The Second International Workshop on

Game Theory, Social Choice, and Mechanism Design

April 16–17, 2026 |

INSEA – National Institute of Statistics and Applied Economics, Rabat, Morocco

Organized by

SI2M Laboratory–Laboratory for Research in Information Systems, Intelligent Systems and Mathematical Modeling

About the Workshop

The Second International Workshop on Game Theory, Social Choice, and Mechanism Design brings together researchers working on the theoretical and applied aspects of collective decision-making. The workshop aims to foster interactions between scholars in game theory, social choice, and mechanism design, with a particular emphasis on recent advances in implementation theory, voting theory, and allocation problems. The program combines invited talks, contributed presentations, and PhD defenses, providing a platform for both senior and junior researchers to exchange ideas. Special attention is given to the interaction between theory and applications, including institutional design, electoral systems, and economic mechanisms. The workshop also aims to strengthen collaborations between Moroccan institutions and international research centers.

About SI2M Research Laboratory

The workshop is organized by the **SI2M Research Laboratory** (Laboratory for Research in Information Systems, Intelligent Systems, and Mathematical Modeling), established in 2017 and directed by Prof. Ahmed Doghmi since October 2023. SI2M conducts interdisciplinary research at the intersection of computer science, artificial intelligence, and applied mathematics. Its activities cover a wide range of areas, including information systems, intelligent systems, artificial intelligence, network and systems security, operations research, decision theory, game theory, social choice, and political economy. The laboratory combines both theoretical and applied approaches, with particular expertise in knowledge representation, multi-agent systems, combinatorial optimization, cooperative and non-cooperative game theory, and algorithmic decision-making. SI2M actively promotes international collaboration and remains committed to playing a central role in PhD training, as well as in organizing scientific events such as workshops, conferences, and seminars.

Organizing Committee

- Prof. Ahmed Doghmi (INSEA)
- Prof. Rachid Benmansour (INSEA)
- Prof. Abdeslam Kadrani (INSEA)

Invited Participants

- Mostapha Diss (University of Franche-Comté)
- Abdelhalim El Ouafdi (Cadi Ayyad University)
- Stéphane Gonzalez (Saint-Etienne School of Economics -Jean Monnet University)
- Olga Gorelkina (Mohammed VI Polytechnic University (UM6P))
- Eric Kamwa (University of Lorraine)
- Alexey Kushnir (Mohammed VI Polytechnic University (UM6P))
- Rida Laraki (Mohammed VI Polytechnic University (UM6P))

- Vincent Merlin (University of Caen Normandy)
- Abderrahmane Ziad (University of Caen Normandy)

Thursday, April 16

09:00 – 09:15	**Opening Session** Welcome address – Director of CEDOC
09:15 – 10	**Mostapha Diss (University of Franche-Comté)** *A Weighted Mechanism for Minority Voting in Sequential Voting*
10: – 10:45	**Vincent Merlin (University of Caen Normandy)** *Searching for Optimal Quotas in Weighted Quota Games: Lessons from the French Inter-communal Councils*
10:45 – 11:15	**Coffee Break**
11:15 – 12:00	**Eric Kamwa (University of Lorraine)** *D'une rive à l'autre : ce que l'expérience antillaise peut apprendre au Maroc face aux sargasses*
12:00 – 14:00	**Lunch**
14:00 – 14:45	**Abdelhalim El Ouafdi (Cadi Ayyad University)** *Probabilités électorales sous IAC : améliorations méthodologiques*
15:00 – 17:00	**PhD Defense** – Badr Bahloul *Strategic-candidacy in Multi-winner Elections: Insights into Electoral System Design*
17:00 – 17:30	**Coffee Break**

Friday, April 17

9:0 – 9:45	**Saloua Amrani Zerrif (INSEA)** *Measuring Freedom of Choice: A Normative and Algorithmic Approach*
09:45 – 10:45	**Stéphane Gonzalez (Saint-Etienne School of Economics - Jean Monnet University)** *Approval Voting with Fixed Electorates, Fixed Agendas and No Ballot Assumptions*
10:45– 11:15	**Coffee Break**
11:15 – 12:30	**Alexey Kushnir (Mohammed VI Polytechnic University (UM6P))** *Optimal Mechanism Design for Multiple Goods via Network Flows*
12:30 – 14:30	**Lunch**
15:00 – 17:00	**PhD Defense** – Mohamed Bouchta *Essays in Game Theory: Implementation in Strong Nash Equilibrium and Applications to Allocation Problems*
17:00 – 17:30	**Coffee Break**
17:30 – 18:00	**Round Table** Future Research Collaborations in Game Theory, Social Choice, and Mechanism Design

