学生开设的，这个想法可能会形成一个新的创业企业的基础。本课程旨在培养研究和分析新企业潜力所需的分析和概念技能。研究过程包括识别、评估和决定是否追求特定的市场机会。此外，该过程涉及分析与相关新企业相关的可取性、可行性和可行性风险。

Working on a team, students will generate an idea, use business modeling techniques to “flesh out” that idea and define a newventure opportunity, perform aresearch-basedassessment of whether their new venture concept is viable and worth pursuing, and “pitch” their idea. Topics covered in this course will include: idea generation, business-model development, market definition, customer discovery, competitive analysis, resource development, and risk analysis.

This is a course for students interested in learning how to research an idea for a new market opportunity that is likely to form the basis for a new entrepreneurial venture. This course is about developing the analytical and conceptual skills required to research and analyze the potential for a new venture. The research process involves identifying, evaluating and determining whether or not to pursue a particular market opportunity. In addition, the process involves analyzing the desirability, feasibility, and viability risks associated with the associated new venture.

2. 大纲介绍

1. 商业模式画布与市场机会识别
2. 市场营销中的价值主张与客户关系管理
3. 客户细分与市场定位
4. 客户调研、市场研究与 MVP 开发
5. 销售管理与获客渠道优化
6. 竞争与外部环境分析策略
7. 创业融资渠道与资本获取
8. 利用创新解决社会和环境问题
9. 社会创新的商业模式探索

10. 企业社会责任与问责机制

1. Idea generation and evaluation for first-time entrepreneurs

2. Developing value propositions

3. Profiling customers

4. Creating minimum viable products (MVP) to enable customer and market research

5. Exploring customer channels

6. Managing customer relationships

7. Analyzing competitive and external environment

8. How to pitch ideas

9. How to raise capital

10. Using entrepreneurship to address social and environmental problems

3. 教授介绍



M.G.

剑桥大学

- 剑桥大学 Judge 商学院终身教授
- 剑桥大学商学院创业中心联合主任
- 曾获第 13 届社会企业家年度会议最佳论文奖
- 曾获 Academy of Management Journal 最佳评审奖
- 曾任加拿大企业社会责任中心研究员

M.G.教授任职于剑桥大学 Judge 商学院。教授的研究方向是创业和可持续发展，着重研究个人和组织通过创业创新方式、引入和维持积极的社会变革的方法，通过研究促进创新和创新管理的背景和个体因素。M.G.教授曾荣获第 13 届社会企业家年度会议最佳论文奖，这一奖项表彰了他在社会企业家精神方面的杰出研究贡献。此外，他还获得了 Academy of Management Journal 的最佳评审奖，体现了他在学术评审和研究指导方面的卓越能力和公正性。在剑桥大学，他通过教学和研究，培养了大批未来的企业家和学者，并推动了创业教育的发展。作为创业中心的联合主任，M.G.教授领导了一系列创新项目和研究计划，旨在支持和发展新兴企业，促进创业生态系统的健康成长。他的多领域成就和跨界影响力，使他成为学术界和企业界备受尊敬的领袖人物。

M.G. is a Professor in Judge Business School, University of Cambridge. His research interests include entrepreneurship and sustainable development. He examines how individuals and organizations create, introduce, and sustain positive social change by way of entrepreneurship by studying both the contextual and individual factors that contribute to innovation and the governance of innovation. He is a member of the Organizational Theory and Information Systems subject group at Cambridge Judge Business School, Academic Co-Director of the Cambridge Judge Entrepreneurship Centre, and current Associate Editor at the Academy of Management Journal.

课程七《体育管理：数据分析在职业联赛 IP 运营与商业价值评估中的应用》

Leap into the World of Sports Data Science and Management

学科方向：管理学

1. 课程介绍

本课程以全面的视角介绍数据科学和管理在体育产业（包括传统体育和电子竞技）中发挥的作用。课程从体育管理方面入手，探讨了如何利用数据在体育管理中做出明智决策，重点是数据和统计，通过这些数据和统计，可以对不同体育项目和不同时代的成绩动态进行比较分析，并发现与大量体育学科的体育成绩和管理演变有关的新的风格化事实。课程主要分为四个部分。第一部分阐述了体育表现测量和分析的动态，以及在体育中识别影响因素的重要性。第二部分介绍了体育数据分析的基本概念和工具，特别关注这些工具在不同体育项目中的应用，包括传统体育和电子竞技。课程的第三部分深入探讨了体育管理方面，讨论了如何利用数据在体育管理中做出明智决策。最后，课程的第四部分探讨了体育数据科学和管理的未来，讨论新兴趋势以及该领域潜在的职业发展路径。

