Novel Practices and Highlights from the Fourth Workshop on Mechanism Design for Social Good

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DOI: 10.1145/3465074.3465082

Abstract

The *Fourth Workshop on Mechanism Design for Social Good* was held virtually in August 2020, with a focus on work bridging research and policy. This article represents the experience of the chairs and discusses novel conference-organizing practices aimed at promoting *multi-disciplinary research for social good* and increasing *racial, linguistic*, and *geographic diversity and inclusion*.

Introduction

The *Fourth Workshop on Mechanism Design for Social Good* (MD4SG'20) was held online on August 16-19, 2020. The authors of this article co-chaired and organized the workshop.

The goal of MD4SG'20 was to highlight research where techniques from algorithms, optimization, and mechanism design, along with insights from other disciplines, have the potential to improve access to opportunity for historically underserved and marginalized communities. The workshop featured five keynote presentations, forty contributed talks including problem pitches and demos, two poster sessions, a panel discussion, and networking events, with a focus on *bridging research and policy*. To this end, participants included researchers as well as practitioners in various government and non-government organizations and industry. Due to the COVID-19 pandemic, the workshop was fully virtual, taking place on the online platforms Zoom and Gather.

The current workshop was the fourth annual workshop (since 2017) in a series of workshops on *Mechanism Design for Social Good* (MD4SG). This was the first independent MD4SG workshop, as the three previous iterations of the workshop were organized alongside the annual ACM Conference on Economics and Computation. All four workshops were organized as a part of the larger MD4SG initiative, which is a multidisciplinary and multi-institutional online research initiative that promotes research at the intersection of computer science, operations, economics, humanities and other disciplines, with the mission of bringing together a range of expertise to tackle problems impacting disadvantaged communities around the world. Since its foundation in 2016, MD4SG has grown to a community of more than 2,000 participants and organizes workshops, tutorials, colloquium series and working groups covering topics such as developing nations, discrimination and equity in algorithmic decision-making systems, environment and climate, inequality, civic participation, as well as newly-formed regional groups (Asia-Pacific, Latin America and the Caribbean).

Workshop Objectives and Main Contributions

Our goal, through the main program of the workshop and novel practices we adopted, was to organize a workshop that is *multidisciplinary*, *diverse* and *thought-provoking*. More specifically, the workshop focused on and achieved three objectives:

– **Multi-disciplinary research for social good.** Following the tradition of the MD4SG initiative and the previous workshops, MD4SG'20 brought together researchers, policymakers and other domain experts and professionals interested in improving equity and developing solutions for problems in a variety of application domains such as education, labor, environment, healthcare, algorithmic fairness, and digital platforms. Due to its interdisciplinary nature, MD4SG'20 attracted a very diverse and large group of members with backgrounds in *computer science, AI, operations research, economics, public policy* and *humanities*, while a great number of papers combined methodologies and insights from multiple fields.

  Beyond science, policy, and humanities, the workshop also explored the intersection between *art* and mechanism design for social

good. Our keynote speaker Stephanie Dinkins, Artist Fellow at the Berggruen Institute, talked about her practice as a transmedia artist working with AI, which "employs lens-based practices, emerging technologies and community engagement to confront questions of bias in AI, consciousness, data sovereignty and social equity".

- **Bridging research and policy.** Our workshop emphasized the application- and policy-oriented character of mechanism design for social good by including four different tracks which ranged from technical content (AI/ML, Theory, Empirical Studies and Policy) to more practical applications (Problems and Demonstrations).

  As a novel highlight from our main program, we encouraged, reviewed, and accepted law and policy papers. Joint research at the intersection of law, policy, economics and computation is underdeveloped. Our session on *Technology, Law, and Policy* included work from law experts on topics such as privacy, security, and gender equality.

  Several of our award-winning papers focused on *policy design*, by presenting policy-oriented research on topics such as feminicide in Latin America, educational policies for admissions at University of California or school choice in Peru and San Francisco, HIV prevention methods for homeless youth, and discrimination in labor markets.

- **Diversity and inclusion: race, language and geography.** One of the main goals of the workshop was to reach out to a broader audience and be inclusive of underserved communities in academia. Such inclusion, especially with regard to *gender, racial and geographic diversity and inclusion*, has always been a core value and strength of MD4SG.

