Report on the 2024 Conference on Mechanism and Institution Design

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The 2024 Conference on Mechanism and Institution Design (CMID) was held between 8-12 July 2024 at the Corvinus University of Budapest. The main subject of the conference is mechanism design, in general aiming at finding and analyzing the efficient and, in some sense, optimal set of rules for our social and economical systems. This wide ranging goal involves research in market design, game theory or voting, as well as behavioural economics and market competition regulations.

CMID is the bi-annual conference of the Society for the Promotion of Mechanism and Institution Design, however, as opposed to the previous two iterations (in 2022 and 2022) for the first time in 6 years it was held live in person (offline), which was a great opportunity for the community to meet in person again.

Accordingly it is no wonder that colleagues arrived from literally every corner of the world to present, listen and discuss the close to 300 presentations: 278 talks in 80 parallel sessions, as well as 4 outstanding plenary speakers, and 4 additional talks dedicated to celebrate Vincent Crawford's 75th birthday made CMID a really special conference.

Nobel laureate speakers

The list of plenary speakers at the conference was one of a kind: besides Éva Tardos, recipient of numerous outstanding awards in mathematics the audience could listen to three Nobel laureates presenting.

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Paul Milgrom (Stanford University) received the Nobel memorial prize in economic sciences (together with his former supervisor, Robert Wilson) in 2020 for his work in the field of auction theory (cf. Biró and Magyarkuti (2021)). Not only for his theoretical results, he had pioneering work in the application of auctions as well. In his plenary talk he presented the role auctions can play in two complex markets: in the transfers of radio spectrum rights and water usage rights.

Regarding the former, Milgrom and Segal (2020) designed the Federal Communications Commission's (FCC) 3-step spectrum auction, which was conducted in 2017. In the first step the FCC determines which rights of spectrum it purchases back from their current holder (typically TV broadcasters) in a descending price auction. Then the FCC proceeds to package the free bandwidths of frequencies in order to create new, more valuable wide bandwidth packages of spectrum for the wireless broadband industry, for which mobile companies are bidding in a (ascending price) combinatorial auction. Apart from this making sure that the most valuable, wide bandwidth parts of the spectrum will be held by the more efficient segment of the market, the FCC also generates substantial revenue for various government initiatives with the net difference of the two auctions (overall 10 billion USD cost and 20 billion USD income).

The other new and exciting application area is in transfering rights of water usage (Ferguson and Milgrom (2024)). Nowadays this market garners more and more attention, however, it's complexity lies in the extensive amount of positive and negative externalities. Due to the limited amount of water available if one parties water usage increases, in general it decreases for all other segments in the market; however, it could be the case that for certain parts of the market this actually leads to increase as well (for instance water used for irrigation may reappear as groundwater somewhere else).

Alvin Roth (Stanford University), Nobel laureate of 2012 (together with Lloyd Shapley) received the prize for his contributions to the theory of stable allocations and the applications of market design. Studying stable matching mechanisms basically starts at the seminal work of Gale and Shapley (1962), which used an algorithm similar to what the National Resident Matching Program (NRMP) employed from the 50s, to provide an efficient solution to a classic problem in college admissions. Roth in the 80s not only showed that the method used in the NRMP is a strategy-proof mechanism and it yields a stable solution (for 'single' residents), he also extended the method in the 90s (yielding stable solutions to pairs of residents as well). His variant is still being employed, and he also identified the fundamental connections between Shapley and Scarf's results on one-sided matchings and kidney exchanges.

In his presentation he focused on certain ethical aspects of market design, particularly related to two areas: kidney transplants and a field experiment. Monetary compensation regarding living donor kidney transplants is forbidden everywhere (except in Iran), nevertheless kidney exchange programs are operating in many countries. In these programs kidney patients exchange their willing but incompatible donors (typically some family member) in between themselves in order to create compatible patient-donor pairs. However, regulations differ vastly in different countries. Even though most Western countries, such as many countries

in the EU, operate a national kidney exchange programme (moreover, international collaborations are more and more widely spreading as well), there are still countries such as Germany, where kidney exchanges are still forbidden (as of today), as opposed e.g. Hungary among many others.

