Xinming Shi

Homepage:
https://embeddedsky.github.io/xinmingshi.github.io//

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Research Interest

- Brain-inspired Computing; Eovlutionary Computing

Education

• University of Birmingham *Birmingham, UK*
Ph. D. in Computer Science Sep. 2019– Dec. 2023
Supervisors: Dr. Leandro L. Minku and Prof. Xin Yao

• Victoria University of Wellington *Wellington, NZ*
Visiting Ph. D. in Computer Science Sep. 2023– Nov. 2023
Supervisors: Prof. Mengjie Zhang and Prof. Bing Xue

• Huazhong University of Science and Technology *Wuhan, China*
M.Eng. in Control Science and Engineering ***(Exempt from Admission Exam)*** Sep. 2016 – Jun. 2019
Supervisor: Prof. Zhigang Zeng

• Wuhan University of Technology *Wuhan, China*
B. Eng. in Electronic Engineering with ***Highest Honors (Top 5%)*** Sep. 2012 – Jun. 2016

• Wuhan University *Wuhan, China*
B. Art. in English Literature Sep. 2014 – Jun. 2016

Work Experience

• Assistant Professor *Belfast, UK*
School of Electronics, Electrical Engineering and Computer Science Aug. 2024–Present
Queen's University Belfast

• Teaching Assistant of Evolutionary Computation and Its Application *Shenzhen, China*
Southern University of Science and Technology Feb. 2022–Jun. 2022
Excellent Student Teaching Assistant Award

• Neuromorphic Chip Researcher in Huawei Technologies Co., Ltd. *Shenzhen, China*
Researcher Internship of Huawei 2012 Laboratories Central Research Institute Dec. 2020–Mar. 2021
Worked on the project of intelligent compiler of the neuromorphic chip

• Teaching Assistant of Data Structures and Algorithms *Birmingham, UK*
University of Birmingham Jan. 2020–Jun. 2020

• Teaching Assistant of Operation Research *Wuhan, China*
Huazhong University of Science and Technology Feb. 2018–Jun. 2018

Publications

1. **Xinming Shi**, Leandro L. Minku and Xin Yao, "Evolving Memristive Reservoir," in *IEEE Transactions on Neural Networks and Learning Systems*, Early Access, pp. 1-15, May 2023, doi: 10.1109/TNNLS.2023.3270224.

2. **Xinming Shi**, Leandro L. Minku and Xin Yao, "Adaptive Memory-Enhanced Time Delay Reservoir and its Memristive Implementation," in *IEEE Transactions on Computers*, vol. 71, no. 11, pp. 2766-2777, 1 Nov. 2022, doi: 10.1109/TC.2022.3173151. **(Excellent Science and Technology Academic Paper Award presented by Shenzhen Association for Science and Technology)**

3. **Xinming Shi**, Leandro L. Minku, and Xin Yao, "A Novel Tree-based Representation for Evolving Analog Circuits and Its Application to Memristor-based Pulse Generation Circuit," *Genetic Programming and Evolvable Machines*, 23, pp. 453–493, Jul. 2022, doi: 10.1007/s10710-022-09436-w.

4. **Xinming Shi**, Zhigang Zeng, Le Yang and Yi Huang, "Memristor-Based Circuit Design for Neuron With Homeostatic Plasticity," in *IEEE Transactions on Emerging Topics in Computational Intelligence*, vol. 2, no. 5, pp. 359-370, Oct. 2018, doi: 10.1109/TETCI.2018.2829914.

5. Zilu Wang, **Xinming Shi**, and Xin Yao, "A Brain-Inspired Hardware Architecture for Evolutionary Algorithms based on Memristive Arrays," *ACM Transactions on Design Automation of Electronic Systems*, vol. 28, no. 5, pp. 32, Sep. 2023, doi: 10.1145/3598421.

6. Le Yang, Zhigang Zeng, and **Xinming Shi**, "A Memristor-based Neural Network Circuit with Synchronous Weight Adjustment," *Neurocomputing*, vol. 363, pp. 114–124, 201, Oct. 2019.

7. **Xinming Shi***, et. al "Memristor-based Evolvable Brain-inspired Computing System," *Nature Machine Intelligence*, 2024. (Under review)

8. **Xinming Shi**, Leandro L. Minku, and Xin Yao, "Tree-based Genetic Programming for Evolutionary Analog Circuit with Approximate Shapley Value," *AI-2024: The Forty-fourth SGAI International Conference*, Cambridge, UK, 2024, Accepted for Publication.

9. **Xinming Shi**, Leandro L. Minku, and Xin Yao, "Novel Memristive Reservoir Computing with Evolvable Topology for Time Series Prediction," *in 31st International Conference on Neural Information Processing (ICONIP)*, Auckland, NZ, 2024, Accepted for Publication.

10. **Xinming Shi** and Zilu Wang, "Memristor Modeling with Homeostatic Threshold Variation for Simulation and Application," *in Proceedings of International Conference on Neuromorphic Computing (ICNC)*, Wuhan, China, pp. 281-290, 2023.

11. **Xinming Shi**, Zilu Wang, Leandro L. Minku, and Xin Yao, "Explaining Memristive Reservoir Computing Through Evolving Feature Attribution," *in Proceedings of the Genetic and Evolutionary Computation Conference Companion (GECCO)*, Portugal, Lisbon, 2023, doi: 10.1145/3583133.3590619.

12. **Xinming Shi**, Jiashi Gao, Leandro L. Minku, and Xin Yao, "Evolving Parsimonious Circuits Through Shapley Value-based Genetic Programming," in *Proceedings of the Genetic and Evolutionary Computation Conference Companion (GECCO)*, Boston, USA, 2022, pp. 602–605.