  This year's workshop achieved a record number of *submissions (138)*, attracting more than double the number of submissions in 2019, and more than *700 registrations* from *59 countries* around the world.

  The workshop successfully reached out to communities and institutions in *Africa* and *Latin America and Caribbean* (LAC). More specifically, 20.9% of our registrants identified as Black, African American, or African, while 18% were of Hispanic, Latino, or Spanish origin. Out of 138 submissions in total, we received 7 and 22 submissions from authors based in Africa and LAC respectively.

  One of the novel practices of the workshop was *linguistic diversity*. A significant barrier for the participation of Latin American communities in similar initiatives has been the language. We released the call for participation both in *English* and *Spanish*, and our Spanish-speaking Program Committee members reviewed and shepherded 6 submissions written entirely in Spanish. In addition, our plenary speaker Natalia Ariza Ramírez (Economist at National University of Colombia and former Vice Minister of Education in Colombia) gave her plenary talk in Spanish, and conducted a discussion panel with experts from LAC entirely in Spanish. We provided real-time interpretation from Spanish to English for the two events in Spanish, and from English to Spanish for the remaining plenary talks.

  For many of our participants, including students and attendees from the Global South, finances were a barrier to attending this workshop. To assist such participants, we provided financial assistance in the form of *registration fee waiver*s to 190 participants and 21 *data plan scholarships* to participants without Internet access. 18 of the data plan scholarships were awarded to participants located in Africa.

  We hope that our outreach to Latin America and Africa will set a positive example for other conferences and research initiatives like MD4SG, and have a long-term impact on increasing the representation and the participation of Latin America in computer science, operations, and related fields.

Novel Conference Practices: Outcomes and Broad Impact

Under the current backdrop of the global COVID-19 pandemic, most academic events such as MD4SG'20 have been forced to migrate to a virtual setting. Although the specific details of effective implementation – from an infrastructural and logistical perspective – are important in their own right, we would like to highlight the most salient aspect of our experience: the very virtual nature of the MD4SG initiative (which has held year-round virtual events since its inception in 2016) along with targeted outreach massively increased the degree of *diversity and inclusion* we could foster. We intend to host virtual events well beyond the pandemic to continue to engage with

academics, local stakeholders and relevant policymakers who may otherwise be unable or less willing to attend in-person events.

MD4SG has traditionally had strong representation from international communities (in particular from within the African continent), and for many such members, attending our workshop in the past has been difficult due to: the large financial burden induced by transportation and registration costs; the logistical difficulties in travelling long distances to workshops; and/or visa difficulties when preparing for travel to events that tend to occur in the United States. Given the virtual nature of MD4SG'20, these issues were either minimized or eliminated completely, paving the way for increased participation from the communities that make MD4SG unique as an organization.

Financial Assistance: Registration Fee Waivers and Data Plan Scholarships

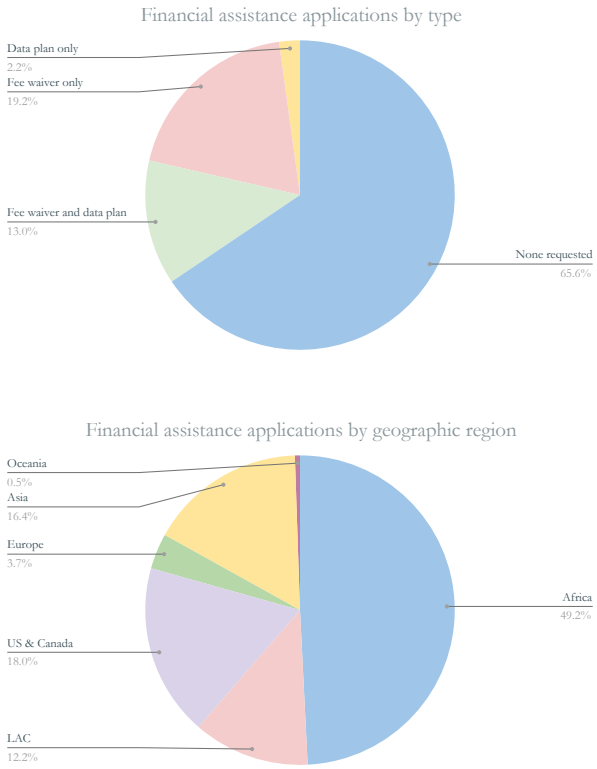
An important lesson from our experience was that registration infrastructure and financial assistance can amplify the increased participation achieved in virtual events. Although we set a 10 USD registration fee, this was mainly to prevent possible spamming attacks that occur at similar virtual events. We provided financial assistance in the form of fee waivers, and data scholarships which provided individuals with 20 USD in the form of local mobile data to participate in the workshop. We received 190 registration fee waiver requests and 87 data plan scholarship applications. The most common reasons for applying for some form of financial aid were:

(1) loss of income due to the COVID-19 pandemic, and

(2) being a student in a developing country and/or without personal income.

We granted all *190 registration fee waivers*, while we also purchased and provided *21 data plan scholarships* (of 20 USD each, in the form of local mobile data) to participants without Internet access; 18 of the data scholarships were awarded to individuals located in Africa. More information about the geographic region of participants who requested financial assistance is provided in Figure 1; our collected data showed that almost half of the financial assistance applications came from the African continent.

Figure 1: *Financial assistance*: Information about the type of financial assistance requested (left) and the geographic region of the applicants (right).



Furthermore, a key innovation within MD4SG'20 registration was the functionality for paying participants to donate towards registration waivers of others in need of assistance. We were pleasantly surprised by the generosity of the MD4SG community, as we obtained 923 USD in *donations*, many of which came in small amounts from other individuals within the very international communities we were striving to include.

Cultural and Linguistic Inclusion

One of our key goals for MD4SG'20 was to foster participation in the workshop and the research organization as a whole from within the *Latin American and Caribbean* (LAC) community. Early on we noticed that a language divide often creates a barrier for participation for individuals from LAC. Thus, in order to engage the LAC community and bridge this divide, some key changes to the agenda as well as the promotion of the workshop helped us expand its inclusiveness for presenters as well as attendees.

For example, prior to the event, we translated our call for papers to *Spanish* to enable Spanish-speaking participants to share their submissions with us. We also ensured that all our marketing materials for the event were bilingual to encourage further awareness and participation from the community. Not only did this result in us receiving 22 submissions from authors affiliated to institutions within LAC regions, but we also received 6 papers entirely in Spanish—a first for a major technical workshop like MD4SG'20. Many of these submissions addressed key issues in education and policy in LAC, opening up a new spectrum of perspectives to all the workshop participants. Correspondingly, we arranged for the submissions to be reviewed by Spanish speaking members of our Program Committee to ensure that they were impartially and accurately reviewed.

Several of the Spanish submissions were shaped into poster presentations via a *shepherding process* involving mentorship from the Program Committee. Each poster had an associated lightning talk, the material of which was presented in both English and Spanish. The sessions were recorded and hosted on YouTube to increase visibility.

From a social perspective, we tried to enhance the participation experience of our Spanish speaking attendees by providing social spaces for Spanish speakers within the Gather platform.

Finally, and perhaps most importantly, we engaged an official *real-time translation and interpretation service* to ensure that all our plenary sessions and panel discussions were live-translated from English into Spanish (and vice versa). Feedback from participants was highly positive, and indicates that this sort of initiative is not often observed in events within our community.

Once more, we note that these outreach efforts alongside the virtual nature of MD4SG'20 allowed us to increase participation from the LAC community to an unprecedented degree. We hope that other established academic events adopt similar practices to decrease linguistic barriers. Such practices have the long-term potential to drastically increase the inclusion of underserved communities in STEM.

Racial, geographic, and gender diversity

The workshop received *more than 700 registrations*, out of which 650 registrants responded to our pre-registration survey. Based on the survey responses, we collected several useful statistics.

