# Xinming Shi

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

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## Research Interest

- Evolvable Hardware based on Memristors; Brain-inspired Computing; Genetic Programming

## 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. Student 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

**• 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*

**• Four-month Part-time Internship in Huawei Technologies Co., Ltd.** — *Shenzhen, China*
*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

**• Journal Publications**

1. **Xinming Shi**, Leandro L. Minku and Xin Yao, "Evolving Memristive Reservoir," in *IEEE Transactions on Neural Networks and Learning Systems*, 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 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, 2022, https://doi.org/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*, 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.

- **Conference Publications**

1. **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.

2. **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.

3. **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.

4. **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, 10 Pages, 2024, Accepted for Publication.

5. **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.

6. 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.

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

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

3. **Xinming Shi** and Zhigang Zeng, "A memristor-based neuron circuit with homeostatic plasticity", Huazhong University of Science and Techology, Pub Number CN107742153A, Feb. 2018.

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

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

## Research Grant

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

## Talks

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

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

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

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

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

## Awards & Honors

**• Excellent Science and Technology Academic Paper** *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

**• Merit Student Award (2 times)** *Wuhan, China*
*Wuhan University of Technology* 2012–2014

**• Scholarship for Outstanding Learning Achievement (Top 5%)** *Wuhan, China*
*Wuhan University of Technology* 2012

## Professional Service

- **Memberships**
  - 2022–Present: SIGEVO Membership
  - 2023–Present: IEEE Computational Intelligence Society (CIS) Membership
- **Community 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