YIXUAN HE

https://sherylhyx.github.io/ ⋄ yixuan.he@balliol.ox.ac.uk
University of Oxford

EDUCATION

University of Oxford, OU Oct. 2020 - Jun. 2024 (expected)
D.Phil. (PhD) student in Statistics *Supervisors: Mihai Cucuringu and Gesine Reinert*

- **Clarendon Scholar (fully funded)**, Balliol Jason Hu Scholarship
- Research topic: **graph neural networks and its applications**

University of Edinburgh, UoE Sept.2018 - June 2020
BSc (Hons) in Maths and Stats *Supervisor: Timothy I. Cannings*

- GPA: **92.33%** Avg., **Rank # 1** in Maths & Stats, **First Class**

University of California, Berkeley Jan. 2018 - May 2018
Semester Exchange

- GPA: **4.0/4.0**

South China University of Technology, SCUT Sept.2016 - June 2020
BSc Mathematics and Applied Mathematics *Supervisor: Delu Zeng*

- Rank: **1/60** (Outstanding graduate)
- Overall GPA for 2016 - 18: **3.99/4.0**, Major GPA: **4.0/4.0**; transferred to UoE on 2+2 program
- Winning 2 years of **National Scholarship** granted by Ministry of Education of China
- **650/710** in CET6, **top 0.02 % of students** in SCUT

RESEARCH EXPERIENCE

OU: Graph Neural Networks and its Applications Oct. 2020 -
Doctoral Research *Supervisors: Gesine Reinert, Mihai Cucuringu*

- Worked on signed, directed, and temporal GNNs, as well as GNNs for signal recovery.
- Developed open-source libraries: creator of PyG Signed Directed & contributor of PyG Temporal.
- Collaborated with Amazon as an applied scientist intern (Mentor: David Wipf).

NetEase Games: Behaviour-based Anti-cheating in FPS Games June 2020 - Aug. 2020
Summer Internship *Supervisor: Xin Wen*

- Extracted features from logs using multiprocessing & built multi-input single-output models with TensorFlow 2.2.

UoE: AUROC vs AUPRC: A Comparison of Performance Measures in Classification Problems Sept. 2019 - Apr. 2020
UoE Honors Project *Supervisor: Timothy I. Cannings*

- Collected data, compared measure scores, **analyzed measure properties** & data properties.

UCLA CSST summer research/REU: Deforestation Brazil June 2019 - Sept. 2019
Funded by NGA & NSF Supervisors: Christian Parkinson, Andrea L. Bertozzi, Stanley J. Osher

- Conducted data mining, data analysis, matlab programming & model construction.
- Implemented **level set method**, numerical PDEs, optimal path searching, satellite image processing, Maximum Penalized Likelihood Estimation (MPLE), time series simulation etc.
- **Delivered a talk** at IPAM's "The Level Set Collective" seminar invited by Professor Stanley Osher.
- **Presented a poster** at Intelligence Community Academic Research Symposium (ICARS) 2019.

SCUT: Robust Image Salient Object Perception Prior for Image Segmentation based on PDEs Related Methods May 2018 - May 2020
Funded by National Natural Science Foundation of China **(NSFC)** *Supervisor: Delu Zeng*

· Studied level set methods and **neural networks** on **semantic image segmentation**.
· Worked on lung nodule segmentation using MEnet.
· Utilized Linux, Colab, Caffe, TensorFlow, PyTorch & programming in Python.

SCUT: Efficiency of Collaborative Innovation Knowledge Output in Professional Towns in Internet + Times May 2017 - May 2018
Funded by MOE of PRC *Supervisors: Shifu Wang, Miaoxi Zhao, Shenquan Liu*

· **Cross-disciplinary**: Maths & Urban Planning.
· Responsible: data mining & analysis, paper writing.
· **Led** the project as part of the National Training Program of Innovation for Undergraduates.

MAJOR AWARDS

Grant	2024 Balliol College Support Grant
Grant	2023-24 Balliol College Floreat Grant for Sports
Grant	2022-23 Balliol College Floreat Grant for Sports
Grant	2022 ICML Participant Award
Grant	2022 Simons Institute Summer School Fund
Grant	2022 Balliol's fund on IMA Conf. on The Mathematical Challenges of Big Data reg.
Award	2022 SIAM Student Travel Award for SDM'22
Award	2022 SIGIR Student Registration Award for WSDM'22
Grant	2021 Balliol's fund on Complex Networks 2021 reg.
Grant	2021 Balliol's fund on NeurIPS 2021 reg.
Grant	2021 Balliol's fund on ACM membership & CIKM'21 registration
Prize	2020 Napier Medal and Gangadhar Balwant Gadgil Prize (**top** Maths student @UoE)
Prize	2020 Lawley Memorial Prize (**top** student in Maths & Stats @UoE)
Scholarship	2020 **Clarendon Scholarship** & Balliol Jason Hu scholarship at Oxford
Honor	2020 Outstanding Graduate at SCUT Maths Dept.
Prize	2019 Arthur Erdelyi Prize (For top 3 performing Math students @UoE)
Prize	2019 James Ward Memorial Prize (**top** student in Maths & Stats @UoE)
Second Prize	2018 ICM/MCM International **Mathematical Modeling** Competition
Grand Prize	2018 Maths Competition of SCUT (Maths Group) (**Rank # 1**)
Honor	2017-2018 one of the ten **Role Models to Merit Students** at SCUT
Prize	2017 & 2018 **National Scholarship**
Second Prize	2017 "9^{th} National College Student **Maths Competition** (Maths)" in Guangdong
Second Prize	2017 National College Student Mathematical Modeling Competition (Guangdong)

