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Investigation Report

Adopted by the Board for Investigation of Deviations from Good
Research Practice, 4 June 2024

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1. Reported researcher

Zhihan Lyu (also known by the names Lv/Lu)

Associate professor at the Department of Game Design, Campus Gotland, Uppsala University

zhihan.lyu@speldesign.uu.se

On leave December 2023, 30 June 2023.

2. Complainant

Alexander Magazinov

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3. Background

On 18 October 2023 Uppsala University received a complaint concerning Associate Professor Lyu's suspected deviations from good research practice. Among other things, it highlights comments on an article on the PubPeer publishing site which claim that there are errors in the article. In addition, it is alleged that Lyu was involved in the practice known as "paper milling".

On 22 November 2023, Uppsala University was also contacted by the publisher Public Library of Science (PLOS) regarding articles authored and reviewed by LYU.

The Vice-Chancellor of Uppsala University decided on 28 November 2023 to refer the complaint to the Board for Investigation of Deviations from Good Research Practice (hereafter "the Board") for assessment of 1. whether there have been deviations from good research practice, and 2. if so, whether these deviations may constitute research misconduct.

Following this, the University received a request from a conference organiser to verify an ethics review permit issued to Lyu.

4. Complaint

The complaint (Appendix 1) emphasises that Lyu's ORCID¹ is the same as the one held by Zhihan Lv at Qingdao University, implying that they are the same person.

Uppsala University is encouraged to carry out an investigation into Mr Lyu's publications in the light of the following. In comments to the article *Deep Learning for Security in Digital Twins of Cooperative Intelligent Transportation Systems* on the website PubPeer, which has Lyu as author along with Uppsala University as the specified affiliation, it is stated that published data sets are fabricated rather than a result of actual data.²

¹ ORCID is digital identifier that enables researchers to be identified, even if they have the same name
<https://orcid.org/>.

² *Deep Learning for Security in Digital Twins of Cooperative Intelligent Transportation Systems*,
<https://pubpeer.com/publications/91DB54D4B9214E6283CC76E3C4482C>.

Furthermore, that an article, *Design and interactive performance of human resource management system based on artificial intelligence*, published with Qingdao University specified as Lyu's affiliation, contains nonsense references and ambiguities in Figure 7 of the article, which do not correspond to the image's descriptive text.³

Lyu is also reported to have been the "academic editor" of a total of 421 articles published in journals through the publisher Hindawi which, following a change of ownership of the publisher, has retracted a large number of articles. These retractions also include articles for which Lyu was "academic editor".

The complaint alleges that, beyond the journals published by Hindawi, Lyu may have been involved in citation farming⁴ and facilitating a fabricated peer review. The complainant concludes with a link to the PubPeer site where Lyu's published articles can be found, as the complainant believes that this could be helpful in finding more examples of (as they may be understood) deviations from good research practice.

5. Written communication from PLOS

PLOS notified Uppsala University that they have recently retracted an article on which Zhihan Lv is a co-author (Appendix 2).⁵ Despite the alternative spelling of the name, PLOS is certain that the author is Lyu from Uppsala University as he included his Uppsala University affiliation in email correspondence to the journal during discussions about the retraction.

PLOS has also retracted two articles for which Lv was academic editor and thus handled the peer review of the articles.⁶ Questions were raised about these articles and others after publication, including similarities between articles, the integrity of the peer-review process and possible manipulation of the publication process through paper milling. PLOS followed up on these issues in accordance with guidance from the Committee on Publication Ethics (COPE) and, based on its editorial judgement and information obtained in follow-up discussions, PLOS ONE retracted the articles in September and November 2023. A notification of the retraction is available on the articles' webpages.

PLOS noted that their investigation of the matter is ongoing and that there is a possibility of more articles being recalled due to the above circumstances. The articles awaiting further review include both articles for which Lv has managed the peer review process and those for which he is a co-author.

³ *Design and interactive performance of human resource management system based on artificial intelligence*, <https://pubpeer.com/publications/05E4876C53E68A013297E858581683>

⁴ See e.g. "Hundreds of extreme self-citing scientists revealed in new database", Richard Van Noorden and Dalmeeth Singh Chawla, *Nature*, 19 August 2019, <https://www.nature.com/articles/d41586-019-02479-7>, 24-01-22.

⁵ "Deployment Optimisation of Multi-Stage Investment Portfolio Service and Hybrid Intelligent Algorithm Under Edge Computing", <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0252244>, 24-01-22.

⁶ 1. "Analyzing the regional economic changes in a high-tech industrial development zone using machine learning algorithms", <https://doi.org/10.1371/journal.pone.0250802>, 24-01-22.

2. "Application of deep learning in automatic detection of technical and tactical indicators of table tennis", <https://doi.org/10.1371/journal.pone.0245259>, 24-01-22.

