

# TEPPER + DIETRICH

## ECONOMICS

### HONORS AND AWARDS

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# 1 Program-Level Recognition

## 1.1 Best Senior Project

The award for the Best Senior Project in Economics was established in the 2007-2008 AY. The Senior Project Course is a capstone course in the undergraduate Economics curriculum. The purpose of the senior project is to showcase the qualitative and quantitative skills that the undergraduate economics student has acquired while an undergraduate at Carnegie Mellon. The senior project coursework produces original empirical, experimental, and theoretical studies. This honor is annually awarded during the Faculty-Graduating Seniors Luncheon in May.

**2021:** Not Awarded

**2020:** Not Awarded

**2019:** "Determinants of Telemedicine Adoption" written by Emma French, Seth Henry, Mayowa Hannah Osinowo, and Gordon Wissinger

**2018:** "State Debt Crises: Examining the Relationship between Debt Maturity and Risk" written by Adrian Del Bosque, Stanley Golcer, Santiago Lusso, and Jose Uribe

**2017:** "The Effects of EPA RVA Regulations on VOC Emissions" written by Raheela Ahsan, Lilia Bidzyan, Daniel Lee, and Dee Dee Paik

**2016:** "McDonald's vs. Chipotle: The Rise of Fast Casual Restaurants (A Comparison of the Net Rates of Entry for McDonald's & Chipotle)" written by Charlton Cheng, Michael Hsun, and Mei Huey (Michelle) Ong

**2015:** "Examining the Relationship Between Education Inequality and Income Inequality" written by Kelsey Choing, Danielle McKinney, and Yasmin Venema

**2014 (tie):** "Consumer Behavior: Upgrading, Who Will Do It and Why?" written by Akwasi Brefo, Maya Geleroff, Zaneta Grant, and Michelle Lin

**2014 (tie):** "A Model for Correlating Growth of GDP and Informality in an Economy" written by Paraj Tyle, Dong Jin (Michael) Shin, and Nikhil Tibrewal

**2013:** "The Rise of Green Cars in America: Examining the Price Elasticities of Gasoline and Green Vehicles in Light of the 2008 Recession" written by Irene Kim, Jongwoo Lee, David Sandor, Allen Song, and I-Ta Yang

**2012:** "Drowning in Economic Sorrow: The Effect of Business Cycles and State Monopolies on Alcohol Consumption" written by Prabhvir Anand, Claire Chin, Shomik Ghosh, Benjamin Gorman, Jennifer Sung, and Steven Yang

**2011:** "Identifying the Factors Influencing Foreclosure in Pennsylvania" written by Claire Herdeman, Jean Hou, and Meredith Lusardi

**2010:** "How Effective is New Jersey's Council on Affordable Housing?" written by Erica Greenberg, Alexandra Kontopoulos, and Sunny Shen

**2009:** "Land Value Taxation", written by Johnathan Spiegel, John Sullivan, Angel Wang, Joel Weiss, and Jeremy Wong

**2008:** "Smoking Bans: An Analysis of State Smoking Bans and the Potential Effect of a Smoking Ban on the State of Pennsylvania" written by William Lutz, Robert Patenge, Ann Stieh, and Xiao-Lan Wong.

**2007 (Awarded in 2008):** "A Case Study on Pennsylvania's Economic Landscape after Legalizing Slot Machines" by Jack Kocerka, Michal Lementowski, and Eugene Shiu.

**2006 (Awarded in 2008):** "How Much Do International Students Contribute to Diversity on the Carnegie Mellon University Campus?" by Selim Baykal, Marcus Chen, John X. Gu, and Dmitry Nulman.

## 1.2 Best Tepper Senior Honors Thesis in Economics

The award for the Best Tepper Honors Thesis in Economics was established in the 2007-2008 AY. The Tepper Senior Honors Program in Economics provides qualified students with the opportunity to engage in original research during their senior year at Carnegie Mellon. For many, this process of intellectual inquiry and knowledge creation is the highlight and culmination of their undergraduate academic experience.

**2021:** "From University Research to Industrial Innovation: Revisiting the Geographical Limitation of Knowledge Spillover Effect in High-Tech Industry" written by Xinyu (Diane) Hul (Advisor: Prof. Laurence Ales)

Abstract: This paper aims to study the knowledge spillover effect from university research to industrial innovation and the geographical limitation of this effect in the high-tech industry. Patent grants are used as the proxy measure and information source of innovation activities and patent citations are studied as the trace of knowledge spillover. The first portion of this paper uses the estimation procedure following Anselin, Varga, and Acs (1997) to estimate the spillover effects using the Griliches-Jaffe knowledge production framework together with two simultaneous equations between university research and industry R&D. The estimation is obtained through a partially identified pair of simultaneous equations at the Metropolitan Statistical Area level and corrected for the spatial autocorrelation using a spatial lag model. The second half of this paper involves studying the patent citation pattern using Hypothesis Testing as in Jaffe, Trajtenberg, and Henderson (1993). The two approaches agree on a positive answer to the research question: the knowledge spillover remains to be geographically limited. Moreover, the localization is getting increasingly significant over time and becomes observable at state level.