PUBLICATIONS

· Aminian, G., **He, Y.**, Reinert, G., Szpruch, Ł., Cohen, SN. Generalization Error of Graph Neural Networks in the Mean-field Regime. (ArXiv 2024)
· **He, Y.**, Reinert, G., Wipf., D., & Cucuringu, M. Robust Angular Synchronization via Directed Graph Neural Networks. (**ICLR 2024**)
· Steach, H., Viswanath, S., **He, Y.**, Zhang, X., Ivanova, N., Hirn, M., Perlmutter, M., Krishnaswamy, S. Inferring Metabolic States from Single Cell Transcriptomic Data via Geometric Deep Learning. (**RECOMB 2024**)
· **He, Y.**, Zhang, X., Huang, J., Rozemberczki, B., Cucuringu, M., & Reinert, G. PyTorch Geometric Signed Directed: A Software Package on Graph Neural Networks for Signed and Directed Graphs. (**LoG 2023**, **Open-Source Software with 100+ stars**)

- Geng, H., Chen, C., **He, Y.**, Zeng, G., Han, Z., Chai, H., Yan, J. Pyramid Graph Neural Network: a Graph Sampling and Filtering Approach for Multi-scale Disentangled Representations. (**KDD 2023**, Talk)
- Wu, Q., Yang, C., Zhao, W., **He, Y.**, Wipf, D., & Yan, J. DIFFormer: Scalable (Graph) Transformers Induced by Energy Constrained Diffusion. (**ICLR 2023**, Spotlight Talk)
- **He, Y.**, Reinert, G., & Cucuringu, M. DIGRAC: Digraph Clustering Based on Flow Imbalance. (**LoG 2022**)
- **He, Y.**, Perlmutter, M., Reinert, G., & Cucuringu, M. MSGNN: A Spectral Graph Neural Network Based on a Novel Magnetic Signed Laplacian. (**LoG 2022**)
- Wang, X., Chen, S., **He, Y.**, Wang, M., Gan, Q., & Yan, J. CEP3: Community Event Prediction with Neural Point Process on Graph. (**LoG 2022**)
- **He, Y.**, Gan, Q., Wipf, D., Reinert, G. D., Yan, J., & Cucuringu, M. GNNRank: Learning Global Rankings from Pairwise Comparisons via Directed Graph Neural Networks. (**ICML 2022**, Talk)
- **He, Y.**, Reinert, G., Wang, S., & Cucuringu, M. SSSNET: Semi-Supervised Signed Network Clustering. (**SDM 2022**, Talk)
- **He, Y.** GNNs for Node Clustering in Signed and Directed Networks. (**WSDM-DC 2022**, Talk)
- Zhang, X., **He, Y.**, Brugnone, N., Perlmutter, M., & Hirn, M. MagNet: A Neural Network for Directed Graphs. (**NeurIPS 2021**)
- Rozemberczki, B., Scherer, P., **He, Y.**, Panagopoulos, G., Riedel, A., Astefanoaei, M., ... & Sarkar, R. PyTorch Geometric Temporal: Spatiotemporal Signal Processing with Neural Machine Learning Models. (**CIKM 2021 best paper award**, **Open-Source Software with 2.3k stars, 300+ forks**)
- **He, Y.**, Hu, T., & Zeng, D. Scan-flood Fill (SCAFF): an Efficient Automatic Precise Region Filling Algorithm for Complicated Regions. (**CVPR 2019** workshop)
- Zeng, D., **He, Y.**, Liu, L., Chen, Z., Huang, J., Chen, J., & Paisley, J. Ro-SOS: Metric Expression Network (MEnet) for Robust Salient Object Segmentation. (ArXiv 2018)

TEACHING EXPERIENCE

University of Oxford Teaching Assistant Dec. 2020 - Dec. 2022

- Courses to grade and discuss a problem in the problem classes: Applied Statistics (Fall 2022), Advanced Topics in Statistical Machine Learning (Spring 2022), Computational Statistics (Spring 2021)
- Course to demonstrate and answer questions: Statistics and Data management (for DTC in Dept. of Zoology, Fall 2020)

UoE's Digital Skills Trainer - Python Dec. 2019 - May 2020

- **Delivered Python training courses**, reviewed & improved existing Python training.
- Recorded lectures: Introduction to Python and Python for Data Science.