In a recent field experiment Qui et al. (2024) the authors asked well-known economists to re-tweet certain graduating students results, randomly selected from a pool of finishing PhD students just entering the job market and willing to participate in the eperiment. The selected applicants on average received almost 1 more job offer, eventually allowing them to find significantly better positions for themselves. The experiment was heavily debated: on hand those who found the experiment unethical argued that those students not being selected (or not even participating in the experiment) have suffered from a disadvantaged position in the market. At the same time it is true, that such an interference could lead to an outcome that is beneficial for everyone on the job market, as well as the conclusions of such experiments could eventually lead to more efficient markets and thereby being beneficial in many applications.

Éva Tardos (Cornell University) received numerous highly prestigious awards in mathematics for her pioneering contribution to computer science (1998 Fulkerson prize, 2006 Dantzig prize, 2012 Gödel prize, 2017 EATCS (European Association for Theoretical Computer Science) prize, 2019 Neumann medal, just to mention a few). Tardos talked about the role of learning processes in equilibrium solutions of strategic games in her plenary talk regarding to two recent results.

In a Nash-equilibrium solution there is no participant optimizing her own objectives willing to deviate as long as other participants are not deviating either. Often times this not only leads to sub-optimal outcomes on society level, occasionally it happens that every participant would (strictly) benefit from a centrally coordinated, alternative outcome. The latter is not stable though in the sense that optimizing their own objectives could lead to certain (or all) participants benefitting from deviating from this centrally coordinated social welfare maximizing outcome. The price we pay for the non efficient self-interest is a key notion in algorithmic game theory, the so called price of anarchy, which is the ratio of the social welfare maximizing outcome and the (worst) Nash-equilibrium solution.

Gaitonde and Tardos (2023) focused on a similar notion, based not on the Nash-equilibrium, but on a more general solution concept: their assumption is that if a player in a game has a strategy that is beneficial for her compared to any other strategy, then the player will learn that and will choose that strategy. They studied the efficiency of this learning process in terms of social welfare and the price of anarchy and provided new theoretical guarantees in a queueing model frequently used in internet package sending. Fikioris and Tardos (2023) simiarly analyzed the role of companies' learning process placing online advertisements in budgeted algorithmic auctions.

Roger Myerson (University of Chicago) received the Nobel prize in 2007 (together with Leonard Hurwicz and Eric Maskin) for laying the foundations of mechanism design. In his online presentation he (extending one of his previous results) focused

on what kind of equilibrium solutions arise in a classical communication game and in it's dual,and what kind of connections can we establish in analyzing these solutions, showing a beautiful applciation of operational research methods in game theory and mechanism design.

Celebrating Vincent Crawford

The conference presented an ideal opportunity to celebrate Professor Vincent Crawford's (University of Oxford and University of California, San Diego)75th birthday. During the day specifically dedicated for this celebration before Crawford professor's own presentation three of his students presented major milestones of his illustrious career. First Alex Teytelboym (University of Oxford) presented the extensive literature based on the foundational labour market model of Kelso and Crawford (1982). Then Kristóf Madarász (London School of Economics) presented the outstandingly impactful Crawford and Sobel (1982) paper (more than 6000 citations) and the literature based on it, introducing the so-called cheap talk, and thus leading to new models of information mechanisms.

Nagore Iriberri (University of the Basque Country) focused on the notion of bounded (level-k) rationality and the role it plays in economics experiments. Finally, perfectly aligned with this Crawford professor presented a behavioural economics model (Crawford and Meng (2011)) as well. Based on reference-based preferences (such as the model introduced by Kőszegi and Rabin (2006)) they analyzed the decision making process and rationality of cab drivers in New York. They have found that instead if mere profit maximization cab drivers do indeed based there decisions on some kind of reference values, primarily evidenced by finishing working days earlier in case the first part of their shift deemed especially successful (thereby quickly leading them close to a certain daily reference profit value).

Finance related and other special sessions

Apart from questions related to finance appeared in many other sessions of market deisgn, in the wide range of parallel sessions there were to specifically dedicated to finance related topics One focusing on financial markets and one, organized by Jean-Jacques Herings, focusing on financial networks. In the latter the organizer himself presented as well, giving a talk about the Csóka and Herings (2023) paper. They study cooperative bankruptcy games and provide an axiomatization for the pairwise netting proportional bankruptcy rule.

The conference also provided the opportunity to dedicate sessions to two colleagues the community lost recently. Memorial sessions dedicated to Makoto Shimoji (University of York) and YingHua He (Rice University) provided an opportunity for co-authors, colleagues, friends, and occasionally for even family members to share stories and memories. ■

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