This course offers a comprehensive perspective on the role data science and management play in modern sports studies. It begins discussing the management aspect of sports, discussing how data can be used to make informed decisions in sports management. The course then branches into four parts. The first part illustrates the dynamics of sports performance measurement and analytics and identification of influential factors in sports. The second part illustrates the basic concepts and tools for sports data analysis and specifically on the application of these tools in various sports, including traditional sports and eSports. The third part of the class delves into the management aspect of sports, discussing how data can be used to make informed decisions in sports management. Finally, the fourth part of the class explores the future of sports data science and management, discussing emerging trends and potential career paths in the field.

2. 大纲介绍

1.体育管理导论

2.体育数据分析导论

3.体育数据特征分析与初步洞察

4.运动表现分析

5.运动表现分析实践案例

6.使用 R 语言进行体育数据分析

7.使用 Python 进行体育数据分析

8.运动员的市场估值和选秀过程

9.工资帽、球员交易与劳资谈判协议

10. 体育数据科学与管理的未来发展

1.Introduction to Sports Management

2.Introduction to Sports Analytics

3. Exploratory Data Analysis (EDA) in Sports I

4. Introduction to Sports Performance I

5. Introduction to Sports Performance II

6. Introduction to R for Sports Data Analysis

7. Introduction to Python for Sports Data Analysis

8. Market Valuation of Athletes and the draft process

9. Introduction to Salary Cap; trading players; CBA

10. Future of Sports Data Science and Management

3. 教授介绍



L.M.

南加州大学

- 南加州大学马歇尔商学院教授
- NBA 洛杉矶湖人队的运动表现分析总监
- Kaweah Delta 医院首席数据科学家
- 运动表现分析知名顾问
- MLB 美国职业棒球大联盟高效能总监

L.M.现任南加州大学数据科学与运营方向教授，长期致力于将数据科学方法应用于公共健康与体育表现研究领域。其研究以“关注分布两端”为核心视角，一方面聚焦弱势群体健康不平等问题，尤其针对西班牙裔/拉丁裔人群的身体活动水平与健康行为进行实证分析，推动健康促进与干预策略的优化；另一方面，她将研究拓展至竞技体育领域，围绕运动表现提升与运动损伤预防开展数据驱动研究。

L.M.教授的研究路径深受其运动员背景影响。作为前职业级网球运动员，她在退役后进入学术界，并在职业体育行业积累了丰富的实践经验。她曾担任洛杉矶湖人队运动表现分析总监，以及美国职业棒球大联盟球队的高性能平台主管，负责将数据分析应用于运动员表现评估与训练优化。这些跨界经历使其研究兼具理论深度与实践导向，能够有效连接数据科学、公共健康与体育产业应用场景。

As an Assistant Professor of Clinical Data Sciences and Operations at the University of Southern California, L.M. stands out for her insightful approach to research, often illustrated through her focus on ""both sides of the bell curve."" This phrase encapsulates her dual research interests: on one side, she is dedicated to reducing health disparities in underprivileged populations, particularly within the Hispanic/Latino community, by examining physical activity levels and promoting healthy lifestyle behaviors. On the other side, her work extends into the realm of sports science, where she concentrates on enhancing sports performance and injury prevention for professional athletes.

L.M.'s unique perspective is deeply influenced by her background as a former elite tennis player. Her transition from athlete to academic has been marked by significant roles in the professional sports industry, including serving as the Director of High Performance for a Major League Baseball team and as the Director of Sports

Performance Analytics for the Los Angeles Lakers. These experiences have provided her with invaluable insights into the practical applications of her research.

