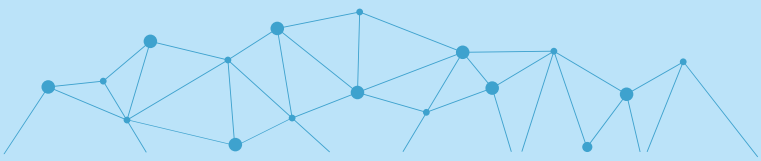
2024 GLOBEX PROGRAM

AT PEKING UNIVERSITY, CHINA

College of Engineering

PEKING UNIVERSITY



GLOBEX JULMESTER PROGRAM

The Globex Julmester program at the College of Engineering, Peking University is a professional mobility program with a worldwide exchange of students from all disciplines of study. Globex aims to promote international academic exchange in engineering and science education. The program consists of a suite of English-language based courses that focus on: 1) engineering & science, 2) innovation & entrepreneurship, and 3) China & globalization. Globex students can take 1-2 courses over a period of 3 weeks in July and get 3-6 university credits.

ONLINE APPLICATION AND TUITION PAYMENT DEADLINE

Application is done at http://globex.coe.pku.edu.cn and requires a compulsory payment of **CNY 350**

Online Application and Tuition Payment Deadline: **April 30, 2024**

IMPORTANT DATES

Registration:
June 30, 2024

First and last day of class:
July 1, 2024 – July 19, 2024

Final exams:
July 19, 2024

Field trip and tour (optional):
3-Day Beijing Tour: June 29, July 6, July 13, 2024
(To participate in the Pre-Globex tour on June 29, students need to arrive in Beijing on June 28, 2024)
After-Globex Tour: July 21 - 25, 2024

PROGRAM WEBSITE & CONTACT INFORMATION

Globex Website: http://globex.coe.pku.edu.cn

Email Inquiry: globex@pku.edu.cn

PROGRAM COURSES

NO.	CATEGORY	COURSE (3 CREDITS)	INSTRUCTOR	ORGANIZATION	CLASS TIME MON-FRI
1	Engineering & Science	Applied Analysis for Engineering Sciences 工程科学应用分析	TANG Shaoqiang Emily TIAN	Peking University Wright State University	AM (9-12)
2		Fundamentals and Applications of Molecular Simulations 分子模拟基础与应用	JIAO Yang ZHUANG Houlong	Arizona State University	AM
3		Simulation Methods for Optimization and Learning 优化和学习的模拟方法	Bernd HEIDERGOTT	Vrije Universiteit, Amsterdam	AM
4		Sustainability Theory and Practices 可持续性理论与实践	Tracy MORSE	The University of Strathclyde, UK	PM (2-5)
5	Innovation & Entrepre-neurship	Financial Decisions in Engineering Project Management 工程项目管理中的金融决策	Daricha SUTIVONG	Chulalongkorn University, Thailand	PM
6	China & Globalization	Chinese Language and Culture 中华语言与文化	ZHANG Aidong	Nanyang Technological University, Singapore	PM

APPLIED ANALYSIS FOR ENGINEERING SCIENCES
工程科学应用分析

3 CREDITS

SYNOPSIS

The objectives of this course include: to show some modern (1900-1990) mathematical methods that are widely used in engineering sciences, nonlinear mechanics and other physical sciences; to help initiating research activities, namely, to boost ideas, to formulate the problem, and to explore the mathematics; to help bridging the gap between the mathematical tools and the physical understandings.

TOPICS

- The qualitative theory of Ordinary Differential Equations (ODE) systems
  a) The second order ODE (plane analysis)
  b) Stability analysis via the Lyapunov function
  c) Chaos in the Lorenz system and the logistic map
- Reaction-diffusion systems
  a) BVP (boundary-value problem) and IBVP (initial boundary-value problem)
  b) b) Traveling wave analysis
  c) Burgers' equation and Cole-Hopf transform
  d) Evolutionary Duffing equation
- Hyperbolic equations
  a) Linear advection equation
  b) Discontinuities in inviscid Burgers' equation
  c) Elementary waves in a polytropic gas
  d) Soliton and inverse scattering transform

GRADING FORMAT

Homework Assignments **40%**	Exam (open-book) **60%**
Total **100%**	

SCHEDULE

9-12 AM, M-F, July 1 - 19, 2024, Total Contact Hours 45

AUDIENCE

Year 3 &4 Undergraduate and Graduate Students
Prerequisites: Calculus (Single variate, and multi-variate), Linear Algebra, Ordinary Differential Equations.

