

Tinkle Chugh

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Education

- 2013–2017 Doctor of Philosophy (Ph.D.), Mathematical Information Technology, University of Jyväskylä, Finland
Thesis Title: Handling expensive multiobjective optimization problems with evolutionary algorithms
Supervisors: Prof. Yaochu Jin, Prof. Kaisa Miettinen, Dr. Karthik Sindhya and Dr. Jussi Hakanen
- 2010–2012 Master of Technology (M.Tech), Chemical Engineering, Indian Institute of Technology (IIT) Hyderabad, India
Thesis Title: Moment based evolutionary approach to model and optimize the free radical polymerization with long chain branching
Supervisors: Associate Prof. Kishalay Mitra and Dr. Saptarshi Majumdar
- 2006–2010 Bachelor of Engineering (B.E.), Chemical Engineering, MD University Rohtak, India

My PhD thesis was a part of the project “Decision Support for Complex Multiobjective optimization problems (DeCoMo)”, where I worked with “Finland Distinguished Professor (FiDiPro)” Yaochu Jin and industries involved. For more details, see [DeCoMo](#)

Research Interests

Evolutionary computation, single, multi and many-objective optimization, surrogate-assisted optimization, data-driven optimization, preference incorporation and decision making

Selected Honours and Awards

- 2017 Best Student Paper Award at the IEEE Congress on Evolutionary Computation (IEEE CEC), San Sebastian, Spain
- 2012 Academic Excellence Award in M.Tech from former President of India Dr. APJ Abdul Kalam
- 2012 Received silver medal for being first in M.Tech in Indian Institute of Technology Hyderabad, India

Publications

Theses and dissertations

- [1] **T. Chugh**. (2017). Handling expensive multiobjective optimization problems with evolutionary algorithms. PhD thesis, Jyväskylä studies in computing 263, ISBN: 978-951-39-7090-1, 2017 Retrieved from <http://urn.fi/URN:ISBN:978-951-39-7090-1>
- [2] **T. Chugh**. (2012). Moment based evolutionary approach to model and optimize the free radical polymerization with long chain branching, Master Thesis, Indian Institute of Technology Hyderabad, India

Peer-reviewed Journal Papers

- [1] **T. Chugh**, Y. Jin, K. Miettinen, J. Hakanen and K. Sindhya. A surrogate-assisted evolutionary algorithm for computationally expensive many-objective optimization. *IEEE Transactions on Evolutionary Computation*, to appear, DOI: [10.1109/TEVC.2016.2622301](https://doi.org/10.1109/TEVC.2016.2622301)
- [2] **T. Chugh**, N. Chakraborti, K. Sindhya and Y. Jin. A data-driven surrogate-assisted evolutionary algorithm applied to a many-objective blast furnace optimization problem. *Materials and Manufacturing Processes*, 32, 1172-1178, 2017
- [3] M. Anitha, **T. Chugh**, S. Majumdar, K. Mitra. "Multi-objective optimization of bulk vinyl acetate polymerization with branching", *Materials and Manufacturing Processes*, 29, 210-217, 2014

Peer-reviewed Conference Papers

- [1] **T. Chugh**, K. Sindhya, K. Miettinen, Y. Jin, T. Kratky and P. Makkonen. Surrogate-assisted evolutionary multiobjective shape optimization of an air intake system. In *Proceedings of 2017 IEEE Congress on Evolutionary Computation (CEC)*, IEEE, 1541-1548, 2017 ([The article won the best student paper award in IEEE CEC 2017](#)).
- [2] J. Hakanen, **T. Chugh**, K. Sindhya, Y. Jin and K. Miettinen. Connections of Reference Vectors and Different Types of Preference Information in Interactive Multiobjective Evolutionary Algorithms. In *Proceedings of 2016 IEEE Symposium Series on Computational Intelligence (SSCI)*, IEEE, 1-8, 2016.

- [3] **T. Chugh**, K. Sindhya, K. Miettinen and J. Hakanen and Y. Jin. On constraint handling in surrogate-assisted many-objective optimization. In *Proceedings of 14th International Conference on Parallel Problem Solving from Nature (PPSN)*, Springer International Publishing, 214-224, 2016.
- [4] **T. Chugh**, K. Sindhya, J. Hakanen, K. Miettinen. An interactive simple indicator-based evolutionary algorithm (I-SIBEA) for multiobjective optimization problems. In *Proceedings of Evolutionary Multi-Criterion Optimization (EMO)*, Springer International Publishing, 277-291, 2015.

Journal articles under review

- [1] **T. Chugh**, T. Kratky, K. Sindhya, K. Miettinen, Y. Jin and P. Makkonen. Preference incorporation in surrogate-assisted multiobjective optimization: A case study.
- [2] **T. Chugh**, K. Sindhya, J. Hakanen and K. Miettinen. A survey on handling computationally expensive multiobjective optimization problems with evolutionary algorithms.
- [3] J. Kaur, **T. Chugh** and V.K. Sangal. Efficient Global Optimization for the Synthesis of Ethyl Tertiary Butyl Ether via Reactive Dividing Wall distillation Column.

