IIT summer session /semester 2 opportunities

https://myiit.force.com/ELEVATEatIIT/s/college-of-science-opportunities-list

Project 1：

Modern Statistics in the Big Data Paradigm (498-101)

大数据范式中的现代统计，招生人数 10，导师 Lulu Kang,建议大三

网址：

https://myiit.force.com/ELEVATEatIIT/s/iit-elevate-opportunity/a2if1000001B7IG

This course is designed to provide students with an introduction to the key aspects of statistics and data science. It gives a general overview of the current status and future development of data science research and application and covers a broad spectrum of data analysis and collection methods, as well as the software implementation of those methods. The students would apply what they have learned through a capstone project designed by the instructor.

Project 2：

Machine Learning Algorithms on Heterogeneous Big Data (498-106)

异构大数据的机器学习算法，招生人数 3，导师 Sou-Cheng Terrya Choi 大二大三

网址：

https://myiit.force.com/ELEVATEatIIT/s/iit-elevate-opportunity/a2if10000006EdY

This is a research course that considers solving scientific, business, or medical research problems by building accurate and reasonable machine-learning models based on real-world big datasets, which could be structured or unstructured, often noisy and incomplete, or even with parts in multimedia formats.

Project 3：

Genomics, Big Data, and Bioinformatics (498-206)

基因组学，大数据和生物信息学，招生人数 3，导师 Jean Pombert

网址：

https://myiit.force.com/ELEVATEatIIT/s/iit-elevate-opportunity/a2i3a000000vi2s

Genomes encode the sum of our abilities, and the field of genomics helps uncover more about ourselves. However, as we move in the era of personalized genomics, the volume of data to analyze is ever expanding, and the analysis of genome data requires a strong computational skillset and the use of bioinformatics tools. In this research project, trainees will learn how to sequence DNA using high-throughput platforms and how to analyze the corresponding data.

Project4：

Big Data Computing (498-409)

大数据计算，招生人数 6，导师 Ioan Raicu

网址：

https://myiit.force.com/ELEVATEatIIT/s/iit-elevate-opportunity/a2i3a000000vi2t

This course is a tour through various topics in distributed data-intensive computing, covering topics in cluster computing, grid computing, supercomputing, and cloud computing. We will explore solutions and learn design principles for building large network-based computational systems to support data intensive computing. Topics include resource management, programming models, application models, system characterizations, and implementations. Our discussions will often be grounded in the context of deployed Cloud Computing systems, such as Amazon EC2 and S3, OpenStack, Yahoo's Hadoop, Apache Spark, TensorFlow, and many other systems. The course involves lectures, brainstorming discussions, and hands-on assignments giving students practical experience with Big Data Computing systems.

Project 5：

A Computational Approach to Approximation Theory（498-105）

一种近似理论的计算方法，招生人数 9，导师 Aleksey Zelenberg

网址：

https://myiit.force.com/ELEVATEatIIT/s/iit-elevate-opportunity/a2if10000006Ecz

Using Matlab software, students will learn the fundamentals of approximation theory. Topics will include data interpolation, quadrature, root-finding, solutions to differential equations, and more. A central component of this course will be collaborative projects in which the theory will be computationally implemented and further explored.

Project 6：

Machine Learning Classifiers (498-107)

招生人数 3，导师 Yuhan Ding

网址：

https://myiit.force.com/ELEVATEatIIT/s/iit-elevate-opportunity/a2i3a000000vi2q

This is a project-based course that considers discovering meaningful rules and knowledge via exploring large quantities of the data. The instructor will introduce several classifiers such as decision trees, logistic regression, support vector machines, and neural networks. Students will apply these different classifiers to real-world datasets and build predictive models. ["Michael Pelsmajer" may appear temporarily as the course instructor for this section.]

Project 7：

Algorithms for Network Design and Games(498-406)

网络设计与游戏算法，招生人数 3，导师 Sanjiv Kapoor

网址：

https://myiit.force.com/ELEVATEatIIT/s/iit-elevate-opportunity/a2if10000006Edi

In this project, we will consider multi-path routing schemes for networks. Based on theoretical developments, algorithms will be developed to implement multi-path protocols in networks , both for wide-area broadband networks and as interprocess networks defining the communication infrastructure of high performance computers. We will also consider game theoretic aspects of network routing.

