Q: Tell me about your work.

My job market paper is on the design of committee search. For example, you are interviewing candidates sequentially, one by one, until this position is filled. And suppose after each interview, you have to decide right away whether to hire the candidate or continue searching. (You can also think of one candidate as the best one in a group of candidates, you can choose to hire that person, to interview another group of people later.) The main problem is, each one of you have different preferences over the candidates, so my question is: how to collectively decide when to stop interviewing and hire someone? It turns out a lot of decision rules are implementable, for example, every member can submit a rating between 0 and 10, and the candidate is hired if the sum of the ratings is larger than some threshold, or some weighted average is above some threshold, and the weights can change over time. The contribution of my paper is showing that all implementable rules are payoff-equivalent to randomizations among a very simple class of voting rules, and the rule is like this: every member writes down one of three things: veto, approve, or recommend. If anyone vetoes me, then I should not be hired. If everyone approves me, then I also should not be hired. I should be hired only when at least one of you recommends me and everyone else approves me. That should happen after every interview. The decision also needs to be linked over time. Sometimes, you may not be given the choice to approve or to veto. For example, if someone vetoes too many times, then that person may not be allowed to veto in the future. Also, in the last few periods, you may be asked not to approve a candidate but only either veto or recommend someone. So again, my main result is that all implementable decision rules are payoff-equivalent to randomization among those simple voting rules I just described, and in particular, all the Pareto optimal rules are like this, so when making these decisions, you can restrict your attention to only using these simple voting rules.

In the existing literature, one group of research focuses on search problems with transfers. So, one member can pay another member to hire someone or not hire someone. In my paper, these transfers are not allowed. The other group of research that focuses on search without transfers, they focus on a small class of mechanisms, for example, unanimity rule, majority voting rule, or token mechanism, or some other virtual budget mechanisms and find the optimal ones or implementable ones among those special mechanisms. In my paper, I have no such restrictions, I allow all possible (direct) mechanisms, and I find the optimal and implementable ones, to be payoff equivalent to these simple voting rules.

I call these voting rules ternary rules because there are three choices, veto, approve, and recommend. The intuitive explanation is that, for any implementable decision rule, the domain can be divided into three regions: the veto region, the approval region and the recommendation region, and they only differ from ternary rules in the region where everyone approves. In an arbitrary decision rule, the candidate may or may not be rejected in this region where everyone approves, but in ternary rules, the candidate is always rejected. So, the intuition is that if everyone thinks that candidate is just okay, then if they wait for one more period, they will get someone, on average, who is around the same for everyone, and maybe better for at least one person. That's why always rejecting in this region is the best choice, and that's why ternary rules are Pareto optimal.

The model can be applied to other search problems such as the design of how a couple can search for a house. In each period, the couple looks at a house, they have different preferences over the house, but they need to decide collectively whether they want to buy it. One house is gone before another house appears, so the decision is irreversible. My solution is every time, the couple say whether they love the house, they are okay with it, or they hate it, and the rule is: they buy the house the first time no one hates it and at least one person loves it. To link decisions over time, for example, if one person hates everything, then at some point, the other person should just become the dictator and make the decision him or herself.

Q: What other essays have you completed for your dissertation?

I have another paper on dynamic mechanism design with transfers. In my job market paper, there are multiple agents and monetary transfers are not allowed, that's why voting rules are used. In my other paper, there is a single agent and transfers are allowed, so principal-agent problem. The transfer is between the principal and the agent. The major difference is that in my job market paper, the committee can stop for only one reason, to hire the candidate. In my other paper, the agent can stop for more than one reasons, for example, they can stop and not hire anyone, they can hire two people, and so on. My other paper gives conditions for implementability when transfers are allowed, and it provides formulas for the transfers. It can be the model of how the government should design employment insurance payments. The payments are used to influence the worker's decision of when to stop searching and when to accept an offer.

Q: What are you working on?

I am working on the school choice problem in which I find how students should be allocated to schools. For example, I have N schools, and groups of students who are living next to those schools. The problem is, for example, the students living next to school 1 may prefer school 2. I show that in this environment, the only the only mechanism that is efficient, envy-free and treats students living around the same area equally, is a modified version of the probabilistic serial mechanism, and I provide a way to find the optimal one, with respect to some social choice rules. So, the first step is that I find the optimal capacities that specify the number of students living in each area that should be allocated to each school. Then I run something similar to the probabilistic serial mechanism. So, imagine each school as a pie with size that is equal to the capacities, every student simultaneously "eats" their favorite pie at the same rate. They keep "eating" until the pies are completely "eaten". At the end, the amount of pie a student "eats" represents the probability he or she gets allocated to the school that's represented by that pie.

Q: What is your research agenda for the next several years?

At this moment, I want to finish my work in progress on the school choice problem. After that, I want to continue to work on related matching problems. A few problems I have in mind right now are about TA allocation and lecture and tutorial room allocation. Personally, sometimes I don't like my TA allocations or I don't like the room locations: they are way too far from my department. So, I wonder if the same thing happens to other people and if it is, the mechanism they use is not Pareto optimal. That's why I am interested to find the optimal mechanisms for these problems, and I want to implement these algorithms so that they can be used to actually allocate students, TAs, and rooms. After that, I would also like to go back to other dynamic mechanism design problems, and I want to learn behavioral economics to see if there are behavioral models that I can use since people may not be that rational, especially when making dynamic decisions, so people may not understand complicated dynamic mechanisms and they may choose actions different from what the design wants them to.

Q: What courses would you like to teach?

I have taught and TAed game theory and mechanism design courses. I was the course instructor for intermediate microeconomics. I can teach mathematical and computational economics as well. I can also try to teach applied micro courses like labor, IO or finance. In general, I like to teach courses where students can understand the concepts through participation or simulation. For example, when I taught intermediate micro theory, I always let the students play the games before solving them and telling them what is the best response, optimal strategy, and Nash equilibrium. For example, I played two-thirds of the average game where I asked the students to submit a number between 0 to 100 and try to be as close as possible to the two-thirds of the average of everyone else's numbers. I repeated this game several times and the average decreases every time, so I think through playing, they understand better why there is an incentive to decrease the number and why only Nash equilibrium is everyone playing 0. I also asked them to play rock paper scissors game so that they can understand why there is this mixed strategy Nash equilibrium. So, I divided the students into two groups to compete with each other, and after repeating this about five or six times, roughly around 1/3 of the students in each group choose rock and paper and scissors, which is the only mixed strategy Nash equilibrium. I also asked them to pretend to be firms and choose either prices or quantities so that they can see how markets converge to the Nash equilibrium. For the quantity competition game, at the beginning many students choose either too high or too low, some people choose not to produce, some people choose to produce more than monopoly quantity, then I tell them the resulting market price, they compute their profits and submit another quantity in the next round. And eventually, after four or five rounds, the quantity converges to the Nash equilibrium. For the price competition game, there is always at least one student who does not know what is going on and submit prices that are less than marginal cost, so it never works. For all these games, I used the apps Socrative or TopHat so that it is easier for the students to submit their answers and see the results in real time.