Proposal	Contact PI's Surname	Initials	Application Number	Panel
Standard	Mei	Y	24-VUW-092	MIS

MARSDEN FUND PRELIMINARY RESEARCH PROPOSAL

Standard Application Form

1A. TITLE OF RESEARCH PROPOSAL

Towards Better Generalisation and Intrepretability in Automated Design of Combinatorial Optimisation Solvers

1B. IDENTIFICATION

Principal Investigator(s)

Name (with title)	Institution	Country
Associate Professor Yi Mei	Victoria University of Wellington	NEW ZEALAND

Associate Investigator(s)

Name (with title)	Institution	Country
Professor Günther Raidl	Technische Universität Wien	AUSTRIA
Professor Xin Yao	Lingnan University	CHINA

1C. FIELDS OF RESEARCH

460203 - Evolutionary computation	60%	Evolutionary computation, artificial intelligence, combinatorial optimisation
490304 - Optimisation	40%	
	0%	

1D. SUMMARY

Combinatorial optimisation is ubiquitous with real-world applications such as logistics and resource allocation. Designing effective combinatorial optimisation solvers highly demands domain expertise. Enabling computers to automatically design combinatorial optimisation solvers will be game changer and completely shift the paradigm of combinatorial optimisation. This project aims to tackle the poor generalisation and interpretability issues faced by existing research. We will define rich search spaces of solvers and novel algorithms to effectively search for better generalisation and interpretability. The project is expected to bring new breakthroughs on machine learning, evolutionary computation, and combinatorial optimisation.

2. VISION MĀTAURANGA

Vision Mātauranga themes and percent contribution of the proposed research to each theme.

The total for all themes ticked can exceed 100%

Indigenous Innovation (economic sustainability)		0%
Taiao (environmental sustainability)		0%
Hauora/Oranga (health and social wellbeing)		0%
Mātauranga (indigenous knowledge)		0%
N/A	✓	

A brief rationale for your choice(s):

This project aims to better solve combinatorial optimisation problems in general. Although not directly related to Vision Mātauranga, it indirectly relates to the four themes as follows.

Many indigenous management and decision making problems are combinatorial optimisation problems, which can be benefited from the outcome of this project. For example, (1) we are exploring AI techniques for Māori land use management, which contributes to indigenous economic and environmental sustainability; (2) we are developing AI techniques for automated Kapa Haka judging with Wellington Māori Cultural Society (SfTI Seed Fund 2022); (3) We are collaborating with Wellington Free Ambulance to develop automated ambulance dispatching algorithms, considering the special requirements of Māori patients. Both (2) and (3) contribute to Hauora/Oranga.

We will actively look for Māori use cases (e.g., the aforementioned examples) to verify our algorithms. We will establish relationships with iwi/hapū via our Māori colleagues (Kevin Shedlock and Kirita-Rose Escott), and consult them for the indigenous requirements, strictly following the indigenous data sovereignty. We will also focus on capacity development of indigenous researchers and engineers. We will look for Māori students and early career researchers, and recruit them as our post-graduate students, postdocs or research assistants.

3A. ABSTRACT OF RESEARCH PROPOSAL

Combinatorial Optimisation (CO) [1] has many real-world applications in areas such as last-mile delivery, manufacturing, and cloud computing. Most CO problems are NP-hard and require strong domain expertise to solve. However, human experts are often unavailable or too expensive. If we can get a computer/machine to automatically design solvers for CO problems, it will have huge practical and theoretical impact. But doing so is extremely difficult.

Previous research [2–8] has used machine learning to automatically design different types of CO solvers, such as the branch-and-bound algorithm [9–13], constructive heuristics [14–18], and improvement heuristics [19–23]). The basic idea is to define a *parametrised framework* for CO solvers, and search for the best solver (i.e., corresponding parameter values) under this framework. However, most existing frameworks are over restricted with limited number of tunable components and/or parameters. The learned CO solvers under these restricted frameworks generalise poorly to different problem instances. Additionally, most learned CO solvers are black-box models with poor interpretability, making them difficult for users to trust and adopt. This project aims to develop novel machine learning approaches to achieve **better generalisation** and **better interpretability** of learned CO solvers.

To improve generalised performance on a wide range of unseen problem instances, we will focus on designing a novel *(meta-)heuristic framework* with rich set of continuous, discrete, and nominal parameters, based on our experiences in designing various (meta-)heuristics (e.g., local search [24–27], beam search [28, 29] genetic algorithm [30, 31], particle swarm optimisation [32, 33], and ant colony optimisation [34–36]). We expect this new framework to contain more complex and powerful meta-heuristics than the existing frameworks. A further step is to consider hybridising (meta-)heuristics with mathematical programming approaches. Although this is very ambitious due to the significantly different structures of the two solver types, we will leverage our related experience [37] to mitigate risks as much as possible.

To search in the huge non-differential space under the new framework, we will employ Genetic Programming (GP) [38] due to its strengths in gradient-free search within variable-length spaces. A major challenge is the time-consuming evaluation for candidate solvers on a large number of different training instances. To tackle this challenge, we propose to *cluster the problem instances*, and *learn an ensemble of solvers*, each solving an instance cluster. We will employ our experiences in *multitask and knowledge transfer techniques* [39–45] to share common characteristics between the solvers for related instance clusters and improve the learning performance. In addition, we will develop novel *mixed-input surrogate models* to approximate the evaluation with good trade-offs between accuracy and computational complexity. We aim to first generalise our learned solvers to different instances within the same problem (e.g., vehicle routing instances with different graph topology), then further generalise to different related problems (e.g., from vehicle routing to pickup-and-delivery problem).

We will improve interpretability of the learned CO solvers in three ways. First, we will design a *context-free grammar* [46–48], to enforce interpretable structures of CO solvers. Second, we will develop multi-objective approaches to *optimise the quantitative interpretability metrics* together with the original performance metrics of CO solvers. Our preliminary studies [49, 50] have achieved promising results on a simplified interpretability metric — model size. Expanding on that, we will consider more realistic interpretability metrics and address the corresponding issues. Last but not least, we will develop novel post-hoc explanation methods to further improve the interpretability of the learned solvers. Our experience for explaining simple constructive heuristics [51, 52] lays a solid foundation to achieve this goal.

Mei's expertise in CO and GP, Raidl's expertise in various CO solvers, and Yao's expertise in artificial intelligence and evolutionary computation provide an excellent basis for this project. We expect this research to produce over 15 publications in prestigious venues such as IEEE TEVC, TCYB, ECJ, EJOR, and GECCO. The outcomes will significantly enhance New Zealand's international leadership in evolutionary computation and combinatorial optimisation.

3B. REFERENCES

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3C. ROLES AND RESOURCES

Roles. The team for this project consists of three experts in combinatorial optimisation (CO), evolutionary computation (EC), and machine learning. They have complementary specific expertise.

Yi Mei (PI) has expertise in CO and GP. He has published over 200 papers in fully refereed international venues (**6,500+** Google Scholar Citations, h-index is **40**). He has won **Best/Outstanding Paper Awards** from IEEE Transactions on Evolutionary Computation (TEVC, the top journal in EC), ACM Genetic and Evolutionary Computation Conference (GECCO, the top conference in EC) and European Conference on Genetic Programming (EuroGP, the flagship conference in GP). He is an **Associate Editor of IEEE TEVC** and **IEEE Transactions on Artificial Intelligence**. He is the **Founding Chair** of the IEEE Task Force on Evolutionary Scheduling and Combinatorial Optimisation. He is a **Fellow of Engineering New Zealand**. He will manage the whole project, and focus on the developments to address the grammar design, knowledge transfer optimisation algorithm and the interpretability issues. He will be the primary supervisor of the proposed PostDoc, PhD student, Honours students and summer research assistants. His FTE will be 0.2.