PLOS also wishes to draw Uppsala University's attention to the fact that Lv is listed as a "guest editor" for over 100 articles in journals which have been recalled by the publisher Hindawi.⁷

Uppsala University contacted PLOS requesting information on whether Lyu was employed by Uppsala University when he served as academic editor of the retracted articles. According to PLOS, based on the information available from the articles in question, Lyu was either in China or the UK during the period of his role as academic editor. In addition, it is noted that the retracted article co-authored by Lyu also specifies a Chinese university as a listed affiliation. PLOS is asked if they are aware of any other cases whereby an article has been retracted or questioned on the basis of good research practice and the research has been carried out at Uppsala University. For example, if this was the case for the retracted articles published by Hindawi on which Lyu served as guest editor.

PLOS encourages Uppsala University to investigate whether Lv's affiliation when publishing, submitting, or otherwise reporting research has taken place during the time Lyu has been employed at Uppsala University. The dates of the three articles in question are available on the articles' websites. Regarding the articles published and retracted by Hindawi, some appear, after a brief and random review, to have been submitted or published in 2021 (sec. note: the year Lyu was employed at Uppsala University).

Lv was a member of the PLOS ONE Editorial Board until March 2022, at which point he was removed due to the above circumstances. He has not informed PLOS of a change in his affiliation to Uppsala University, so if he has managed the peer-review process for any articles during this time, his stated affiliation has been incorrect on the articles in question unless he had multiple affiliations at the time.

6. Written communication from conference organiser

On 6 March 2024, Uppsala University was contacted by an American conference organiser⁸ (see Appendix 3) with a request to verify an ethics review permit (see Appendix 4) submitted as part of preparatory work on the review process for the 2024 conference. The guidelines state that contributions submitted to the conference describing research involving human subjects must be supported by a permit from the corresponding ethics committee. During the review process, questions were raised about the validity of the ethical approval. The permit was granted to Lyu.

7. Zhihan Lyu's statements

Lyu has submitted questions as to how investigations of suspected deviations from good research practice are carried out at Uppsala University; whether the investigation will be discontinued if he resigns his employment; and about what Uppsala University's investigative responsibility entails. Lyu is currently on leave of absence from Uppsala

⁷ <https://docs.google.com/spreadsheets/d/1CWG84ncHW7-7mgzq9EZBoPC6Sw5n9mS6pInStNs78gA/edit#gid=0>

⁸ 2024 IEEE Conference on Virtual Reality and 3D User Interface (<https://ieeevr.org/2024/>).

University. Three statements were received from Lyu; one concerning the complaint, one concerning the written communication from PLOS and one concerning the Expert opinion.

7.1 Statement regarding the complaint

In his statement, Lyu thanks Uppsala University and informs it of his plans to return to his home country, China, to look for a job there, meaning he will resign in the near future (Appendix 5).

Lyu explains that most of what is highlighted in the complaint was carried out before he came to Uppsala University and that only two (sec. note: as it may be understood) of the articles have a bearing on Uppsala University. Lyu argues that the simple fact of an article having been reported on the PubPeer website does not mean that it contains errors. PubPeer is sometimes considered to be a blackmail website. On social media, there are revelations that the website PubPeer has been colluding with Biotech to commit blackmail. PubPeer is not always correct and he may be blackmailed at a later stage.

Regarding article 1, Lyu states that the publication date was 6 October 2021, which is before he joined Uppsala University. The article was finalised while he was working at Qingdao University in China. He specified Uppsala University as his affiliation because he had received an offer of employment at Uppsala University and was authorised to do so by the head of the department. Lyu states that he signed the employment contract on 11 October 2021, by email which is only 5 days after the date of publication. A solution is proposed: the affiliation of the article can be corrected to Qingdao University. In response to the comment on PubPeer, Lyu states:

“The three parameters F1, Recall, and Precision will be equal only when the model's positive and negative category predictions are balanced, that is, Precision and Recall are both high at the same time. To achieve this situation, ideal states such as reasonable threshold settings and no noise data are required. There are errors in general simulation experiments sometimes. It is possible that these three parameters are equal if they are the same. However, in this work, since it is a multi-category classification task, regarding the prediction of traffic congestion, the number of samples in different categories varies greatly, so it is reasonable for these three parameters to be inconsistent.”

Regarding the article “Design and interactive performance of human resource management system based on artificial intelligence”⁹, Lyu states that he does not know the authors who listed him as co-author. His affiliation is stated as the School of Data Science and Software Engineering, Qingdao, China, and the article is thus not relevant to Uppsala University.

Regarding the issue of the articles published and retracted by Hindawi, Lyu argues that they are irrelevant to Uppsala University as this took place before he joined that university.

⁹ <https://pubmed.ncbi.nlm.nih.gov/35089946/>.

Lyu does not consider the allegations in the complaint concerning potential citation farming to be relevant to either Sweden or Uppsala University as this took place before he joined that university. Likewise the data facilitating a fabricated peer review.

7.2 Statement regarding the written communication from PLOS

Lyu claims that none of the publications referred to can be attributed to research carried out at Uppsala University (Appendix 6). He has carefully checked on the PLOS website that none of the retracted articles have publication dates that coincide with his employment at Uppsala University.

