

## NSFC Grant Approval Notice

Dear Jeffrey Chu,

In line with the Regulations of the National Natural Science Foundation of China (hereinafter referred to as the NSFC) and relevant management measures, and based on the peer review results, the NSFC has decided to approve your application for funding. Grant number: W2433186, Project title: Anomaly detection methods for blockchain-based networks, Direct cost: 40.00 (Unit: 10,000 yuan), Grant period: 2025-01 to 2026-12. The Project Review Comments and Revision Suggestions are as attached.

Please log on to the Grants System (<https://grants.nsf.gov.cn>), carefully read the "Instructions for the Research Plan of Research Fund for International Scientists of NSFC" and fill in the research plan as required. For projects with revision suggestions, please revise the relevant content of the research plan according to the suggestions timely. If you have questions about the revision suggestions, please raise them to Department of International Programs before the deadline of submission.

Please submit the research plan to NSFC through the Grants System (<https://grants.nsf.gov.cn>) after it is reviewed by the host institution. If the research plan is not approved by NSFC, it will be returned for revision and resubmission.

After the online research plan report is approved by NSFC, the PI should print two hard copies of the report, sign and submit them to the Office of Scientific Research as well as the Department of Finance of the host institution for review and official seal. The commitment letter of the host institution should also be stamped with official seal of the institution. The electronic version of the approved research plan and the paper version must be presented in consistency. The NSFC will review the signed and sealed research plan, and if necessary, the host institution is allowed only one chance to revise or add necessary materials.

Please note that:

1. The signed and sealed pages of the Letter of Commitment for Research Integrity (in the proposal) should also be attached to one of the research plan, and mailed to NSFC together.
2. All the awardees must upload the electronic version of the employment contract signed with the host institution to the grants system as an attachment to the research plan report. In accordance with the *Call Guidelines for the RFIS 2024* ([https://www.nsf.gov.cn/english/site\\_1/international/D5/2024/01-26/355.html](https://www.nsf.gov.cn/english/site_1/international/D5/2024/01-26/355.html)), the duration of the employment contract should cover the project duration period. Specially, the awardee shall commit to working at the host institution for at no less than 9 months per calendar year during the project duration period.

Failure to submit a valid employment contract may result in the NSFC withholding the allocated funds or terminate the award.

Please pay attention to the following timeline:

1. Deadline for submitting the electronic version of the research plan report: **16:00, September 9, 2024;**
2. Deadline for submitting the electronic version of the revised research plan report: **16:00, September 16, 2024;**
3. Deadline for receiving the paper version of the research plan (two copies, one copy should be attached with the signed and sealed pages of the Letter of Commitment for Research Integrity in the proposal): **16:00, September 23, 2024.**
4. Deadline for receiving the paper version of the revised research plan: **16:00, October 8, 2024.**

Please submit the electronic version of the research plan report in time according to the above requirements, and mail the hard copies of the research plan report, the signed and sealed pages of the Letter of Commitment for Research Integrity together to NSFC. Those who fail to submit and mail the above-mentioned documents on time without good reasons will be deemed as automatically giving up the grant. Failure to revise as required or late submission of the signed and stamped application page will result in delayed funding allocation or other possible consequences.

**Attachment:** Project Review Comments and Revision Suggestions Form

Sincerely Yours,

Division I, Department of International Programs  
National Natural Science Foundation of China  
2024-8-23