**2020:** "Costs to Migration and Occupational Switching across Time" written by Shlok Goyal (Advisor: Prof. Laurence Ales)

**2019:** "How Important are the Interregional Moving Costs in Explaining Wage Inequality?" written by Jiyoung Kim (Advisor: Prof. Ali Shourideh)

**2018 (tie):** "Impact of Social Networks on Buying Behavior: Predicting the Success of Pittsburgh Businesses Through Analysis of Yelp Social Networks" written by Apoorva Havanur (Advisor: Prof. Maryam Saeedi)

Abstract: In this paper, we analyze data collected from Yelp to understand the importance of the social networks created between Yelp reviewers, and the impact it has on the businesses they patronize. We then look at the shape of the social network generated by reviewers and identify differences between the behavior of "elite" users vs. non-elite users. We then view the trends in network formation for particular businesses overtime, and use features of the network of the business early in its development in order to predict its future success. We construct linear regression and random forest models that solely use features derived from review data, as well as models that are built using a combination of review and social network features. We see that the additional network features are statistically significant, and help reduce the root mean squared error of our models by a significant percentage. Ultimately, using our network features of reviewers from the first three months of business, we can predict the number of reviewers for a business within its first year with an error of less than 2.5 reviewers, an error of 8.5 over two years, and 13 over three.

**2018 (tie):** "Income Mobility in America" written by Manvendu Navjeevan (Advisor: Prof. Laurence Ales)

**2017:** "Bitcoins in the Black Market: Criminal Currency in the 21st Century" written by Charlotte Townsend (Advisor: Prof. Stephen Spear)

Abstract: The rising price of the cryptocurrency Bitcoin has resulted in a surge in curiosity to understand the drivers of Bitcoin price. While Bitcoin prices are correlated with many measures, such as gold price and total number of Bitcoins in circulation, Bitcoin still remains a partially speculative asset. Cybercriminals favor cryptocurrencies as a form of payment. Research has shown relationships between criminal activity and Bitcoin interest, and separately Bitcoin interest and Bitcoin price. However, no previous work has shown the direct relationship between criminal activity and Bitcoin price. This research examines the relationship between Bitcoin price and criminal activity and whether the inclusion of criminal activity creates a more predictive model of Bitcoin price.

**2016 (tie):** "Do Women Have a Say: Explaining Variation in Female Participation in Household Decision-Making?" written by Richa Mohan (Advisor: Prof. Laurence Ales)

Abstract: We analyze a select set of demographic features that influence women's power in household decision-making, in rural India. Estimates of causal factors are generated using a large-scale, six-year panel dataset, composed of over 1500 households from eight Indian states. We create a novel composite measure of gender-wise division of household

decision making power, reflecting the extent to which women contribute to choices regarding children, contraceptives, healthcare and household assets. We examine variation in decision-making power across a wide range of social and economic variables, including education, age, caste, and religion.

**2016 (tie):** "Google's Antitrust lawsuits in the EU: Using Microsoft's Past to Predict Google's Future" written by David Moss (Advisor: Prof. Joachim Groeger)

Abstract: Google, one of the largest and most valuable companies in the world, is being sued for allegedly anticompetitive practices regarding two of its most popular products: its eponymous search engine and the phone operating system Android. The verdicts in these cases have the potential to change Google's ascendant trajectory, much as it did for another firm that found itself in a similar position some twenty years ago – Microsoft. By analysing Microsoft's historical lawsuits and building models for specific features found in the technologies and actions of Microsoft, a framework for determining "guilt" in an antitrust case can be developed. Applied to Google, this framework predicts a successful conviction regarding Android, but an unsuccessful one for Google's search product.

**2015 (tie):** "An Econometric Estimation of Deadweight Loss in Pennsylvania's Water Market" written by Brent Heard (Advisor: Prof. Joachim Groeger)

Abstract: Industrial water demand in the state of Pennsylvania is anticipated to increase in the near future due to the expansion of hydraulic fracturing of the Marcellus Shale. Pennsylvania's water markets are increasingly operated by investor-owned water monopolies, and have prices regulated by the Pennsylvania Utility Commission (PUC). The PUC's decisions on whether to approve or deny changes in the price of water can take up to nine months. This thesis estimates the quantity of deadweight loss attributable to this regulatory lag in Pennsylvania's water markets in a scenario of increasing demand. In this work, the model for a natural monopoly facing a price ceiling is defined, followed by an estimation of the relevant cost and revenue curves for a representative Pennsylvania water monopoly, after which residential and commercial water demand were estimated, with deadweight losses then being calculated. Demand is then increased such that market price would exceed the PUC-approved maximum price, which is then charged while the hearing and petitioning process occurs. This analysis calculates increases in estimated deadweight loss of 92.83% for the residential water market, and 40.46% for the commercial market. This finding indicates that if maintaining market efficiency is a goal for the PUC, this commission should aim to respond as dynamically as possible to changing market conditions when regulating monopoly water pricing.

**2015 (tie):** "Examining Applications of Fourier Transforms to Financial Data and Covariance Estimation" written by Stanley Krasner (Advisor: Profs. Yaroslav Kryukov and Lars-Alexander Kuehn)

Abstract: Fourier transforms project functions and signals onto a space of orthogonal trigonometric functions. The transform preserves all the information contained in a function and gives insight into the spectral components, or different frequency components, that make up the function. As a result, Fourier transforms have been useful in many fields of engineering, mathematics, statistics and finance. This paper will discuss some potential new uses of Fourier transforms in financial time series analysis. First, we show that traditional autoregressive models omit information that is captured by a Fourier transform. We then apply spectral decomposition to obtain better parameter estimates for an autoregressive process with a new estimation technique. For a certain set of parameters, the spectral decomposition estimator is more accurate and more precise than a traditional maximum likelihood estimator. We conclude with a discussion on extending this method to covariance estimation.