MD4SG'20 was a truly global workshop. In terms of geography, our participants came from *59 countries* around the world (see Figure 2), with most of them coming from the following countries, in order of participation: *United States*, *Ethiopia*, *Mexico*, *India*, *Nigeria*, *Canada*, *United Kingdom*, and *Tanzania*. Thus, despite the time constraints of any online workshop, MD4SG'20 managed to have a very good level of representation around the world, especially from Africa and Latin America. Figure 3 includes the relevant statistics for each geographic region.

Figure 2: *Registration map*: The countries (current location) of registrants are highlighted in blue.

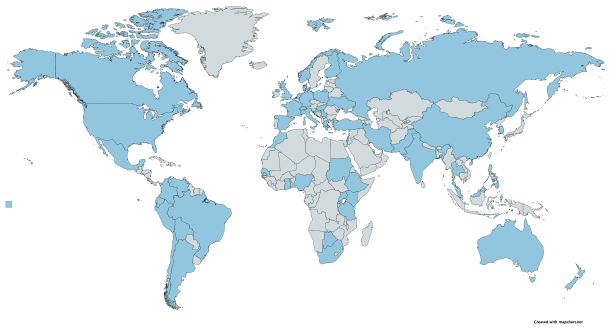
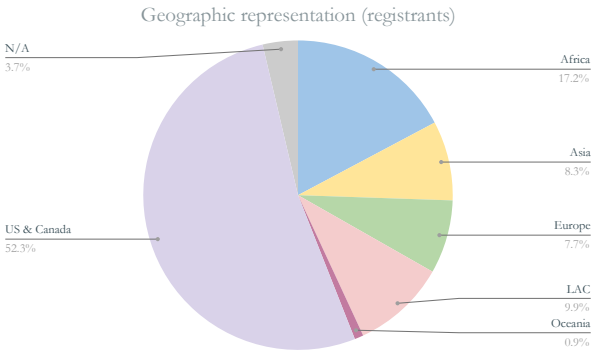


Figure 3: *Geographic representation*: Percentage of registrants based on their reported country of current location, grouped by geographic location. N/A denotes that registrants did not report their current location.



From the responses to our pre-registration survey, we also collected some useful demographic

information about the workshop registrants. Regarding the *diversity and inclusion* outcomes of the workshop, some statistics are particularly encouraging as Figure 5 illustrates. For example, in terms of racial and ethnic diversity, we had *20.9%* registrants who identified as *Black, African American, or African*, while *18%* of registrants were of *Hispanic, Latino, or Spanish origin*. With respect to gender diversity, *37.5%* of our registrants identified as *female*. Furthermore, the registrants consisted mostly of younger individuals, with 74% being less than 34 years old, and 38.2% of our registrants were graduate students while 7.5% were undergraduate students.

Academic Inclusion of Other Disciplines

One of the key pillars of the MD4SG initiative is fostering participation from a variety of disciplines to ensure well-rounded perspectives on the key issues that our community works on.

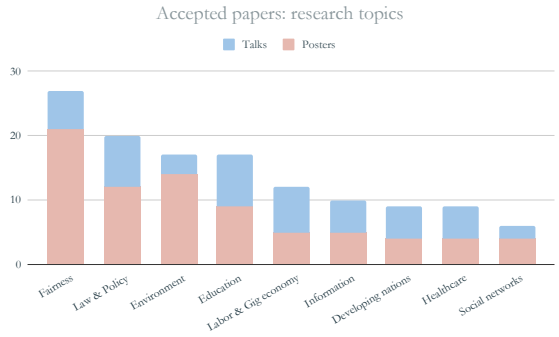
A big step towards this in our workshop was the inclusion of a number of participants from different backgrounds—most notably, *law*. To this end, we held a session with four contributed talks on the intersection of Law and Computer Science which was well-received by participants. While there was scope to further align the content of these talks to the backgrounds of the vast majority of the participants, we believe this session was a step in the right direction towards bringing these two fields together.

A great number of papers also focused on policy interventions informed by empirical methods, as well as the empirical validation of policy interventions. The Problems and Demonstrations track targeted papers from government and policy, as well as non-government organizations and industry, and included white papers documenting open problems or demonstrating prototyped and/or deployed software systems and mobile platforms.

We were particularly encouraged by the wide range of topics studied by the papers we received. As Figure 4 shows in greater detail, the most common research area was fairness in algorithmic design and resource allocation settings, followed by papers in the intersection of law and policy.

