

Dagstuhl Seminar 18031:

Personalized Multiobjective Optimization: An Analytics Perspective

The purpose of multiobjective optimization is to develop methods that can solve problems having a number of (conflicting) optimization criteria and constraints, providing a multitude of solution alternatives, rather than pursuing only one “optimal” solution. Multiobjective optimization thus lends itself towards the demanding aims of mass-customization, product/service variation and personalization we see today in areas such as engineering, planning, operations, investment, media and Web services, and healthcare. Particular application challenges pursued in this seminar are **(i) platform design and product lines**, **(ii) responsive and online personalization**, and **(iii) complex networks of decision makers**. Taking the first steps, this seminar will explore an “Analytics” perspective already proven in handling large-scale pervasive data, and seek to build the scientific foundations for delivering efficient and effective (even optimal) mass-personalization.

During the seminar, the three application challenges will be crosslinked with the three research domains **(1) Model building, approximation, and representation**, **(2) Preference modelling**, and **(3) Algorithm design and efficiency**, that constitute the methodological core of multiobjective optimization and have been the foundation for the discussions at the previous Dagstuhl seminars.

Monday, January 15, 2018

08:45 – 10:30: Welcome Session

- Welcome and Introduction
- Short presentation of all participants (2 minutes each!)

Coffee Break

11:00 – 12:00: Application Challenges

- Karl Heinz Küfer: Industrial Applications of Multicriteria Decision Support Systems
- Georges Fadel: Culturally Tailored Multicriteria Product Design using Crowdsourcing

Lunch

13:30 – 14:30: Personalization in Model Building, Approximation, and Representation

- Kalyanmoy Deb: Metamodeling Approaches for Multiobjective Optimization
- Serpil Sayin: Representations: Do they have Potential for Customer Choice?

Coffee Break

15:00 – 15:30: Personalization and Preference Modelling

- Robin Purshouse: Modelling Complex Networks of Decision Makers: An Analytical Sociology Perspective

15:30 – 16:00: Personalization in Algorithm Design and Efficiency

- Manuel López-Ibáñez: Data-Driven Automatic Design of Multi-Objective Optimizers

Break

16:15 – 18:00: Group Discussion about Hot Topics and Working Groups

Tuesday, January 16, 2018

09:00 – 10:00: Decision Analytics and Consensus Chair: Salvatore Greco

- Michael Emmerich: Maximizing the Probability of Consensus in Group Decision Making
- Kaisa Miettinen: Decision Analytics with Multiobjective Optimization and a Case in Inventory Management

Coffee Break

10:30 – 12:00: Working Groups

Lunch

13:30 – 14:30: Personalization and Learning Chair: Jussi Hakanen

- Jürgen Branke: Active Learning for Mapping Advertisements to Customers
- Roman Slowinski: The NEMO framework for EMO: Learning value functions from pairwise comparisons

Coffee Break

15:00 – 17:00: Working Groups

17:00 – 18:00: Reports from Working Groups

- 6 minutes / 3 slides per working group
- General discussion and working group adaptations

Wednesday, January 17, 2018

09:00 – 10:00: Metamodelling and Knowledge Extraction Chair: Carlos Fonseca

- Mickaël Binois: Uncertainty Quantification on Pareto Fronts
- Abhinav Gaur: Unveiling Invariant Rules from Non-Dominated Solutions for Knowledge Discovery and Faster Convergence

10:00: Announcements

Coffee Break

10:30 – 12:00: Working Groups

Lunch

14:00: Group Foto (Outside)

14:05 – 16:00: Hiking Trip

16:30 – 18:00: Reports from Working Groups

- 15 minutes / 5 slides per working group

Thursday, January 18, 2018

9:00 – 10:00: Data Structures

- José Rui Figueira: Compressed Data Structures for Bi-Objective $\{0, 1\}$ -Knapsack Problems
- Andrzej Jaszkiwicz: Recent Algorithmic Progress in Multiobjective (Combinatorial) Optimization

Coffee Break

10:30 – 12:00: Working Groups

Lunch

13:30 – 15:30: Working Groups

Coffee Break

16:00 – 17:00: Working Groups

17:00 – 18:00: Continuing the Dagstuhl Seminar Series

20:00: Wine & Cheese Party (Music Room)

Friday, January 19, 2018

9:00 – 11:00: Presentation of Working Group Results

Coffee Break

11:30 – 12:00: Summary, Feedback, and Next Steps

Lunch & Goodbye