**2014:** "Public Health and Tuberculosis Mortality During the Framingham Tuberculosis Demonstration?" written by Avery Calkins (Advisor: Prof. Karen Clay)

Abstract: Between 1900 and 1940, tuberculosis declined rapidly in the United States, even though there was no effective medical treatment or vaccine for tuberculosis until after the Second World War. Public health improvements are often used to explain the decline in tuberculosis, and studying what public health improvements helped in the United States can help combat tuberculosis in the developing world today. Little quantitative research has been done on the decline of tuberculosis in the United States. My project investigates the little-known Framingham Community Health and Tuberculosis Demonstration, during which several public health improvements were made on the small town of Framingham, Massachusetts to reduce tuberculosis incidence and mortality, to find which public health improvements were effective in reducing tuberculosis.

**2013:** "Diversity Considerations in School Choice: Developing Fair and Effective Mechanisms" written by Karthik Nagarajan (Advisor: Prof. Isa Hafalir)

Abstract: Controlled school choice policies aim to provide families a choice as to which school their child will attend while maintaining diversity in schools. These policies are often implemented in the form of minimum and maximum

quotas on student types (that can be based on race, ethnicity or socioeconomic factors). When these quotas are interpreted as hard bounds, standard fairness and non-wastefulness properties are compromised, imposing a cost on student welfare. By interpreting the minimum quota as a flexible guideline (a "soft" bound), I employ a mixed interpretation of these quotas to formulate a modified version of the student-optimal deferred acceptance algorithm that guarantees fairness. Furthermore, I show that both this and a purely soft interpretation of the diversity bounds can be used to formulate effective mechanisms that ensure fairness, even in settings with notionally hard bounds.

**2012:** "The Determinants of Self-Employment in Mexico and Household Transitions Between 2002 and 2005" written by Yaqi Niu (Advisor: Prof. Rebecca Lessem)

Abstract: The study of self-employment has been an intriguing factor in many developing countries. However, not many empirical studies analyze self-employment on a household level. This research focuses on Mexico in 2002 and 2005 and investigates the determinants of self-employment, transitions between self-employment and the labor market, and these transitions across asset levels all from the household perspective. The results show that high school education, asset level, previous self-employment experience and household size are important determinants of self-employment. The transition between self-employment and labor market is not homogenous across asset levels, because higher asset level increases chances of self-employment. Lastly, self-employment status decreases income, suggesting that a self-employed household will earn higher income if it were to enter the labor market.

**2011:** Not awarded

**2010:** "Finding Nash Equilibria in Asymmetric Auctions with Resale: Numerical and Analytical Developments" written by Richard M. Katzwer (Advisor: Prof. Isa Hafalir)

**2009:** "Do Special and Charter Schools Help Attainment in Public Schools?" written by André Tartar (Advisor: Prof. Maria Ferreyra)

**2008:** "Anti-Foreign Sentiment in the California Gold Rush" written by Robert L. Jefferson (Advisor: Prof. Karen Clay)

### 1.3 Meeting of the Minds (MoM)

The annual celebration of undergraduate research, Meeting of the Minds – Undergraduate Research Symposium, is one of the most exciting events on our campus; it is a day when undergraduate students come together and present their research to their peers and faculty. We encourage everyone to attend – play with a new robot, hear a concerto, listen to a poem, consider the effects of poverty on primary education achievement in third world countries, find out about emerging technologies...and more. Each year, student projects are recognized for their innovation, creativity, and contribution to the discipline. Below you will find a list of competitions in which Undergraduate Economics Program students have been recognized.

#### 1.3.1 MoM: Undergraduate Economics Program Competition (2010-2015) - Oral Presentations

A goal of the Undergraduate Economics Program is to encourage students to think creatively and bring together their formal training with their passions. Eligibility: Open to any undergraduate student pursuing a degree in Economics or team of undergraduate students enrolled in an UEP course. Eligible prospects include students writing a senior thesis in Economics and projects developed in UEP courses (including independent study Students meeting the eligibility requirements must participate in the "Oral Presentations" category during Meeting of the Minds in order to be considered for the award. Participating in the "Poster Sessions" is not sufficient. Judging is based on the following factors: a) the quality of the abstract; b) intellectual process and results described in the presentation; and c) presentation skills (including Q&A) during the Meeting of the Minds.

**2015 First Place (tie):** Brent Heard (Economics, Class of 2015): "An Econometric Estimation of Deadweight Loss in Pennsylvania's Water Market" Abstract: Industrial water demand in the state of Pennsylvania is anticipated to increase in the near future due to the expansion of hydraulic fracturing of the Marcellus Shale. Pennsylvania's water markets are increasingly operated by investor-owned water monopolies, and have prices regulated by the Pennsylvania Utility Commission (PUC). The PUC's decisions on whether to approve or deny changes in the price of water can take up to nine months. This thesis estimates the quantity of deadweight loss attributable to this regulatory lag in Pennsylvania's water markets in a scenario of increasing demand. In this work, the model for a natural monopoly facing a price ceiling is defined, followed by an estimation of the relevant cost and revenue curves for a representative Pennsylvania water monopoly, after which residential and commercial water demand were estimated, with deadweight losses then being calculated. Demand is then increased such that market price would exceed the PUC-approved maximum price, which is then charged while the hearing and petitioning process occurs. This analysis calculates increases in estimated deadweight loss of 92.83% for the residential water market, and 40.46% for the commercial market. This finding indicates that if maintaining market efficiency is a goal for the PUC, this commission should aim to respond as dynamically as possible to changing market conditions when regulating monopoly water pricing.