Link to articles on which Lyu was editor:

https://journals.plos.org/plosone/search?unformattedQuery=editor%3A%22zhihan%20X2%22&q=editor%3A%22zhihan%20X2%22&sortOrder=DATE_NEWEST_FIRST&page=1

Link to articles on which Lyu was co-author:

https://journals.plos.org/plosone/search?unformattedQuery=editor%3A%22zhihan%20X2%22&q=editor%3A%22zhihan%20X2%22&sortOrder=DATE_NEWEST_FIRST&page=1

https://journals.plos.org/plosone/search?unformattedQuery=author%3A%22zhihan%20X2%22&q=author%3A%22zhihan%20X2%22&sortOrder=DATE_NEWEST_FIRST&page=1

They are not relevant for Sweden or Uppsala University as this all happened before he joined Uppsala University. Lyu asks the Board to check the articles' "publish time" instead of "retraction publish time" to compare the dates with the time of Lyu's employment at Uppsala University.

7.3 Statement regarding the written communication from conference organiser

Lyu has not been given the opportunity to comment on the ethics review permit submitted to the *2024 IEEE Conference on Virtual Reality and 3D User Interface*.

7.4 Statement regarding the expert opinion

Lyu has submitted a statement on the expert opinion. This opinion is set out in Appendix 7.

8. Expert opinion

An expert opinion has been obtained from Fredrik Tufvesson, Professor of Communications Engineering at Lund University. The Board asked Tufvesson to respond to the following questions:

1. Does the complaint concerning the article *Deep Learning for Security in Digital Twins of Cooperative Intelligent Transportation Systems* (<https://ieeexplore.ieee.org/document/9560727>) constitute a basis for misconduct (<https://npof.se/oredlighet-i-forskning/>) or deviation from good research practice?
2. Is Lyu's opinion an acceptable explanation for what was presented as inaccuracies in the article?
3. Is there anything else in the article that may constitute a deviation from good research practice/misconduct in research?

The opinion summarises the following:¹⁰

Article [1]¹¹ contains inconsistent results that cannot occur naturally. Article [1] and article [2]¹² show result figures that are exactly the same, even though they should show different things and come from completely different data sets.

Such a similarity between the curves cannot be explained as natural, instead suggesting that [1], [2] or both articles contain falsified or fabricated data. Given the inconsistencies in Figure 6 of [1] and the lack of simulation parameters, simulation scenario and simulation results, it is likely that [1] is based on falsified or fabricated data. This could therefore clearly constitute a case of research misconduct.

Furthermore, [1] contains many strange references and claims that are not supported by the references cited and lacks a reference to a key tool for the study. This is a deviation from good research practice and, due to its systematic misuse of references, it can possibly be seen as a serious deviation from good research practice.

9. The Board's assessment

Lyu has been employed at Uppsala University since 1 December 2021. The Board's investigation has not revealed that Lyu was affiliated with Uppsala University at the time of publication of the articles accused of citation farming. The articles published by PLOS

¹⁰ For the full text of the statement, see Appendix 8.

¹¹ [1] Z. X2, Y. Li, H. Feng and H. X2, "Deep Learning for Security in Digital Twins of Cooperative Intelligent Transportation Systems" in *IEEE Transactions on Intelligent Transportation Systems*, vol. 23, no. 9, pp. 16666-16675, Sept. 2022, (Doi: 10.1109/TITS.2021.3113779).

¹² [2] Wan Z, Dong Y, Yu Z, X2 H and X2 Z (2021) "Semi-Supervised Support Vector Machine for Digital Twins Based Brain Image Fusion". *Front. Neurosci.* 15:705323. (Doi: 10.3389/fnins.2021.705323).

and withdrawn were published before Lyu was employed at Uppsala University. Only one article that has been reported lists Uppsala University as an affiliate: *Deep Learning for Security in Digital Twins of Cooperative Intelligent Transportation Systems* (the article), which is thus the article that the Board has to assess.

The expert opinion states that there are circumstances in the article that may constitute research misconduct. The Board shares this conclusion.

As regards the letter from the conference organisers, the document claimed to be an ethics review permit may constitute a deviation from good research practice, and may also be suspected of constituting some form of criminal conduct. The written communication has consequently been handed over to the police as part of a police report into suspected fraud.

10. The conclusion of the Board

10.1 The article

The Board's expert has assessed that both articles may contain fabricated data and that there are statements and references in the reported article that are not supported by the cited references. The expert's assessment is thus that there are grounds for suspecting research misconduct. The Board shares this conclusion. There are therefore grounds for suspecting that there have been such serious deviations from good research practice that the matter should be referred to the National Board for Assessment of Research Misconduct for further investigation.

10.2 Written communication from conference organiser

The Board also considers that the written communication concerning the ethics review permit submitted to the *2024 IEEE Conference on Virtual Reality and 3D User Interface* was likely fabricated by Lyu in order to give the impression that there was an ethics review permit. The written communication contains incorrect information about a non-existent review body at Uppsala University. This conduct has been reported to the police, but as there are reasons to suspect that the behaviour may constitute research misconduct, this written communication should also be forwarded to the National Board for Assessment of Research Misconduct.

On behalf of the Board for Investigation of Deviations from Good Research Practice

Johan Höök, Chair