

Zhichao Lu

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EDUCATION

Michigan State University, East Lansing, Michigan, USA

Ph.D in Electrical and Computer Engineering

Sep 2014 - May 2020

- Advisor: Prof. *Kalyanmod Deb*

Michigan State University, East Lansing, Michigan, USA

B.S in Electrical and Computer Engineering

Sep 2009 - Dec 2013

- Graduated with honor; GPA: 3.86 / 4.0

EXPERIENCE

Post-doc Research Fellow, *SUSTech*, Shenzhen, Guangdong, China

Sep 2020 – Now

- Evolutionary machine learning, notably machine learning assisted evolutionary algorithms, automated machine learning, and in particular evolutionary neural architecture search.

Algorithm Developer Intern, *Siemens PLM Software*, E. Lansing, MI, USA

May 2018 – Aug 2018

- Developed a large-scale combinatorial optimization algorithm for the capacitor placement problem on a circuit board, achieved 10 times reduction in search cost with comparable results to expert systems.
- Designed a customized operator to use gradient information within an evolutionary framework, leading to an improved convergence by a factor of 5 times on a series of engineering design problems.

JOURNAL PUBLICATIONS

1. **Z. Lu**, G. Sreekumar, E. Goodman, W. Banzhaf, K. Deb, and V. N. Boddeti, Neural Architecture Transfer, *IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)*, 2021.
2. S. Zhu, L. Xu, E. Goodman and **Z. Lu**, A New Many-Objective Evolutionary Algorithm based on Generalized Pareto Dominance, *IEEE Transactions on Cybernetics (TCYB)*, 2021.
3. **Z. Lu**, I. Whalen, Y. Dhebar, K. Deb, E. Goodman, W. Banzhaf and V. N. Boddeti, Multi-Objective Evolutionary Design of Deep Convolutional Neural Networks for Image Classification, *IEEE Transactions on Evolutionary Computation (TEVC)*, 2020.
4. A. Sinha, **Z. Lu**, K. Deb, and P. Malo, Bilevel Optimization based on Iterative Approximation of Multiple Mappings, *Journal of Heuristics*, 2020.
5. **Z. Lu**, K. Deb, and A. Sinha, Uncertainty Handling in Bilevel Optimization for Robust and Reliable Solutions, *International Journal of Uncertainty, Fuzziness and Knowledge-Based Systems*, 2018.

CONFERENCE PUBLICATIONS

1. S. Hu, R. Cheng, C. He, and **Z. Lu**, Multi-objective Neural Architecture Search with Almost No Training, *Evolutionary Multi-Criterion Optimization*, 2021.
2. S. Zhu, L. Xu, E. Goodman, K. Deb, and **Z. Lu**, The (M-1)+1 framework of relaxed Pareto dominance for evolutionary many-objective optimization, *Evolutionary Multi-Criterion Optimization*, 2021.
3. **Z. Lu**, K. Deb, E. Goodman, W. Banzhaf, and V. N. Boddeti, NSGANetV2: Evolutionary Multi-Objective Surrogate-Assisted Neural Architecture Search, *European Conference on Computer Vision (ECCV)*, Oral presentation, 2020. (acceptance rate = 2%)
4. **Z. Lu**, I. Whalen, V. N. Boddeti, Y. Dhebar, K. Deb, E. Goodman, and W. Banzhaf, NSGA-Net: Neural Architecture Search using Multi-Objective Genetic Algorithm (Extended Abstract), *International Joint Conference on Artificial Intelligence (IJCAI)*, 2020.
5. **Z. Lu**, K. Deb, and V. N. Boddeti, MUXConv: Information Multiplexing in Convolutional Neural Networks, *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2020.