**2015 First Place (tie):** Stanley Krasner (Economics and Mathematics, Class of 2015) "Examining Applications of Fourier Transforms to Financial Data and Covariance Estimation" Abstract: Fourier transforms project functions and signals onto a space of orthogonal trigonometric functions. The transform preserves all the information contained in a function and gives insight into the spectral components, or different frequency components, that make up the function. As a result, Fourier transforms have been useful in many fields of engineering, mathematics, statistics and finance. This paper will discuss some potential new uses of Fourier transforms in financial time series analysis. First, we show that traditional autoregressive models omit information that is captured by a Fourier transform. We then apply spectral decomposition to obtain better parameter estimates for an autoregressive process with a new estimation technique. For a certain set of parameters, the spectral decomposition estimator is more accurate and more precise than a traditional maximum likelihood estimator. We conclude with a discussion on extending this method to covariance estimation.

**2014 First Place (tie):** Paul Ko (Mathematics, Economics, Class of 2014): "Controlled School Choice with Mixed Bounds Approach: A Balance Between Stability and Diversity Considerations"

Abstract: Controlled school choice over public schools has been an important concern for both the parents of students and school. It gives numerous options for how fairness and diversity consideration can be balanced. The notion of diversity is often imposed by limiting the number of admitted students who have the same type (quotas), or by reserving seats for each student type (reserves). The controlled school choice rule that we explore in this paper is the combination of "reserves" and quotas," where schools implement minimum reserves (a "soft" bound) and maximum

quotas (a "hard" bound) together. In this paper, we provide a full characterization of the mixed bounds approach, and show that it satisfies the requirements for the existence of a student-optimal stable matching.

**2014 First Place (tie):** Avery Calkins (Economics, Class of 2014): "Public Health and Tuberculosis Mortality During the Framingham Tuberculosis Demonstration"

Abstract: Between 1900 and 1940, tuberculosis declined rapidly in the United States, even though there was no effective medical treatment or vaccine for tuberculosis until after the Second World War. Public health improvements are often used to explain the decline in tuberculosis, and studying what public health improvements helped in the United States can help combat tuberculosis in the developing world today.

Little quantitative research has been done on the decline of tuberculosis in the United States. My project investigates the little-known Framingham Community Health and Tuberculosis Demonstration, during which several public health improvements were made on the small town of Framingham, Massachusetts to reduce tuberculosis incidence and mortality, to find which public health improvements were effective in reducing tuberculosis.

**2013 First Place:** Jung Moon Jang (Economics and Statistics, Class of 2013): "The Relationship Between the Unemployment Rate and Birthrate in Korea"

Abstract: Through this research, I have looked at the relationship between the unemployment rate and the birth rate with a focus in Korea. For past few decades, despite the high volume of students obtaining undergraduate degrees, the unemployment rate has constantly increased, bringing about a critical social issue. On the other hand, families have been giving birth to fewer children or no child at all despite the government's efforts to financially aid parents to raise their children. Because of this phenomenon, a new term called 'Sampo generation' has emerged, describing people in their 20s and 30s giving up on three things since they can't economically support themselves: dating, marriage, and giving birth. It has been hypothesized that since the unemployment rate is high, more people are having fewer kids as a consequence because it costs money and time to raise kids which parents in nowadays can't afford with their own incomes. Believing there are many other factors behind this issue, I have selected other variables such as political perspectives, income levels, and education levels of parents etc. from the Korean Statistical Information Service between 1990 and 2011 to include in a panel dataset. I have discovered that there is a negative relationship between birth rate and unemployment. In addition, parents' education levels, political perspectives, activity rates, and income levels are also significant variables.

**2013 Second Place (tie):** Oliver Haimson (Economics, Class of 2013): "Where are They Now? Analyzing Gender Differences in Executive Exit Patterns"

Abstract: One of the main reasons that the representation of female executives is lower in top ranks relative to lower ranks is that female executives exit the market at a higher rate than male executives. In particular, one hypothesis is that discrimination against females exists in this market, while another hypothesis is that female executives exit more frequently for other reasons, such as family. This project aims to examine the reasons why female executives leave their positions at a significantly higher rate than male executives. While some explanations can be ruled out by observing promotion and compensation of executives who remain in the occupation, it is not possible to directly address issues of discrimination without observing the outcomes of executives after they leave.

To address this question, I research a data set of female and male executives, using databases and web searches to collect data on their exit reasons and next steps after exiting their positions. An analysis of the data finds that female exit reasons differ significantly from male exit reasons in several important ways. Female executives were found to be more likely to be fired, less likely to retire or resign, and more likely to move onto a public company than their male counterparts, even when controlling for human capital and job-related variables. While these results suggest the possibility of workplace discrimination against female executives, more research would be needed to argue this conclusively.