4. 人文及其他类

课程一《语言学：文字符号系统与认知神经科学的跨学科逻辑关联》

Linguistic Encoding: Writing Systems, Emojis and Signs

学科方向：语言学

1. 课程介绍

语言对每个人来说都是不同的，因为每一个图案，符号，单词，字体对于每个人都有着不一样的含义。比如双手合并在日本的文化中是表示感谢的意思，而在西方国家人们会认为这个动作和宗教祈祷个人修为相挂钩。除了文化差异让每个人理解方向不同以外，个人的经历也会造成很大的差异，毕竟内向外向性格的人，激进和保守态度的人都是因为经历不同才会对又不同的处世原则进而语言在他们心中对应的事物也不同。便是因为有了些许这般的变化，语言就文字本身的含义而言是不断进化的。

Language is different for each individual because every pattern, symbol, word, and font carries unique meanings for each person. For example, in Japanese culture, bringing together one's hands signifies gratitude, whereas in Western countries, people might associate this gesture with religious prayer or personal spirituality. Apart from cultural differences that lead to varied interpretations, personal experiences also introduce significant disparities. After all, introverted and extroverted personalities, as well as individuals with progressive or conservative attitudes, develop different approaches to navigating life due to their diverse experiences. As a result, the concepts associated with language in their minds can also differ. It's precisely due to these subtle changes that language, in terms of the meanings conveyed through words, is in a constant state of evolution.

2. 大纲介绍

1. 写作系统的语言学：音节文字与表意文字
2. 写作系统的语言学：辅音与元音
3. 哨语和鼓语：音调与音段
4. 手语和手势：表意性、发音和转录
5. 图像的语言学：洞穴艺术与表情符号
6. 文学的语言学：口头艺术中的语言
7. 写作系统的演变：从古代文字到数字通信
8. 极简主义、连接主义和动物语言学

9. 认知革命与语言的数学基础

10. 结构主义、跨语言的普遍性和收敛证据

1. The Linguistics of Writing Systems: Syllabaries vs Logograms

2. The Linguistics of Writing Systems: Consonants vs Vowels

3. The Linguistics of Whistled and Drum Languages: Tones vs Segments

4. The Linguistics of Sign and Gesture: Iconicity, Articulation, and Transcription

5. The Linguistics of Pictorial Images: Cave Art vs Emojis

6. The Linguistics of Literary: Language in the Verbal Arts

7. Evolution of Writing Systems: From Ancient Scripts to Digital Communication

8. New Frontiers: Minimalism, Connectionism, and Animal Linguistics

9. Cognitive Revolution and Mathematical Foundations of Language

10. Structuralism, Universals across Language, and Converging Evidence

3. 教授介绍



A.N.

伦敦大学

- 伦敦大学学院语言学终身教授
- 曾任哈佛大学语言学终身教授
- 美国语言学会项目委员会联合主席
- 牛津大学理论语言学研究高级顾问
- 加拿大语言学杂志编辑委员会成员
- 美国国家科学基金会、葡萄牙科学基金会评审员
- 《自然语言与语言理论》《美国语言学国际期刊》等期刊审稿人

A.N.教授于2000年获得麻省理工学院认知科学与计算机科学双学士学位，并于2004年在该校获得语言学博士学位。在2008年至2010年期间，他在哈佛大学担任语言学终身教授，自2012年起担任伦敦大学学院语言学终身教授。他在学界的影响力显著，担任美国语言学会项目委员会联合主席以及牛津大学理论语言学研究高级顾问，同时也是美国国家科学基金会评审员之一。2019年，A.N.教授受浙江大学特聘担任该校“求是”荣誉教授。他的主要研究方向包括语言学、认知与计算心理学、人类学、神经科学以及生物心理学等多个学科领域，曾出版《元音和谐的局部性》、《规则、约束和音系现象》和《屈折同一性》等多本语言学著作。他的研究兴趣包括音韵和形态理论；少数语言对语言学理论的贡献；新兴手语、连词一致和省略、元音和辅音和谐等。

A.N. received dual bachelor's degrees in Cognitive Science and Computer Science from MIT in 2000 and a Ph.D. in Linguistics from MIT in 2004. He was a tenured professor at Harvard University from 2008 to 2010 and has been at University College London since 2012. He co-chairs the Program Committee of the Linguistic Society of America and advises on theoretical linguistics at Oxford University. He is also a reviewer for the National Science Foundation. In 2019, he was appointed ""Qiushi"" Honorary Professor at Zhejiang University. His research spans linguistics, cognitive and computational psychology, anthropology, neuroscience, and biopsychology. Notable publications include ""Locality in Vowel Harmony,"" ""Rules, Constraints, and

Phonological Phenomena,"" and ""Inflectional Identity."" His interests include phonological and morphological theory, minority languages, emergent sign languages, conjunction agreement, ellipsis, and harmony in vowels and consonants.