Guenther Raidl's expertise is on CO, meta-heuristics, and operations research. He is the PI of a number of prestigious research grants on combinatorial optimisation in Europe. He has won **Best Paper Awards** from many international conferences and workshops. He is an **Associate Editor of ACM Transactions on Evolutionary Learning and Optimization, Evolutionary Computation**, and **INFORMS Journal on Computing**. He has over 250 publications, ∼**10,000** Google Scholar Citations, and h-index is **46**. He will co-supervise the PostDoc and PhD student, and co-design the new framework and search algorithms. He will visit VUW four weeks per year, sponsored by the Catalyst Leaders Fund. His FTE will be 0.05.

Xin Yao is a world-leading expert in artificial intelligence and EC. He is the recipient of the 2020 **IEEE Frank Rosenblatt Award** (one of the most prominent international awards in computational intelligence and artificial intelligence), 2012 **Royal Society Wolfson Research Merit Award** and 2013 **IEEE Computational Intelligence Society EC Pioneer Award**. He has won **Outstanding Paper Awards** on the top artificial intelligence and evolutionary computation journals. He is an **IEEE Fellow** and **IEEE Distinguished Lecturer**. He has published 800+ papers in fully refereed journals and international conferences, and his h-index is **123** (∼**75,000** Google Scholar Citations). He will provide advice on the framework design and interpretability improvement. He will co-supervise the PostDoc and PhD student. He will visit the PI at VUW once a year for two to three weeks and/or use a video conference facility to communicate with the PI and the team at VUW. His FTE will be 0.05.

This project will include a PostDoc and a PhD. The PostDoc will focus on developing and implementing the new framework and search algorithms, and the PhD student will focus on developing new methods for better interpretability. We will also have an Honours student and a part-time/summer research assistant each year. The Honours and summer project students will be chosen from our own final-year students with good programming skills and good background in EC and machine learning. They will mainly carry out programming and experimentation.

This project will continue NZ's significant international research profile in evolutionary machine learning and combinatorial optimisation. Our previous work on evolutionary learning and combinatorial optimisation has earned a good reputation worldwide. This project will allow that research to continue to be carried out in NZ. We also expect this project to further develop NZ as an international centre on EC and evolutionary combinatorial optimisation.

Resources. The project requires the grid computing facilities and library resources. The School of Engineering and Computer Science and Victoria University of Wellington have these resources and the PI and the students can easily access them. We also need video conference tools (e.g. Zoom) for remote discussions. VUW, TU Wien and Lingnan University can provide these tools.

4. PERSONNEL

List the time involvement of all personnel in terms of a Full Time Equivalent (FTE). Give names for all personnel (except when they are as yet unknown for such people as postdoctoral fellows and postgraduate students). Please refer to the Preliminary Research Proposal Guidelines for Applicants for recommended minimum time for Principal Investigators.

Name	FTE Year 1	FTE Year 2	FTE Year 3
Principal Investigator (Contact)(s)			
Associate Professor Yi Mei	0.20	0.20	0.20
Associate Investigator(s)			
Professor Günther Raidl	0.05	0.05	0.05
Professor Xin Yao	0.05	0.05	0.05
Postdoctoral Fellow(s)			
Dr	0.50	0.50	0.50
Postgraduate Student(s)			
PhD	1.00	1.00	1.00
Honours Student	0.25	0.25	0.25
Summer Student	0.20	0.20	0.20
TOTAL	**2.25**	**2.25**	**2.25**

5. CURRICULUM VITAE, PUBLICATIONS AND OTHER PUBLISHED WORKS

PART 1

1a. Personal details				
Full name	*Title* Dr	*First name* Yi	*Second name(s)*	*Family name* Mei
Present position	Associate Professor			
Organisation/Employer	Victoria University of Wellington			
Contact Address	CO353, Cotton Building			
	Victoria University of Wellington			
	Kelburn, Wellington		**Post code**	6012
Work telephone	04-463 5331	**Mobile**	021 087 95586	
Email	Yi.mei@ecs.vuw.ac.nz			
Personal website	https://meiyi1986.github.io/			

1b. Academic qualifications

2010, PhD, Computer Science, University of Science and Technology of China.
2005, BSc, Mathematics, University of Science and Technology of China.

1c. Professional positions held

2023-present, Associate Professor, Victoria University of Wellington.
2016-2022, Lecturer and Senior Lecturer, Victoria University of Wellington.
2015-2016, Research Fellow, Victoria University of Wellington.
2012-2015, ARC Discovery Research Fellow, RMIT University.
2010-2012, Research Associate, Chinese University of Hong Kong.

1d. Present research/professional speciality

- Evolutionary Computation, Genetic Programming, Hyper-Heuristics
- Operations Research, Scheduling, Combinatorial Optimisation

1e. Total years research experience	13 years

1f. Professional distinctions and memberships (including honours, prizes, scholarships, boards or governance roles, etc)

Research Funding

- 2024-2027, “Machine Learning for Emergency Medical Dispatch: A Data Driven Approach”, MBIE Smart Idea Fund, $1,000,000NZD (PI)
- 2024-2025, “Machine Learning for Combinatorial Optimisation: An Evolutionary Computation Approach”, NZ Royal Society Catalyst Leaders Fund, $150,000NZD (PI)
- 2022-2023, “Te Taupanga Tapoi: A Post-COVID Kaupapa Māori Tour Recommendation System”, VUW Faculty Strategic Research Fund, $49,000NZD (PI)
- 2022-2023, “Te Kapahaka Pūnaha Taupanga (The kapahaka software judging system)”, NSC SfTI Seed Fund, $200,000NZD (co-PI)
- 2021-2022, “Interpretable Genetic Programming for Combinatorial Optimisation”, Victoria University of Wellington, University Research Fund, $37,275NZD (PI)
- 2017-2020, "Automatic Design of Heuristics for Dynamic Arc Routing Problem with Genetic Programming", 16-VUW-079, Marsden Fund (Fast-Start), $300,000NZD (PI).
- 2020-2027, A data-science driven evolution of aquaculture for building the blue economy (AI/ML Advanced Research and Applications to Aquaculture). MBIE SSIF Fund on Data Science. Grant: $13,000,000 (Key Researcher)
- 2019-2020, “Intelligent Routing for Northland Waste Collection”, industrial project with Northland Waste, $12,000NZD (PI)
- 2018, “Real-Time Tourist Trip Recommendation using Genetic Programming”, VUW University Research Fund, $28,720 NZD (PI)

Prestigious Awards

- 2022, 2023, Best Paper Awards, ACM Genetic and Evolutionary Computation Conference (top conference in evolutionary computation, CORE Tier A)
- 2022, Best Paper Award, European Conference on Genetic Programming (top conference in genetic programming)
- 2017, IEEE Transactions on Evolutionary Computation (TEVC) Outstanding Paper Award for the paper “Cooperative Co-evolution with Differential Grouping for Large Scale Optimization”. (***top journal in AI/EC, CORE Tier A*, impact factor = 16.497, acceptance rate around 5%, only one paper per year wins the award***)

Editorship

- 2023-present, **Associate Editor**, IEEE TEVC (***top journal in AI/EC, CORE Tier A****)
- 2024-present, **Associate Editor**, IEEE Transactions on Artificial Intelligence
- 2016, Guest Editor, Genetic Programming and Evolvable Machines
- 2020-present, Editorial Board Member, International Journal of Bio-Inspired Computation, and International Journal of Automation and Control
- 2019-prsent, Associate Editor, International Journal of Applied Evolutionary Computation

Conference Organisation

- **Program Chair**, Pacific Rim International Conferences on Artificial Intelligence 2025
- **Journal to Conference Chair,** IEEE Congress on Evolutionary Computation 2024
- **Track Chair**, ACM Genetic and Evolutionary Computation Conference 2024
- **Finance Chair**, Conference on Image and Vision Computing New Zealand 2020.
- **Proceedings Chair**, IEEE Congress on Evolutionary Computation 2019 (ARC Tier A).
- **Tutorial Chair**, Pacific Rim International Conferences on Artificial Intelligence 2019.
- **Sponsorship Chair**, Australasian Joint Conference on Artificial Intelligence 2018.
- Organizational Committee Member, International Conference on Computers and Industrial Engineering 2018
- Technical Co-chair, International Conference on Data Intelligence and Security 2018.
- Co-chair of 12 Special Sessions in IEEE Congress on Evolutionary Computation (CEC) (ARC Tier A) 2016-2022
- Co-chair of 4 IEEE Symposia on Evolutionary Scheduling and Combinatorial Optimization (flagship conference in EC) 2019-2022

Professional Membership

- **Fellow** of Engineering New Zealand
- **Chair** of IEEE New Zealand Central Section, 2021-present
- **Chair** of IEEE Computational Intelligence Society Travel Grants subcommittee
- **Founding Chair** of IEEE Taskforce on Evolutionary Scheduling and Combinatorial Optimisation, 2021-present
- **Vice-Chair** and Member of IEEE Computational Intelligence Society (CIS) Emergent Technologies Technical Committee, 2017-2018
- Member of IEEE CIS Emergent Technologies Technical Committee 2017-2019
- Member of IEEE CIS Intelligent Systems Applications Technical Committee 2017-2020
- IEEE Senior Member, ACM Member
- Reviewer of over 30 international journals, including the top journals in EC and OR.
- Program Committee Member for over 40 international conferences.

