美国顶尖高校前沿学科项目

Machine Learning with Business Analytics

机器学习与商业分析方向

商业分析被列为未来最被企业需要的技能之一，美国劳工统计局预测，到2026年，商业分析师的职位将增长27%，这一速度远快于所有职业的平均水平。跨学科的商业分析课程站在数学、统计学、金融学、计算机科学的交叉口。商业大数据与其他的大数据相比蕴含着大量的待发掘价值，学术界在大数据的理念、模型以及相关的人才培养方面进行了相当多的探索与讨论。掌握描述性、预测性、规范性等分析方法既符合商业决策向"数据驱动"靠拢的趋势，满足公司对行业稀缺人才和专精技能的需求，也将培养学生理性系统思维和商业洞察力。从聚类算法绘制用户画像，聚类回归预测周期价值，到数理和视觉维度上挖掘数据，本项目通过学习揭示隐藏关系、相关性、模式、关联、投资者行为等方法，结合商业案例、真实数据，利用建模和算法来提取所需信息、展示，复现商业、经济、投资等领域决策。
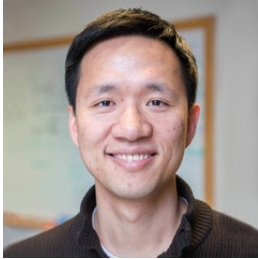
- 麻省理工学院斯隆商学院野村金融讲席教授、金融系主任
- 美国国家经济研究局研究员
- 现任Journal of Finance, Review of Financial Studies, Management Science 和Journal of Banking and Finance编委
- 研究领域包括资产定价及其与公司金融的关系，尤其是用机器学习研究宏观经济和信用风险、流动性风险、融资及投资决策之间的相互影响。

Prof. Hui Chen

顶尖师资，直播教学

Engaging with live lectures from tier-one faculty

在线答疑，实时解惑

Attending Q&A sessions, as per specific program schedule

案例研究，数据实操

Engaging with data/cases/examples of core topic

小组研讨，同侪评议

Participating in moderated discussion groups with your peers

前沿应用，行业实践

Completing a capstone project to apply and demonstrate

knowledge learned

项目日期：2023年1月8日-2月5日（春节假期调休）
时间安排：直播课程一般在北京时间上午9-12点
项目课时：**60**课时（每课时45分钟），包括核心课程、实践、科研写作等多个模块
论文产出：在项目结束后学生将获得项目证书，同时可结合项目课题产出一篇约5000词的科研论文（小组协作）

Master Class	**Capstone**	**Writing Booster**	论文修改润色指导投稿支持建议
3大模块学科前沿课程； 一对一答疑指导； 对机器学习、商业分析、回归分析、金融科技等课题研究计划的指导以及论文选题建议；	三种不同的深度神经网络模型进行投资组合分析；	进阶写作科研论文指导	

■ Master Class 核心课程模块，总计25课时，周均6-7课时，由责任教授直播授课

■ Capstone Project 实践模块，总计15课时，周均3-4课时，由行业专家/博士后/助教直播授课及指导

■ Writing Booster 写作模块，总计20课时，周均3-4课时，由教授/期刊编辑直播授课及指导

□ 论文指导、修改润色及投稿支持，每个小组论文完成后由教授/期刊编辑审核及指导

*本项目包含学术进阶写作模块，论文指导服务周期为项目结束后90天内。

- ## DCF and Sensitivity analysis in Asset Pricing
  After a brief intro of the time value of money, students will learn about the "justification" of each parameter in CAMP and WACC models. With real world data/case/example and a DCF Model Excel template, students will learn about "more fragile firms or firms that rely more on external finance appear to cut investment more when facing an increase in their cost of capital", "ongoing debate about the causes of the sluggish rate of corporate investment observed in many developed economies in the aftermath of the 2008 crisis" and more. By linking the NPV of firms to cells that influence the underlying assumptions, student will see the influence each parameter cast with instrumental changes and then use data tables and goal seek to preform sensitivity analysis. (with a brief touch on "dark matter" and rational expectation).