课程二《探源“一带一路”历史渊流：丝绸之路沿线古代文明的交流与发展》

The Silk Road in Global History

学科方向：区域研究

1. 课程介绍

丝绸之路，又称丝路，通常指的是陆上丝绸之路，更广泛地划分为陆上丝绸之路和海上丝绸之路。丝绸之路的重要性超越了单纯的商业贸易，它是不同文明相互交融的桥梁，为各种文化、宗教和历史背景的人们创造了相互了解和交流的机会。丝绸之路不仅促进了商品如丝绸、香料、宝石的交换，也促进了知识、艺术、哲学和宗教信仰的传播。

The Silk Road, usually refers to the Land Silk Road, and is more broadly divided into the Land Silk Road and the Maritime Silk Road. The importance of the Silk Road goes beyond mere commerce and trade. It serves as a bridge between different civilizations and creates opportunities for people of various cultural, religious and historical backgrounds to understand and communicate with each other. The Silk Road not only facilitated the exchange of commodities such as silk, spices, and precious stones, but also the spread of knowledge, art, philosophy, and religious beliefs.

2. 大纲介绍

1. 丝绸之路的起源
2. 游牧文明，游牧政治经济的考古学
3. 帝国与欧亚互动
4. 游牧帝国主义： 关于波斯人和匈奴
5. 大陆商业网络： 索格迪亚人
6. 横跨印度洋的商业网络，第一部分
7. 横跨印度洋的商业网络，第二部分
8. 丝绸之路上的宗教文化，第一部分
9. 丝绸之路上的宗教文化，第二部分
10. 伊斯兰教的兴起

1. The Central Eurasian Bronze Age
2. The Scythian Complex
3. Empires and the Silk Road
4. The Xiongnu and Nomadic Political Economy
5. Nomadic Empires
6. The Sogdian Mercantile Network

7. Indian Ocean Commerce

8. Early Islam and the Silk Road

9. Religions alongthe Silk Road, II

10. The Rise of Islam

3. 教授介绍



R.P.

芝加哥大学

- 芝加哥大学历史系终身教授
- 芝加哥大学古典历史研究项目负责人
- 曾获伊朗伊斯兰共和国文化和伊斯兰指导部颁发的伊朗伊斯兰共和国年度书籍世界奖
- 曾获得美国哲学学会颁发的 Jacques Barzun Prize 的历史研究领域最高奖项
- 曾获得国际伊朗研究学会 Ehsan Yarshater 奖

R.P.教授目前是芝加哥大学历史学院终身教授，研究东亚历史文化领域最杰出的学者，毕业于普林斯顿大学并获得历史学博士学位。R.P.教授是美国文化历史研究领域最高奖项雅克·巴尔赞奖（Jacques Barzun Prize ）的获得者，他的著作“A State of Mixture”获得了学界广泛赞誉，他还曾获如美国大学优等生荣誉学会、德国 DAAD 等机协会颁发的多项重要奖项。R.P.教授将历史分析、宗教研究和文化人类学研究相结合，揭示了不同宗教和民族群体之间复杂的文化融合。他的著作《Desigualdades Antiguas》和《古代阿富汗帝国的界限》等深入研究了古代社会的社会经济动态和权力结构。

R.P. is currently a tenured professor in the History Department at the University of Chicago, and is regarded as one of the most distinguished scholars in the field of East Asian historical and cultural studies. He holds a Ph.D. in History from Princeton University. R.P. is the recipient of the prestigious Jacques Barzun Prize in American Cultural History, and his work ""A State of Mixture"" has garnered widespread acclaim in academia. He has also been honored with several significant awards from organizations such as the Phi Beta Kappa Society and the German Academic Exchange Service (DAAD). R.P. combines historical analysis with religious studies and cultural anthropology. His research reveals the intricate cultural amalgamation among different religious and ethnic groups. His publications, such as ""Desigualdades Antiguas"" and ""The Limits of Empire in Ancient Afghanistan,"" delve into socio-economic dynamics and power structures in ancient societies.

