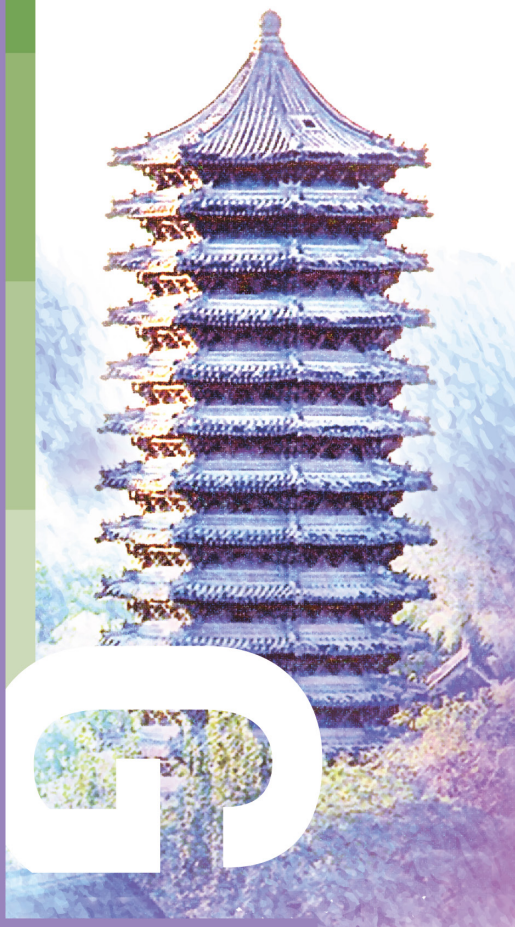
College of Engineering
PEKING UNIVERSITY

GLOBEX
暑期项目 Globex Julmester Program

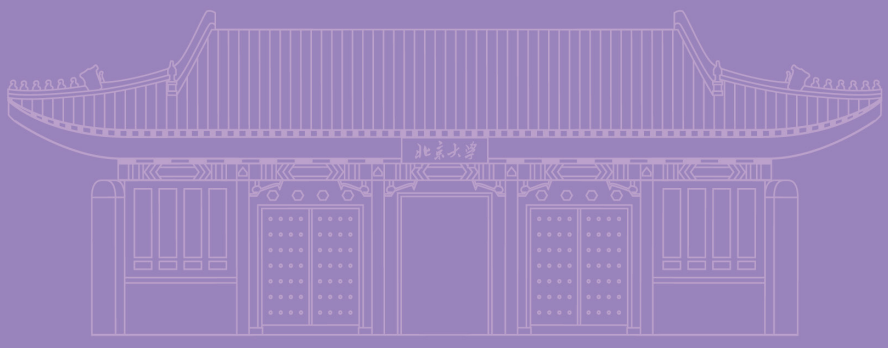
GLOBEX Julmester Program

at Peking University, China

2026



GLOBEX



2026 GLOBEX Julmester Program at Peking University, China

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. Additionally, the program organizes cultural and corporate visits to help students experience Chinese culture and industrial development.

Eligibility

Applicants for the Globex Julmester program should fulfill the following requirements:

- Be between the ages of 16 and 40 (inclusive) and in good health.
- Be currently enrolled in college/university.
- Meet the major requirements of the courses.
- Good English proficiency.

How to apply

- Applications will open on **January 15, 2026**
- Application is done at http://globex.coe.pku.edu.cn and requires a compulsory application fee of **CNY 350**
- Online Application deadline: **April 30, 2026**

Important Dates

Application	January 15 – April 30, 2026
Registration and Orientation	July 3, 2026
First and last day of class	July 6 – July 24, 2026， Mon. – Fri.
Beijing Tour	July 4 – 5, July 11, 2026