TANG Shaoqiang
maotang@pku.edu.cn
Department of Mechanics and Engineering Science
College of Engineering, Peking University

Dr. Tang is a professor at the College of Engineering, Peking University. He earned PhD in Applied Mathematics, HKUST. His research areas focus on Computational Mechanics and Applied Mathematics: multiscale simulations, scientific computing. He teaches both undergraduate and graduate courses such as Calculus, Applied Analysis, Scientific Computing, Numerical Methods, Multiscale Algorithms et al. He was honored the Teacher of Excellence Award by Beijing Municipal Government in 2013.

Emily M. TIAN
mei.tian@wright.edu
Department of Mathematics and Statistics
Wright State University

Dr. Tian is an associate professor at Wright State University located in Dayton, Ohio. She has been teaching mathematical methods in applied fields for 22 years, after receiving her PhD in applied math from Washington State University. Her expertise is finding the basic building blocks in nonlinear dynamic systems. Dr. Tian is passionate about inspiring students to listen to the stories spoken by the formulas.

FUNDAMENTALS AND APPLICATIONS OF MOLECULAR SIMULATIONS
分子模拟基础与应用

3 CREDITS

SYNOPSIS

This course will provide the students with an introductory level understanding of the concepts and techniques for the modeling and simulations of materials on atomistic and molecular scales. Both fundamentals and applications of the most popular molecular simulation methods including Monte Carlo (MC) simulations, Molecular Dynamics (MD) methods and Density Functional Theory (DFT) will be discussed, through examples distilled from the frontier of computational materials and soft matter research.

TOPICS

- Essence of statistical mechanics and C/C++ programming
- Fundamentals of Monte-Carlo simulation
- Monte-Carlo simulations in different ensembles
- Case study: Phase transitions in colloids
- Optimization via simulated annealing
- Fundamentals of molecular dynamics
- Case study: Self-diffusion in liquid Argon
- Many-body Schrödinger equation
- Fundamentals of density functional theory
- Equilibrium structure of materials: calculations vs. Experiment
- Elastic properties of materials
- Vibrations of molecules and solids
- Phonons, vibrational spectroscopy, and thermodynamics
- Band structures and photoelectron spectroscopy
- Dielectric function and optical spectra

GRADING FORMAT

Class Project Assignments (2 class projects) **70%**	Final Project **30%**
Total **100%**	

SCHEDULE

9-12 AM, M-F, July 1 - 19, 2024, Total Contact Hours 45

AUDIENCE

Students taking this course should have some general knowledge of college physics and a background in and working knowledge of a computer programming language (C/ C++/ FORTRAN/ MATLAB).

JIAO Yang
yjiao13@asu.edu
School for Engineering of Matter, Transport and Energy
Arizona State University

Dr. Jiao is an associate professor of materials science and engineering in the School for Engineering of Matter, Transport and Energy at Arizona State University. Jiao obtained his B.E. from Peking University, China in 2005 and Ph.D. from Princeton University in 2010. He has developed analytical and computational models for complex materials which can deepen fundamental understanding of the nature of such materials. Before joining ASU in 2013, Jiao was a postdoctoral reserach associate at the Physical Science in Oncology Center and Princeton Institute for the Science and Technology of Materials at Princeton University.

