

# Xue Li, Ph.D.

Email: [lixue.liv@outlook.com](mailto:lixue.liv@outlook.com) Tel: (+86) 15640520158

Github: <https://lixueliv.github.io>



## Summary

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Ph.D. in Astrophysics and Cosmology with a strong track record of leading and contributing to scientific research projects. Specializing in data analysis, machine learning, and AI. Proven ability to identify and solve complex problems using innovative data-driven solutions. Expertise in pattern and trend recognition, data modeling, and anomaly detection. Notable for pioneering the use of gamma-ray burst supernovae as standard candles and leading the groundbreaking discovery of the anomalous cosmic phenomenon AT2018cow as a black hole with quasi-periodic oscillations. Recognized for analytical thinking and innovation.

## Professional Experience

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### 2022-up to date: Self-employed, data scientist

- Leveraged data analysis, machine learning, and statistical methods to provide insights into a variety of projects.
- Independently managed projects, ensuring timely and high-quality deliverables.

### 2016-2022: Research Associate, physics department, Tsinghua University, China

- Served as Principal Investigator for National Post-doc Fundings and actively participated in National Fundings.
- Pioneered the discovery of the cosmic phenomenon AT2018cow's origin, presenting this achievement at American Astronomical Society (AAS) meetings, significantly advancing astrophysical understanding.
- Conducted cutting-edge astrophysics research with international teams, applying advanced mathematical and statistical tools for time series data analysis, and contributing to multiple projects and publications.

### 2014-2016: Visiting researcher, Niels Bohr Institute, University of Copenhagen, Denmark

- Collaborated with a global network of astrophysicists, using computational skills to analyze complex datasets.

## Education

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### 2010-2014: PhD in Astrophysics and Cosmology, Niels Bohr Institute, University of Copenhagen, Denmark

- Pioneered the discovery that gamma-ray burst supernovae can be used as standard candles, enabling astronomers to better understand the expansion of the universe, highlighted by Sky & Telescope Magazine.

### 2006-2009: MSc in Physics, Dalian University of Technology, China

### 2002-2006: BSc in Physics, Dalian University of Technology, China

## Skills

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- Python, IDL, Matlab, SQL, TensorFlow, R, PyTorch, Deep Learning, AI, Microsoft Power Platform, Azure, Data Analysis and Modeling

- Probability and Statistics, Geometry, Differential Geometry, Mathematical Methods of Physics, Numerical Recipes, Signal Processing and Analysis

## **IT Certifications**

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- TensorFlow Developer Certificate
- Microsoft Certified: Power Platform Solution Architect Expert
- Microsoft Certified: Azure Data Scientist Associate
- Microsoft Certified: Azure AI Engineer Associate
- Microsoft Certified: Power BI Analyst Associate
- Microsoft Certified: Power Platform Functional Consultant Associate

## **Selected leading and contributed projects**

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### **1. Supernova Classification with AI and ML**

- Supervised students in studies of supernovae classification using AI.
- Collaborated on data collection, ML model building, and data analysis using SQL, TensorFlow, and Python.

### **2. Web Scraping and ML for Netizen Behavior Analysis**

- Led a project on netizen behavior analysis through social media analysis.
- Applied web scraping techniques to collect real-time social media data, and utilized ML techniques and statistical tools such as TensorFlow, Python and SQL for natural language processing, pattern recognition, and trend analysis.

### **3. Time Series Analysis of AT2018cow: Black Hole Discovery**

- Initiated and led a scientific project on the anomalous cosmic phenomenon AT2018cow, where I was the first to discover that AT2018cow was a black hole with quasi-periodic oscillations.
- Designed the scientific approach, applied mathematical and statistical tools to analyze time series data, and presented these groundbreaking findings at the American Astronomical Meeting in 2022.

### **4. Multidimensional Analysis of SN 2018oh: Origin of Supernova Explosions**

- Contributed to a scientific project on the cosmic phenomenon SN 2018oh, utilizing Matlab and Python for analyzing spectra and light curves.
- Identified the origin of supernova explosions, highlighted by phys.org.

### **5. Data-Driven Discovery: Gamma-ray Burst Supernovae as Standard Candles**

- Pioneered the discovery that supernovae associated with Gamma-ray bursts can be used as standard candles, highlighted by Sky & Telescope Magazine.

### **6. Diverse Scientific Projects in Data Analysis and Data Science**

- Led and contributed to 10+ projects and 20+ scientific papers focused on data analysis and data science in the field of scientific research.

## **Awards and Scholarships**

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2020: 'Excellent Tutor' awarded by Beijing Association for Science and Technology.

2006-2009: National scholarship recipient for master's studies.

2006: Awarded a postgraduate placement without an entrance test.

2002: Named 'Best Debater' and represented the college to win third place in the university-level debate competition.

2001: Third prize in the Chinese Physics Olympiad.