Course List

No.	Category	Course (3 credits)	Instructor	Institution	Class Time M-F
1	Engineering & Science	Applied Analysis for Engineering Sciences 工程科学应用分析	TANG Shaoqiang Emily TIAN	Peking University, China Wright State University, USA	AM (9-12)
2		Data-Driven Optimization and Learning 数据驱动的优化与学习	Bernd HEIDERGOTT	Vrije University Amsterdam, The Netherlands	AM
3		AI Enabled Control Engineering 人工智能驱动的控制工程	HUANG Xun	Peking University, China	AM
4		Scientific Machine Learning: Blending Science with Data 科学机器学习：融合科学与数据	Andrew OOI	The University of Melbourne, Australia	AM
5		Sustainability Theory and Practices 可持续性理论与实践	Tracy MORSE	University of Strathclyde, UK	PM (2-5)
6	Innovation & Entrepreneurship	Financial Decisions in Engineering Project Management 工程项目管理中的金融决策	Daricha SUTIVONG	Chulalongkorn University, Thailand	PM
7	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

Synopsis

The objectives of this course include: to show mathematical methods that are widely used in engineering sciences; to explore linear and nonlinear differential equations; to help bridge the gap between mathematical tools and physical understandings.

Topics

1. Recap: how to solve Ordinary Differential Equations (ODEs) exactly?

- Linear ODEs with constant coefficients
- General ODEs: inhomogeneous, variable coefficients, power series and perturbation method

2. Qualitative theory of ODEs

- Plane analysis for second order ODE
- Stability analysis via Lyapunov function
- Bifurcation and chaos

3. Solving PDEs: linear and nonlinear

- Laplace equation: separating variables, Green's function (⋆ spherical and cylindrical coordinates)
- Heat equation: Fourier transform, Green's function
- Wave equation: characteristic method, D'Alembert's principle
- Nonlinear equations: Burgers' equation via Cole-Hopf transform, shock and rarefaction waves in inviscid Burgers' equation (⋆ traveling waves)

Grading Format

40%
Homework Assignments

60%
Exam (open-book)

Schedule

9–12 AM, M–F, July 6 – July 24, 2026,

Total Contact Hours: 45

Audience

Year 2+ Undergraduate and Graduate Students

Prerequisites: Calculus (Single variate, and multi-variate), Linear Algebra.

Emily M. TIAN

emilytianedu@gmail.com

Department of Mathematics and Statistics

Wright State University, USA

Dr. Tian is an associate professor at Wright State University located in Dayton, Ohio. She has been teaching mathematical methods in applied fields for over two decades, 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.

TANG Shaoqiang

maotang@pku.edu.cn

Department of Mechanics

School of Mechanics and Engineering Science, Peking University

Dr. Tang is a Boya Distinguished professor at School of Mechanics and Engineering Science, Peking University. He earned PhD in Applied Mathematics, HKUST. His research areas focus on computational mechanics and applied mathematics. He teaches both undergraduate and graduate courses such as Calculus, Linear Algebra, Ordinary Differential Equations, Partial Differential Equations, Fundamentals of Machine Learning, Applied Analysis, Scientific Computing, Numerical Methods, Multiscale Algorithms etc. He was honored the Teacher of Excellence Award, and Hall of Fame in College Teaching by Beijing municipal government.

Data-Driven Optimization and Learning

数据驱动的优化和学习

Synopsis

This course gives a broad treatment of the important aspects of the use of computer simulation and of streaming data for the analysis and optimization of dynamic stochastic models. The emphasis is on continuous optimization and learning (i.e., we do not cover discrete optimization in this course). The course will introduce students to the use of recursive algorithms in analyzing dynamic stochastic models through simulation-based/data-driven methods for optimization and learning. The leading question of the course is how to use simulation/streaming-data 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

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

Grading Format

- 30% Presentation and written report
- 30% Simulation project written report
- 30% Final exam
- 10% Attendance and discussion

Schedule

9–12 AM, M–F, July 6 – July 24, 2026,

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

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Department of Econometrics and Operations Research