Other honours

- Invited talks in New Zealand, Australia, UK, and China.
- Supervision of over 20 PhD students (9 PhD have successfully completed).

1g. Total number of *peer reviewed* publications and patents	Journal articles	Books	Book chapters, books edited	Conference proceedings	Patents
	75	1	2	135	1

PART 2

2a. Research publications and dissemination

Peer-reviewed journal articles

* = PhD students supervised by **Mei**; # = postdoc/research fellows supervised by **Mei**

1. M. Xu*, **Y. Mei**, F. Zhang, and M. Zhang. Genetic programming for dynamic flexible job shop scheduling: Evolution with single individuals and ensembles. *Transactions on Evolutionary Computation (TEVC)*, DOI: 10.1109/TEVC.2023.3334626, **2023** (*CORE A*, impact factor = 14.3*)
2. T. Guo*, **Y. Mei**, K. Tang, and W. Du. Cooperative co-evolution for large-scale multi-objective air traffic flow management. IEEE TEVC, DOI: 10.1109/TEVC.2023.3328886, **2023** (*CORE A**)
3. Y. Zhang, **Y. Mei**, H. Zhang, Q. Cai, and H. Wu. Rocash2: An effective route clustering and search heuristic for large scale multi-depot capacitated arc routing problem. *IEEE Computational Intelligence Magazine*, 18(4):43--56, **2023** (*CORE A, impact factor = 9*)
4. S. Wang*, **Y. Mei**, and M. Zhang. Explaining genetic programming-evolved routing policies for uncertain capacitated arc routing problems. *IEEE TEVC*, DOI: 10.1109/TEVC.2023.3238741, **2023** (*CORE A**)
5. **Y. Mei**, Q. Chen, A. Lensen, B. Xue, and M. Zhang. Explainable artificial intelligence by genetic programming: A survey. *IEEE TEVC*, DOI: 10.1109/TEVC.2022.3225509, **2022** (*CORE A**)
6. X. Cai, K. Wang, **Y. Mei**, Z. Li, J. Zhao, and Q. Zhang. Decomposition-based lin-kernighan heuristic with neighborhood structure transfer for multi/many-objective traveling salesman problem. *IEEE TEVC*, DOI: 10.1109/TEVC.2022.3215174, **2022** (*CORE A**)
7. F. Zhang#, **Y. Mei**, S. Nguyen, K.C. Tan, and M. Zhang. Task relatedness based multitask genetic programming for dynamic flexible job shop scheduling. *IEEE TEVC*, DOI: 10.1109/TEVC.2022.3199783, **2022** (*CORE A**)
8. F. Zhang#, **Y. Mei**, S. Nguyen, and M. Zhang. Multitask multi-objective genetic programming for automated scheduling heuristic learning in dynamic flexible job shop scheduling. *IEEE Transactions on Cybernetics (TCYB)*, DOI: 10.1109/TCYB.2022.3196887, **2022** (*CORE A, impact factor = 11.8*)
9. S. Wang*, **Y. Mei**, and M. Zhang. A multi-objective genetic programming algorithm with αdominance and archive for uncertain capacitated arc routing problem. *IEEE TEVC*, DOI: 10.1109/TEVC.2022.3195165, **2022** (*CORE A**)
10. Z. Huang*, **Y. Mei**, and J. Zhong. Semantic linear genetic programming for symbolic regression. *IEEE TCYB*, DOI: 10.1109/TCYB.2022.3181461, **2022** (*CORE A*)
11. F. Zhang#, **Y. Mei**, S. Nguyen, K.C. Tan, and M. Zhang. Instance rotation based surrogate in genetic programming with brood recombination for dynamic job shop scheduling. *IEEE TEVC*, DOI: 10.1109/TEVC.2022.3180693, **2022** (*CORE A**)
12. Y. Jia#, **Y. Mei**, and M. Zhang. Learning heuristics with different representations for stochastic routing. *IEEE TCYB*, DOI: 10.1109/TCYB.2022.3169210, **2022** (*CORE A*)
13. M. Ardeh*, **Y. Mei**, M. Zhang, and X. Yao. Knowledge transfer genetic programming with auxiliary population for solving uncertain capacitated arc routing problem. *IEEE TEVC*, DOI: 10.1109/TEVC.2022.3169289, **2022** (*CORE A**)
14. Y. Jia#, **Y. Mei**, and M. Zhang. Confidence-based ant colony optimization for capacitated electric vehicle routing problem with comparison of different encoding schemes. *IEEE TEVC*, 26(6):1394--1408, **2022** (*CORE A**)

15. M. Ardeh*, **Y. Mei**, and M. Zhang. Genetic programming with knowledge transfer and guided search for uncertain capacitated arc routing problem. *IEEE TEVC*, 26(4):765--779, **2022** (*CORE A**)
16. S. Wang*, **Y. Mei**, M. Zhang, and X. Yao. Genetic programming with niching for uncertain capacitated arc routing problem. *IEEE TEVC*, 26(1):73--87, **2022** (*CORE A**)
17. G. Gao*, **Y. Mei**, B. Xin, Y. Jia, and W. Browne. Automated coordination strategy design using genetic programming for dynamic multi-point dynamic aggregation. *IEEE TCYB*, 52(12):13521--13535, **2022** (*CORE A*)
18. Y. Jia#, **Y. Mei**, and M. Zhang. A bi-level ant colony optimization algorithm for capacitated electric vehicle routing problem. *IEEE TCYB*, 52(10):10855--10868, **2022** (*CORE A*)
19. F. Zhang*, **Y. Mei**, S. Nguyen, KC Tan, and M. Zhang. Multitask genetic programming based generative hyper-heuristics: A case study in dynamic scheduling. *IEEE TCYB*, DOI: 52(10):10515--10528, **2022** (*CORE A*)
20. F. Zhang*, **Y. Mei**, S. Nguyen, and M. Zhang. Collaborative multi-fidelity based surrogate models for genetic programming in dynamic flexible job shop scheduling. *IEEE TCYB*, 52(8):8142--8156, **2022** (*CORE A*)
21. Y. Zhang, **Y. Mei**, S. Huang, X. Zheng, and C. Zhang. A route clustering and search heuristic for largescale multi-depot capacitated arc routing problem. *IEEE TCYB*, 52(8):8286--8299, **2022** (*CORE A*)
22. X. Cai, Q. Sun, Z. Li, Y. Xiao, **Y. Mei**, Q. Zhang, and X. Li. Cooperative coevolution with knowledge-based dynamic variable decomposition for bilevel multiobjective optimization. *IEEE TEVC*, 26(6):1553--1565, 2022 (*CORE A**)
23. Y. Jia#, **Y. Mei**, and M. Zhang. A two-stage swarm optimizer with local search for water distribution network optimization. *IEEE TCYB*, DOI: 10.1109/TCYB.2021.3107900, **2021** (*CORE A*)
24. F. Zhang*, **Y. Mei**, S. Nguyen, and M. Zhang. Correlation coefficient based recombinative guidance for genetic programming hyper-heuristics in dynamic flexible job shop scheduling. *IEEE TEVC*, 25(3):552-566, **2021** (*CORE A**)
25. F. Zhang*, **Yi Mei**, S. Nguyen, K.C. Tan, M. Zhang. Surrogate-Assisted Evolutionary Multitasking Genetic Programming for Dynamic Flexible Job Shop Scheduling. *IEEE TEVC*. 25(4):651-665, **2021** (*CORE A**)
26. B. Xu*, **Y. Mei**, Y. Wang, Z. Ji, and M. Zhang. Genetic programming with delayed routing for multi-objective dynamic flexible job shop scheduling. *Evolutionary Computation*, 29(1):75-105, **2021** (*CORE A*)
27. B. Tan*, H. Ma, **Y. Mei**, M. Zhang, "Evolutionary Multi-Objective Optimization for Web Service Location Allocation Problem," *IEEE Transactions on Services Computing*, 14(2):458-471, **2021** *(CORE A*, impact factor = 8.1)*
28. F. Zhang*, **Y. Mei**, S. Nguyen, and M. Zhang. Evolving scheduling heuristics via genetic programming with feature selection in dynamic flexible job shop scheduling. *IEEE TCYB*, DOI: 10.1109/TCYB.2020.3024849, **2020** (*CORE A*)
29. G. Gao*, **Y. Mei**, Y. Jia, W. Browne, and B. Xin. Adaptive coordination ant colony optimisation for multi-point dynamic aggregation. *IEEE TCYB*, DOI: 10.1109/TCYB.2020.3042511, **2020** (*CORE A*)
30. Y. Jia#, **Y. Mei**, and M. Zhang. Contribution-based cooperative co-evolution for non-separable large-scale problems with overlapping subcomponents. *IEEE TCYB*, DOI: 10.1109/TCYB.2020.3025577, **2020** (*CORE A*)
31. J. MacLachlan*, **Y. Mei**, J. Branke, and M. Zhang. Genetic programming hyper-heuristics with vehicle collaboration for uncertain capacitated arc routing problems. *Evolutionary Computation*, 28(4), 563-593, **2020** (*CORE A*)
32. J. Xie*, **Y. Mei**, A. Ernst, X. Li, and A. Song, "A Bi-level Optimization Model for Grouping Constrained Storage Location Assignment Problems," *IEEE TCYB*,