ZHUANG Houlong
zhuanghl@asu.edu
School for Engineering of Matter, Transport and Energy
Arizona State University

Dr. Zhuang is an assistant professor in the School for Engineering of Matter, Transport and Energy at ASU. He received his doctorate in materials science and engineering at Cornell University. Prior to ASU, Dr. Zhuang was a postdoctoral researcher at Princeton University. Dr. Zhuang's current research interests are quantum simulations, machine learning, and quantum computing. Dr. Zhuang is a recipient of the NSF CAREER Award, Interstellar Initiative Early Career Investigator Award from The New York Academy of Sciences and Japan Agency for Medical Research and Development (AMED), ACS Cadence/Openeye Outstanding Junior Faculty Award, Materials Today Rising Star Award, Talman Scholar Award of the 62nd Sanibel Symposium, and an invited participant of the 9th Arab-American Frontiers of Science, Engineering, and Medicine organized by the National Academy of Sciences. He is also a Scialog Fellow for Negative Emissions Science and a Fellow of the International Association of Advanced Materials.

3 CREDITS

SIMULATION METHODS FOR OPTIMIZATION AND LEARNING

优化和学习的模拟方法

SYNOPSIS

This course gives a broad treatment of the important aspects of the use of computer simulation for the analysis and optimization of dynamic stochastic models. The emphasis is on modeling the stochastic system as a discrete event dynamic system, and analyzing and improving its performance by means of discrete event simulation. Applications will stem from a wide range of domains: from Social Networks to Computer Networks, and Financial Engineering to Business Processes. The course will introduce students to the use of computer simulation in analyzing dynamic stochastic models through simulation-based methods for optimization and learning. The leading question of the course is how to use simulation to make better and more responsible decisions for real-life problems. The course will also reflect on the technological and mathematical developments we witness in our societies. While actively working on simulation projects, the course will provide space for reflecting on the mathematical/technological paradigm. That is, next to learning the actual techniques, students will be stimulated to reflect on the history of science and the technological developments around them.

TOPICS

- Programming language is Python (basic programs will be provided). Other programming languages, such as Matlab, are also fine but are not supported.
- Basics of Monte Carlo Simulation: random number generation, discrete event simulation, output analysis
- Standard simulation models: queuing systems, social networks, financial products, inventory systems, news vendor problem
- Data and simulation: combining simulation with available historical data
- Estimation of gradients via simulation and their application in learning and optimization: stochastic gradient method, stochastic approximation, supervised learning, non-supervised learning

GRADING FORMAT

Simulation project I and written report **30%**	Simulation project II written report **30%**
Final exam **30%**	Attendance and discussion **10%**
Total **100%**	

SCHEDULE

9-12 AM, M-F, July 1 - 19, 2024, Total Contact Hours 45

AUDIENCE

Year 3 &4 Undergraduate and Graduate Students

NOTE

Students need to bring their own laptops for this course.

Bernd HEIDERGOTT

b.f.heidergott@vu.nl

Department of Econometrics and Operations Research

Vrije Universiteit Amsterdam

Dr. Heidergott is professor of Stochastic Optimization at the department of Econometrics and Operations Research of the Vrije Universiteit Amsterdam. He is working at the VU since 2002. Before that he worked at the TU Eindhoven, at EURANDOM, at DIAM, and at the Erasmus University Rotterdam. He obtained his PhD in 1996 at the University of Hamburg, Germany. In 2004 he received his Habilitation (non-cumulative) in Mathematics at the University of Hamburg, Germany. Bernd is author of more than 50 scientific papers and 3 monographs. From 2013 to 2018 be served as Program Director Econometrics and Operations Research. Currently, he is Board Member of Amsterdam Business Research Institute. His research interests include simulation based stochastic optimization, stochastic gradient based algorithms, model and parameter inscecurity, social network analysis, differentiation theory of stochastic models and Max-plus algebra.

SUSTAINABILITY THEORY AND PRACTICES
可持续性理论与实践

3 CREDITS

SYNOPSIS

This course will introduce students to sustainable development using real-world design challenges in a supported environment. Through a project-based learning approach, students will examine the impact of their future disciplines on people, place and the planet. Students will learn the theory of sustainable development and climate change, and then using these principles will examine solutions to real life problems through case studies, taking into consideration the environment, social and economic implications of proposed solutions. Students will explore issues of interdisciplinary and cross sectoral engagement, risks of maladaptation, and the role of technology. This course will be led by Professor Tracy Morse and Donald Robertson and will feature lectures from other experts from the University of Strathclyde.