Vrije Universiteit Amsterdam, the Netherlands

Dr. Heidergott is a professor of Stochastic Optimization at the Department of Operations Analytics of the Vrije Universiteit Amsterdam. He has been working at the VU since 2002. Before that, he worked at TU Delft, TU Eindhoven, at EURANDOM, and at 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 the author of more than 100 scientific papers and 3 monographs (one of which has been translated into Japanese). From 2013 to 2018, he served as Program Director of Econometrics and Operations Research. Bernd is a recipient of the best lecture award from the School of Business and Economics, Vrije Universiteit, Amsterdam, and the Business Data Science program at the Tinbergen Institute, Amsterdam. He received the INFORMS Outstanding Simulation Publication Award and the Vrije Universiteit Innovation Award. His research interests include simulation-based stochastic optimization, stochastic gradient-based algorithms, model and parameter insecurity, social network analysis, differentiation theory of stochastic models, and Max-plus algebra.

AI Enabled Control Engineering

人工智能驱动的控制工程

Synopsis

Introduce the fundamentals of control theories to undergraduates in Engineering. Graduate students in dynamics and control are also welcomed if their undergraduate trainings were not in control. The pre-requisite course is calculus and linear algebra. Knowledge in electronic circuits and signal and processing will be helpful too, but will be summarized in this tutorial when it is necessary. In addition, the emerging machine learning-based control methods will be introduced, mainly through the successful completion of the designed software tasks. Hence, students are expected to have experience with Python or other similar programming language.

In this course, students will learn to model and analyze real-world problems from a control perspective, while also mastering fundamental modeling and control methods. Following this, they will be introduced to basic AI techniques, starting with a simulated environment and culminating in the development of a real inverted pendulum system. The first 7 lectures will be mathematic extensive, covering the fundamentals of control theory, and setting the stage for the more experiential learning approach in the final eight lectures. By completing this course, students are expected to gain extensive hands-on experience with sensors, actuators, edge AI hardware, and the associated control concepts and coding configurations. More importantly, they will learn how to integrate these components into a mechatronic system.

Topics

1. Introduction
2. Mathematical model of system
3. Time domain analysis & control
4. Frequency domain analysis & control
5. Case study: dynamics & control of inverted pendulum
6. AI for control
7. Case study: Gym env and its AI-enabled control
8. State space
9. Observability & Controllability
10. Case study: classical control vs modern control vs AI-control
11. Exp1: Mechatronic of inverted pendulum (sensors, actuator, MCU, …)
12. Exp2: Classical control design for inverted pendulum
13. Exp3: AI tools for inverted pendulum (Jetson, Linux, …)
14. Exp4: AI enabled control of inverted pendulum
15. Competition of the control performance

Grading Format

- 0%
  Homework problems
  (Ony for self-evaluation)
- 50%
  Experiential learning report
- 50%
  Final exam

Schedule

9–12 AM, M–F, July 6 – July 24, 2026,

Total Contact Hours: 45

Audience

Year 2 to 4 Undergraduate and Graduate Students. Students are encouraged to have a strong interest in building electronic and mechanical gadget and be willing to troubleshoot coding issues throughout the course. In addition, they should be able to quickly read through supplementary materials after each lecture, including sensor manuals and edge AI device documentation, to ensure that they are fully prepared for the following lectures.

HUANG Xun

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Department of Aeronautics and Astronautics

School of Mechanics and Engineering Science, Peking University

Dr. HUANG Xun is a professor in Department of Aeronautics and Astronautics, School of Mechanics and Engineering Science, Peking University, and an adjunct professor in Department of Mechanical and Aerospace Engineering, HKUST. He earned his Ph.D. from Aeronautics and Astronautics, University of Southampton, United Kingdom. His research areas are aeroacoustics, flow control, flight control, and array signal processing. He has served as Associate Editor for Journal of the Acoustical Society of America and has published his research outcomes in prestigious journals such as Nature, Science Advances, and Progress in Aerospace Sciences.