vol. 48, no. 1, pp. 385-398, 2018. (*CORE A*)

33. **Y. Mei**, S. Nguyen, B. Xue, M. Zhang, "An Efficient Feature Selection Algorithm for Evolving Job Shop Scheduling Rules with Genetic Programming," *IEEE Transactions on Emerging Topics in Computational Intelligence*, Vol. 1, No. 5, pp. 339-353, 2017.
34. M.N. Omidvar*, M. Yang, **Y. Mei**, X. Li and X. Yao, "DG2: A Faster and More Accurate Differential Grouping for Large-Scale Black-Box Optimization," *TEVC*, vol. 21, no. 6, pp. 929-942, 2017 (*CORE A**)

Peer reviewed books

1. F. Zhang#, S. Nguyen, **Y. Mei**, and M. Zhang. Genetic Programming for Production Scheduling: An Evolutionary Learning Approach. Springer, Singapore, 336 pages, **2021**

Refereed conference proceedings

*Selected publications on **CORE Tier A conferences or best paper awards***

1. Z. Huang*, **Y. Mei**, F. Zhang, and M. Zhang. Grammar-guided linear genetic programming for dynamic job shop scheduling. *In Proceedings of the ACM Genetic and Evolutionary Computation Conference (GECCO)*, pages 1137--1145. ACM, 2023. (*GP Track Best Paper Award*)
2. F. Zhang#, **Y. Mei**, S. Nguyen, and M. Zhang. Importance-aware genetic programming for automated scheduling heuristics learning in dynamic flexible job shop scheduling. *In Proc. of the International Conference on Parallel Problem Solving from Nature (PPSN)*, pages 48-62. Springer, **2022**
3. S. Wang*, **Y. Mei**, and M. Zhang. Local ranking explanation for genetic programming evolved routing policies for uncertain capacitated arc routing problems. *In Proc. GECCO*, pp. 314-322. **2022**. (*ECOM Best Paper Award*)
4. Z. Huang*, **Y. Mei**, F. Zhang, and M. Zhang. Graph-based linear genetic programming: A case study of dynamic scheduling. *In Proc. GECCO*, pp. 955-963. **2022**
5. J. Costa*, **Y. Mei**, and M. Zhang. Guided local search with an adaptive neighbourhood size heuristic for large scale vehicle routing problems. *In Proc. GECCO*, pp. 213-221. **2022**
6. Z. Huang*, F. Zhang#, **Y. Mei**, and M. Zhang. An investigation of multitask linear genetic programming for dynamic job shop scheduling. In *Proc. of the European Conference on Genetic Programming (EuroGP)*, pp. 162-178, **2022**. (*Best Paper Award*)
7. S. Wang*, **Y. Mei**, and M. Zhang. A two-stage multi-objective genetic programming with archive for uncertain capacitated arc routing problem. *In Proc. GECCO*, pp. 287-295, **2021**
8. M. Ardeh*, **Y. Mei**, and M. Zhang. A novel multi-task genetic programming approach to uncertain capacitated arc routing problem. *In Proc. GECCO*, pp. 759-767, **2021**
9. Y. Jia#, **Y. Mei**, and M. Zhang. A memetic level-based learning swarm optimizer for large-scale water distribution network optimization. *In Proc. GECCO*, pp. 1107-1115. **2020**
10. B. Tan*, H. Ma, and **Yi Mei**. An nsga-ii-based approach for multi-objective micro-service allocation in container-based clouds. *In Proc. of the IEEE/ACM International Symposium on Cluster, Cloud and Internet Computing (CCGRID)*, pp. 282-289. IEEE, **2020**
11. S. Wang*, **Y. Mei**, and M. Zhang. Novel ensemble genetic programming hyper-heuristics for uncertain capacitated arc routing problem. *In Proc. GECCO*, pp. 1093-1101, **2019**.

A full list of my publications can be seen from: https://meiyi1986.github.io/publication/

5. CURRICULUM VITAE, PUBLICATIONS AND OTHER PUBLISHED WORKS

PART 1

1a. Personal details					
Full name	*Title* Dr.	*First name* Günther	*Second name(s)* Robert	*Family name* Raidl	
Present position	ao. Univ.-Professor				
Organisation/Employer	Technische Universität Wien (TU Wien)				
Contact Address	Institute of Logic and Computation				
	Favoritenstr. 9/E19201				
	Vienna, Austria		**Post code**	1040	
Work telephone	+43-1-58801-19116	**Mobile**	+43-664-605882186		
Email	raidl@ac.tuwien.ac.at				
Personal website	https://www.ac.tuwien.ac.at/raidl				

1b. Academic qualifications

2003, Habilitation in Practical Computer Science, TU Wien, Austria
1994, PhD, Computer Science, TU Wien, Austria
1992, Dipl.-Ing. (MSc), Computer Science, TU Wien, Austria

1c. Professional positions held

2009-present, ao. Univ.-Professor, TU Wien, Austria
2005-2009, Temporal full professorship for combinatorial optimization, TU Wien, Austria
2003-2005, Associate Professor, TU Wien, Austria
2001-2003, Assistant Professor, TU Wien, Austria
1992-2001, Research Assistant and Lecturer, TU Wien, Austria

1d. Present research/professional speciality

- Algorithms, combinatorial optimization, operations research, machine learning
- Metaheuristics, evolutionary computation, mathematical/constraint programming

1e. Total years research experience	31 years

1f. Professional distinctions and memberships (including honours, prizes, scholarships, boards or governance roles, etc)

