

Session R – Humanities and Social Sciences  
(Alphabetical)

**Fundraising Between the United States Congress and British Parliament**

Michael Bea

*Mentor: Roderick D. Kiewiet*

Tactical voting is an electoral strategy where a voter chooses one of the top two candidates in an election because their preferred one has no chance of winning. By comparing survey data starting with Conservatives rise to complete power in 1983 to present elections elicits ideas around how people may think tactically in an election. Research surrounding tactical voting tries to explain the strategy but does little to help politicians gain the vote. In particularly close elections between two parties getting the tactical vote is critical as it can be up to 17 percent of voters. Using game theory, statistics, and campaign strategy candidates from British political parties should be able to get the tactical vote. Looking into reasons for why people vote is a large issue for tactical voters because their preferred political party has no chance of winning but these people still need to get to the polls. Third parties are the most affected by tactical voting as they can be predicted to come in second or even winning but come in third as no voter has confidence in their party.

**Application of Mechanism Design to the Caltech Rotation Problem**

Anthony Y. Chong

*Mentors: John Ledyard and Luke Boosey*

The California Institute of Technology (Caltech) has a unique undergraduate living arrangement based on the English style system of colleges. There are eight undergraduate houses (Avery, Blacker, Dabney, Fleming, Lloyd, Page, Ricketts, and Ruddock), each with distinct personalities. As the approximately two-hundred matriculating freshmen enter every year, upperclassmen at Caltech are faced with the formidable task of deciding how to match freshmen to their most appropriate house. We formulate this assignment problem (Rotation) as a mechanism design problem and provide the foundations for alternative mechanisms which may provide a practical solution to Caltech's annual house assignment issues.

**Equilibrium Results to Competition in Alternative Electoral Systems with Generalized n-Dimensional Policy Space**

Daniel Chun

*Mentor: Matias Jose Iaryczower*

In this paper, we build upon the analysis of PR (proportional representation) system in the paper *On the Nature of Competition in Alternative Electoral Systems* and generalize the results about election equilibrium to both a situation with the location-dependent part of the voter utility function set to a general convex function rather than just a quadratic function and a situation with a non-constant voter density function over the ideological spectrum. In addition, we build upon the intuitive idea that an equilibrium with larger number of candidates leads to a larger average campaign expenditure and ideas from the paper *Many Enemies, Much Honor? On the Competitiveness of Elections in Proportional Representation Systems* to come up with a newer concept of "effective number of candidates" which correlates directly with the average campaign expenditure value. Finally, we apply our theoretical results to data from elections and campaign finances all over the world and discuss both the effectiveness of our model and its short-comings.

**Living After the Sins of the Fathers: Children of French Collaborators Exorcise Infamy From Their Family History**

Lauren C Kendrick

*Mentors: Kristine Haugen and Christiane OrceI*

People who supported fascism and the Vichy government during the Nazi occupation of France were later held responsible for their misdeeds. The blame attached to these individuals also affected their families, forcing their children to deal with denial and guilt regarding their paternal heroes. The four authors in this study tried to rehabilitate their collaborating fathers in the public eye by writing family memoirs based mostly on personal and family accounts. With one exception they present the reader with as much evidence as possible, acknowledging difficulties including ambiguities, contradictions, and sparseness of available information as they attempt to reconcile the man they remember with his political malefaction. They share several themes and techniques, most notably manipulating the perspective of narration, which they apply with varying success to persuade the reader of the father's humanity and good but misdirected intentions. The motivation for them to publish came partially from the popularity of the subject in the 1970's, but as the most recent (2008) book shows with its painstaking examination of the details of the father's life, it appears that the authors also needed public as well as personal absolution to put their collaborating fathers' memories to rest.

## **The Quality of Elected and Appointed Judges: Evidence from State Supreme Courts**

Garrett Lewis

*Mentor: Matias Iaryczower*

State Supreme Court justices in the United States are selected by variations on three methods: appointment, election, and the Missouri Plan. Each exhibits benefits and drawbacks with regard to the performance of the justices, yet there is little empirical material available to measure these effects. Elected justices face the possibility of electoral backlash if they make unpopular decisions, for example, while appointed justices are subject to the bias of the body or individual which appoints them. Empirical research was conducted to determine how each of these selection methods affects the quality of justices and which results in the most accurate decisions. By studying variance in justices' votes across cases between 1995 and 1998, a measure of quality was determined with respect to each justice's state, his or her background, and the unique nature of the case.

