

COST Action IC1205 on Computational Social Choice: STSM Report

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During this visit, we worked on several interesting questions from various domains:

- We wondered how much information we lose if we force voters in an election to report single-peaked preferences even if their true preferences are not single-peaked. For several measures, we showed that this coercion loses essentially all information, and we might end up selecting an arbitrarily bad winning alternative.
- On the topic of allocating indivisible goods, one can consider a weakening of envy-freeness known as ‘envy-freeness up to the least good’. Ariel and his group conjecture that this condition can always be satisfied under additive preferences. I formulated an integer program to search for counter-examples, and used it to establish that the conjecture holds for 3 agents and 5 goods (previously this was only known for 4 goods). Maybe the number of goods can be increased by optimising the IP formulation.
- Also on allocating indivisible goods, we thought about the computational complexity of finding a Pareto optimal allocation that is envy free up to one good (EF1). Recent work of Ariel and others gave an NP-hard mechanism that always returns such an allocation. We wondered whether all such mechanisms are NP-hard, but could not find an appropriate technique for showing this.
- On the topic of strategy-proof facility location, we tried to extend the *Proportional Mechanism* to $k = 3$ facilities. We studied several candidate mechanisms that turned out to perform poorly.
- Jointly with Florian Brandl, we worked on aggregation of metric spaces, designing several aggregation rules for this setting and starting to work on their axiomatic characterisation.

In the week of 19 September to 23 September, I also used the occasion of visiting the US to visit Lirong Xia and Elliot Anshelevich at RPI, and Bill Zwicker at Union College, which also lead us to start several exciting research projects.