- ## Intro to Machine Learing and Regression
  Students will be introduced with both traditional cross-section regressions on stock returns and ones based on Machine Learning methods with a focus on R^2, momentum indicators, long short term memory and feed forward network, Boosted Regression Tree/Gradient Descent/Loss Function. Students will then be dealing with modern algorithms and approaches from machine learning, particularly deep learning (robust DNN, loss correction, open sources like CIFAR-10), and how it could provide new hope to address issues given their outstanding prediction performance.

- ## Business Analytics and Decision Making

  Student will go over most recent academic studies in empirical asset pricing that employ machine learning techniques i.e. use the fundamental no-arbitrage condition as criterion function, to construct the most informative test assets with an adversarial approach and to extract the states of the economy from many macroeconomic time series. (regularization—double selection procedure, omitted variable bias, LASSO VS Ridge, dimension reduction—combine RP-PCA with either IPCA or Kozak's method, neural networks— Back-propagation, Stochastic gradient, and fitting parameters) Students will learn about ways to recalibrate human resources and machine capabilities and create competitive differentiation for firms in general, i.e. improve AI Decisions: Mitigate bias, inequity, and overconfidence by understanding and preparing for the common pitfalls of algorithmic decision-making.

- ## Capstone project

  We propose a new way to estimate asset pricing models for individual stock returns that can take advantage of the vast amount of conditioning information, while keeping a fully flexible form and accounting for time-variation. For this purpose, we combine three different deep neural network structures in a novel way: A feedforward network to capture non-linearities, a recurrent (LSTM) network to find a small set of economic state processes, and a generative adversarial network to identify the portfolio strategies with the most unexplained pricing information. Our crucial innovation is the use of the no-arbitrage condition as part of the neural network algorithm. And students will come to learn the Rapidminer software, and see the results from Python are different when advanced models like FNN, RF, and LSTM structure (NN) are used.

L1	Summarize and Paraphrase	Emulating clarity, tone, clause types and combinations, language for stance and positioning, and information flow for crafting sophisticated sentences.
T1	Summarize and paraphrase practices	
L2	Quotation and Citation	Academic integrity and plagiarism, and citation systems such as MLA and APA.
T2	Citation tools in Microsoft Word	
L3	Thesis Development	Examining thesis sentences and moving through thoughtful strategies (specific, unique, debate causing, room for discussion) for complicating a thesis
T3	Construct thesis practices	
L4	Themed Seminar	The instructor will identify key concepts students can use to make sense of the complex communication experiences in their particular contexts.
T4	Handy tips in writing	
L5	Compose and Revise	Setting the context, stating the thesis, building points, developing ideas, and proofreading.
T5	Grading and peer review	

项目涵盖**机器学习、商业分析、量化投资、金融科技**等多个前沿学科、交叉学科和新兴学科方向，项目教学资料与顶尖高校该学期开设课程**同步更新**，与国外顶尖高校**保持教材一致以及研究数据同步。**

世界顶尖水平的师资教学团队全程指导，**斯隆商学院野村金融讲席教授、金融项目负责人**全程直播教学与答疑。 项目配中文助教，提升学生学习效率。

项目中重要部分之一是数据模型案例实践，金融、商业企业在当前热门领域的**行业应用案例**将作为实践教学案例，学生可根据回归模型分析等研究其在多个领域的最新应用，将实践案例课题**进行跨学科分析及研究。**

学生将掌握商业分析的前沿热点，学会如何研究工具完成各类交叉学科研究，并基于此完成项目论文。在完成项目后将获得麻省理工学院讲席教授签发的**项目证书、支持网申要求的学术推荐信、论文期刊投稿支持。**

项目费用及奖学金

- 短期项目费用：16900元/人
- 项目费用包含课程、助教指导、项目服务管理、注册、资料费用
- 项目方为合作高校提供奖学金减免3000-5000元/人，线上费用可抵扣2023年春季/暑期线下交流项目。

申请条件

- 本校全日制在读本科、研究生，符合本校国际交流派出要求
- 英文流利，能够接受全英文的教学环境
- 具备申请学科的基础知识
- 能保证项目时间投入

申请方式及咨询

- 扫描下方左侧二维码，填写申请信息
- 通过初审后于3个工作日内收到项目录取邮件
- 更多问题欢迎咨询Cindy老师，微信tbstudy11
  电话18917342671

项目申请二维码   咨询微信二维码