## **Creating and Validating Dynamic Stimuli for Social Rewards**

Chris Li

*Mentors: Ralph Adolphs and Alice Lin*

Current understanding of decision-making posits that individuals are motivated by the desire to maximize rewards, which are monetary in the context of traditional research. However, economists have been puzzled over why experimental subjects deviate from equilibria/dominant strategies predicted by rational choice models. One explanation proposes that individuals are affected by social rewards, a category that includes simple social interactions, as well as constructs such as fairness and approval.

To investigate social outcomes as rewards, we performed a behavioral study where subjects chose between two bandits characterized by different stochastic distributions of positive, neutral, or negative outcomes, which were videos of smiling, neutral, or angry faces. This stimulus set was validated through a ratings task where subjects identified the emotion displayed and answered items from the self assessment mannequin (SAM). We looked to confirm that the various dynamic social outcomes of smiling, neutral, and angry were perceived as positive, neutral, and negative respectively and elicited emotional feelings of approach and avoidance. Additionally, the behavioral data shows that subjects consistently chose the bandit with the highest probability for smiling faces, supporting the argument that social stimuli function as rewards in driving learning and decision-making.

## **Effects of Visual Attention on Price Elasticity of Demand**

Dingchao Lu

*Mentors: Antonio Rangel, Colin Camerer, and Ian Krajbich*

In 2007, experiments in the Rangel lab showed that visual attention drives the process of value computation during choices between two positive rewards. To determine if visual attention plays a similar role in more complex decisions involving costs and benefits, we used an eye tracker to monitor subjects' gazes as they made real purchasing decisions on a computer screen. During each trial, subjects were shown a picture of a common consumer item as well as one of many prices at which the item was being offered. We found that the pattern of visual fixations affected subjects' purchasing decisions differently from how the model predicts, suggesting a new model is needed. Simulations and model fitting with Bayesian methods are ongoing.

## **Peripheral Visibility of Unattended Stimuli Affects Economic Choices**

Erik Madsen

*Mentor: Antonio Rangel*

Consumer choices are a crucial component of everyday economic decisions. When entering a store to make a purchase, consumers are confronted with shelves full of items and must quickly parse and select among a variety of options. Understanding the details of this decision-making process is therefore essential for developing models of economic behavior at the level of the individual. We examined two-item snack-food choices to determine the impact of peripheral vision on the decision-making process. Subjects were presented with pairs of snack food items and asked to choose the more desirable one under two visibility conditions: both items always visible, and only fixated items visible. Eye-tracking was used to condition item visibility on fixation location and to collect visual fixation data. Choices were then compared to prior valuations to construct psychometric choice curves. We fitted a drift-diffusion model of the choice process to the data using Bayesian methods and found that a key bias parameter (representing the influence of the value of the unattended item on the mental drift rate toward a choice threshold) was significantly higher when unattended items were visible than when they were hidden. This result provides evidence that the simple presence of unattended items in the field of vision significantly affects the mental computational processes underlying economic decision-making.

### **Identification and Estimation of Bounds on School Performance Measures: Analysis of a Mixture Model With Verification**

Mallika Saran

*Mentor: Robert Sherman*

Using a mixture model with verification the paper seeks to estimate sharp bounds on test scores of students in the Pasadena Unified School District (PUSD). A mixture model is one in which each observation in the data is either generated from the observation of interest, or a possibly spurious distribution. In this model, the indicator of English proficiency plays the role of a verification indicator. The test scores data can be viewed as a mixture model where a score is valid when a student is truly English proficient; and otherwise invalid. The verification information can be used to develop sharp bounds on characteristics such as mean of the distributions of interest. By developing bounds on characteristics such as mean test scores for both the distribution of valid scores for the truly English proficient students and the distribution of valid scores for all students, the paper seeks to use the data in a fair way to analyze how schools are doing over time; as well as with respect to particular demographic groups. The data is also bootstrapped to get estimates of the standard errors for the characteristics of the distribution.

### **The Contribution of Coastline Irregularities to Warfare and Politics in China and Europe**

Eric Schropp

*Mentor: Philip T. Hoffman*

The research asks why China has usually been unified, while Europe has been fragmented into warring states. The biologist Jared Diamond claims that the ultimate cause is geography: because Europe's coastline was more irregular than China's, it was easier to defend small coastal states. This project employs several scientific and mathematical methods to examine Diamond's claims. The first method uses Alan Miller's Measure of Bizarreness to evaluate the irregularity of the coastlines in Europe and China. Miller's program uses a grid to calculate the probability that a line connecting two points passes outside a region. Our second method finds the smallest convex polygon that encloses a region and then compares the area of this convex polygon to the area of the region. The closer the ratio is to one, the more regular the region. The results of the second method are complete and they show that China did indeed have a more regular coastline. If the measure of bizarreness yields similar results, it will support Diamond's argument.