6. **Z. Lu**, I. Whalen, V. N. Boddeti, Y. Dhebar, K. Deb, E. Goodman, and W. Banzhaf, NSGA-Net: Neural Architecture Search using Multi-Objective Genetic Algorithm, *Genetic and Evolutionary Computation Conference (GECCO)*, 2019. (**Best Paper Award**)
7. **Z. Lu**, K. Deb, and H. Singh, Balancing Survival of Feasible and Infeasible Solutions in Constraint Evolutionary Optimization Algorithms, *IEEE Congress on Evolutionary Computation (CEC)*, 2018.
8. **Z. Lu**, K. Deb, E. Goodman, and J. Wassick, Solving a Supply-chain Management Problem using a Bilevel Approach, *Genetic and Evolutionary Computation Conference (GECCO)*, 2017.
9. B. Barnhart, **Z. Lu**, M. Bostian, A. Sinha, K. Deb, L. Kurkalova, M. Jha, and G. Whittaker, Handling Practicalities in Agricultural Policy Optimization for Water Quality Improvements, *Genetic and Evolutionary Computation Conference (GECCO)*, 2017.
10. **Z. Lu**, K. Deb, and A. Sinha, Finding Reliable Solutions in Bilevel Optimization Problems under Uncertainties, *Genetic and Evolutionary Computation Conference (GECCO)*, 2016. (Best Paper Award Runner-up)
11. **Z. Lu**, K. Deb, and A. Sinha, Handling Decision Variable Uncertainty in Bilevel Optimization Problems, *IEEE Congress on Evolutionary Computation (CEC)*, 2015.
12. K. Deb, **Z. Lu**, C. B. McKesson, C. C. Trumbach, and L. DeCan, Towards Optimal Ship Design and Valuable Knowledge Discovery under Uncertain Conditions, *IEEE Congress on Evolutionary Computation (CEC)*, 2015.

BOOK CHAPTERS

1. K. Deb, A. Sinha, P. Malo, **Z. Lu**, Approximate Bilevel Optimization with Population-Based Evolutionary Algorithms. In: Dempe S., Zemkoho A. (eds) *Bilevel Optimization*. Springer Optimization and Its Applications, vol 161. Springer, Cham, 2020. (ISBN 978-3-030-52118-9)

HONORS AND AWARDS

SUSTech the 8th Presidential Outstanding Postdoctoral Award	2021
MSU College of Engineering GOF Fellowship	2020
GECCO Best Paper Award (Evolutionary Machine Learning Track)	2019
MSU Graduate School Dissertation Completion Fellowship	2019
GECCO Best Paper Award Runner-up (Real-world Application Track)	2016
MSU Engineering Distinguished Fellowship	2014
MSU Walker Memorial Engineering Scholarship	2012
MSU Yates Memorial Engineering Scholarship	2010 - 2012

TALKS AND PRESENTATIONS

- ECCV Conference, August 2020, [oral presentation](#) on “NSGANetV2: Evolutionary Multi-Objective Surrogate-Assisted Neural Architecture Search”.
- NAS workshop of CVPR Conference, June 2020, [oral presentation](#) on “Neural Architecture Transfer”.
- NAS workshop of CVPR Conference, June 2020, [oral presentation](#) on “MUXConv: Information Multiplexing in Convolutional Neural Networks”.

PROFESSIONAL ACTIVITIES

Conference Program Committee/Reviewer:

- IEEE Conference on Computer Vision and Pattern Recognition (CVPR)
- Genetic and Evolutionary Computation Conference (GECCO)
- IEEE Congress on Evolutionary Computation (CEC)
- International Conference Series on Evolutionary Multi-Criterion Optimization (EMO)

Journal Reviewer:

- IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)
- IEEE Transactions on Evolutionary Computation (TEVC)
- IEEE Transactions on Artificial Intelligence (TAI)
- IEEE Computational Intelligence Magazine (CIM)
- Swarm and Evolutionary Computation

TECHNICAL SKILLS

Python, MATLAB, PyTorch, Tensorflow, Shell, Android, Vim, Git, Linux

REFERNCES

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Dr. Erik Goodman

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Dr. Wolfgang Banzhaf

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