Teaching Support in a Primary School in Longsheng Rural Village July 2017

- Devised & delivered lectures in singing, dancing, craftmanship & story-telling.
- **Leader** in hosting the closing ceremony.
- **Visited families** to collect information & offer suggestions.

ACADEMIC SERVICES

Reviewer

- Conferences: ICML2024, ICLR2024, AAAI 2024, NeurIPS 2023, ICML 2023, WWW 2023, AAAI 2023, NeurIPS 2022, SIGKDD 2022, ICML 2022, WSDM 2022
- Journals: IEEE Transactions on Knowledge and Data Engineering (TKDE), Journal of Complex Networks, Statistics and Computing

Organizer

· One of the **organizers** for: LoG^2 @ Oxford: the Learning on Graphs and Geometry seminar series

WORK EXPERIENCE

Applied Scientist Intern at Amazon Web Services AI Shanghai Lablet Nov. 2021 -

· Mentor: David Wipf.
· Conducted research on graph neural networks.

NetEase Games Programmer Jun. 2020 - Aug. 2020

· Project: Behaviour-based Anti-cheating in FPS Games (Supervisor: Xin Wen)
· Selected as **Outstanding Intern** to present my work.

Student Assistant for School of Mathematics Sept. 2016 - Aug. 2017

· Assisted in organizing materials & releasing notifications.
· Outstanding individual in work-study of South China University of Technology.

CONFERENCES/SUMMER SCHOOLS

12th International Conference on Learning Representations (**ICLR**)	Author	May 2024
2nd Learning on Graphs (LoG) Conference	Author	Nov. 2023
Workshop: statistical learning on LARge scale GRaphs (LARGR)	Presenter	Mar. 2023
1st Learning on Graphs (LoG) Conference	Author	Dec. 2022
4th IMA Conference on The Mathematical Challenges of Big Data	Speaker	Sept. 2022
39th International Conference on Machine Learning **(ICML)**	Author	Jul. 2022
SIAM International Conference on Data Mining **(SDM)**	Author	Apr. 2022
15th ACM Int. Conf. on Web Search and Data Mining **(WSDM)**	Doctoral Cons.	Feb.2022
35th Conf. on Neural Information Processing Systems **(NeurIPS)**	Author	Dec.2021
The 10th Int. Conf. on Complex Networks and their Applications	Author	Nov.2021
Int. Conf. on Information and Knowledge Management **(CIKM)**	Author	Nov.2021
Intelligence Community Academic Research Symposium **(ICARS)**	Poster presenter	Sept. 2019
Computer Vision and Pattern Recognition **(CVPR)**	Author	June 2019

COMPUTER SKILLS

Programming:	**Python (Advanced)**, C++ (Intermediate), VB (Basic) & Pascal (Basic)
Statistical Analysis:	**R (Advanced)**, SQL (Intermediate) & SPSS (Intermediate)
Modelling:	**Matlab (Advanced)**, Maple (Intermediate) & Xpress (Intermediate)
Paper writing:	**Latex (Advanced)**

POSITIONS OF RESPONSIBILITY

President of Oxford University Table Tennis Club (OUTTC) May 2023 -

· **Organized** club activities, promoted the club, organized training, booked & coordinated facilities.
· Participated in table tennis **competitions** as a squad member.
· **Initialized** the use of an Oxford mailing list to send notifications (600+ subscribers) & **managed** a club Facebook group (1.2k members).

Director of Dept. of Visiting Scholars in Oxford Chinese Students & Scholars Association (OXCSSA) July 2021 - July 2022

· **Co-organized** 2021 welcoming event for new students to University of Oxford.
· **Organized** events for visiting scholars: visiting scholars' tea party, hiking, formal, punting etc.
· Collaborated with other departments to hold virtual and in-person talks.

Head of Class Sept. 2013 - June 2018

· Conveyed notifications, organized activities & led by example.
· 2017 & 2018 South China University of Technology **Outstanding Student Leader**.
· 2016-2017 **outstanding class** of SCUT & 2017-2018 top-16 classes of SCUT.

University Student Representative May 2017 - May 2018

· Actively listened to students′ opinions & participated in raising proposals.
· Outstanding Student Representative of South China University of Technology in 2017.

Member of Public Relationship Dept., Math Student Union Sept. 2016 - Oct. 2017

· **Led** the hosting of a social party in School of Mathematics.
· 2017 **Star** in Mathematics Student Union.