**2013 Second Place (tie):** Karthik Nagarajan (Economics, Class of 2013): "School Choice: Diversity Constraints"

Abstract: Controlled school choice policies are often implemented in the form of "hard" quotas on student types (e.g. race, gender, location). Results from literature show that the standard fairness property is not satisfied under such "hard" quotas. As a compromise between fairness and diversity restrictions, I employ a mixed interpretation of these quotas (in which the minimum quotas are "soft" and maximum quotas are "hard") to formulate a modified version of the student-proposing deferred acceptance algorithm that satisfies the desired fairness property. This algorithm also provides an improvement in controlled diversity over a purely "soft" quotas approach, but at the cost of non-wastefulness, reflecting the welfare-diversity trade-offs inherent in controlled school choice.

**2012 First Place (tie):** Ashish Thakrar (Economics, Class of 2012): "The Rising Cost of Diabetes Care: Annual and Geographic Variations in Expenditures, Decomposed by Price and Utilization"

Abstract: This project aims to analyze health care spending for patients with diabetes from 2006 to 2010. We begin by reviewing descriptive data on rising health care costs and the rising prevalence of diabetes nationwide, with a focus on the state of Florida. In our analysis, we use inpatient hospital data from Florida to construct an index that measures changes in health expenditures for diabetics. Based on these calculations, inpatient hospital spending on diabetes increased 23% for those insured by Medicaid, 25% for those insured by Medicare, and 10% for those with private insurance. We decompose these expenditure indexes into price and quantity components to understand whether increased spending is driven by higher prices or increased utilization. These indices are further broken down into age and sex cohorts. Overall we find significant variation in price and quantity changes, with the highest price increases for Medicaid recipients and greatest utilization increases for those with private insurance. Shifts in expenditures for females were generally driven by increased utilization, while shifts in expenditures for men were driven by price increases.

**2012 First Place (tie):** Lyubov Zeylikman (Economics, Class of 2012): "What's the Deal with Free Shipping?"

Abstract: E-commerce giants like Amazon Prime and Zappos are known for their offering of unconditional free shipping on purchases. However, while the results are clear, the reasons why this phenomenon occurs are not. We develop an experimental model based on Michael Lewis' and Yinghui Yang's findings which support that medium thresholds for free shipping incentivize consumers to buy higher quantities of goods more than low, high, and free shipping thresholds. In our model we also include a fixed shipping rate condition with no option to earn free shipping. We report the results of an experiment to test the effects of offering varied schedules for earning free shipping in a simulated online shopping environment. 34 Carnegie Mellon students participated in an experiment with a given endowment and shopping list, to purchase items across 3 periods, per 6 different conditions. The performance during the experiment was judged based on whether the participant performed optimally. Results are in agreement with the model, supporting that the medium threshold condition incentivizes participants to buy higher quantities of goods more than other conditions.

**2012 Second Place:** Alisa Deychman (Economics, Class of 2012): "Merger Retrospective: Examining Kimberly-Clark and Scott Paper Company Merger"

**2011 First Place:** Dina Megretskaja (Economics, Class of 2011): "Investigating the Effect of Payment Medium on Consumer Spending"

Abstract: Much interest has been directed towards the credit card industry in the past several years, in part because of households' increasing debt levels. I am interested in whether credit cards inspire higher spending, not for liquidity reasons but merely due to lack of salience of the amount being spent. It is my hypothesis that method of payment affects how much consumers spend, specifically that paying with credit card leads to higher spending than paying with cash. By conducting a field experiment with random assignment of payment medium, I intend to study whether there is a causal relationship between payment medium and spending amount.

**2011 Second Place:** Sebastian Wai (Economics, Class of 2011): "Tracking Semiconductor Inventors in Silicon Valley and Beyond"

Abstract: This project is a methodical, in-depth study on the origins of inventors in the semiconductor industry. Inventors are identified through patent data, then tracked using both patents and biographical sources. Data collected on inventors is then used to profile the hiring patterns of a variety of semiconductor firms across the country and across the history of the industry. The analysis focuses on geography, education, and employment history, as well as a defining feature of the industry: interplay between parent and spinoff firms.

**2011 Third Place:** Shweta Suresh (Economics, Class of 2011): "Impact of Social Risk Aversion and Audience Effects on Generosity to the Poor"

Abstract: This paper is focused on understanding the impact of social risk aversion and audience effects on generosity from the relatively well-off to the poor. By conducting dictator games, I have collected data that measures how much people decide to donate to a disabled person or a drug or alcohol user under different situations. My experiment modifies Christina Fong and Felix Oberholzer-Gee's prior experimental design in order to better identify how the two separate phenomena of social risk aversion and audience effects work to alter donors' decisions, especially when they are given the option to purchase information about the welfare recipient. Understanding these motivations behind



people's decision to donate is important because this information allows governments and NGOs to better structure transfer programs.