TOPICS

- Understanding the principles of sustainability and climate change
- Interdisciplinary working and human centered design
- Design process for inclusive development
- Ideation and iteration in design
- Critical evaluation of sustainable solutions

GRADING FORMAT

Week 1: Quiz (individual)	**30%**
Week 2: Midterm presentation (group)	**30%**
Week 3: Final presentation (group)	**40%**
Total	**100%**

SCHEDULE

2-5 PM, M-F, July 1 - 19, 2024, Total Contact Hours 45

AUDIENCE

Year 3 &4 Undergraduate and Graduate Students

Tracy MORSE

tracy.thomson@strath.ac.uk
Centre for Sustainable Development
The University of Strathclyde, UK

Tracy Morse is Professor of Environmental Health and Head of Strathclyde Centre for Sustainable Development. Having previously been based in Malawi for 20 years, she leads an interdisciplinary research team with a focus community health and mechanisms to address the determinants of health in low and middle income countries. Working with a number of partners globally, she is focused on promoting the importance of inter- and transdisciplinary research in addressing sustainable development for all, and supporting the transformational change needed to support attainment of UN SDGs.

3 CREDITS

FINANCIAL DECISIONS IN ENGINEERING PROJECT MANAGEMENT

工程项目管理中的金融决策

SYNOPSIS

The course introduces widely-used financial techniques for project evaluation. Based on the time value of money concept, the course examines how to analyze and valuate various cash flow patterns and provides popular economic measures for project assessment and selection, including the net present value and the rate of return, along with the application criteria for single and multiple project decisions. The course also addresses decision under uncertainties using techniques such as breakeven analysis, sensitivity analysis, decision tree, etc. Students will have an opportunity to perform a financial analysis of their interested problem in a group project and create management report and presentation.

TOPICS

- Time Value of Money, Interest Rate, Economic Equivalence, Simple and Compound Interests
- Cash Flow Analysis and Valuation: Single Cash Flows, Cash Flow Series
- Nominal and Effective Interest Rates: Discrete Time Period, Continuous Compounding
- Present Value Analysis: Equal-life Alternatives, Different-life Alternatives, Capitalized Cost, Payback Period
- Annual Value Analysis: Capital Recovery, Equivalent Annual Value
- Rate of Return Analysis: Single Alternative
- Rate of Return Analysis: Multiple Alternatives
- Breakeven Analysis: Single and Multiple Alternatives
- Decision under Uncertainties: Sensitivity Analysis, Three Estimates, Expected Value Decision, Decision Tree
- Financial Analysis Modeling
- Creating Report and Presentation for Management

GRADING FORMAT

Quiz 1 (Topic 1-3) **25%**	Quiz 2 (Topic 4-7) **35%**
Group Project Presentation and Report **30%**	Attendance and discussion **10%**
Total **100%**	

SCHEDULE

2-5 PM, M-F, July 1 - 19, 2024, Total Contact Hours 45

AUDIENCE

Undergraduate and Graduate Students (all majors and all levels) with no prerequisites

Daricha SUTIVONG

daricha.s@gmail.com
Department of Industrial Engineering
Chulalongkorn University, Thailand

Daricha SUTIVONG, a professor in Department of Industrial Engineering at Chulalongkorn University, earned her PhD and MS in Management Science and Engineering from Stanford University and MEng and SB in Electrical Engineering and Computer Science from MIT. Her research interests mainly focus on data analytics techniques and applications in social sciences, health, finance, etc., engineering economic analysis and modeling, and decision analysis and risk management.

CHINESE LANGUAGE AND CULTURE
中华语言与文化

3 CREDITS

SYNOPSIS

This course is designed to introduce different aspects of Chinese language and culture. Including, the relationship between Chinese thought, culture, and language. The characteristics of Chinese language and scripts. Chinese society, folklore, and language. Chinese thought patterns and thinking styles. Eastern and Western ways of thinking and the cultural attributes embedded. The social and cultural changes as well as its influence on Chinese language.

