Yuhang Song

▬▬▬ BIOGRAPHY

2025 – Now	**Associate Professor (Pre-Tenure)**, _School of Artificial Intelligence_, _Nanjing University_.
2024 – 2025	**CSO & Co-founder**, _Circlemind Ltd_.
2022 – 2024	**CTO & Co-founder**, _Fractile Ltd_.
2021 – 2022	**J.P. Morgan AI Research Fellow**, _University of Oxford_.
2018 – 2022	**Ph.D.**, _Department of Computer Science_ & _Nuffield Department of Clinical Neurosciences_, _University of Oxford_.
2014 – 2018	**B.S.**, _Beihang University_.

Fellowships / Scholarships

2025	_National Science Fund for Distinguished Young Scholars Overseas_	~**CNY 500,0000**
2024	_Thomas Willis Early Career Researcher Prize, University of Oxford_	
2024	_Ideas 2 Impact (I2I) Fellow, Saïd Business School, University of Oxford_	
2022	_J.P. Morgan AI Research Fellowship_	**$100,000** | **A total of 11 awardees worldwide**
2019	_Special Project Grant_ @ _Somerville College_	**£2,000** | **Top-tier**
2018	_Honorary China Oxford Award_ | **15 among 1,000**	**£3,000** |**1st Prize**
2017	_National Innovation Scholarship_ | **20 among 200,000+**	**$12,000** | **1st Prize**
	Awarded by the National Ministry of Industry and Information.	
2016	Outstanding Science and Technology Scholarship | **12 among 256**	**$220** |**1st Prize**
2015	_Airbus Academic Scholarship_ | **2 among 600+**	**$1,200** |**2nd Prize**

▬▬▬ PUBLICATIONS

(∗: Corresponding Author. †: Equal Contribution.)

[1] `Journal` **Yuhang Song**∗, Beren Millidge, Tommaso Salvatori, Zhenghua Xu∗, Thomas Lukasiewicz∗, Rafal Bogacz∗. _Inferring Neural Activity Before Plasticity: A Foundation for Learning Beyond Backpropagation._ **Nature Neuroscience**. [Link]

[2] `Journal` Beren Millidge†, **Yuhang Song**†∗, Armin Lak, Mark E. Walton, Rafal Bogacz∗. _eward Bases: A simple mechanism for adaptive acquisition of multiple reward types._ **PLOS Computational Biology**. [Link]

[3] `Conference` Tommaso Salvatori†, **Yuhang Song**†∗, Yordan Yordanov, Beren Millidge, Lei Sha, Cornelius Emde, Zhenghua Xu, Rafal Bogacz, Thomas Lukasiewicz. _A Stable, Fast, and Fully Automatic Learning Algorithm for Predictive Coding Networks._ **ICLR 2024**. [Link]

[4] `Journal` Mufeng Tang, Tommaso Salvatori, Beren Millidge, **Yuhang Song**, Thomas Lukasiewicz, Rafal Bogacz∗. _Recurrent predictive coding models for associative memory employing covariance learning._ **PLOS Computational Biology**. [Link]

[5] `Conference` Tommaso Salvatori, Beren Millidge, **Yuhang Song**, Rafal Bogacz, Thomas Lukasiewicz. _Associative Memories in the Feature Space._ **ECAI 2023**. [Link]

[6] `Conference` Beren Millidge, **Yuhang Song**[*], Tommaso Salvatori, Thomas Lukasiewicz, Rafal Bogacz. *A Theoretical Framework for Inference and Learning in Predictive Coding Networks.* **ICLR 2023**. [Link]

[7] `Conference` Beren Millidge, **Yuhang Song**[*], Tommaso Salvatori, Thomas Lukasiewicz, Rafal Bogacz. *Backprop at the Weak-Feedback Limit of Energy-Based Models: Unifying Predictive Coding, Equilibrium Propagation, and Contrastive Hebbian Learning.* **ICLR 2023**. [Link]

[8] `Conference` Luca Pinchetti, Tommaso Salvatori, Yordan Yordanov, Beren Millidge, **Yuhang Song**[*], Thomas Lukasiewicz. *Predictive Coding beyond Gaussian Distributions.* **NeurIPS 2022**. [Link]

[9] `Conference` Tommaso Salvatori[†], Luca Pinchetti[†], Beren Millidge, **Yuhang Song**[*], Tianyi Bao, Rafal Bogacz, Thomas Lukasiewicz. *Learning on Arbitrary Graph Topologies via Predictive Coding.* **NeurIPS 2022**. [Link]

[10] `Conference` Beren Millidge, Tommaso Salvatori, **Yuhang Song**[*], Thomas Lukasiewicz, Rafal Bogacz. *Universal Hopfield Networks: A General Framework for Single-Shot Associative Memory Models.* **ICML 2022**. [Link]

[11] `Conference` Beren Millidge[†], Tommaso Salvatori[†], **Yuhang Song**[*], Rafal Bogacz, Thomas Lukasiewicz. *Predictive Coding: Towards a Future of Deep Learning beyond Backpropagation?* **IJCAI 2022**. [Link]

[12] `Conference` Tommaso Salvatori, **Yuhang Song**[*], Zhenghua Xu, Thomas Lukasiewicz, Rafal Bogacz. *Reverse Differentiation via Predictive Coding.* **AAAI 2022**. [Link]