课程三《教育学：K-12 儿童驱动学习的创新教学策略与教育政策》

How People Learn: An Investigation into Theories of Learning

学科方向：教育学

1. 课程介绍

乌尔里希.伯泽尔在《有效学习》中强调: “学会‘如何学习’，将是专家们所说的‘终极生存技能’，这是现代社会超越其他一切技能的关键能力。”这一观点鲜明地指出，学会如何学习比掌握特定知识更为重要。未来的人才需具备两种能力: 一是解决“非结构化问题”的能力，也就是能够解决那些没有现成答案的问题。二是洞察信息的能力，也就是能够根据现有信息，发现别人看不到的内在联系，提出新的见解。这不仅意味着学生需要获取知识，更需要掌握学习的方法、策略和技能，以应对未来不断变化的挑战。

In ""Effective Learning,"" Ulrich Boser emphasizes, ""Learning how to learn will be what experts call the 'ultimate survival skill,' the key ability that surpasses all other skills in modern society."" This viewpoint vividly underscores that learning how to learn is more crucial than mastering specific knowledge. Future talents need to possess two key abilities: firstly, the capacity to solve ""unstructured problems,"" which entails addressing questions without pre-established answers; secondly, the ability to discern information, uncover hidden connections from existing data, and propose fresh insights. This implies that students must not only acquire knowledge but also grasp learning methods, strategies, and skills to effectively confront the ever-changing challenges of the future.

2. 大纲介绍

1. 了解你自己的学习习惯与理论
2. 把学习理解为一个行为改变的过程
3. 把学习理解为一个认知过程
4. 把学习理解为一个建构现实的过程
5. 把学习理解为一个文化变迁的过程
6. 把学习理解为一个生态发展的过程
7. 了解学习的动机从何而来
8. 如何培养高情商及其在学习环境中的作用
9. 学习理论如何影响老师的教学方式
10. 我们到底如何去学习的自我反思

1.Uncovering Your Own Tacit Theory of Learning

2.Understanding Learning as a Process of Behavioral Modification

3.Understanding Learning as a Cognitive Process

4.Understanding Learning as the Process of Actively Constructing Reality

5.Understanding Learning as a Cultural Process

6.Understanding Learning as an Ecological Process

7.Understanding Motivation's Role in Learning

8.Social Emotional Learning (SEL) and its role in Learning Environments

9.How Theories of Learning Impact Teaching

10.Revisiting Our Own Theories About How People Learn

3. 教授介绍



S.K.

宾夕法尼亚大学

- 宾夕法尼亚大学教育学院终身教授
- 宾州费城教育局学习实验室教学研究负责人
- 斯坦福大学卓越教学支持中心博士后
- 曾任华盛顿大学导师实验室(K-12 学校)首席研究员
- 曾多次在 American Educational Research Journal 等期刊发表文章
- 曾荣获詹姆斯·S·麦克唐纳基金会专项研究资金

S.K.教授是宾夕法尼亚大学教育学院终身教授，是 Collaboratory for Teaching and Teacher Education 的主任和宾州费城教育局学习实验室教学研究负责人。她还曾任华盛顿大学导师实验室（K-12 学校）首席研究员。她的研究主要集中在帮助教师把正义和平等的信念转化为实际教学实践上。她的研究得到了斯宾塞基金会、詹姆斯 S. 麦克唐纳基金会和卢卡斯教育研究等组织的资助，她曾是《美国教育研究杂志》和《阅读研究季刊》等领先教育研究期刊的编辑委员会成员。除其他知名学术期刊外，她的研究还发表在《美国教育研究杂志》、《教育研究者》、《认知与指导》、《教师学院纪录》、《教师教育杂志》和《教学与教师教育》等期刊上。她还合著了《基于项目的学习的核心实践：教师和领导者指南》一书。

S.K. is a tenured faculty member at the Graduate School of Education, University of Pennsylvania, where she serves as the Director of the Collaboratory for Teaching and Teacher Education and as the Research Lead for the Philadelphia Education Research Lab. Previously, she held the position of Senior Researcher at the Mentor Lab at the University of Washington, focusing on K-12 education. Her research primarily revolves around assisting teachers in translating their beliefs in justice and equality into actionable teaching practices. She has received funding for her research from organizations such as the Spencer Foundation, the James S. McDonnell Foundation, and Lucas Education Research. Additionally, she has served as a member of the editorial boards for leading educational research journals, including the American Educational Research Journal and Reading Research Quarterly. Her work has been published in esteemed academic journals such as the American Educational Research Journal, Educational Researcher, Cognition & Instruction, Teachers College Record, Journal of Teacher Education, and Teaching and Teacher Education. Furthermore, she is a co-author of the book ""Core Practices for Project-Based Learning: A Guide for Teachers and Leaders."