Abstracts

Mostapha Diss (University of Franche-Comté)

Titre : A weighted mechanism for minority voting in sequential voting

Co-authors: Romain Biard and Salma Larabi

Abstract: We propose a weighted minority voting mechanism within a two-round sequential voting process, in which all individuals retain their voting rights in the second round but with different weights depending on the first-round outcome. In a utilitarian framework where individuals have a given utility function that depends on the outcomes of each round, first-round winners are identified and vote with reduced weight in the second round, while losers retain full weight. By giving greater weight to first-round losers, this design ensures that first-round winners continue to contribute to the final decision without dominating it, thereby mitigating repeated disadvantages for losers. We then compare the expected aggregate utility of society across different levels of second-round weight assigned to first-round losers, including both the simple majority rule - where all voters carry equal weight in both rounds - and the limiting case of minority voting where first-round losers receive no weight in the second round. To do so, we analyze two models: one in which individual utility derives solely from

material payoffs, and another in which a form of harmony is considered, whereby individuals incur a utility loss if others repeatedly belong to the losing minority. This analysis allows us to assess how strategic behavior affects the effectiveness of the proposed mechanism.

Vincent Merlin (University of Caen Normandy)

Title: Searching for Optimal Quotas in Weighted Quota Games: Lessons from the French Inter-communal Councils

Co-author: Zineb Abidi Perier

Abstract: It is known that in weighted majority games, the influence of a player might be much more important than the number of votes he controls. For example, the Banzhaf index of a player with $k >> 1$ votes tends to 1 when he is surrounded by a large number of players with only one vote. This situation can be problematic in the French Inter-communal council, where the number of votes must be proportional to the population of each municipality. A way to reduce the influence of major municipalities would be to increase the quota, making it more difficult for them to build winning coalitions. In this paper, we compute the Banzhaf power of the municipalities, belonging to 1,251 different French inter-communal structures, for quotas ranging from 50% to 98%. We are able to determine the optimal quota in each council, which minimizes the discrepancies between the weights and the Banzhaf power. However, it seems difficult to derive a general rule from our results that could be applied in all the cases.

Eric Kamwa (University of Lorraine)

Titre: D'une rive à l'autre : ce que l'expérience antillaise peut apprendre au Maroc face aux sargasses

Résumé: Depuis plus d'une décennie, les Antilles françaises vivent au rythme des échouages massifs de sargasses. Ce phénomène, d'abord perçu comme une anomalie passagère, s'est progressivement installé comme une crise structurelle aux conséquences sanitaires, écologiques et économiques considérables. Cette intervention propose un retour d'expérience critique sur la gestion de cette crise, dans le but d'éclairer les choix que le Maroc peut encore faire en amont.

L'un des enseignements les plus saisissants de l'expérience antillaise est l'absence de responsabilité clairement assignée. Entre l'État, les collectivités territoriales et les instances européennes, la compétence en matière de gestion des sargasses est restée durablement floue, chacun renvoyant à l'autre la charge d'agir. Cette dilution institutionnelle a considérablement alourdi les délais de réponse et fragilisé la coordination opérationnelle sur le terrain.

Face à une crise dont le coût annuel est estimé à plusieurs dizaines de millions d'euros pour les seules Antilles, les budgets alloués aux Plans Sargasses successifs sont restés structurellement insuffisants. Les financements ont été réactifs, fragmentés, et déconnectés des réalités saisonnières. L'absence de mécanisme de financement pérenne a empêché la constitution d'une véritable capacité de réponse : équipements de collecte inadaptés, communes littorales livrées à elles-mêmes, logistique improvisée d'une saison à l'autre. La dépollution des littoraux est ainsi devenue un fardeau financier sans propriétaire.

Face aux défaillances institutionnelles, les populations locales et les associations ont souvent pris en charge ce que les pouvoirs publics ne pouvaient ou ne voulaient pas assumer. Cet engagement citoyen, réel et précieux, ne saurait toutefois être un substitut à une politique publique assumée. Il révèle, en creux, l'ampleur du désengagement institutionnel et le sentiment d'abandon ressenti

par les communautés littorales. Mobiliser les citoyens sans leur donner les moyens, le cadre et la reconnaissance nécessaires, c'est transformer une ressource démocratique en variable d'ajustement budgétaire.

