Research Agenda

Renjie Zhong

My current works contribute to information design and mechanism design, specifically in **utilizing information structures as screening instruments**. These involve the **joint design of multi-dimensional screening and information**.

Designing screening policies to mitigate information asymmetry is a cornerstone of economic theory. In many contexts, designers *design persuasion mechanisms*, i.e., use information structures to screen agents' private information. Examples include allocating and designing tests or investigations, pricing information products (such as data, consultancy, scores, and advertisements), and lobbying. Dating back to Admati and Pfleiderer [1986] and Admati and Pfleiderer [1990], the literature can be classified into three strands; persuasion mechanism without transfer (Kolotilin et al. [2017], Guo and Shmaya [2019], Ely et al. [2021], Dasgupta [2023]), persuasion mechanism with transfer (Li and Shi [2017], Bergemann et al. [2018], Yang [2022]), and mechanism design with persuasion (Bergemann and Pesendorfer [2007], Bergemann et al. [2022]).

My first work, *Selling Training Data*, characterizes revenue-maximizing policies for data brokers to **design and price supplemental datasets to buyers with private baseline datasets**. Buyers may obtain private datasets externally or collect them themselves. Private datasets influence the evaluation of supplemental datasets by altering outside options and how these datasets are merged in decision-making. This problem reduces to a *multi-dimensional screening problem* with *obedience constraints* and *double deviations*. These constraints simplify the menu by imposing rigidity. In this framework, we can re-interpret and extend Bergemann et al. [2018].

My second work, *Optimal Data Procurement with Tests*, addresses how to **design procurement mechanisms with inspection when data buyers possess baseline datasets to verify the purchased datasets**. The goal is to minimize transfers subject to eliciting truthful reporting by data collectors. Current results show that, without loss of optimality, this problem can be reduced to a screening mechanism subject to *a linear feasibility constraint between allocation and transfer*.

Broadly speaking, the mechanism design where **information structures as sources of information asymmetry (private type)** is a specific class of **multi-dimensional mechanism design problem.** Multi-dimensional screening is notoriously hard (Armstrong and Rochet [1999]). The optimal menu can be infinitely complex (Daskalakis et al. [2017]), while simple menus yield negligible profits (Manelli and Vincent [2007], Hart and Nisan [2019]). The literature imposes additional assumptions to justify optimality of certain bundling policies, such as robustness concerns (Carroll [2017], Deb and Roesler [2023]), distributional assumptions (Haghpanah and Hartline [2021], Yang [2023]), certain class of mechanisms (Hart and Reny [2015]), convergence rate (Frick et al. [2024]). In future work, I aim to **generalize the methodological insights in my current works to explore a foundational framework in this field**.

Beyond the above, my research interests can be organized into two branches: (1) organization structure design, (2) culture and mechanism design. I also have broad interests in other areas of economic theory, including *model misspecification*, *dynamic learning and statistical inference in games*, and *testing the performance of economic models*.

1. Organization Structure Design.

1.1. Using Organization-specific Instruments as Incentive/Commitment Tools. Literature shows that internal incentive schemes (Winter [2004], Halac et al. [2021]), delegation systems (Alonso et al. [2008], Frankel [2014]), communication structure (Alonso and Matouschek [2008], Matouschek et al. [2024]) will shape organization performance. Beyond these, the organization designer can design *position*, *clauses/rules*, *welfare policies*, and *task allocation* as incentive and commitment tools. For example, the organization designer can allocate ex-post bargaining power to positions to ensure commitment and incentivize effort.

1.2. Robustly Optimal Organization Structure. An organization should handle tasks in different categories. For example, tasks in political organizations can be classified as environmental protection, administration reform and legislation, economic policy and regulation, and so on. Organization designer sets different sectors, i.e. the horizontal structure of organization, to divide these tasks. The designer also sets an award scheme to incentivize agents in different sectors to exert effort. Tasks may have correlations ambiguous to the designer. I am interested in what is the robustly optimal task allocation and reward design mechanism.

2. Culture and Mechanism Design.

2.1. Model Persuasion and Mechanism Design. Motivated by the conceptual framework analyzing interactions between culture and institutions (Acemoglu and Robinson [2024]), decision making under imperfect causal relations (Spiegler [2016]), model persuasion (Schwartzstein and Sunderam [2021]), and learning under different models (Mailath and Samuelson [2020]). I am interested in developing a theoretical framework to explore the *joint design of models/narratives and mechanisms* and *dynamics between models and institutions*. Institution designers use narratives/ideology/story to justify institutions, which in turn reinforce these narratives/ideology/story. I am dedicated to exploring the diversity of social configurations under this framework.

2.2. Culture-neutral/dependent Mechanism Design. The implementability and performance of a mechanism depend on culture and social norms. Agents' strategies in optimal mechanisms may exhibit morally and culturally dependent features. For example, the standard revelation principle in the static screening model implies that the mechanism designer can without loss of generality restrict the attention to truthful-telling mechanisms. In other words, the designer designs mechanisms inducing *agents behaving honestly*. These mechanisms perform well both in *economics* and *culture*. Given these observations, my broad vision is to conceptualize, formalize and characterize culture-related and culture-neutral mechanisms.

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