TOPICS

- Chinese language, culture, and thought
- Cultural exchange and languages
- Chinese Language, characters, Chinese cultural circle
- Chinese Language, literature, and theatre
- Society, folklore, and language
- Appellation and name
- Proverbs and the Chinese view of the world
- "Qi": its thinking and language
- Traditional Chinese culture and its modern technological exploration
- Numbers and Chinese culture
- Thinking: East vs West

GRADING FORMAT

Assignment **30%**	Presentation **30%**
Test **30%**	Attendance and discussion **10%**
Total **100%**	

SCHEDULE

2-5 PM, M-F, July 1 - 19, 2024, Total Contact Hours 45

AUDIENCE

Undergraduate and Graduate Students (all majors and all levels) with prerequisite: basic Chinese reading and listening skills

ZHANG Aidong

azhang2020@outlook.com
Asian Languages and Cultures, NIE, Nanyang Technological University
Academic Director, OCCB International, Singapore

Zhang Aidong obtained her PhD from University of Toronto, Canada. She has taught in Asian Languages and Cultures, NIE, Nanyang Technological University for over twenty years, and is now the Academic Director of OCCB International, Singapore. Her academic expertise is in the areas of Classical Chinese Literature, Chinese Language and Culture, and Modern Chinese Literature.

PROGRAM EXPENSES

ITEM	COST (1 USD ≈ 7 CNY)	ESTIMATED EXPENSES FOR A 1-MONTH (IN JULY) STAY IN BEIJING (PRO-RATE YOUR EXPENSES IF YOUR STAY IS LESS THAN 31 DAYS)
Registration Fee	USD 50 (CNY 350)	Compulsory Registration Fee for All Applicants
Accommodation	**31-Day Stay** A: USD 996 (CNY 6975) B: USD 1218 (CNY 8525) C: USD 1457 (CNY 10199)	**Beijing Post & Telecom Conference Center** Type A - Standard Double Occupancy: CNY 225/day/person Type B – Superior Double Occupancy: CNY 275/day/person **Zhongguanyuan Global Village PKU** Type C – Double Occupancy of No.1 Building: CNY 329/day/person
Meals	~ USD 220 (CNY 1550)	CNY 50/day X 31 days (meals at PKU cafeteria)
Miscellaneous	~ USD 220 (CNY 1550)	Personal Items, transportation etc.
BASIC TOTAL	**USD 1489 -1950 (CNY 10425 -13649)**	**Recommended minimum.** **Expenses are estimates, your actual cost may be different.** **Airfare not included**
Globex Tuition	USD 0–1714 (CNY 0–12,000)	1. Full tuition waiver (you may still need to pay tuition to your home school) 2. Partial tuition waiver 3. Full cost recovery
Field Trip & Tour (Optional) **Subject to change, please see latest info at Globex website**	~ USD 150 (CNY 1050)	Pre-/Mid-Globex Beijing Tour (Including the Great Wall, Forbidden City, Summer Palace etc.)
	~ USD 400~450 (CNY 2800~3150)	After-Globex Tour (round-trip sleeping berth/high-speed train): 1. Xi'an Terra Cotta Warriors, Huaqing Palace, Qianling, Ming City Wall (5 days, ~USD 450) 2. Hangzhou-Suzhou-Wuzhen-Shanghai (5 days, ~USD 430) 3. Jinan Baotu Spring - Taishan Mountain-Qufu Confucius Temple (3 days, ~USD 400)

MISCELLANEOUS INFO: CREDIT TRANSFER, CHINESE VISA, HEALTH INSURANCE, TRANSCRIPT ETC.

Globex will provide course syllabi and official PKU transcript to facilitate course credit transfer, it does not however, guarantee that the credits will be acceptable by the student's home university. Students should check with the academic department of their home university directly concerning the possibility of credit transfer.

Globex will provide the necessary documents for applicants to apply for their Chinese visas.

It is mandatory for all Globex students to process a valid medical insurance during their stay in China.

Official PKU transcript and certificate of completion will be offered in **September, 2024**.

Please visit http://globex.coe.pku.edu.cn for more detailed information and stay informed for the latest updates.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2023 Globex Welcome Dinner
College of Engineering, Peking University


2023 Globex Welcome Dinner
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