In the future, we would like to further work alongside our participants from other disciplines to ensure that their work translates more effectively into the language of our community.

Figure 4: *Research topics at MD4SG'20*: Research topics studied by accepted papers (posters, talks) at the workshop. A subset of papers focus on more than one research area.



Partnerships and Collaborations Developed

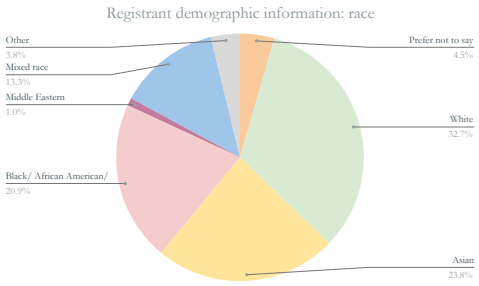
The workshop helped MD4SG solidify our existing partnerships with relevant organizations such as: Schmidt Futures and SIGAI who so kindly helped fund our event. Furthermore, the engagement we received from individuals from LAC has persisted in various ways. First of all, many working groups have increased their membership to include individuals from LAC countries who were previously unaware of MD4SG research. This is especially true of individuals from academic institutions which were heavily represented in the submission process, such as the University of Chile (who's authors led 4 different submissions). In addition, the success of the LAC outreach from MD4SG'20 has created sufficient momentum for existing MD4SG members to prepare a bilingual work agenda around regional issues for a new LAC working group.

Overall Lessons

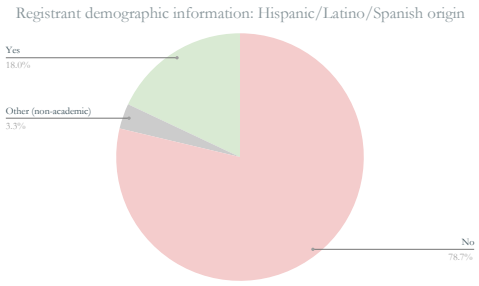
The current pandemic is a situation completely unforeseen by all of us within the community. In the midst of these difficult times, we have also learned how valuable the social angle of a workshop like MD4SG'20 can be. A common remark on our user survey is that participants enjoyed the social nature of the Gather platform driven by the social events prepared by our workshop chairs. MD4SG is currently in the process of providing a similar social space on a regular basis for MD4SG members throughout the year.

Figure 5: *Diversity and Inclusion*: Demographic information about the MD4SG'20 registrants.

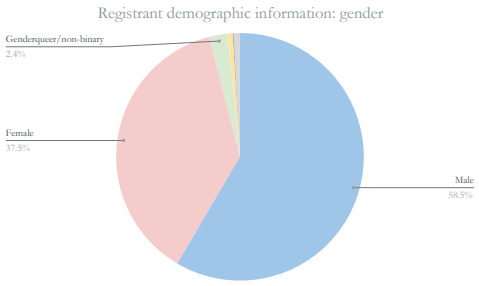
(a) Race



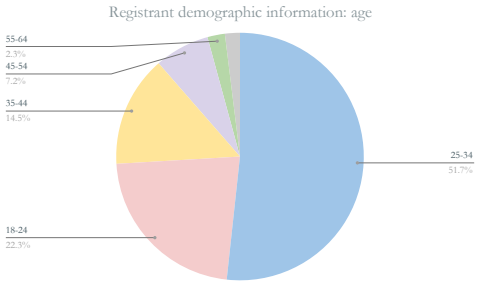
(b) Hispanic/Latino origin



(c) Gender



(d) Age



Program Highlights

Together with the whole MD4SG community, the participation at our annual workshop has also grown year by year. The first MD4SG workshop took place in 2017 and had 20 submissions. The workshop continued to grow with 30 submissions in 2018 and 65 submissions in 2019. Our virtual workshop MD4SG'20 received *more than double* the number of submissions in 2019, reaching the record number of *138 submissions* and exceeding our initial expectations.

As already mentioned, the main program of the workshop (on August 17-19) ran for three days and included 5 *keynote talks*, 40 *contributed long and short oral presentations*, a *panel discussion*, and two *poster sessions*. We also organized 4 *networking events*, starting with an informal reception on August 16.