**2011 Fourth Place:** Akshay Upadhyay (Economics, Class of 2011): "Increasing Reliability: Attracting More Clients to Microfinance Institutions"

Abstract: Dr. Muhammad Yunus was awarded the Nobel Peace Prize in 2006 for his efforts to break large population groups out of poverty, through the formation of Grameen Bank. Grameen Bank provided small loans to the poorest of the rural population in Bangladesh. Its goal was to spur economic development from the bottom of the income chart. Dr. Yunus felt that making this credit available to the poor would serve as a catalyst for improving their socio-economic conditions. Economists say that, "Bottom-up initiatives like microcredit allow rural-based development," which will help halt the cycle of poverty that the poor are forced to deal with. October 2, 1983 marked the formation of the Grameen Bank, the first official bank for the rural poor. Since then, the industry has grown to approximately 10,000 microfinance institutions serving over 113 million clients worldwide. Approximately 32.6% of the world population, or 2.2 billion people, are below the poverty line. The availability of microfinance institutions is known by close to 750 million of these people. But only approximately 15% of these people are actually clients of microfinance institutions despite the arising of financial needs. This presentation provides an analysis of existing policies on microfinance loans. Also, behavioral economic anomalies will be used to propose a new policy on microfinance loans in the hope of attracting more clients to microfinance institutions

**2010 First Place (tie):** Engin Levent Altinoglu (Economics, Class of 2010): "Do Zoning Ordinances Affect the Distribution of Housing?"

Abstract: In his 1975 paper in Urban Affairs, Bruce Hamilton wrote about how his extension of the Tiebout model of housing predicts the institution of zoning ordinances effect the distribution of housing. However, not much is known about how well Hamilton's predictions explain real world data. It is often assumed that the implementation zoning ordinances has the desired effect of producing individual communities characterized by a range of lot sizes, but few empirical studies have been conducted examining if this is true, or if an effect of their implementation on the distribution of housing really exists. This study examines data collected from Arizona's Maricopa County to see if the implementation of minimum lot size zoning in ten of its largest municipalities has an effect on the distribution of housing, and if so, the nature of the effect. Using the Hamilton's paper as a guide, the researcher's hypothesis is that the zoning restrictions have a significant effect on the distribution of housing, resulting in bunching of housing near the minimum lot sizes within each municipality and a high ratio of variance across municipalities to variance within municipalities. The data included information about all lots in each municipality including lot size, property type, municipality to which it belongs, and property value. The results were somewhat mixed, but overall, the analysis suggests that the zoning restrictions have little, if any, effect on the distribution of housing. To summarize the important results, we do not see bunching of housing near the minimum lot size values in each municipality. The method of decomposition of variance indicated that, for certain regressions, the variance across municipalities is much smaller than that within municipalities. In conclusion, there is not sufficient evidence to conclude that the implementation of minimum lot size zoning has any effect on the distribution of housing in Maricopa County.

**2010 First Place (tie):** D. Scott Taylor (Economics and Statistics, Class of 2010): "Modeling the Price Dynamics of Catastrophe Bonds"

Abstract: This work modifies the assumptions of Burnecki, Kukla, and Taylor's paper "Pricing of Catastrophe Bonds" to build a pricing model for indemnity-based catastrophe bonds, allowing for the possibility of partial default.

### 1.3.2 MoM: Statistics Department Competitions - Oral Presentations

This competition is sponsored by the Department of Statistics. Its purpose is to encourage undergraduate projects and research in statistics, and to inform faculty and students about these projects. The competition is open to any student or team of students who have completed a project under supervision of a Statistics faculty member. A panel of judges will rate the projects according to the following criteria: quality of abstract; clarity of objective; organization of thoughts; general quality of work; significance of work; oral presentation skills; visual presentation quality; appropriate use of statistical methods; and responses to questions.

**2017:** Second Place Oral Presentations: "Why do People Retweet? An Analysis of the Effect of Sentiment and Rhetorical Devices on Retweeting" by Blaine Cole (Economics and Statistics, Class of 2017)

Honorable Mention Oral Presentation: "Identifying Donor Trends for the Pittsburgh Civil Light Opera" by Honordrew Bryan and Shichen Yang (Economics and Statistics, Class of 2017); Apoorva Havanur, Emily Helfer, and Naveen Shankar) "Identifying Donor Trends for the Pittsburgh Civil Light Opera"

Honorable Mention Oral Presentation: "Post-Consumer Food Waste" by Harit Agrawala (Economics and Statistics, Class of 2017), Jack Kroger (Economics and Statistics, Class of 2017), Sameer Dhavalikar, Megan Fu), and Barbara Samaniego (Economics, Class of 2017)

**2016:** Honorable Mention Oral Presentation: "Port Authority Bus Reliability Across Pittsburgh Neighborhoods" Meghna Baskar (Economics, Class of 2017), Kiersten Suvrath, Rohit Srungavarapu, and Skye Toor

Honorable Mention Oral Presentation: "Optimization of Spaces in Hunt Library" Timothy Fitzgerald (BHA in Economics and Music Technology, Class of 2016), Dee Dee Paik (Economics, Class of 2017), Daniel Park (Economics and Statistic, Class of 2017s), Siqi Yang, Derek Young

**2014:** First Place Oral Presentations: "Artist Music Discovery: The Digital Road to the Top of Radio" by Emily Wright (Economics and Statistics, Class of 2014)

Abstract: Radio is a powerful medium with a vast and all encompassing audience reaching about 244.5 million consumers a year (Nielsen, 2014). Consequently, a music artist's position on the top radio charts is a primary measure of success in the music industry. It is of particular interest to record labels to identify artists whom are most likely to hit the top charts of radio. One way to do so is to monitor artists' activity on online streaming services and social media. It is believed artists with the highest activity are expected to reach radio's merit of success. This paper is a formal inquiry and analysis examining the relationship between an artist's online presence and their appearance on the top charts of radio. A Cox Proportional Hazards model was fit predicting an artist's presence on radio with usage on Facebook, Wikipedia, Twitter, Youtube, Vevo and Soundcloud as explanatory variables. The final findings can be used to inform artists how best to promote themselves and further can aid record labels in choosing which artists to sign and promote.