13. **Xinming Shi**, Jiashi Gao, Leandro L. Minku, James Jian Qiao Yu and Xin Yao, "Second-order Time Delay Reservoir Computing for Nonlinear Time Series Problems," *2021 IEEE Symposium Series on Computational Intelligence (SSCI)*, Orlando, USA, 2021, pp. 1-8, doi: 10.1109/SSCI50451.2021.9659913.

14. **Xinming Shi** and Zhigang Zeng, "Memristor-Based Neuron Circuit with Adaptive Firing Rate," *2018 Eighth International Conference on Information Science and Technology (ICIST)*, Cordoba, Granada, and Seville, Spain, 2018, pp. 176-181, doi: 10.1109/ICIST.2018.8426182.

15. Jiashi Gao, **Xinming Shi** and James Jian Qiao Yu, "Attn-CommNet: Coordinated Traffic Lights Control On Large-Scale Network Level," *2021 IEEE 33rd International Conference on Tools with Artificial Intelligence (ICTAI)*, Washington, DC, USA, 2021, pp. 289-293, doi: 10.1109/ICTAI52525.2021.00048.

16. Jiashi Gao, **Xinming Shi** and James Jian Qiao Yu, "Social-dualcvae: Multimodal Trajectory Forecasting Based on Social Interactions Pattern Aware and Dual Conditional Variational Auto-encoder," *arXiv preprint*, arXiv:2202.03954.

Patents

1. **Xinming Shi** and Xin Yao, "," Pub Number: CN113420519 B, Apr. 2023. **(China patent)**

2. **Xinming Shi** and Xin Yao, "Automatic design method and device for analog circuit based on tree structure, equipment and medium," Pub Number: 17/880015, Aug. 2022. **(American patent)**

3. **Xinming Shi** and Xin Yao, "Automatisches Entwurfsvorrichtung fur eine analoge Schaltung basierend auf enier Baumstruktur," Prioritat: 25.06.2021, Sep. 2022. **(German patent)**

4. **Xinming Shi** and Zhigang Zeng, "A memristor-based neuron circuit with homeostatic plasticity", Pub Number CN107742153A, Feb. 2018.

5. Huazhong Xu, Miaoke Chen, **Xinming Shi**, Hang Yang, Xiao Peng and Jian Luo, "Concentrated treatment of living oil fumes emissions", Pub Number 201530152318.7, May. 2015.

6. Huazhong Xu, Yixin Wang, **Xinming Shi**, Xipeng Yu, Xiao Peng, Miaoke Chen, "An emission device of living oil fumes", Pub Number 201520324700.6, May. 2015.

Research Grant

• IEEE CIS Graduate Student Research Grants, Principal Investigator (USD 4,000) *USA*
IEEE Computational Intelligence Society (CIS) 2023

• Startup funding, Principal Investigator (GBP 10,000) *UK*
School of EEECS, QUB 2024

Talks

• Conference talk at WCCI 2024 *Yokohama, Japan*
"Evolving Memristive Reservoir" Jul. 2024

• Conference talk at GECCO 2023 *Portugal, Lisbon (Virtually participated)*
"Explaining Memristive Reservoir Computing Through Evolving Feature Attribution" Jul. 2023

• Conference talk at GECCO 2022 *Boston, USA (Virtually participated)*
"Evolving Parsimonious Circuits Through Shapley Value-based Genetic Programming" Jul. 2022

• Conference talk at SSCI 2021 *Orlando, USA (Virtually participated)*
"Second-order Time Delay Reservoir Computing for Nonlinear Time Series Problems" Dec. 2021

• Invited talk at SUSTech-Huawei RAMS Technology Innovation Lab Meeting *Shenzhen, China*
"Novel EHW based Emerging Electronic Devices" Jul. 2021

• Conference talk at ICIST 2018 *Cordoba, Spain*
"Memristor-Based Neuron Circuit with Adaptive Firing Rate" Jun. 2018

Awards & Honors

•Recipient of Leverhulme Early Career Fellowships (Success rate: 6%**)** *UK*
Leverhulme Trust 2024

• SUSTECH Top Ten Outstanding Graduate Students *Shenzhen, China*
Southern University of Science and Technology 2024

• Excellent Science and Technology Academic Papers *Shenzhen, China*
Shenzhen Association for Science and Technology (SZSTA) 2022

• Excellent Student Teaching Assisant Award *Shenzhen, China*
Southern University of Science and Technology 2022

• Outstanding Graduate Student Leader *Wuhan, China*
Huazhong University of Science and Technology 2018

• Meritorious Winner of Mathematical Contest in Modeling (MCM) *Wuhan, China*
Consortium for Mathematics and Its Applications (COMAP) 2015

• Second Prize of The 1st Delta Advanced Automation Contest *Wuhan, China*
Chinese Association of Automation 2014

Professional Service

- **Professional Activities**
  - 2024–Present: Co-founder of Chinese Open Source Community – Open Neuromorphic
- **Memberships**
  - 2022–Present: SIGEVO Member
  - 2023–Present: IEEE Computational Intelligence Society (CIS) Member
- **Professional Services**
  - 2021–Present: Committee Member of Conference Activities and Communications Subcommittee in IEEE Computational Intelligence Society (CIS).
- **Conference Services**
  - PC member of IEEE LA-CCI 2023.
- **Journal Review Services**
  - IEEE Transactions on Neural Networks and Learning Systems
  - IEEE Transactions on Cognitive and Developmental Systems
  - IEEE Transactions on Emerging Topics in Computational Intelligence
- **Conference Review Services**
  - ICIST 2018
  - IEEE LA-CCI 2023
  - IJCNN 2023