Book Chapters

- [1] **T. Chugh**, A. Rahat, V. Volz and M. Zaefferer. Towards Better Integration of Surrogate Models and Optimizers. Submitted to the book “High-Performance Simulation Based Optimization” edited by Prof. Thomas Bartz-Beielstein, Prof. Bogdan Filipic, Assoc. Prof. Peter Korosec and Prof. El-Ghazali Talbi, in the Springer series “Studies in Computational Intelligence”.
- [2] **T. Chugh**, C. Sun, H. Wang and Y. Jin. Surrogate-assisted optimization of large problems. Submitted to the book “High-Performance Simulation Based Optimization” edited by Prof. Thomas Bartz-Beielstein, Prof. Bogdan Filipic, Assoc. Prof. Peter Korosec and Prof. El-Ghazali Talbi, in the Springer series “Studies in Computational Intelligence”.

Technical Reports

- [1] **T. Chugh**, K. Sindhya, J. Hakanen, K. Miettinen. Handling Computationally Expensive Multiobjective Optimization Problems with Evolutionary Algorithms: A Survey, *Reports of the Department of Mathematical Information Technology, Series B, Scientific Computing, No. B 4/2015*, University of Jyväskylä, Jyväskylä, 2015.
- [2] **T. Chugh**, Y. Jin, K. Miettinen, J. Hakanen and K. Sindhya. A Kriging-assisted evolutionary algorithm for many-objective optimization, *Reports of the Department of Mathematical Information Technology, Series B, Scientific Computing, No. B 2/2016*, University of Jyväskylä, Jyväskylä, 2016.

Other Conferences

- [1] J. Hakanen, **T. Chugh**, K. Sindhya, Y. Jin and K. Miettinen. Interactive K-RVEA: interactive evolutionary multiobjective optimization algorithm for computationally expensive problems. Ac-

- cepted in the conference Multiple Criteria Decision Making (MCDM), 2017.
- [2] K. Sindhya, T. Rauhala, **T. Chugh**, Y. Jin, K. Miettinen and J. Hakanen. Multiobjective Optimization in Assessment of Transmission Network Compensation Strategy, 28th European Conference on Operational Research 2016 , Poznan, Poland, July 3- 7, 2016.
- [3] **T. Chugh**, K. Sindhya, J. Hakanen, K. Miettinen, Y. Jin. A surrogate assisted inverse model based evolutionary multiobjective optimization algorithm for computationally expensive problems, Multiple Criteria Decision Making (MCDM) 2015 , Hamburg, Germany, August 2 - 7, 2015.
- [4] **T. Chugh**. Handling computationally expensive multi-objective optimization problems using evolutionary algorithms: A survey, In International conference for Mathematical Modeling and Optimization in Mechanics (MMOM) 2014, Jyväskylä, Finland, March 6 - 7, 2014.
- [5] M. Anitha, **T. Chugh**, K. Mitra, S. Majumdar. Effect of live radical species in controlled branching of bulk free radical polymerization system: A multi objective evolutionary approach. In International Conference on Advances in Chemical Engineering (ACE 2013), IIT Roorkee, India, February 22 - 24, 2013.
- [6] M. Anitha, **T. Chugh**, S. Majumdar, K. Mitra. Optimal process conditions for the controlled branching of free radical polymerization: A case study. In Chemcon 2012, NIT Jalandhar, India, December 27-30, 2012.
- [7] **T. Chugh**, M. Anitha, S. Majumdar. Study of branching in batch free radical polymerization of vinyl acetate. In TACEE 2012, BITS Pilani, India, March 23-24, 2012

Professional Activities

- Reviewer of journals, IEEE Transactions on Evolutionary Computation, Soft Computing, Applied Soft Computing, Materials and Manufacturing Processes
- Reviewer of conferences, The Genetic and Evolutionary Computation Conference (GECCO), IEEE Symposium Series on Computational Intelligence (IEEE SSCI)
- Visited Prof. K.C. Giannakoglou, School of Mechanical Engineering, National Technical University of Athens, Greece as a visiting researcher, Aug 22- Sep 03, 2017
- Participated in Doctoral Network Training Cruise Seminar (coordinated by Prof. Ahti Salo, Aalto University School of Science) from Helsinki to Tallinn, 29-30 May, 2017
- Visited University of Surrey, UK as a PhD student from September-November 2015 and September-October 2016
- Participated in workshop on surrogate-assisted multi-criteria optimization (SAMCO) from Feb 29 to March 4, 2016, Leiden, Netherlands
- Participated in EURO PhD School on MCDM from Feb 17 to Feb 28, 2014, Madrid, Spain

Previous work experience

- Post graduate engineer trainee in Mercedes Benz Research and Development India Pvt Ltd from July 2012 to Aug 2013
Tasks: Worked for various computational fluid dynamics involving three dimensional and one dimensional simulations to get the optimized flow parameters

References

- Prof. Yaochu Jin
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- Prof. Kaisa Miettinen
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- Adjunct Professor Jussi Hakanen
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