

## M.I.TO LAB.

## Self-organization of collective decision-making

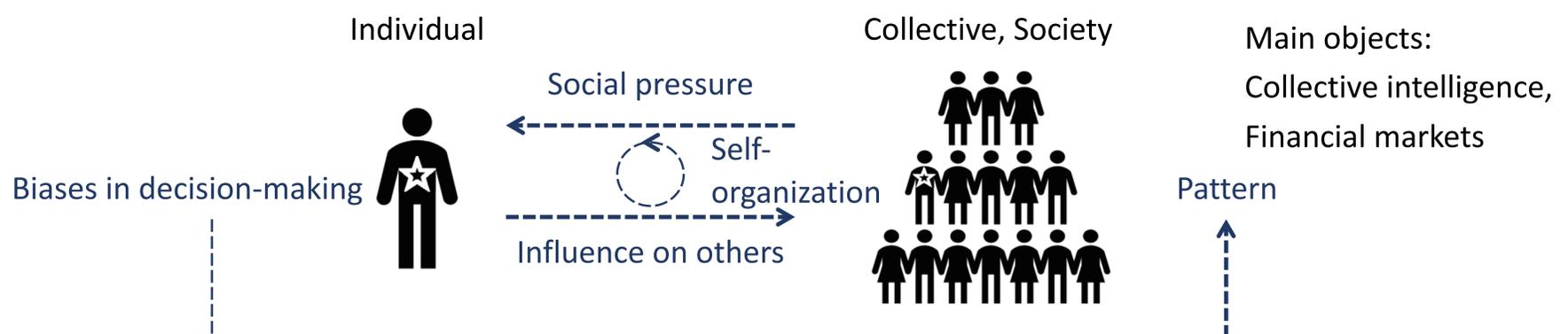


Department of Human and Social Systems  
Center for Social Complex Systems

Mathematics for Collective Decision-Making

## Self-organization of collective decision-making

The decision-making of each individual and the collective is affected by each other. We focus on the patterns within collectives formed through such mutual interactions.



## Investigation of collective decision-making using mathematical approaches

We investigate patterns in collective decision-making and society using analytical calculations and data analysis.

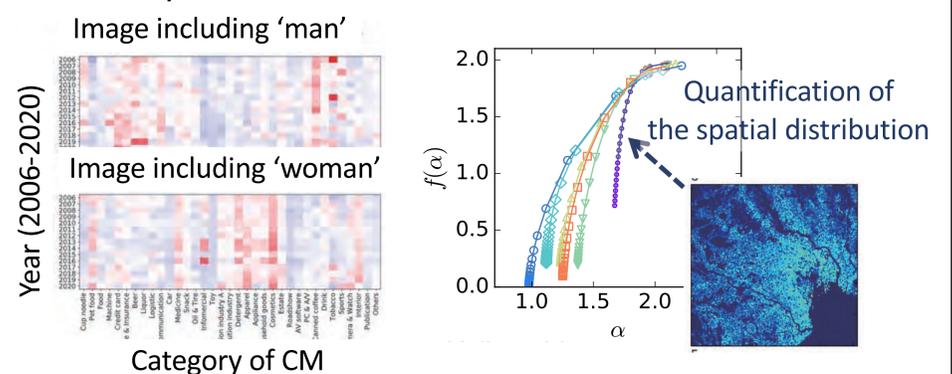
- ❖ Algorithm for maximizing an individual's accuracy in collective decision-making

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1:  $S = \{1\}, T = \emptyset, R = \emptyset$ 
2: for  $2 \leq n \leq N$  do
3:   if  $\sum_{m \in S} r_m^* - \sum_{m \in T} r_m^* > r_n^*$  then
4:      $R \leftarrow R \cup \{n\}, Y_n = s$ 
5:   else if  $\sum_{m \in T} r_m^* - \sum_{m \in S} r_m^* > r_n^*$  then
6:      $R \leftarrow R \cup \{n\}, Y_n = t$ 

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- ❖ Capturing hidden patterns in society through the analysis of socioeconomic data



## Who decides and when?

The timing of individuals' decisions significantly affects the correlation structure of individuals' opinions. We are focusing on the heterogeneous distribution of individuals' decision timings.