**Attachment: Project Review Comments and Revision Suggestions Form**

Grant Number	W2433186	Principal Investigator	Jeffrey Chu	Application Code	G0111
Project Title	Anomaly detection methods for blockchain-based networks				
Program Type	Research Fund for International Scientists	Sub Category	Research Fund for International Young Scientists		
Additional Notes(if applicable)					
Host Institution	中国人民大学				
Direct Costs	40.00 (Unit: 10,000 yuan)	Project Duration	2025-01 to 2026-12		
<p>Peer Review Comments:</p> <p>&lt;1&gt;The Project " Anomaly detection methods for blockchain-based networks" addresses a fundamental scientific question in support of economic and social development.</p> <p>The rationale behind this project lies in recognizing the critical role of blockchain technology in economic and social advancement, with a specific focus on the importance of anomaly detection in this domain. As blockchain technology rapidly evolves and finds widespread application, it has become a vital component of global industries such as finance, facilitating transactions and information transfer. However, the decentralized nature of blockchain technology presents regulatory challenges due to the absence of standardized global regulations, making systems susceptible to the influence of anomalies and irregular behavior.</p> <p>In this context, research into anomaly detection methods within blockchain technology becomes imperative. Anomalies may manifest as fraudulent or unauthorized transactions, potentially resulting in data corruption and network attacks, thereby significantly impacting the entire blockchain system. Timely identification and mitigation of these anomalies are crucial for safeguarding the security of users and stakeholders' assets, as well as maintaining the credibility and stability of blockchain systems.</p> <p>In summary, in-depth research and effective monitoring of anomalies within blockchain technology not only contribute to enhancing transaction security and reliability but also promote sustainable global economic and social development. The outcomes of this project will serve as essential references for formulating corresponding regulatory policies and security measures, facilitating the healthy development and widespread adoption of blockchain technology.</p> <p>The scientific value of innovation and expected outcomes:</p> <p>1) Addressing the challenge of accurately classifying data into "normal" and "abnormal" categories, we have developed a novel anomaly detection method tailored to blockchain-based network data by applying time analysis techniques to</p>					

construct network graphs and using statistical methods to model and analyze changes in network structure and properties. This innovation addresses the limitations of traditional anomaly detection methods in blockchain networks and contributes to enhancing the accuracy and robustness of anomaly detection.

2) In response to the challenge of generating a large number of features in blockchain-based networks, we have proposed a comprehensive approach to utilizing feature data by exploring correlations between features and employing dimensionality reduction techniques to reduce feature quantity while retaining key information. This method optimizes feature handling, leading to the creation of a more efficient and reliable anomaly detection model. Additionally, it enhances detection performance in the background of unlabeled data, thereby increasing the practicality and applicability of anomaly detection methods.

Based on abundant data and institutional resources, as well as the author's notable research achievements in the field of blockchain, this project possesses a strong research foundation and feasibility. However, the research methods employed in this project mainly consist of the extension and application of existing approaches, thus potentially requiring further exploration for greater innovation.

<2>The applicant has experience of conducting basic research, and has published several excellent papers related to the project. The applicant possesses an excellent educational background. Regarding the issue of anomaly and fraud detection in blockchain-based networks, the project aims to develop accurate and effective static and dynamic anomaly detection methods to identify anomalies caused by genuine errors or fraudulent activities, thus strengthening risk management for blockchain. The research of this project is conducive to improving the operational efficiency of enterprises, enhancing the stability of financial markets, and promoting the development of digital currencies and trade. The research of this project possesses significant scientific value and application prospects, with well-established innovative research content. The research content of this project comprises three aspects: temporal analysis and understanding of blockchain-based networks, development of anomaly detection methods, and interpreting, evaluating, and testing the significance of models. Regarding these three aspects, the applicant has elaborated on the research approach and methodology in detail. The applicant has also published some related papers on blockchain-based digital currency, providing a certain research foundation for the feasibility of the project. The project has high feasibility, and is expected to achieve excellent results. The research can promote the applicant's academic exchange.

<3>This project aims to investigate the existing issues of abnormal detection and fraud detection within blockchain networks, with the goal of establishing a robust method for anomaly detection. The applicant has an excellent educational background and has accumulated some research experience in the preliminary stage. The research proposal is feasible and is anticipated to contribute to the applicant's career development and the promotion of academic exchanges. However, the

specific research plan lacks sufficient elaboration on key technical methods, and further strengthening is needed in the research.

Revision Suggestions of Science Department:

Department of International Programs  
2024-8-23