Scientific Machine Learning: Blending Science with Data

科学机器学习：融合科学与数据

Synopsis

Data driven techniques can be used to find models for engineering problems based on given data. However, it is usually common that the derived models do not perform well when used outside the parameter range used in the training data. In order to obtain better predictions, scientific knowledge of the problem needs to be introduced into the mathematical model. In this course students will learn to efficiently apply modern day artificial intelligence and machine learning tools to classical problems in engineering. There will be emphasis on blending scientific engineering domain knowledge with modern AI tools to arrive at an optimal solutions to engineering problems. In addition, we will also introduce students to methodologies for uncertainty quantification and how these techniques can be used to understand the sensitivities of the solutions to uncertainties in input parameters. The main goal for this course is to arm students with data-driven tools that can be used to create mathematical models for simplified engineering applications. There will be an emphasis to blend scientific knowledge with data-driven techniques to ensure rigorous scientific principles is embedded into the model.

Topics

1. Programming language is Julia (basic programs will be provided). Other programming languages, such as Matlab and Python, are also fine but are not supported
2. Basics of Uncertainty Quantification
3. Automatic Differentiation
4. Optimization
5. Introduction to Neural Network and regression.
6. Physics Informed Neural Network
7. Neural Ordinary Differential Equations

Grading Format

- 20% Assignment 1
- 30% Assignment 2
- 40% Final exam
- 10% Attendance and discussion

Schedule

9–12 AM, M–F, July 6 – July 24, 2026,

Total Contact Hours: 45

Audience

Year 3 & 4 Undergraduate and Graduate Students

Andrew Ooi

a.ooi@unimelb.edu.au

Department of Mechanical Engineering

The University of Melbourne, Australia

Professor Andrew Ooi is an academic staff member in the Department of Mechanical Engineering at The University of Melbourne and Associate Dean (Academic) in the Melbourne School of Engineering. Prof Ooi graduated with a BEng in 1993 and PhD in 1997 from the University of Melbourne. Prior to his current appointment, Andrew worked at the Center for Turbulence Research (CTR) at NASA Ames, Stanford University and as a research scientist at the Defence Science and Technology Organisation (DSTO). His current research interests include numerical simulation and the application of artificial intelligence methodologies for fluid flow applications such as bluff body natural convection and multiphase flows.

Sustainability Theory and Practices

可持续性理论与实践

Synopsis

This course offers a holistic and interdisciplinary introduction to the theory and practice of sustainability, providing foundational knowledge relevant to students from all disciplines. Participants will explore the origins and evolution of sustainability thinking, develop an understanding of today's complex global challenges, and apply this knowledge to real-world contexts through practical design and problem-solving activities.

Through lectures, discussions, interactive exercises and project-based learning, students will engage with key sustainability concepts such as the Sustainable Development Goals, the planetary boundaries framework, and the science–policy interface. They will also examine how different knowledge systems and interdisciplinary ways of working can help address today's complex global challenges. Applying these ideas in practice to real-world case studies, students will explore design processes for inclusive and sustainable development, human-centred design, sustainability in business, and emerging models of sustainable policymaking.

The course will be led by academics from the University of Strathclyde's Centre for Sustainable Development. Professor Tracy Morse and Donald Robertson bring international sustainable development experience to the teaching and aim to combine academic rigour with practical application and real-world skill development (with some fun thrown in as well). As well as both course leaders, the course will feature expert guest speakers from the University of Strathclyde (online) and from Peking University (in-person) where schedules permit.

Topics

1. The concept of sustainability and sustainable development.
2. The Sustainable Development Goals (SDGs) and global progress on sustainability.
3. Three Dimensions of Sustainability: the environmental limits of our planet, the social foundations for society and our economic systems within the context of sustainability.
4. Knowledge systems and multi/inter/transdisciplinary ways of working to solve complex sustainability challenges.
5. Discussions on important sustainability concepts/theories (examples): the Energy Trilemma, Nexus Challenges, climate change risk, justice' in sustainable development, 'polycrisis', ethics in sustainability, science-policy interface.
6. Applying sustainability in practice (examples): Design process for inclusive development in sustainability, human-centered design, active

citizenship, sustainability in business, emerging models and approaches to sustainability.