Honorable Mention Oral Presentations: "Comparing Propensity Score Methodologies for Analyzing High School Class Assignment" by Zachary Branson (Economics and Statistics, Class of 2014)

Abstract: Students' class assignment is extremely relevant to their academic achievement, but the problem of assigning a student to the correct class is difficult to assess. It may not be clear whether a student should be placed in remedial, regular, or advanced math classes, but it could greatly affect how a student does in school. All school districts face this problem, but the solution is not readily apparent. This project assesses several methodologies – focusing on propensity scores – to analyze this problem, and determines which one is most effective for analyzing school data.

One can view class assignment as a causal inference problem, where class assignment is a treatment. In reality a student is assigned to only one class difficulty, and we want to determine how their academic achievement would be affected if they were, counterfactually, assigned to a different class. Thus, we want to determine the treatment effect of class assignment. Propensity scores are a common way to analyze observational data to assess treatment effects when the treatment is nonrandom. Class assignment is nonrandom because school districts likely use students' test scores, grades, and other information for their class assignment.

There are several methodologies for utilizing propensity scores, but it isn't clear which one is the most useful for analysis. This project compared methodologies such as (1) including hierarchy in modeling propensity scores, (2) matching, and (3) stratifying propensity scores to determine which was the most effective with the purpose of analyzing real-world data from Pittsburgh Public Schools.

**2010:** Not Awarded

**2009:**

First Place Oral Presentations: "Brain Activity of a Sedated Cat" by Michael Albrecht (Statistics, Class of 2009), Vinith Annam (Economics and Statistics, Class of 2010), and Nicole Mattison (Economics and Statistics, Class of 2009)

Abstract: We are interested in determining the neural effects of an external visual stimulus on a sedated domestic cat. In this study, researchers make a cat look at a television screen with bars moving across the display, while filming the cat's brain to look for changes. However, the largest changes in the video are not caused by neural activity, but rather by the direct effects of respiration and circulation, which interfere with the cat's brain activity. Our objective is to remove these extraneous effects from selected parts of the original data, so that others can study the relationship

between the external visual stimulus and the "corrected" data. Our approach uses Fourier analysis to isolate and filter out the periodic effects of respiration and circulation.

### 1.3.3 MoM: Statistics Department Competition - Poster Presentations

## 1.4 Omicron Delta Epsilon $O\Delta E$ , The International Honor Society

In 1969, a Carnegie Mellon University chapter was admitted to Omicron Delta Epsilon, the International Honor Society in Economics. As written in its philosophy statement, "Omicron Delta Epsilon is dedicated to the encouragement of excellence in economics. It encourages devotion on the part of its members as economists to the advancement of their science and to the scholarly effort to make freedom from want and deprivation a reality for all mankind."

**2020-2021 Nominees:** Anusha Agarwal (Class of 2021); Margaret Caballero (Class of 2021); Yuhao Chen (Class of 2021); Ari Cohn (Class of 2021); Carlo Duffy (Class of 2021); Lingrui Fan (Class of 2022); Fuller, John (Class of 2022); William Fleming (Class of 2021); Abigail Glaser (Class of 2022); Sarah Gough (Class of 2021); Ze Guo (Class of 2022); Pratham Gupta (Class of 2021); Xiyue Huang (Class of 2022); Lucas Jia (Class of 2022); Andrew Joyner (Class of 2021); David Kang (Class of 2021); Rahul Khare (Class of 2022); Ananya Krishnan (Class of 2021); Timothy Kusuma (Class of 2021); Jerry Li (Class of 2022); Eric Liu (Class of 2022); Parvathi Meyyappan (Class of 2021); Brittany Pierce (Class of 2021); Qiao Shen (Class of 2021); Zachary Shirk (Class of 2021); Charles Tripp (Class of 2022); Shamini Wadhvani (Class of 2022); Leah Varughese (Class of 2021); and Richard Yan (Class of 2022);

**2019-2020 Nominees:** Connie Chau; Yiyun Chen (Class of 2020); Mark Dempsey (Class of 2020); Jack Dunbar (Class of 2021); Alexander Dziadosz (Class of 2020); Aditya Darshan Gandhi (Class of 2021); Lingfeng Gao (Class of 2021); Sanchi Gupta (Class of 2020); Peijie He (Class of 2020); Chloe Ireland (Class of 2021); Young Jun (Alex) Kim (Class of 2020); Ryan Labriola (Class of 2021); Harshini Malli (Class of 2020); Malavika Mandapati (Class of 2021); Kevin Ouyang (Class of 2019); Vasily Potanin (Class of 2021); Omkar Sakhawalkar (Class of 2020); Yanan Shi (Class of 2020); Prisha Singh (Class of 2021); Neha Srivastava (Class of 2020); Amy Tsai (Class of 2020); Chongyan Tu (Class of 2021); Liam Walsh (Class of 2020); Lauren Wholey (Class of 2020); Sarah Zebar (Class of 2020)