Research funding of last 10 years

- 2023-2027, PI of the project “Learning to Solve Dynamic Vehicle Routing Problems”, funded by Honda Research Institute Europe, Germany
- 2022-2025, PI of the project “Cooperative Personnel Scheduling”, funded by Honda Research Institute Europe, Germany
- 2018-2024, PI of the project “Cooperative Optimization Approaches for Distributing Service Points”, funded by Honda Research Institute Europe, Germany
- 2016-2024, Faculty member of the Vienna Graduate School on Computation Optimization (VGSCO), doctoral college funded by the, grant no. W1260
- 2015-2019, Co-PI of the project “Cycles in Graphs and Properties of Graphs with Special Cycle Structures”, funded by the FWF, grant no. 27615-N25
- 2015-2017, Co-PI and local leader of the project “Location Planning of Bike Sharing Systems”, funded by FFG, grant no. 849028
- 2012-2015, PI of project “Complete Solution Archives for Evolutionary Combinatorial Optimization”, funded by the FWF, grant no. P24660-N23
- 2011-2014, Co-PI of the project “Balancing Bicycle Sharing Systems”, funded by the FFG, grant no. 831740
- 2010-2014, Co-PI of the project “Optimization Challenges in the Operation of the Future, Federated Internet (OptFI)” funded by WWTF, grant no. ICT10-027

Awards

- EvoStar “Old Croc” Award for Outstanding Contributions to Evolutionary Computation in Europe, 2012
- Best paper awards: Evolutionary Computation in Combinatorial Optimization Conferences (EvoCOP) in 2008, 2010, 2013, 2022, and 2023
- Best paper award at 9th Int.\ Conference on Hybrid Intelligent Systems (HIS 2009)
- Best paper award at Workshop on Analysis and Design of Representations, Genetic and Evolutionary Computation Conference's Workshops Proceedings, 2003

Current Editorships

- Associate editor for ACM Transactions on Evolutionary Learning and Optimization, since 2019
- Associate editor of the INFORMS Journal on Computing, since 2013
- Associate editor of the Evolutionary Computation Journal, MIT Press, 2005-2014, editorial board member since 2015
- Editorial board member of the Algorithms journal , MDPI, since 2020
- Editorial board member of the journal Engineering Applications of Artificial Intelligence, Elsevier, since 2022
- Editorial board member of the Metaheuristics journal, Springer, since 2018

Major Organizational Activities and Memberships

- Co-founder and member of the steering committee of the Conference Series on Evolutionary Computation in Combinatorial Optimization, EvoCOP, since 2001
- Steering committee member of EvoAPPS, the Int. Conference Series on Applications of Evolutionary Computation, since 2018
- Steering committee member of the Workshop on Hybrid Metaheuristics, since 2012
- TU Wien's coordinator in the European Marie Curie Research Training Network on Algorithmic and Discrete Optimization (ADONET), 2005-2007
- Exec. Board member of the Austrian Society of Operations Research, 2013-2016.

Major Conference Organization Activities

- Co-Chair of the Workshop on Theory and Applications of Metaheuristic Algorithms at the International Conference on Computer Aided Systems Theory, 2024, 2022, 2019, 2017, 2015, 2013, and 2011
- Local chair of SoCS 2022: The Int. Symposium on Combinatorial Search, 2022
- Program Chair of the 10th Metaheuristic International Conference (MIC), 2013
- Local Co-Organizer of EvoStar 2013
- General and Local Chair of the Hybrid Metaheuristics Workshop, 2010
- Co-Chair of the Evolutionary & Metaheuristic Combinatorial Optimization Track of the 2011 Genetic and Evolutionary Computation Conference (GECCO), 2011
- Editor-in-Chief and Program Chair of GECCO 2009, the 11th Annual Genetic and Evolutionary Computation Conference 2009, ACM, Montreal, Canada, 2009
- IEEE Computational Intelligence Society Emergent Technology Technical Committee Member (IEEE CIS ETTC), 2012

Other Honours

- Supervision of over 25 PhD students, 18 so far successfully completed
- Over 42 invited talks given worldwide
- Reviewer for over 40 int. journals in the area of optimization and metaheuristics
- Program committee member for over 80 international conferences

1g. Total number of *peer reviewed* publications and patents	Journal articles	Books	Book chapters, books edited	Conference proceedings	Patents
	55	1	15	201	0

PART 2

2a. Research publications and dissemination

Peer-reviewed journal articles

- S. Limmer, J. Varga, **G. R. Raidl**: Large Neighborhood Search for Electric Vehicle Fleet Scheduling, Energies 16(12), art.nr. 4576, **2023**
- J. Varga, **G. R. Raidl**, S. Limmer: Computational Methods for Scheduling the Charging and Assignment of an On-Site Shared Electric Vehicle Fleet, Access 10, art.nr. 105786, **2022**
- M. Djukanovi´c, A. Kartelj, D. Matic, M. Grbic, C. Blum, **G. R. Raidl**: Graph Search and Variable Neighborhood Search for Finding Constrained Longest Common Subsequences in Artificial and Real Gene Sequences, Applied Soft Computing 122, art.nr. 108844, **2022**,
- T. Jatschka, **G. R. Raidl**, T. Rodemann: A General Cooperative Optimization Approach for Distributing Service Points in Mobility Applications, Algorithms 14(8), art.nr. 232, **2021**
- B. Nikolic, A. Kartelj, M. Djukanovic M. Grbic, C. Blum, **G. R. Raidl**: Solving the Longest Common Subsequence Problem Concerning Non-Uniform Distributions of Letters in Input Strings, Mathematics 9(13), art.nr. 1515, **2021**
- C. Blum, M. Djukanovic, A. Santini, H. Jiang, C.-M. Li, F. Manya, **G. R. Raidl**: Solving Longest Common Subsequence Problems via a Transformation to the Maximum Clique Problem, Computers & Operations Research 125(105089), **2021**
- M. Horn, J. Maschler, **G. R. Raidl**, E. Rönnberg: A*-based Construction of Decision Diagrams for a Prize-Collecting Scheduling Problem, Computers & Operations Research 126(105125), **2021**
- M. Horn, **G. R. Raidl**, E. Rönnberg: A* Search for Prize-Collecting Job Sequencing with One Common and Multiple Secondary Resources, Annals of Operations Research 302, pp. 477-501, **2021**
- B. Klocker, H. Fleischner, **G. R. Raidl**: A Model for Finding Transition-Minors, Discrete Applied Mathematics 228, pp. 242–264, **2020**
- M. Horn, **G. R. Raidl**, C. Blum: Job Sequencing with One Common and Multiple Secondary Resources: An A∗/Beam Search Based Anytime Algorithm, Artificial Intelligence 227(103173), **2019**
- M. Riedler, **G. R. Raidl**: Solving a Selective Dial-a-Ride Problem with Logic-based Benders Decomposition, Computers & Operations Research 96, pp. 30–54, **2018**
- B. Biesinger, B. Hu, **G. R. Raidl**: A Genetic Algorithm in Combination with a Solution Archive for Solving the Generalized Vehicle Routing Problem with Stochastic Demands, Transportation Science 52(3), pp. 673–690, 2018
- P. C. Pop, C. Sabo, B. Biesinger, B. Hu, **G. R. Raidl**: Solving the Two-State Fixed-Charge Transportation Problem with a Hybrid Genetic Algorithm, Carpathian Journal of Mathematics 33(3), pp. 365–371, 2017

- C. Kloim¨ullner, **G. R. Raidl**: Full-Load Route Planning for Balancing Bike Sharing Systems by Logic-Based Benders Decomposition, Networks 69(3), pp. 270–289, 2017
- E. Lizarraga, M. J. Blesa, C. Blum, **G. Raidl**: Large Neighborhood Search for the Most Strings with Few Bad Columns Problem, Soft Computing 21(17), pp. 4901–4915, 2017
- B. Biesinger, B. Hu, **G. R. Raidl**:A Hybrid Genetic Algorithm with Solution Archive for the Discrete (r|p)-Centroid Problem, Journal of Heuristics 21(3), pp. 391–431, 2015
- G. Raidl: Decomposition Based Hybrid Metaheuristics, European Journal of Operational Research 244(1), pp. 66-76, 2015
- M. Leitner, **G. R. Raidl**: Branch-and-Cut-and-Price for Capacitated Connected Facility Location, Journal of Mathematical Modelling and Algorithms, 10(3), pp. 245–267, 2011

Peer reviewed books

- C. Blum, **G. R. Raidl**: Hybrid Metaheuristics – Powerful Tools for Optimization, in series Artificial Intelligence: Foundations, Theory, and Algorithms, Springer, 2016.

