Ksenia Bestuzheva

Berlin, Germany | Postdoctoral Researcher | bestuzheva@zib.de

Education

Ph.D. in computer science, *Australian National University* (Canberra, Australia) 2019
Thesis title: Global Optimisation for Energy Systems
Supervisors: Prof. Markus Hegland, Dr. Hassan Hijazi, Prof. Sylvie Thiebaux

Diplom in applied mathematics and computer science, *State Management University* (Moscow, Russia) 2014
With highest distinction

Work Experience

Postdoctoral Researcher, *Zuse Institute Berlin* (Berlin, Germany) 2018-present

Leading the Global Optimization research area; leading the development of the constraint integer programming solver SCIP; research in the area of mixed-integer nonlinear programming; student supervision.

Publications

Peer-reviewed publications

- K. Bestuzheva, A. Chmiela, B. Müller, F. Serrano, S. Vigerske, and F. Wegscheider. Global optimization of mixed-integer nonlinear programs with SCIP 8. *Journal of Global Optimization*, 2023. doi: 10.1007/s10898-023-01345-1
- K. Bestuzheva, A. Gleixner, and S. Vigerske. A computational study of perspective cuts. *Mathematical Programming Computation*, 15(4):703–731, 2023. doi: 10.1007/s12532-023-00246-4
- K. Bestuzheva, A. Gleixner, and T. Achterberg. Efficient separation of RLT cuts for implicit and explicit bilinear products. In *Integer Programming and Combinatorial Optimization*, pages 14–28, Cham, 2023. Springer. doi: 10.1007/978-3-031-32726-1_2
- K. Bestuzheva, M. Besançon, W.-K. Chen, A. Chmiela, T. Donkiewicz, J. van Doornmalen, L. Eifler, O. Gaul, G. Gamrath, A. Gleixner, et al. Enabling research through the SCIP optimization suite 8.0. *ACM Transactions on Mathematical Software*, 49(2):1–21, 2023. doi: 10.1145/3585516
- E. Ramin, K. Bestuzheva, C. L. Gargalo, D. Ramin, C. Schneider, P. Ramin, X. Flores-Alsina, M. M. Andersen, and K. V. Gernaey. Incremental design of water symbiosis networks with prior knowledge: The case of an industrial park in Kenya. *Science of The Total Environment*, 751:141706, 2021. doi: 10.1016/j.scitotenv.2020.141706
- K. Bestuzheva, H. Hijazi, and C. Coffrin. Convex relaxations for quadratic on/off constraints and applications to optimal transmission switching. *INFORMS Journal on Computing*, 32(3):682–696, 2020. doi: 10.1287/ijoc.2019.0900
- K. Bestuzheva and H. Hijazi. Invex optimization revisited. *Journal of Global Optimization*, 74(4):753–782, 2019. doi: 10.1007/s10898-018-0650-1

Other publications

- K. Bestuzheva, A. Gleixner, and H. Völker. Strengthening SONC relaxations with constraints derived from variable bounds. *arXiv preprint arXiv:2211.05518 (submitted to Journal of Global Optimization)*, 2022
- K. Bestuzheva, M. Besançon, W.-K. Chen, A. Chmiela, T. Donkiewicz, J. van Doornmalen, L. Eifler, O. Gaul, G. Gamrath, A. Gleixner, et al. The SCIP Optimization Suite 8.0. *arXiv preprint arXiv:2112.08872*, 2021
- G. Gamrath, D. Anderson, K. Bestuzheva, W.-K. Chen, L. Eifler, M. Gasse, P. Gemander, A. Gleixner, L. Gottwald, K. Halbig, et al. The SCIP Optimization Suite 7.0. 2020

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Invited Lectures and Talks

- SCIP Beyond 8.0. 7th ZIB-IMI-ISM-NUS-RIKEN-MODAL Workshop on Future Algorithms and Applications, Berlin, Germany (2023)
- Perspective cuts for generalized on/off constraints. Mixed Integer Programming Workshop, Los Angeles, USA (2023)
- Strengthening dual bounds in branch-and-bound by SONC certificates. SCIP 20th Anniversary Workshop. Berlin, Germany (2022)
- Recent developments in SCIP. 5th ZIB-RIKEN-IMI-ISM MODAL Workshop on Optimization, Data Analysis and HPC in AI. Berlin, Germany (2021)
- Mixed-Integer Nonlinear Programming. Combinatorial Optimization at Work, online (2020)
- Nonlinear Constraints in SCIP. SCIP Online Workshop (2020)

Teaching Experience

Theses supervised

- H. Müller. Algorithms for constrained optimization using sums of nonnegative circuit polynomials certificates. Master's thesis, Humboldt University of Berlin, 2021

  Supervised jointly with Prof. Andrea Walther.

Awards

- COIN-OR Cup 2021: Hassan Hijazi, Guanglei Wang, Ksenia Bestuzheva, Smitha Gopinath, Mertcan Yetkin, and Carleton Coffrin (Gravity)
- Best Student Paper Award, 24th National Conference of the Australian Society for Operations Research, 2016

Other Related Experience

Technical Editor, *Mathematical Programming Computation* 2022-present

Performing technical reviews of submitted articles focusing on the software and/or data aspect of the submission.

Contributor, *ASCEND - mathematical modelling software* 2012-2016

Worked on dynamic modelling, participated in two Google Summer of Code (GSOC) projects as a student (2012, 2013) and in two GSOC projects as a mentor (2015, 2016).

Schools attended

- NICTA Optimization Summer School. Kioloa, Australia (2016).
- Combinatorial Optimization at Work. Zuse Institute Berlin, Berlin, Germany (2015).