Keynote talks

The workshop hosted 5 invited presentations which focused on topics connecting research for social good and policy design: markets without money, civil liberties and extremism, technology in support of care-giving, educational policies in Colombia, and the dialogue between art and artificial intelligence. Each talk was followed by a short presentation and an open discussion with the participants led by invited discussants. The talks were as follows:

"Research and Policy Challenges in Implementing Colombia's *Ser Pilo Paga* Program," by *Natalia Ariza Ramírez* (Economist at National University of Colombia and former Vice Minister of Education in Colombia);

"Community, Craft, and the Vernacular in Artificial Intelligence," by *Stephanie Dinkins* (Artist Fellow at the Berggruen Institute);

"Tech in Support of Caregiving: Innovation Opportunities and Ecosystem Challenges," by *Deborah Estrin* (Associate Dean for Impact at Cornell Tech);

"Maximizing the Social Good: Markets without Money," by *Nicole Immorlica* (Senior Researcher at Microsoft Research);

"How to Fight White Supremacist Extremism While Protecting Civil Liberties: A Multidisciplinary Approach Using Technology, Research, and Policy," by *Anjana Rajan* (Chief Technology Officer at Polaris).

Discussion panel

On the second day of the main program, the workshop highlighted topics from Latin America. To that end, we also hosted a discussion panel in Spanish (with live interpretation to English) which followed after the keynote talk by Natalia Ariza Ramírez and the session on Education in Practice. The focus of our panel was the intersection of policy and academia within the scope of education in Latin America. Our panelists were our keynote speaker *Natalia Ariza Ramírez*, *José R. Correa* (Professor at Universidad de Chile), and *Rafael Obregón* (UNICEF Paraguay). The engaging discussion introduced the MD4SG community to new policy-oriented problems and relevant experts, and helped the participants understand the unique challenges that policy makers and researchers face with respect to the educational system in Latin American countries, in comparison to the rest of the world and the United States in particular.

Contributed talks

The technical program included *12 long talks*, *28 short talks*, and *75 poster presentations*. The 10 sessions for contributed talks represented the wide range of topics and application domains of interest to the MD4SG community, the combination of novel and diverse methodologies as well as the strong connections of many papers to policy design. In the spirit of the workshop's theme of bridging research and policy, and to encourage the academic exchange of ideas between law and mechanism design for social good, we included a session dedicated to non-technical papers on the connections among law, technology and policy.

More specifically, the sessions were as follows: (1) *Education Policy and Diversity*, (2) *Technology, Law and Policy*, (3) *Labor Markets*, (4) *Environment, Agriculture and Food Consumption*, (5) *Education in Practice*, (6) *Healthcare*, (7) *Fairness and Inequality*, (8) *Algorithms for Policy and Governance*, (9) *Online Platforms and Civic Participation*, and, finally, (10) *Information*.

Awards

The workshop included three categories of technical awards for exemplary work (*paper awards*, *poster awards*, and *participant awards*), while *Most Popular Poster Awards* recognized the most successful poster presentations based on participants' votes. Three *Best Tweet Awards* were given to the participants with the most engaging tweets or the most active social media coverage of the workshop.

Related to the workshop theme of bridging research and policy, the award-winning papers highlighted new research directions for policy-oriented work in the MD4SG community. They spanned various critical application domains such as education, labor, healthcare, and criminal justice in the United States and worldwide, successfully combining different methodologies in a novel manner. The winning papers that equally shared the **Best Paper Award** were:

- **"Top Percent Policies and the Return to Postsecondary Selectivity"**, by Zachary Bleemer, and
- **"Competition under Social Interactions and the Design of Education Policies"**, by Claudia Allende.

Both papers focused on the design of effective educational policies and demonstrated exceptional, policy-driven research that can have a positive impact on the lives of thousands of students from less privileged backgrounds. The former paper used novel data from a "Top Percent" admissions policy implemented by the University of California to analyze the impact on barely-eligible applicants on their university admission and future career outcomes, while the latter studied the role of peer preferences in school choice and the design of optimal assignment policies using data from elementary schools in Peru.