Les alertes scientifiques existent côté marocain. La fenêtre préventive est encore ouverte. En s'appuyant sur l'expérience antillaise, ses erreurs autant que ses acquis, le Maroc dispose d'une opportunité rare : construire dès maintenant une gouvernance claire, un financement anticipé et une mobilisation citoyenne structurée, plutôt que de les improviser sous la pression d'une crise déjà installée.

Mots-clés: Sargasses, gouvernance littorale, responsabilité institutionnelle, financement public, engagement citoyen, Antilles, Maroc, gestion des risques côtiers.

Abdelhalim El Ouafdi (Cadi Ayyad University)

Titre: Probabilités électorales sous IAC : améliorations méthodologiques

Résumé: Le présent travail présente quelques améliorations méthodologiques pour le calcul des probabilités de résultats électoraux sous l'hypothèse de Culture Anonyme Impartiale (IAC). Afin de surmonter les limites computationnelles rencontrées en grande dimension par les logiciels standards tels que LattE et Normaliz, des techniques alternatives d'évaluation du polynôme d'Ehrhart et de dénombrement des points entiers dans des polytopes rationnels sont développées. Ces approches reposent, d'une part, sur une transformation géométrique ramenant le polytope à l'intersection d'un hypercube et d'un hyperplan et, d'autre part, sur une méthode d'approximation spectrale permettant d'isoler les composantes ondulatoires dominantes du système. Les résultats obtenus montrent parfois un gain substantiel en temps de calcul, pouvant atteindre 60%, et rendent ainsi plus accessible l'analyse multidimensionnelle de problèmes tels que la manipulabilité électorale et l'efficacité de Condorcet.

Badr Bahloul (INSEA)

Title: Strategic-candidacy in Multi-winner Elections: Insights into Electoral System Design

Abstract: This thesis studies strategic candidacy in multi-winner elections: settings where a committee of fixed size is chosen from a larger pool of potential candidates. A game-theoretic framework of candidacy is developed in which candidates choose whether to stand or withdraw and where coalitions of candidates may coordinate their participation to influence the identity of the elected committee. The thesis evaluates robustness to such manipulation using the concept of candidate-coalition strategy-proofness (CCSP). The technical contribution is threefold. First, committee scoring rules are analysed under a nonresolute interpretation (where tied winning committees are treated as the object of strategic concern) and parameterised characterisations of CCSP are provided in terms of the number of voters n, the committee size k. Second, the non-resolute analysis is compared with a resolute model in which tie-breaking procedures are public and binding, showing that knowledge of tie-breaking can materially change when some rules are immune to coalition manipulation, and that voter-based tie-breaking can recover strategy-proof election-points for BLOC and k-Plurality. Third, stable rules are studied, and restrictions on the preference domain (notably single-peakedness) are shown to alter the set of rules satisfying CCSP.

Methodologically, the thesis combines constructive examples that expose vulnerabilities, combinatorial arguments that establish impossibility, and algebraic analysis of scoring parameters to obtain tight, parameter-dependent results. The findings clarify how the interaction of electorate size, committee size, rule structure, tie-breaking knowledge, and admissible preference domains determines whether

multiwinner rules can be resistant to coordinated candidate entry and exit. The results inform the design and evaluation of multi-winner electoral institutions where candidate behaviour is endogenous.
Keywords: strategic candidacy, multi-winner elections, committee scoring rules, tie-breaking, Condorcet committees, strategy-proofness.

Saloua Amrani Zerrif (INSEA)

Title: Measuring Freedom of Choice: A Normative and Algorithmic Approach

Co-author: Ahmed Doghmi

Abstract: This paper analyzes existing approaches to freedom of choice and proposes a novel framework of sufficient normative conditions for its definition. It focuses on the comparison of two sets of alternatives, A and B, in settings where neither set is a subset of the other—an issue central to social choice theory and related disciplines. We develop a philosophical argument to justify the proposed framework and present an algorithmic method for measuring freedom in n-dimensional spaces. An illustrative example shows how this approach captures both the quantitative and qualitative dimensions of freedom. Our findings suggest that measuring freedom in multidimensional settings requires balancing logical consistency between sets with the maximization of an agent's effective freedom of choice, with implications for understanding basic human rights and freedoms. This work contributes to the theoretical foundations of social choice and offers potential applications in economics, political decision-making, and allied areas where the measurement of freedom is relevant.
Keywords: Freedom of choice, Multidimensional set comparison, Axioms of freedom, Algorithm for set comparison, Sen's axiom, Pattanaik–Xu's axiom.

