

Planning & Scheduling in Sitola

Hana Rudová

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SitSem 2023, Telč



- Employees
 - Václav Chlumský
 - Dalibor Klusáček



... defended in 2023

- Employees
 - Václav Chlumský
 - Dalibor Klusáček
 - Hana Rudová
- Students
 - Václav Sobotka
 - Peter Gábor
 - Martin Blažek
 - Samuel Krivánek
 - Milan Kubík
- Bachelor thesis
 - Jan Ševeček, Dean's awards
Artificial bee colony for project scheduling
- Master thesis
 - Jiří Papoušek
Solver for dynamic vehicle routing problem with time windows
 - Ondřej Holub
Framework for dynamic vehicle routing
 - Ivana Krumlová
Capacity planning for high-speed trains

FI MU cooperations

- Companies: Wereldo, Notino
- Purdue University, UniTime, Tomáš Müller
- MU ESF, Institute for Transport Economics, Geography and Policy
- Technical University Wien, group of Nysret Musliu



- Optimization of HPC infrastructure scheduling, including:
 - queue reconfiguration, support for interactive (GUI) jobs
 - continuous improvements in fairshare prioritization calculation



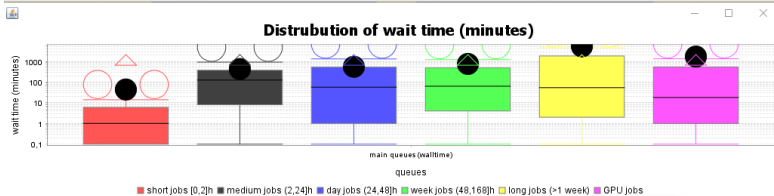
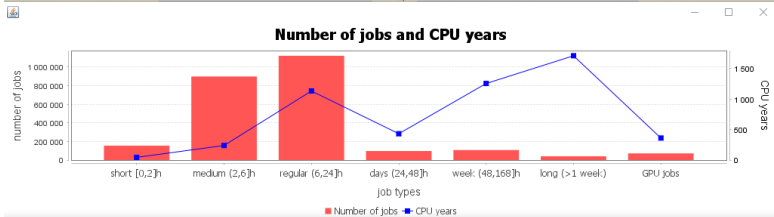
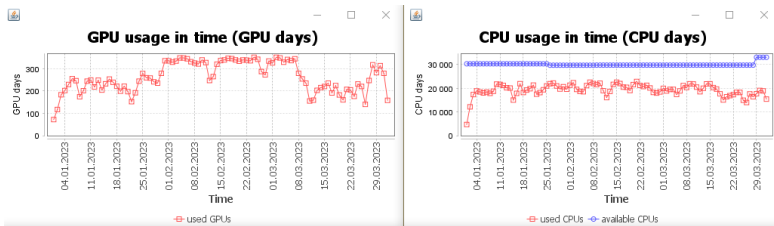
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- Green Computing: existing tools in mainstream RMS
 - analysis of existing tools in mainstream resource managers that (claim) to enable Green Computing features
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- **Automated infrastructure optimization**
 - recent idea to investigate whether it is possible to model and optimize existing HPC/K8s system automatically
 - is it possible to develop automated recommend system that would help the administrator to change selected scheduling parameters with predictable effects?
 - covers several areas ranging from simulation, and modeling to AI/ML approaches



- Tools to generate statistics
 - existing tools (Grafana, Excel) were too slow due to a large number of jobs (more than 11 millions of jobs per year)
 - development of automated tools to generate statistic charts of various MetaCentrum usage metrics





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JSSPP 2023, Florida USA
 - 14 submissions, 8 accepted
 - Keynote about SLURM Resource Manager given by Moe Jette (CEO of SchedMD, the developer of the SLURM RMS)
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 - Reviewing, short discussion among reviewers, author feedback, discussion among reviewers, review update, metareview, final decision



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- **International Joint Conference on Artificial Intelligence**
IJCAI 2023, CORE A*



Co-chairing, reviewing

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IJCAI 2023, CORE A*, 2 686 PC members
 - Distinguished Program Committee Member Certificate (61)



International Timetabling Competition 2019

- <http://www.itc2019.org>
- Special track about competition at PATAT 2022 conference
- 30 real-life problems from 10 universities over the world
- 2022: about 400 registered users from 60 countries
- 2023: about 480 registered users from 66 countries

- Journal paper in revision
 - Analysis of real-world problems and solution approaches
 - FI MU problems: gap about 30 %



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 - Hybrid whale optimization algorithm for solving timetabling problems of ITC 2019
 - Complex university timetabling using iterative forward search algorithm and great deluge algorithm



Freight transportation with Wereldo company

- PPL, DPD, WEDO combining pallets with "small" packages
- Cooperation from Spring 2019
 - 6 defended Master thesis, 3 dean's awards
 - Software used in their daily production [1]
 - PhD sponsorship [2]
- Evolution
 - ① Static problems
 - all known from the beginning
 - ② Uncertainties
 - such as increased volume for the request
 - ③ Dynamic problems
 - such as arrival of new request

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1. Rudová, Sassmann, Gabonay and Sobotka. *Real-World Vehicle Routing using Adaptive Large Neighborhood Search*. In *Evolutionary Computation in Combinatorial Optimization (EvoCOP 2023)*. LNCS 13987, 34-49, Springer, 2023.
 2. Sobotka and Rudová. *Real-world Pickup and Delivery Problem with Transfers*. In *International Symposium on Combinatorial Search (SoCS 2023)*. AAAI Press, 2023.