[13] `Conference` Tommaso Salvatori, **Yuhang Song**[*], Yujian Hong, Lei Sha, Simon Frieder, Zhenghua Xu, Rafal Bogacz, Thomas Lukasiewicz. *Associative Memory via Predictive Coding.* **NeurIPS 2021**. [Link]

[14] `Conference` **Yuhang Song**, Thomas Lukasiewicz, Zhenghua Xu[*], Rafal Bogacz. *Can the Brain Do Backpropagation? –Exact Implementation of Backpropagation in Predictive Coding Networks.* **NeurIPS 2020**. [Link]

[15] `Conference` **Yuhang Song**, Andrzej Wojcicki, Thomas Lukasiewicz, Jianyi Wang, Abi Aryan, Zhenghua Xu[*], Mai Xu, Zihan Ding, Lianlong Wu. *Arena: A General Evaluation Platform and Building Toolkit for Multi-Agent Intelligence.* **AAAI 2020**. [Link]

[16] `Conference` **Yuhang Song**, Jianyi Wang, Thomas Lukasiewicz, Zhenghua Xu[*], Shangtong Zhang, Andrzej Wojcicki, Mai Xu. *Mega-Reward: Achieving Human-Level Play without Extrinsic Rewards.* **AAAI 2020**. [Link]

[17] `Conference` **Yuhang Song**[†], Jianyi Wang[†], Thomas Lukasiewicz, Zhenghua Xu[*], Mai Xu. *Diversity-Driven Extensible Hierarchical Reinforcement Learning.* **AAAI 2019**. [Link]

[18] `Journal` Mai Xu[†*], **Yuhang Song**[†], Jianyi Wang, Minglang Qiao, Liangyu Huo, Zulin Wang. *Predicting Head Movement in Panoramic Video: A Deep Reinforcement Learning Approach.* **TPAMI**. [Link]

[19] `Conference` **Yuhang Song**, Mai Xu[*], Shengxi Li. *Watching Videos with Certain and Constant Quality: PID-based Quality Control Method.* **DCC 2017**. [Link]

[20] `Conference` Xin Deng[†], Hao Wang[†], Mai Xu[*], Yichen Guo, **Yuhang Song**, Li Yang. *LAU-Net: Latitude Adaptive Upscaling Network for Omnidirectional ImageSuper-resolution.* **CVPR 2021**. [Link]

[21] `Conference` Jianyi Wang, Xin Deng, Mai Xu*, Congyong Chen, **Yuhang Song**. *Multi-level Wavelet-based Generative Adversarial Network for Perceptual Quality Enhancement of Compressed Video.* **ECCV 2020**. [Link]

[22] `Journal` Jianyi Wang, Mai Xu*, Lai Jiang, **Yuhang Song**. *Attention-based Deep Reinforcement Learning for Virtual Cinematography of 360° Videos.* **IEEE Transactions on Multimedia, IF: 5.452**. [Link]

[23] `Workshop` **Yuhang Song**, Mai Xu*, Songyang Zhang, Liangyu Huo. *Generalization Tower Network: A Novel Deep Neural Network Architecture for Multi-Task Learning.* **Deep Reinforcement Learning Symposium at NeurIPS 2018**. [Link]

[24] `Journal` Liangyu Huo, Zulin Wang, Mai Xu*, **Yuhang Song**. *A Task-Agnostic Regularizer for Diverse Subpolicy Discovery in Hierarchical Reinforcement Learning.* **IEEE Transactions on Systems, Man, and Cybernetics: Systems, IF: 13.451**. [Link]

[25] `Technical report` **Yuhang Song**, Christopher Grimm, Xianming Wang, Michael Littman*. *Learning Approximate Stochastic Transition Models.* **2018**. [Link]

[26] `Technical report` Hao Sun, Ziping Xu, **Yuhang Song**, Meng Fang, Jiechao Xiong, Bo Dai, Zhengyou Zhang, Bolei Zhou. *Supervised Q-Learning for Continuous Control.* **2021**. [Link]

[27] `Technical report` Christopher Grimm, **Yuhang Song**, Michael Littman*. *Summable Reparameterizations of Wasserstein Critics in the One-Dimensional Setting.* **2018**. [Link]

Patents

[28,...,35] **Yuhang Song**, Xianglong Kong. *A Power / Joint / Servo / Connector Module Device in a Modular UAV System.* 4 Invention & 4 Utility Model Patents. ZL201620302692.X, ZL201620302142.8, ZL201620302048.2, ZL201620302137.7, 201610224780.7, 201610225217.1, 201610225216.7, 201610224853.2.

TEACHING

2019 **Advanced Machine Learning**, *Department of Computer Science*, *University of Oxford*.
- Role: Teaching Assistant & Tutor
- Lecturers:
  - *Prof. Yarin Gal*
  - *Prof. Thomas Lukasiewicz*

2019 **Imperative Programming 3**, *Department of Computer Science*, *University of Oxford*.
- Role: Teaching Assistant & Tutor
- Lecturers:
  - *Prof. Peter Jeavons*

2018 **Introduction to Machine Learning**, *Beihang University*.
- Role: Teaching Assistant & Tutor
- Lecturers:
  - *Prof. Mai Xu*