Peer reviewed books, book chapters, books edited

- B. Biesinger, B. Hu, **G. R. Raidl**: A Memetic Algorithm for Competitive Facility Location Problems, in Business and Consumer Analytics: New Ideas, Springer, pp. 637–660, **2019**
- **G. R. Raidl**, J. Puchinger, C. Blum: Metaheuristic Hybrids, in M. Gendreau and J. Y. Potvin: Handbook of Metaheuristics, pp. 385–417, Springer, **2019**
- **G. R. Raidl**, J. Puchinger, and C. Blum: Metaheuristic Hybrids, in M. Gendreau and J. Y. Potvin: Handbook of Metaheuristics, 2nd edition, Int. Series in Operations Research & Management Science, volume 146, Springer, pp. 469–496, 2010
- M. Leitner, **G. R. Raidl**: Combining Lagrangian Decomposition with Very Large Scale Neighborhood Search for Capacitated Connected Facility Location, Post-Conference Book of the Eight Metaheuristics International Conference – MIC 2009
- C. Blum, J. Puchinger, **G. R. Raidl**, A. Roli: Hybrid Metaheuristics, CPAIOR 10th Anniversary, Springer, 2009
- J. Puchinger, **G. R. Raidl**, S. Pirkwieser: MetaBoosting: Enhancing Integer Programming Techniques by Metaheuristics, Matheuristics – Hybridizing Metaheuristics and Mathematical Programming, Annals of Information Systems, Vol. 10, Springer, pp. 71–102, 2009

Refereed conference proceedings

- N. Frohner, **G. R. Raidl**, Francisco Chicano: Multi-Objective Policy Evolution for a Same-Day Delivery Problem with Soft Deadlines, in Proceedings of the Companion Conference on Genetic and Evolutionary Computation (GECCO 2023), ACM Press, pp. 1941-1949, **2023**

- J. Varga, E. Karlsson, **G. R. Raidl**, E. Rönnberg, F. Lindsten, T. Rodemann: Speeding up Logic-Based Benders Decomposition by Strengthening Cuts with Graph Neural Networks, in Proceedings of the 9th International Conference on Machine Learning, Optimization, and Data Science (LOD 2023), to appear **2024** in Springer LNCS
- J. Varga, **G. R. Raidl**, E. R¨onnberg, T. Rodemann: Interactive Job Scheduling with Partially Known Personnel Availabilities, in Proceedings of OLA 2023: Optimization and Learning, Springer CCIS 1824, pp. 236–247, **2023**
- S. Limmer, J. Varga, **G. R. Raidl**: An Evolutionary Approach for Scheduling a Fleet of Shared Electric Vehicles, in EvoApplications 2023: Applications of Evolutionary Computation, Springer LNCS 13989, pp. 3–18, **2023**
- M. Huber, **G. R. Raidl**: A Relative Value Function Based Learning Beam Search for the Longest Common Subsequence Problem, in Proceedings of the 18th International Conference on Computer Aided Systems Theory (EUROCAST 2022), Springer LNCS 13789, pp. 87–95, **2023**
- N. Frohner, **G. R. Raidl**: Learning Value Functions for Same-Day Delivery Problems in the Tardiness Regime, in Extended Abstracts of the 18th International Conference on Computer Aided Systems Therory (EUROCAST 2022), Las Palmas, Spain, pp. 20-21, **2023**
- R. Ettrich, M. Huber, **G. R. Raidl**: A Policy-Based Learning Beam Search for Combinatorial Optimization, in Proceedings of EvoCOP 2023 – Evolutionary Computation in Combinatorial Optimization, **best paper award winner**, Springer LNCS 13987, pp. 130–145, **2023**
- N. Frohner, J. Gmys, N. Melab, **G. R. Raidl**, E.-G. Talbi: Parallel Beam Search for Combinatorial Optimization, in Workshops of the International Conference on Parallel Processing (ICPP 2022), art.-nr. 21, pp. 1–8, **2022**
- J. Mayerhofer, M. Kirchweger, M. Huber, **G. R. Raidl**: A Beam Search for the Shortest Common Supersequence Problem Guided by an Approximate Expected Length Calculation, in Proceedings of EvoCOP 2022 – Evolutionary Computation in Combinatorial Optimization, **best paper award winner**, Springer LNCS 13222, pp. 127–142, **2022**
- M. Huber, **G. R. Raidl**: Learning Beam Search: Utilizing Machine Learning to Guide Beam Search for Solving Combinatorial Optimization Problems, in Machine Learning, Optimization, and Data Science – 7th International Conference, LOD 2021, Springer LNCS 13164, pp. 283–298, **2022**
- M. Horn, **G. R. Raidl**: A*-Based Compilation of Relaxed Decision Diagrams for the Longest Common Subsequence Problem, in Proceedings of 17th Int. Conf. on Integration of Constraint Programming, Artificial Intelligence, and Operations Research (CPAIOR'21), Springer LNCS 12735, pp. 72–88, **2021**
- A. Bracher, N. Frohner, **G. R. Raidl**: Learning Surrogate Functions for the Short-Horizon Planning in Same-Day Delivery Problems, in Proc. of 17th Int. Conf. on Integration of Constraint Programming, Artificial Intelligence, and Operations Research (CPAIOR'21), Springer LNCS 12735, pp. 283–298, **2021**

5. CURRICULUM VITAE, PUBLICATIONS AND OTHER PUBLISHED WORKS

PART 1

1a. Personal details					
Full name	*Title* Prof	*First name* Xin	*Second name(s)*	*Family name* Yao	
Present position	Chair Professor				
Organisation/Employer	Lingnan University				
Contact Address	Department of Computing and Decision Sciences				
	Lingnan University				
	8 Castle Peak Road, Tuen Mun, Hong Kong		**Post code**		
Work telephone	(852) 26168879	**Mobile**			
Email	xinyao@LN.edu.hk				
Personal website (if applicable)	https://www.cs.bham.ac.uk/~xin/				

1b. Academic qualifications

1990, PhD, University of Science and Technology of China, China
1985, M.Sc., North China Institute of Computing Technology, China
1982, B.Sc., University of Science and Technology of China, China

1c. Professional positions held

- 2024 – Present: Tong Tin Sun Chair Professor of Machine Learning, Lingnan University, Hong Kong
- 2016 – 2024: Chair Professor and Founding Head of Computer Science and Engineering Department, Southern University of Science and Technology, China.
- 1999 – Present: Chair Professor, University of Birmingham, UK
- 2016 – Present: Immediate Past President, and acting Vice President (technical activities), IEEE Computational Intelligence Society
- 2014 – 2015: President, IEEE Computational Intelligence Society
- 2003 – 2008, Editor-in-Chief, IEEE Transactions on Evolutionary Computation
- 2000 – Feb 2004, Aug 2004 – Aug 2007: Deputy Head of School, School of Computer Science, UB, UK
- Jan 1999 – Mar 1999: Associate Professor in the School of Computer Science, University College, The University of New South Wales (UNSW), Australian Defence Force Academy (ADFA), Australia.

1d. Present research/professional speciality

- Evolutionary Computation; Computational Intelligence; Machine Learning; Data Science; Meta-heuristic Optimisation

1e. Total years research experience	39 years

1f. Professional distinctions and memberships (including honours, prizes, scholarships, boards or governance roles, etc)

Research Grants (recent five years)

- 2023 – 2025: NSFC Joint Research Fund for Overseas Scholars, 62250710682, “Evolutionary Computation-based Trustworthy AI Theory and Methods,” CNY3,700,000 (PI)
- 2018 – 2023: Guangdong Province Department of Science and Technology Zhujiang Talent Innovative Business Program, 2017ZT07X386, “Reconstruct Brain-like Computation System,” CNY20,000,000 (PI)
- 2017 – 2020: National Key R&D Program of China, 2017YFC0804003, Multi-Modal Corruption Detection and Prediction”, CNY7,090,000 (PI)

- 2014 – 2017: NSFC Joint Research Fund for Overseas Scholars, 61329802, “High-Performance Evolutionary Computation,” CNY2,000,000 (PI)
- 2012 – 2018: EPSRC (EP/J017515/1). ``DAASE: Dynamic Adaptive Automated Software Engineering." GBP6,834,903. (Co-Is).