Stéphane Gonzalez (Saint-Etienne School of Economics - Jean Monnet University)

Title: Approval Voting with Fixed Electorates, Fixed Agendas and No Ballot Assumptions

Co-author: Raffaele Berzi

Abstract: We provide an axiomatic characterization of approval voting that does not impose any restriction on the structure of ballots. Voters submit abstract signals whose approval content is identified endogenously through the characterization itself. In contrast to the standard approach in the literature, we consider a fixed electorate and a fixed set of alternatives, and our analysis does not rely on consistency axioms or population-variation arguments. Approval voting is characterized by four axioms: (i) a richness condition requiring that every nonempty subset of alternatives can arise as the outcome under some unanimous profile; (ii) a unanimity axiom guaranteeing that alternatives supported by all voters are selected; and (iii) two axioms that adapt the classical principle of positive responsiveness to our abstract environment. Our results demonstrate that the distinctive properties of approval voting can be identified without presupposing any particular ballot format.

Alexey Kushnir (Mohammed VI Polytechnic University (UM6P))

Title: Optimal Mechanism Design for Multiple Goods via Network Flows

Co-author: Ali Shourideh.

Abstract: In this paper, we revisit the multiple-good monopolist problem, in which a seller designs the optimal mechanism for the sale of multiple goods to a buyer with multiple dimensions of private information. Using a first-order approach to simplify the problem, we use network flow methods to identify sufficient conditions for optimality of candidate allocations. Our main result is that within a large class of mechanisms, optimality under the first-order approach is equivalent to a first-order stochastic dominance condition in the direction of trade. We apply this result to several settings and identify conditions on the distribution of types under which deterministic and random bundles are optimal, and derive the optimal mechanism for several families of distributions with correlated types.

Mohamed Bouchta (INSEA)

Title: Essays in Game Theory: Implementation in Strong Nash Equilibrium and Applications to Allocation Problems

Abstract: This thesis contributes to the literature on game theory and mechanism design, focusing on strong Nash implementation. While classical results such as Maskin's theorem [1977, 1999] provide simple conditions for Nash implementation, achieving strong Nash implementation–that is, robustness against coordinated deviations by coalitions–remains significantly more challenging. Existing characterizations are often complex and difficult to apply, and simple, tractable sufficient conditions are largely missing. This thesis addresses this gap by identifying structural and behavioral conditions that enable strong implementation of socially desirable outcomes.

The first contribution examines the implementability of the weak core in simple cooperative games where winning coalitions satisfy natural properties such as monotonicity, non-emptiness, and inverse consistency. It provides conditions under which the weak core can be implemented in strong Nash equilibrium, together with a corresponding Nash-implementation result for the two-agent case. The analysis relies on a strengthened version of Maskin monotonicity—Y -monotonicity—combined with unanimity, thereby extending the Nash-implementation perspective developed by Shinotsuka and Takamiya and building on Yi's strengthened monotonicity requirement [2003, 2012]. The second contribution introduces a domain condition called Agents with Separately Exclusive Alternatives (ASEA). This condition captures environments in which two agents each hold an alternative that they strictly prefer, exclusive relative to the other's preference, while the remaining agents weakly prefer socially selected outcomes. Such asymmetries generate credible threat points that constrain collective deviations, allowing strong implementation of social choice correspondences satisfying weak Pareto optimality and Y-monotonicity.

The third contribution incorporates a behavioral dimension by studying strong implementation under partial honesty. Even minimal honesty, such as the presence of a single partially honest agent, can discipline strategic behavior and expand implementability [2012, 2018]. Combining partial honesty with the ASEA structure, the thesis derives robust strong-implementation results and introduces two variants–Weak-ASEA and Robust-ASEA–each paired with weak Pareto optimality and weak Pareto dominance under different honesty regimes.

The results are applied to matching markets, fair allotment problems with restricted domains, efficient sharing rules, and core solutions. Overall, the thesis provides new structural and behavioral insights that enhance strong Nash implementation and inform the design of mechanisms resilient to both individual and coalitional deviations.

Keywords: Game theory; implementation; strong Nash equilibrium; ASEA; partial honesty; Pareto efficiency; allocation problems.