Cheng He

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Research Interests

I am particularly interested in computational intelligence based optimization, including data-driven/modelbased optimization, multi/ many-objective optimization, constraint handling, large-scale optimization, the combination of deep learning and evolutionary algorithm, and real-world problems.

Education

2012 - 2018: PhD in Control Sci. & Eng., Huazhong University of Science & Technology, China

Thesis: Many-Objective Optimization Algorithms and Their Applications

Supervisor: Prof. Linqiang Pan

2008 - 2012: B.Eng. in Automation, Wuhan University of Science & Technology, China

Work

2022.4 - present: Assistant Professor, School of Electrical and Electronic Engineering, Huazhong University of Science & Technology, China.

2020.7 - 2022.3: Research Assistant Professor, Department of Computer Science & Engineering, Southern University of Science & Technology, China.

2018.10 - 2020.5: Postdoctoral Research Fellow, Department of Computer Science & Engineering, Southern University of Science & Technology, China.

2018.3 - 2018.9: Visiting Scholar, Department of Computer Science & Engineering, Southern University of Science & Technology, China.

Collaborator: Prof. Xin Yao (IEEE Fellow)

2016 - 2017: Visiting Student, University of Surrey, U.K.

Collaborator: Prof. Yaochu Jin (IEEE Fellow)

Research Grants

2021 – 2022: Voltage Transformer Ratio Error Estimation Driven by Computational Intelligence, **PI**, Shenzhen Science and Technology Program, China

2021 – 2024: Computational Intelligence based Error State Evaluating for Grouped Instrument Transformers : Key Technologies and Applications, **Co- PI**, National Science Foundation, China

2020 – 2023: Computationally Expensive Large-Scale Multi-Objective Optimization Driven by Generative Learning, **PI**, National Science Foundation, China

2020 – 2024: Deep Learning Based Aerofoil Design, Co-PI, Ministry of Industry and Information Technology, China

2020 – 2022: Evolutionary Computation Based Deep Neural Architecture Search for Microchips, **Co-PI**, Huawei Hisilicon, China

Honors and Awards

- 2021: Rising Star Award, ACM SIGBio, China.
- 2020: Presidential Outstanding Postdoctoral Award, Southern University of Science and Technology, China

2019: Best Paper Award, The 14th International Conference on Bio-inspired Computing: Theories and Applications (BIC-TA 2019), China.

Publications

Refereed Journal Articles (*: Corresponding Author)

- Cheng He, Ran Cheng*, Ye Tian, Xingyi Zhang, Kay Chen Tan, and Yaochu Jin. Paired Offspring Generation for Constrained Large-scale Multiobjective Optimization. *IEEE Transactions on Evolution*ary Computation, 25(3), 448-462, 2021.
- Cheng He, Shihua Huang, Ran Cheng*, Kay Chen Tan, and Yaochu Jin. Evolutionary Multi-Objective Optimization Driven by Generative Adversarial Networks (GANs). *IEEE Transactions on Cybernetics*,2020.
- Cheng He, Ran Cheng*, and Danial Yazdani. Adaptive Offspring Generation for Evolutionary Large-Scale Multiobjective Optimization. *IEEE Transactions on Systems, Man, and Cybernetics: Systems*, 2020.
- Cheng He, Ran Cheng*, Chuanji Zhang, Ye Tian, Qin Chen and Xin Yao. Evolutionary Large-Scale Multiobjective Optimization for Ratio Error Estimation of Voltage Transformers. *IEEE Transactions* on Evolutionary Computation, 24(5), 868-881, 2020.
- Cheng He, Lianghao Li, Ye Tian, Xingyi Zhang, Ran Cheng*, Yaochu Jin, and Xin Yao. Accelerating Large-scale Multiobjective Optimization via Problem Reformulation. *IEEE Transactions on Evolution*ary Computation, 23 (6), 949-961, 2019.
- Cheng He, Zhixiong Zhang, Jie Ye, Jinbang Xu, and Linqiang Pan*. Switching Ripple Suppressor Design of the Grid-Connected Inverters: A Perspective of Many-Objective Optimization with Constraints Handling. *Swarm and Evolutionary Computation*, 44, 293-303, 2019.
- 7. Cheng He, Ye Tian, Yaochu Jin, Xingyi Zhang, and Linqiang Pan*. A Radial Space Division Based Evolutionary Algorithm for Many-Objective Optimization. *Applied Soft Computing*, 61, 603-621, 2017.
- 8. Cheng He, Ye Tian, Handing Wang, and Yaochu Jin. A Repository of Real-World Datasets for Data-Driven Evolutionary Multiobjective Optimization. *Complex & Intelligent Systems*, 6, 189-197, 2020.
- Lianghao Li, Cheng He*, Ran Cheng, Hongbin Li, Linqiang Pan*, Yaochu Jin. A Fast Sampling based Evolutionary Algorithm for Million-dimensional Multiobjective Optimization. Swarm and Evolutionary Computation, 75, 101181, 2022.