Professional and Administrative Activities:

- Past President, and acting Vice President, IEEE CIS
- Invited keynote/plenary speeches at over 100 international conferences
- (Guest) Editors of 36 international journals
- Conference chairs of more than 40 international conferences
- Conference committee memberships and invited talks for more than 70 conferences
- Member of the Scientific Advisory Board for SolveIT Software
- Chair of IEEE Computational Intelligence Society Fellows Evaluation Committee (2008)
- Member of the Universities UK ORS (Overseas Research Students) Award Committee (2003-04). Chair of Panel D in 2005
- Director of the Nature Inspired Computation and Applications Laboratory (NICAL), University of Science and Technology of China (USTC), Hefei, China.
- Chief Professor of the School of Software Engineering, USTC, Hefei, China.

Awards and Honours (recent years):

- 2020 IEEE Frank Rosenblatt Award
- 2017 IEEE Computational Intelligence Society (CIS) Meritorious Service Award
- 2016 Thomson Reuters Highly Cited Researchers
- 2013 IEEE Computational Intelligence Society Evolutionary Computation Pioneer Award
- 2012 Royal Society Wolfson Research Merit Award
- 2008, 2016 and 2017 IEEE Transactions on Evolutionary Computation (**the top journal in evolutionary computation, CORE A***) Outstanding Paper Award
- 2011 IEEE Transactions on Neural Networks (**the top journal in neural network, CORE A***) Outstanding Paper Award
- Fellow of IEEE (since 2003)
- The 2nd prize of 2010 BT Gordon Radley Award for Best Author of Innovation for the paper
- Distinguished "Leon the Mathematician" Lecturer, Department of Informatics, Aristotle University of Thessaloniki, Greece. 2 Nov 2010
- 2010 (Inaugural) University Award for Excellence in Doctoral Research Supervision, University of Birmingham, UK. (Announced in June 2010)
- Best Paper Award in the Theory track at the 2009 Genetic and Evolutionary Computation Conference, 8-12 July 2009, Montreal, Canada
- The Best PhD Student Paper Prize at the 2008 IEEE International Conference on Software Testing Verification and Validation Workshop (ICSTW'08), 2008. Lillehammer, Norway
- Sterling Hou Lecture, University of Missouri - Columbia, Columbia, USA, 28 Oct 2005.
- IEEE CIS Distinguished Lecture, University of Missouri, USA, 26 Oct 2005.
- Cheung Kong Scholar (Changjiang Chair Professorship), Ministry of Education of the People's Republic of China.

1g. Total number of *peer reviewed* publications and patents	Journal articles	Books	Book chapters, books edited	Conference proceedings	Patents
	412		66	346	3

PART 2

2a. Research publications and dissemination

Peer-reviewed journal articles

*Selected related articles in the last **five** years published in top* **ARC Tier A/A*** journals

1. Li, K., Lai, G., & **Yao, X.** (**2023**). Interactive Evolutionary Multi-Objective Optimization via Learning-to-Rank. *IEEE Transactions on Evolutionary Computation (TEVC)*. DOI: 10.1109/TEVC.2023.3234269 (*CORE A**)
2. Zhang, G., Li, L., Su, Z., Shao, Z., Li, M., Li, B., & **Yao, X**. (**2022**). New Reliability-Driven Bounds for Architecture-Based Multi-Objective Testing Resource Allocation. *IEEE Transactions on Software Engineering*. DOI: 10.1109/TSE.2022.3223875 (*CORE A**)
3. Jiang, S., Zou, J., Yang, S., & **Yao, X**. (**2022**). Evolutionary dynamic multi-objective optimisation: A survey. ACM Computing Surveys, 55(4), 1-47. (*CORE A**)
4. Su, Z., Li, M., Zhang, G., Wu, Q., Li, M., Zhang, W., & **Yao, X.** (**2022**). Robust Audio Copy-Move Forgery Detection Using Constant Q Spectral Sketches and GA-SVM. *IEEE Transactions on Dependable and Secure Computing*. DOI: 10.1109/TDSC.2022.3215280 (*CORE A*)
5. Luo, W., Shi, L., Lin, X., Zhang, J., Li, M., & **Yao, X**. (**2022**). Finding top-K solutions for the decision-maker in multiobjective optimization. Information Sciences, 613, 204-227. (*CORE A*)
6. Yao, Y., Pan, Y., Tsang, I. W., & **Yao, X.** (**2022**). Differential-Critic GAN: Generating What You Want by a Cue of Preferences. *IEEE Transactions on Neural Networks and Learning Systems (TNNLS)*. DOI: 10.1109/TNNLS.2022.3197313 (*CORE A**)
7. Yan, B., Zhao, Q., Zhang, J., Zhang, J. A., & **Yao, X**. (**2022**). Gridless Evolutionary Approach for Line Spectral Estimation With Unknown Model Order. *IEEE Transactions on Cybernetics (TCYB)*. DOI: 10.1109/TCYB.2022.3179378 (*CORE A*)
8. Yazdani, D., Yazdani, D., Branke, J., Omidvar, M. N., Gandomi, A. H., & **Yao, X.** (**2022**). Robust Optimization Over Time by Estimating Robustness of Promising Regions. *IEEE TEVC*. DOI: 10.1109/TEVC.2022.3180590 (*CORE A**)
9. Zhang, T., Wang, H., Yuan, B., Jin, Y., & **Yao, X.** (**2022**). Surrogate-Assisted Evolutionary Q-Learning for Black-Box Dynamic Time-Linkage Optimization Problems. *IEEE TEVC*. DOI: 10.1109/TEVC.2022.3179256 (*CORE A**)
10. Shi, X., Minku, L. L., & **Yao, X.** (**2022**). Adaptive Memory-Enhanced Time Delay Reservoir and its Memristive Implementation. IEEE Transactions on Computers, 71(11), 2766-2777. (*CORE A**)
11. Tong, H., Minku, L. L., Menzel, S., Sendhoff, B., & **Yao, X.** (2022). A Novel Generalized Metaheuristic Framework for Dynamic Capacitated Arc Routing Problems. *IEEE TEVC*, 26(6), 1486-1500. (*CORE A**)
12. Lan, W., Ye, Z., Ruan, P., Liu, J., Yang, P., & **Yao, X.** (**2021**). Region-focused Memetic Algorithms with Smart Initialisation for Real-world Large-scale Waste Collection Problems. *IEEE TEVC*, DOI: 10.1109/TEVC.2021.3123960 (*CORE A**)
13. Zhang, S., Tino, P., & **Yao, X. (2021).** Hierarchical Reduced-space Drift Detection Framework for Multivariate Supervised Data Streams. *IEEE Transactions on Knowledge and Data Engineering*. DOI: 10.1109/TKDE.2021.3111756 (*CORE A**)
14. Lu, X., Tang, K., Menzel, S., & **Yao, X. (2021)**. Dynamic Optimization in Fast-Changing Environments via Offline Evolutionary Search. *IEEE TEVC*. DOI:

10.1109/TEVC.2021.3104343
15. Omidvar, M. N., Li, X., & **Yao, X. (2021)**. A review of population-based metaheuristics for large-scale black-box global optimization: Part A & B. *IEEE TEVC*. DOI: 10.1109/TEVC.2021.3130838
16. Yazdani, D., Cheng, R., Yazdani, D., Branke, J., Jin, Y., & **Yao, X. (2021)**. A Survey of Evolutionary Continuous Dynamic Optimization Over Two Decades–Part A & B. *IEEE TEVC*. DOI: 10.1109/TEVC.2021.3060014
17. Tong, H., Huang, C., Minku, L. L., & **Yao, X. (2021)**. Surrogate models in evolutionary single-objective optimization: A new taxonomy and experimental study. *Information Sciences*, 562, 414-437. (*CORE A*)
18. Zheng, W., Chen, H., & **Yao, X. (2021)**. Analysis of evolutionary algorithms on fitness function with time-linkage property. *IEEE TEVC*, 25(4), 696-709.
19. Shi, S., Sharifi, N., Chen, Y., & **Yao, X. (2021)**. Tension-Relaxation In Vivo Computing Principle for Tumor Sensitization and Targeting. *IEEE TCYB*. DOI: 10.1109/TCYB.2021.3052731 (*CORE A*)
20. Tang, K., Liu, S., Yang, P., & **Yao, X. (2021)**. Few-Shots Parallel Algorithm Portfolio Construction via Co-Evolution. *IEEE TEVC*, 25(3), 595-607.
21. Su, Z., Zhang, G., Yue, F., Zhan, D., Li, M., Li, B., & **Yao, X. (2021)**. Enhanced Constraint Handling for Reliability-Constrained Multiobjective Testing Resource Allocation. *IEEE TEVC*, 25(3), 537-551.
22. M. Yang, A. Zhou, C. Li, and **X. Yao**, "An efficient recursive differential grouping for large-scale continuous problems.", *IEEE TEVC*, DOI: 10.1109/TEVC.2020.3009390, **2020**.
23. K. Li, M. Liao, K. Deb, G. Min and **X. Yao**, "Does Preference Always Help? A Holistic Study on Preference-Based Evolutionary Multi-Objective Optimisation Using Reference Points." *IEEE TEVC*, 24(6), 1078-1096, **2020**.
24. C. He, R. Cheng, C. Zhang and **X. Yao**, "Evolutionary Large-Scale Multiobjective Optimization for Ratio Error Estimation of Voltage Transformers." *IEEE TEVC* 24(5), 868-881, **2020**.
25. S. Liu, K. Tang and **X. Yao**, “Generative Adversarial Construction of Parallel Portfolios.” *IEEE TCYB*, DOI: 10.1109/TCYB.2020.2984546, **2020**.
26. C. Huang, Y. Li and **X. Yao**. "A survey of automatic parameter tuning methods for metaheuristics." *IEEE TEVC* 24(2) 201-216, **2019**.
27. M. Li and **X. Yao**. "Quality evaluation of solution sets in multiobjective optimisation: A survey." ACM Computing Surveys (CSUR) 52(2), 1-38, **2019**.
28. E.R.Q. Fernandes, A.C. de Carvalho and **X. Yao.** "Ensemble of classifiers based on multiobjective genetic sampling for imbalanced data." *IEEE Transactions on Knowledge and Data Engineering* 32(6), 1104-1115, **2019**.
29. C. He, L. Li, Y. Tian, X. Zhang, R. Cheng and **X. Yao**. "Accelerating large-scale multiobjective optimization via problem reformulation." *IEEE TEVC* 23(6), 949-961, **2019**.
30. C. Wnag, C. Xu, **X. Yao** and D. Tao, "Evolutionary generative adversarial networks." *IEEE TEVC* 23(6), 921-934, **2019**.
31. R. Cheng, M.N. Omidvar, A. Gandomi, B. Sendhoff, S. Menzel and **X. Yao,** "Solving Incremental Optimization Problems via Cooperative Coevolution." *IEEE TEVC* 23(5), 762-775, **2018**.
32. W. Hong, K. Tang, A. Zhou, H. Ishibuchi and **X. Yao**. "A scalable indicator-based evolutionary algorithm for large-scale multiobjective optimization." *IEEE TEVC* 23(3), 525-537, **2018**.
33. K. Li, R. Chen, D. Savic and **X. Yao,** "Interactive decomposition multiobjective optimization via progressively learned value functions." *IEEE Transactions on Fuzzy Systems* 27(5), 849-860, **2018**. (*CORE A**)
34. K. Li, R. Chen, G. Min and **X. Yao,** "Integration of preferences in decomposition

multiobjective optimization." *IEEE TCYB* 48(12), 3359-3370, **2018**.

35. K. Li, R. Chen, G. Fu and **X. Yao,** "Two-archive evolutionary algorithm for constrained multiobjective optimization." *IEEE TEVC* 23(2), 303-315, **2018**.
36. H. Chen, B. Jiang, and **X. Yao**. "Semisupervised negative correlation learning." *IEEE TNNLS* 29(11), 5366-5379, **2018**. (*CORE A*, impact factor = 10.451*)
37. Z. Gong, H. Chen, B. Yuan and **X. Yao**. "Multiobjective learning in the model space for time series classification." *IEEE TCYB* 49(3), 918-932, **2018**.
38. S. Wang, L.L. Minku and **X. Yao**. "A systematic study of online class imbalance learning with concept drift." *IEEE TNNLS* 29(10), 4802-4821, **2018**.
39. Y. Sun, K. Tang, Z. Zhu and **X. Yao**. "Concept drift adaptation by exploiting historical knowledge." *IEEE TNNLS* 29(10), 4822-4832, **2018**.

Peer reviewed book chapters, books edited

1. H. Zhang, J. Liu, and **X. Yao**. "A Hybrid Evolutionary Algorithm for Reliable Facility Location Problem." *Lecture Notes in Computer Science (LNCS)*. vol. 12269 (PPSN), Springer, 454-467, **2020**.
2. H. Tong, L.L Minku, S. Menzel, B. Sendhoff and **X. Yao**. "Towards Novel Meta-heuristic Algorithms for Dynamic Capacitated Arc Routing Problems." *Lecture Notes in Computer Science (LNCS).* vol. 12269 (PPSN), Springer, 428-440, **2020**.
3. S. Friess, P. Tino, S. Menzel, B. Sendhoff and **X. Yao.** "Improving Sampling in Evolution Strategies Through Mixture-Based Distributions Built from Past Problem Instances." *Lecture Notes in Computer Science (LNCS)*. vol. 12269 (PPSN), Springer, 583-596, **2020**.

Refereed conference proceedings

*Selected related papers in the last **five** years published in* **ARC Tier A/A*** conferences

1. S. Liu, K. Tang, Y. Lei and **X. Yao**, “On Performance Estimation in Automatic Algorithm Configuration.” *AAAI*, 2384-2391, **2020**.
2. S. Liu, K. Tang and **X. Yao**, "Automatic construction of parallel portfolios via explicit instance grouping." *AAAI*. Vol. 33. 1560-1567, **2019**.
3. H. Tao, J. Liu and **X. Yao**. "Algorithm portfolio for individual-based surrogate-assisted evolutionary algorithms." *Proceedings of the Genetic and Evolutionary Computation Conference*. 943-950, **2019**.
4. L. Zhang, K. Tang and **X. Yao**. "Explicit planning for efficient exploration in reinforcement learning." Advances in Neural Information Processing Systems *(NeurIPS)*. 7488-7497, **2019**.
5. D. Yazdani, J. Branke, M.N. Omidvar, T.T. Nguyen and **X. Yao**, "Changing or keeping solutions in dynamic optimization problems with switching costs." *Proceedings of the Genetic and Evolutionary Computation Conference*. 1095-1102, **2018**.
6. T. Chen, M. Li, and **X. Yao**. "On the effects of seeding strategies: a case for search-based multi-objective service composition." *Proceedings of the Genetic and Evolutionary Computation Conference*. 1419-1426, **2018**.
7. C. Qian, Y. Zhang, K. Tang and **X. Yao**, "On multiset selection with size constraints." *AAAI*, **2018**.
8. P.T. Thuong, X.H. Nguyen and **X. Yao**. "Combining conformal prediction and genetic programming for symbolic interval regression." *Proceedings of the Genetic and Evolutionary Computation Conference*. 1001-1008, **2017**.
9. L. Zhang, K. Tang and **X. Yao**. "Log-normality and skewness of estimated state/action values in reinforcement learning." *Advances in Neural Information Processing Systems (NeurIPS).* 1804-1814, **2017**.

The full publication list can be seen from https://www.cs.bham.ac.uk/~xin/publications.html

6. OTHER FUNDING

List of other funding organisations to whom you have sought or received a grant for this application.

No other funding applications listed.