The **Best Student Paper Award** was awarded to two papers with student leading authors:

- **"Large-scale Clinical Trial of an AI-augmented Intervention for HIV Prevention in Youth Experiencing Homelessness,"** by Bryan Wilder, Laura Onasch-Vera, Graham Diguiseppi, Robin Petering, Chyna Hill, Amulya Yadav, Eric Rice and Milind Tambe, and
- **"All Things Equal? Social Networks as a Mechanism for Discrimination,"** by Chika Okafor.

The paper by Wilder et al. focused on the issue of HIV prevalence in homeless youth and the design and successful implementation of a related clinical trial, with a particular highlight on community

engagement and informational bottlenecks. The other award-winning paper by Okafor developed a theoretical labor market model with referrals and showed that the combination of homophily and different group size can lead to disparities across different social groups.

This year, we also introduced the **New Horizons Award**, to highlight promising, ongoing work in an emerging area of research. Two working papers shared this award:

- **"Feminicide and Machine Learning: Detecting Gender-based Violence to Strengthen Civil Sector Activism,"** by Catherine D'Ignazio, Helena Suarez Val, Silvana Fumega, Harini Suresh, Isadora Cruxen, Wonyoung So, Maria De Los Angeles Martinez and Mariel Garcia-Montes, and
- **"Modeling Assumptions Clash with the Real World: Configuring Student Assignment Algorithms to Serve Community Needs,"** by Samantha Robertson, Tonya Nguyen, and Niloufar Salehi.

The former paper highlighted a highly relevant topic to the Latin American region by adopting machine learning tools to understand the complex issue of feminicide and inform policy at all levels. The latter paper studied how the theoretical guarantees of the San Francisco Unified School District's student assignment algorithm can differ from the practical behaviour of parents using the algorithm.

Finally, the workshop featured awards for papers accepted for poster presentation. Based on participants' votes, three papers (one written and presented in Spanish) shared the **Most Popular Poster Award**:

- **"Laboratorio de Derecho y Política Local, propone: Red de Monitoras y Monitores Derecho para Todos,"** by Lorayne Finol Romero, Cecilia González Jeria and Maximiliano Núñez Gómez,
- **"Guaranteeing Maximin Shares: Some Agents Left Behind,"** by Hadi Hosseini, Andrew Searns and Sawyer Welden, and
- **"A Comparison of Living Standards Across the States of America,"** by Vegard Nygaard and Elena Falcettoni.

Acknowledgments

It was a wonderful learning experience to preside over MD4SG'20 as co-chairs and work together with so many people to organize this workshop. We are indebted to our *Steering Committee* members Rediet Abebe, Kira Goldner, Jon Kleinberg, Illenin Kondo, Sera Linardi, Irene Lo, and Ana-Andreea Stoica, for their guidance and support in organizing the workshop. We are also very grateful to our *Area Chairs* Zoe B. Cullen, Daniel Freund, Abhishek Gupta, Dina Machuve, Robert Manduca, Araba Sey, Ana-Andreea Stoica, Sam Taggart, Matt Weinberg, Bryan Wilder, and—of course—all the 74 members of our *Program Committee* for their invaluable help with the reviewing process, as well as our *Organization Chairs* Jessie Finocchiaro, Michelle Gonzalez, Meareg Hailemariam, Wanyi Li, Duncan McElfresh, Amita Shukla, Logan Stapleton, and Lily Xu, for their hard work in planning and organizing the workshop. We would also like to thank Jenny Lam and the department of Management Science and Engineering at Stanford University for their assistance throughout the registration process and financial planning of the workshop, *Virtual Chair* for their assistance in event planning, platform design and organization, and Pat Gutierrez for her wonderful translation work. Finally, we are extremely grateful to the sponsors of our workshop, *ACM SIGAI Activities Fund* and *Schmidt Futures*, for their generous financial support.

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Faidra Monachou is a Ph.D. candidate in Management Science and Engineering at Stanford University. She is interested in market design and the study of discrimination, diversity, and information in socioeconomic problems that arise in matching markets. Faidra received her undergraduate degree in Electrical and Computer Engineering from National Technical University of Athens in Greece.