- Linqiang Pan, Cheng He, Ye Tian, Handing Wang, Xingyi Zhang, and Yaochu Jin*. A Classification-Based Surrogate-Assisted Evolutionary Algorithm for Expensive Many-Objective Optimization. *IEEE Transactions on Evolutionary Computation*, 23(1), 74-88, 2019.
- Changwu Huang, Lianghao Li, Cheng He*, Ran Cheng, and Xin Yao. Adaptive Multiobjective Evolutionary Algorithm for Large-Scale Transformer Ratio Error Estimation. *Memetic Computing*, 14, 237-251, 2022.
- 12. Linqiang Pan, Lianghao Li,Ran Cheng, **Cheng He**^{*}, and Kay Chen Tan. Manifold Learning Inspired Mating Restriction for Evolutionary Multi-Objective Optimization with Complicated Pareto Sets. *IEEE Transactions on Cybernetics*, 2020.
- Linqiang Pan, Wenting Xu, Lianghao Li, Cheng He*, and Ran Cheng*. Adaptive Simulated Binary Crossover for Rotated Multi-Objective Optimization. *Swarm and Evolutionary Computation*, 60, 100759, 2020.
- 14. Linqiang Pan, Lianghao Li, **Cheng He**^{*}, and Kay Chen Tan. A Subregion Division-Based Evolutionary Algorithm with Effective Mating Selection for Many-Objective Optimization. *IEEE Transactions on Cybernetics*, 50(8), 3477-3490, 2019.
- 15. **Cheng He**, Hao Tan, Shihua Huang, Ran Cheng*. Efficient Evolutionary Neural Architecture Search by Modular Inheritable Crossover. *Swarm and Evolutionary Computation*, 64(2021), 100894, 2021.
- Lianghao Lia, Cheng He*, Wenting Xua, Linqiang Pan*. Pioneer Selection for Evolutionary Multiobjective Optimization with Discontinuous Feasible Region. *Swarm and Evolutionary Computation*, 65, 100932, 2021.

