

# YIXUAN HE

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University of Oxford

## EDUCATION

**University of Oxford, Dphil in Statistics** Oct. 2020 - Jun. 2024 (expected)

**Clarendon Scholar (fully funded)**, Balliol Jason Hu Scholarship

College: Balliol, supervisors: **Mihai Cucuringu** & **Gesine Reinert**

Research area: **graph neural networks**

Teaching assistant for: Advanced Topics in Statistical Machine Learning (SC 4, HT 2022), Computational Statistics (SB 1.2, HT 2021), Statistics and Data management (for DTC in Department of Zoology, MT 2020)

Reviewer for: AAAI 2022, NeurIPS 2022, SIGKDD 2022, ICML 2022, WSDM 2022 etc..

**University of Edinburgh, UoE**

Sept. 2018 - June 2020

Major: **(BSc Hons) Maths & Stats (92.33% Avg., Rank # 1 in Maths & Stats, First Class)**

Courses: Stats Methodology(100%), Financial Maths(100%), Numerical PDEs(100%), Fundamentals of Optimization(98%), Nonparametric Regression Models(96%).

Paid job at UoE: **Digital Skills Trainer-Python**

**University of California, Berkeley**

Jan. 2018 - May 2018

Courses: Numerical Analysis (A+), Complex Analysis (A+), Abstract Algebra (A)(GPA: **4.0/4.0**)

**South China University of Technology, SCUT**

Sept. 2016 - June 2020

Major: **Mathematics & Applied Mathematics** (Rank **1/60**)(Outstanding graduate)

Overall GPA for 2016-18: **3.99/4.0**, Major GPA: **4.0/4.0**; transferred to Edinburgh on 2+2 program

Winning 2 years' **National Scholarship** granted by Ministry of Education of China

**650/710** in CET6, overtaking **99.98%** students in SCUT

## RESEARCH EXPERIENCE

*Oxford: Graph Neural Networks and its Applications*

Oct. 2020 -

*Doctoral research*

*Supervisors: Mihai Cucuringu, Gesine Reinert*

- **First** author of **ICML 2022** paper: **GNNRank: Learning Global Rankings from Pairwise Comparisons via Directed Graph Neural Networks.**
- **First** author of **SDM 2022** paper: **SSSNET: Semi-Supervised Signed Network Clustering.**
- **First** author of **WSDM 2022** Doctoral Consortium paper: **GNNs for Node Clustering in Signed and Directed Networks.**
- Second author of **NeurIPS 2021** paper: **MagNet: A Neural Network for Directed Graphs.**
- Third author of **CIKM'21** paper: **PyTorch Geometric Temporal: Spatiotemporal Signal Processing with Neural Machine Learning Models.(best paper award).**
- **First** author of paper: **DIGRAC: Digraph Clustering Based on Flow Imbalance.**
- **First** author of paper: **PyTorch Geometric Signed Directed: A Survey and Software on Graph Neural Networks for Signed and Directed Graphs.**
- **First** author of paper: **MSGNN: A Spectral Graph Neural Network Based on a Novel Magnetic Signed Laplacian.**
- Third author of paper: **CEP3: Community Event Prediction with Neural Point Process on Graph.**

*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, **analysed 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**.
- **First author** of paper at workshop of **CVPR 2019: Scan-flood Fill (SCAFF): an Efficient Automatic Precise Region Filling Algorithm for Complicated Regions**.
- Worked on lung nodule segmentation using MEnet.
- 2<sup>th</sup> auth. of: **Ro-SOS: Metric Expression Network (MEnet) for Robust Salient Object Segmentation**.
- 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, Miaoqi 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.

## CONFERENCES/SUMMER SCHOOLS

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4th IMA Conference on The Mathematical Challenges of Big Data	Speaker	Sept. 2022
UC Berkeley Simons Institute Deep Learning Theory Workshop	Participant	Aug. 2022
39th International Conference on Machine Learning ( <b>ICML</b> )	Author	Jul. 2022
SIAM International Conference on Data Mining ( <b>SDM</b> )	Author	Apr. 2022
15th ACM Int. Conf. on Web Search and Data Mining ( <b>WSDM</b> )	Doctoral Cons.	Feb.2022
35th Conf. on Neural Information Processing Systems ( <b>NeurIPS</b> )	Author	Dec.2021
The 10th Int. Conf. on Complex Networks and their Applications	Author	Nov.2021
Int. Conf. on Information and Knowledge Management ( <b>CIKM</b> )	Author	Nov.2021
Intelligence Community Academic Research Symposium ( <b>ICARS</b> )	Poster presenter	Sept. 2019
Computer Vision and Pattern Recognition ( <b>CVPR</b> )	Author	June 2019
European Conf. on Computer Vision ( <b>ECCV</b> ) pre-conference	Attendee	July 2018
Berkeley Undergraduate Number Theory Conference	Attendee	Apr. 2018

## MAJOR AWARDS

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

## COMPUTER SKILLS

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

## WORK EXPERIENCE

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

- Mentor: **David Wipf**.
- Conduct research on graph neural networks.

**Director of Department 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, hosted the Shenzhen welcoming event.
- Collected information for visiting scholars & built contact.
- **Divided work** as the **leader** of a team of over 15 members.
- **Organized** events for visiting scholars: visiting scholars' tea party, hiking, formal, punting etc..
- Collaborated with other departments such as the academic department to hold virtual and in-person talks.

**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**.

**Head of Class** Sept. 2013-June 2018

- Conveyed notifications, organized activities & led by example.
- 2017's & 2018's South China University of Technology **Outstanding Student Leader**.
- 2016-2017's **outstanding class** of SCUT & 2017-2018's 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's **Star** in Mathematics Student Union.

**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.

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

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