7. Critical evaluation of sustainable solutions.

Grading Format

Three Assessments (indicative), note that attendance will be monitored.

- **30%**
  Week 1: Quiz on taught class material (individual)
- **30%**
  Week 2: Midterm presentation on case study-based exercise (group)
- **40%**
  Week 3: Final presentation/ report (group)

Schedule

2–5 PM, M–F, July 6 – July 24, 2026, Total Contact Hours: 45

Audience

Open to all Undergraduate and Graduate Students of any academic discipline (no prerequisites).

Tracy MORSE

tracy.thomson@strath.ac.uk
Centre for Sustainable Development
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.

Donald ROBERTSON

donald.j.robertson@strath.ac.uk
Centre for Sustainable Development
Department of Civil and Environmental Engineering
University of Strathclyde, UK

Donald Robertson is a Teaching Fellow and researcher with the Centre for Sustainable Development at the University of Strathclyde. Donald has many years of applied international research experience at the interface of science, policy, and practice, focused on complex sustainability and water resource challenges both in the UK and internationally. In a teaching capacity Donald leads several interdisciplinary sustainability courses at the University of Strathclyde and has been teaching as part of the GLOBEX Julmester programme since 2023. Donald brings experience and expertise to the teaching programme in topics including: the role of data in sustainability decision making, monitoring and evaluation, stakeholder engagement, environmental governance, participatory research methods, geosciences, environmental management, and interdisciplinary research approaches.

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

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

Grading Format

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

Schedule

2–5 PM, M–F, July 6 – July 24, 2026,
Total Contact Hours: 45

Audience

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

Daricha SUTIVONG

daricha.s@gmail.com

International School of Engineering

Chulalongkorn University, Thailand

Daricha SUTIVONG, a professor in the International School of 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

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

1. Chinese language, culture, and thought
2. Cultural exchange and languages
3. Chinese language, characters, and Chinese cultural circle
4. Culture, civilization, and Language-Culture Pyramid
5. Chinese society, folklore, and language (1): Appellation and name
6. Chinese society, folklore, and language (2): Avoidance and Taboos
7. Proverbs and the Chinese view of the world
8. "Qi": its thinking and language
9. Traditional Chinese culture and its modern technological exploration
10. Chinese philosophical thinking and wisdom, and its modern application
11. Numbers and Chinese culture
12. Thinking: East vs West

Grading Format

- 20% Assignment
- 30% Presentation
- 40% Test
- 10% Attendance & discussion

Schedule

2–5 PM, M–F, July 6 – July 24, 2026,
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, National Institute of Education

Nanyang Technological University, Singapore

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

Application Fee & Tuition Fee

Application Fee	CNY **350**	
Tuition Fee	Early Bird Rate CNY **13,000**	Regular Rate CNY **15,000**

- Early Bird refers to applicants who apply and complete the online payment for tuition before March 31, 2026.
- The tuition is the same whether student take one course or two. Each student can choose up to 2 courses with no more than 6 credits.

Accommodation Fees

Beijing Post & Telecom Conference Center	Type A – Double Occupancy: CNY **275**/day/person
ShaoYuan, Peking University	Type B – Two-bedroom Apartment: CNY **329**/day/person
No.9 Building Zhongguanyuan Global Village, Peking University	Type C – Single Occupancy: CNY **448**/day

- Students can choose the accomodation booked by Globex or arrange accommodation by themselves.

Miscellaneous Info:

Credit Transfer, Transcript, Chinese Visa, Health Insurance 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.
- Official PKU transcript and certificate of completion will be offered in September 2026.
- 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.
- Please visit *http://globex.coe.pku.edu.cn* for more detailed information and stay informed for the latest updates.

Program Website & Contact Information

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

Email Inquiry: *globex@pku.edu.cn*

GLOBEX

暑期项目 Globex Julmester Program

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