Project 8：

Algorithms for Shortest Path Planning in Geometric Domains(498-407)

几何域中最短路径规划的算法，招生人数 4，导师 Sanjiv Kapoor

网址：

https://myiit.force.com/ELEVATEatIIT/s/iit-elevate-opportunity/a2if10000006Edn

Algorithms for geometric shortest paths in three dimensions will be developed and implemented. Three-dimensional models will include euclidean 3D models as well as terrain models. The project will use computational geometric techniques, and algorithms for shortest paths in both rectilinear and euclidean metric will be developed and implemented.

Project 9：

Online Social Network Analysis (498-410)

在线社交网络分析，招生人数 9，导师 Aron Culotta

网址：

https://myiit.force.com/ELEVATEatIIT/s/iit-elevate-opportunity/a2i3a000000vi2u

This project-based course explores the latest algorithms for analyzing online social networks, considering both their structure and content. Projects will focus on ways to combat rising issues that confront online platforms, including cyberbullying, bots, and misinformation. Real-world data will be analyzed using artificial intelligence approaches to natural language processing and network analysis, using the latest open-source tools in Python, including TensorFlow, scikit-learn, and nltk.

Project 10：

Deep Neural Networks for Science & Engineering (498-108)

科学与工程的深度神经网络，招生人数 9，导师 Matthew Dixon

网址：

https://myiit.force.com/ELEVATEatIIT/s/iit-elevate-opportunity/a2i3a000000vi2r

Deep neural networks are a powerful class of machine learning methods which have proven successful in many scientific and engineering applications. This course is designed to equip students with the statistical computing skills needed to apply deep neural networks to pattern recognition and regression problems in science and engineering applications. Computing projects, designed by the instructor, will provide students with hands-on statistical computing experience solving real-world science and engineering problems with TensorFlow.

Project 11：

Elements of drug design against pathogenic bacteria(498-203)

针对致病菌的药物设计要素，招生人数 5，导师 Oscar Juarez

网址：

https://myiit.force.com/ELEVATEatIIT/s/iit-elevate-opportunity/a2if1000001B7Ia

In this course, students will be introduced to the main concepts of drug development, in particular the design of drugs against human pathogenic bacteria. Students will perform microbiological experiments manipulating bacteria, biochemical analysis of molecular targets, and molecular structure analysis to identify possible inhibition sites.

Project 12：

Cancer Cell Biology(498-204)

癌细胞生物学，招生人数 3，导师 Jialing Xiang

网址：

https://myiit.force.com/ELEVATEatIIT/s/iit-elevate-opportunity/a2if1000001B7Os

In this course, students will learn basic characteristics of different cancer cells and their responses to chemotherapies. Students will also have opportunities to participate ongoing research with undergraduate and graduate students in the laboratory.

Project 13：

Synthetic Biology-IGEM -International Genetically Engd Machine Comp(498-205)

合成生物学-IGEM-国际基因工程机器大赛，招生人数 9，导师 Nick Menhart，Abhinav Bhushan

网址：

https://myiit.force.com/ELEVATEatIIT/s/iit-elevate-opportunity/a2if10000006Edd

The International Genetically Engineered Machine Competition (IGEM) is a student centered competition and professional development activity at the interface of Engineering and Biology. Lying within the emerging discipline of "Synthetic Biology" this has arisen out of our increasing ability to manipulate genetic material as we enter the post genomic age. This project focuses on assembling an IIT entry to IGEM 2019, an international student competition and conference held annually at Harvard/MIT. Teams from an across the US and internationally gather to present their projects, learn from each other, and interact and compete.

Project 14：

Synthesis and testing of advanced battery materials - Section 2(498-509)

高级电池材料的合成和测试-第 2 节，招生人数 3，导师 Carlo U. Segre

网址：

https://myiit.force.com/ELEVATEatIIT/s/iit-elevate-opportunity/a2if10000006Eds

The need for better batteries to be used in electronic devices, electric vehicles, and storage of renewable energy is well established. In this course, students will learn the basic electrochemical principles and phenomena of batteries and current state-off-the-art battery technologies, and they will get hands-on experience in synthesis and testing of novel battery cathodes and anodes.

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