课程四《传播学：数字时代的智能传媒与信息传播机制研究》

Communication through Social & Digital Media

学科方向：传播学

1. 课程介绍

数字媒体的迅速崛起已经深刻改变了人们获取信息和社交互动的方式。社交媒体平台如抖音（TikTok）和 Facebook 等已经成为全球范围内广泛使用的传播工具，塑造了社会文化、影响了舆论态势。这些平台的传播策略和媒体舆论的研究变得至关重要，以更好地理解数字时代信息传播的动态和规律。

抖音等短视频平台的传播策略，包括内容创作、算法推荐、用户互动等方面，对于塑造信息的流动、扩散和受众接触至关重要。与此同时，数字媒体平台上涌现出各种观点和声音，引发了复杂的媒体舆论现象。了解这些舆论的形成、演变和影响，有助于揭示社交媒体在公众舆论形成过程中的作用。通过对抖音、Facebook 等社交平台传播策略与媒体舆论的深入研究，我们可以更好地把握数字媒体时代信息传播的脉络，为未来的媒体策略和舆论引导提供有力支持。

The rapid rise of digital media has profoundly transformed the way people access information and engage in social interactions. Social media platforms such as TikTok and Facebook have become widely used tools for global communication, shaping social culture and influencing public opinion. The study of the dissemination strategies and media discourse on these platforms has become crucial to better understand the dynamics and patterns of information dissemination in the digital age.

The dissemination strategies of Short video platforms like TikTok, including content creation, algorithmic recommendations, and user interactions, play a critical role in shaping the flow, diffusion, and audience exposure of information. Simultaneously, a variety of viewpoints and voices emerge on digital media platforms, leading to complex media discourse phenomena. Understanding the formation, evolution, and impact of these discourses helps unveil the role of social media in the process of public opinion formation. Through an in-depth study of the dissemination strategies and media discourse on platforms like TikTok and Facebook, we can gain a better grasp of the contours of information dissemination in the digital media era, providing robust support for future media strategies and opinion guidance.

2. 大纲介绍

1. 社交媒体和媒体理论导论
2. 虚假信息与伦理和媒体素养
3. 数字时代的媒体素养
4. 社交媒体平台的演变
5. 社交媒体沟通中的伦理困境
6. 社交媒体中的数据隐私与安全
7. 社交媒体对身份和自我呈现的影响
8. 假新闻和虚假信息宣传
9. 数字活动主义和社会变革
10. 社交媒体中的新兴趋势和危机沟通

1. Introduction to Social Media and Media Theories
2. Disinformation vs. Ethics& Media Literacy
3. Media Literacy in the Digital Age

4. The Evolution of Social Media Platforms

5. Ethical Dilemmas in Social Media Communication

6. Data Privacy and Security in Social Media

7. Impact of Social Media on Identity and Self-Presentation

8. Fake News and Disinformation Campaigns

9. Digital Activism and Social Change

10. Emerging Trends and Crisis Communication in Social Media

3. 教授介绍



S.M.

马里兰大学

- 马里兰大学菲利普-梅里尔新闻学院终身教授
- 公共传媒与国际事务中心主任
- 萨尔茨堡传媒与全球变化学院的联合创始人
- 新闻权威著作《利用新闻谋取政治利益》作者
- 曾担任布兰迪斯大学新闻项目主管长达 10 年
- 曾获得马里兰州执委会教学奖
- 美国主流媒体的常驻评论嘉宾

S.M.教授本科毕业于耶鲁大学,研究生和博士分别于1985年和1987年毕业于哈佛大学。教授现任马里兰大学菲利普-梅里尔新闻学院终身教授，同时担任国际媒体与公众议程中心的主任和萨尔茨堡媒体学院的联合创始人，后者被誉为“新闻届的黄埔军校”。在教授的指导下，ICMPA 进行了关于国际新闻全球媒体报道的研究。作为知名的个人研究人员，教授撰写了许多重要的媒体研究，包括《大规模杀伤性武器的媒体报道》和《政府、媒体与人权》等文章，拥有丰富的新闻行业从业经历，她还是新闻权威著作《利用新闻谋取政治利益》作者。

S.M. received her bachelor's degree from Yale University in 1979, and went on to earn her master's and doctoral degrees from Harvard University in 1985 and 1987 respectively. She is the director of the International Center for Media and the Public Agenda (ICMPA) and the co-founder of Salzburg Academy on Media and Global Change. ICMPA, under Moeller's direction, conducts studies of global media coverage of international news. As an individual researcher, S.M. has authored numerous major media studies, such as “Media Coverage of Weapons of Mass Destruction” and “Government, Media and Human Rights” and so on. She is the author of the authoritative work on journalism, “Packaging Politics: Political News in America”.