Conference Proceedings

- Lianghao Li, Cheng He*, Ran Cheng, and Linqiang Pan*. Large-Scale Multiobjective Optimization via Problem Decomposition and Reformulation. *IEEE Congress on Evolutionary Computation* (CEC'2021), Kraków, Poland, June 2021.
- 2. Cheng He and Ran Cheng*. Population Sizing of Evolutionary Large-Scale Multiobjective Optimization. International Conference Series on Evolutionary Multi-Criterion Optimization (EMO), 2021: 41-52.
- Lianghao Li, Cheng He*, Ran Cheng, and Linqiang Pan. Manifold Learning Inspired Mating Restriction for Evolutionary Constrained Multiobjective Optimization. *International Conference Series on Evolutionary Multi-Criterion Optimization (EMO)*, 2021: 296-307.
- 4. Changwu Huang, Lianghao Li, Cheng He*, Ran Cheng, and Xin Yao. Operator-Adapted Evolutionary Large-Scale Multiobjective Optimization for Voltage Transformer Ratio Error Estimation. International Conference Series on Evolutionary Multi-Criterion Optimization (EMO), 2021: 672-683.
- Cheng He, Ran Cheng, Ye Tian, and Xingyi Zhang. Iterated Problem Reformulation for Evolutionary Large-Scale Multiobjective Optimization. *IEEE Congress on Evolutionary Computation (CEC'2020)*, Glasgow, UK, June 2020.
- 6. Yiming Chen, Tianci Pan, **Cheng He**^{*}, and Ran Cheng^{*}. Efficient Evolutionary Deep Neural Architecture Search (NAS) by Noisy Network Morphism Mutation. *The 14th International Conference on Bio-inspired Computing: Theories and Applications (BIC-TA),* Zhengzhou, China, December 2019.
- 7. Hao Tan, **Cheng He***, Dexuan Tang, and Ran Cheng*. Efficient Evolutionary Neural Architecture Search (NAS) by Modular Inheritable Crossover. *The 14th International Conference on Bio-inspired Computing: Theories and Applications (BIC-TA)*, Zhengzhou, China, December 2019. *Best Paper Award*

- 8. Cheng He, Ran Cheng, Yaochu Jin, and Xin Yao. Surrogate-Assisted Expensive Many-Objective Optimization by Model Fusion. *IEEE Congress on Evolutionary Computation (CEC'2019)*, Wellington, New Zealand, June 2019.
- 9. Cheng He, Linqiang Pan, Hang Xu, Ye Tian, and Xingyi Zhang. An Improved Reference Point Sampling Method on Pareto Optimal Front. *IEEE Congress on Evolutionary Computation (CEC'2016)*, Vancouver, Canada, June 2016.

Professional Services

Editorship

2022 – now: Associate Editor, Complex & Intelligent Systems

Committee Services

2020 - now: Chair, IEEE CIS Task Force on Intelligence Systems for Health

Organizer of Academic Events

IEEE MBEA'2019-2022: Co-Chair, IEEE Symposium on Model-Based Evolutionary Algorithms

IEEE WCCI'2022: **Co-Chair**, 2022 IEEE WCCI Special Session on "Evolutionary Computation in Healthcare Industry", Padua, Italy

IEEE CEC'2021: **Co-Chair**, 2021 IEEE CEC Special Session on "Large-scale Multi- and Many-objective Optimization and its Applications", Kraków, Poland

IEEE CEC'2019: **Co-Chair**, 2019 IEEE CEC Competition on "Online Data-Driven Multi-Objective Optimization", Wellington, New Zealand

BIC-TA'2017: **Publication Chair**, 2017 International Conference on Bio-inspired Computing: Theories and Applications, Harbin, China

Program Committee Membership

EMO'2021: PC Member, 2021 International Conference on Evolutionary Multi-Criterion Optimization, Shenzhen, China

IEEE CEC'2020: PC Member, 2020 IEEE Congress on Evolutionary Computation, Glasgow, United Kingdom

ACM GECCO'2020: PC Member, 2020 ACM Genetic and Evolutionary Computation Conference, Cancun, Mexico

ACM GECCO'2019: PC Member, 2019 ACM Genetic and Evolutionary Computation Conference, Prague, Czech Republic

IEEE SSCI'2019: Track Chair, 2019 IEEE Symposium Series on Computational Intelligence, Xiamen, China

BIC-TA'2019: PC Member, 14th Bio-Inspired Computing: Theories and Applications, Zhengzhou, China

IEEE CEC'2019: PC Member, 2019 IEEE Congress on Evolutionary Computation, Wellington, New Zealand

BIC-TA'2018: PC Member, 13th Bio-Inspired Computing: Theories and Applications, Beijing, China BIC-TA'2017: PC Member, 12th Bio-Inspired Computing: Theories and Applications, Harbin, China IEEE SSCI'2016: PC Member, IEEE Symposium Series on Computational Intelligence, Orlando, USA BIC-TA'2015: PC Member, 10th Bio-Inspired Computing: Theories and Applications, Hefei, China

Referees

Xin Yao

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