**2018-2019 Nominees:** Samuel Bolig (Class of 2018); Mike Cheng (Class of 2019); Anushka Dhyani (Class of 2019); Allysa Dong (Class of 2018); Selina Du (Class of 2020); Zeyan Du (Class of 2019); Ryanne Ege (Class of 2020); Wenyi (Phoebe) Fei (Class of 2019); Amelia Gilson (Class of 2019); Shlok Goyal (Class of 2020); Brandon Hao (Class of 2018); David Hua (Class of 2019); Eric Huang (Class of 2019); Rahul Iyer (Class of 2019); Arnav Jain (Class of 2018); Jiyoung Kim (Class of 2020); Yedin Lui (Class of 2020); Stacey Lum (Class of 2020); Ally Moon (Class of 2020); Jae Ho Rhee (Class of 2019); Jules Ross (Class of 2019); Evan Schindewolf (Class of 2020); Yuyuan Shao (Class of 2020); Jia Shi (Class of 2019); Neha Srivastava (Class of 2020); Minjung (Jane) Suh (Class of 2019); Adam Tucker (Class of 2019); Deepak Vanjani; (Class of 2019) Shwetha Venkatesh; (Class of 2020) Andrew Wissinger (Class of 2019); Gordon Wissinger (Class of 2019); Xinni (Echo) Wu (Class of 2019); Chong (Victoria) Xu (Class of 2019); Shenheng (Angela) Xu (Class of 2019); Megan Yelsangikar (Class of 2019);

**2017-2018 Nominees:** Luis Arreaga (Class of 2018); Adrian Del Bosque (Class of 2018); Noopura Herle (Class of 2018); Hanyu (Lyra) Jiang (Class of 2018); Wenzong Jin; (Class of 2018); Yong Hwan Kim (Class of 2018); Ruoshu Liu; Ashvin Niruttan (Class of 2018); Joseph Pickens (Class of 2018); Isabelle Tseng (Class of 2018); and Alexandra Ulven (Class of 2018),

**2016-2017 Nominees:** Andrew Affable (Class of 2018); Mohin Banker (Class of 2017); Eric Coolbaugh (Class of 2018); Jian Chao Huo (Class of 2017); Colleen Fang (Class of 2018); Stanley Golcer (Class of 2018); Apoorva Havanur (Class of 2018); Yong Hwan Kim (Class of 2018); Jack Kroger (Class of 2017); Daniel Lee (Class of 2017); Eric Lee (Class of 2018); Eric Li (Class of 2017); Fei Lu (Class of 2018); Ari Mapua (Class of 2018); Dorsa Massihpour (Class of 2017); Michael McCaffrey (Class of 2017); Mohak Nahta (Class of 2017); Manvendu Navjeevan (Class of 2018); Noshin Nova (Class of 2017); Daniel Park (Class of 2017); Benjamin Pierce (Class of 2018); Shaan Phagura (Class of 2017); Joshua Ragen (Class of 2018) Mrinalini Samanta (Class of 2018); Mark Saporta (Class of 2018); Yoona Seon (Class of 2017); Aashil Shah (Class of 2017); Gujri Singh (Class of 2017); Aileen Tan (Class of 2018); Frances Tso (Class of 2017); Kunal Wadwani (Class of 2017); Suren Wanasundera (Class of 2018); Shichen Yang (Class of 2018); Siqi Yang (Class of 2017); Qiutong Ye (Class of 2017); Boyan Zhang (Class of 2018); and Marianne Zhao (Class of 2017)

**2015-2016 Nominees:** Eric Alpert (Class of 2016); Brendan Badia (Class of 2016); Peter Brady (Class of 2017); Jiaqi Chen (Class of 2017); Yitian Feng (Class of 2016); Max Goetschel (Class of 2016); Rishab Khemka (Class of 2016); Ryan Lapre (Class of 2017); Mei Huey (Michelle) Ong (Class of 2016); Anwesha Patnaik (Class of 2016); Theodore Peterson (Class of 2017); Michael Rosenberg (Class of 2017); Aaron Tian (Class of 2017); Charlotte Townsend (Class of 2017); Vaasavi Unnava (Class of 2017); Steven Wang (Class of 2016); Jiayin Yuan (Class of 2016);

**2014-2015 Nominees:** Patrick Brown (Class of 2015); Anushi Chawla (Class of 2015); Nivedita Chopra (Class of 2015); Justin Fischler (Class of 2015); Brent Heard (Class of 2015); Shreya Jhavar (Class of 2015); Anusha Kukreja (Class of 2016); Richa Mohan (Class of 2016); David Moss (Class of 2016); Michael Spinelli (Class of 2015); Samuel Walters (Class of 2016)

**2013-2014 Nominees:** Adrian Botta (Class of 2015); John Cusick (Class of 2015); Shivika Dhar (Class of 2014); John Foo (Class of 2014); Ronald Fudala (Class of 2015); Sung Jin (Kevin) Hong (Class of 2015); Kyongche Kang (Class of 2014); Radowan Khan (Class of 2015); Stanley Krasner (Class of 2015); Mei Chun Kuo (Class of 2014); Jonghwan (Brian) Lee (Class of 2015); Danielle McKinney (Class of 2015); Ian Meeker (Class of 2015); Robert Mohan (Class of 2014); Dong Jin (Michael) Shin (Class of 2014); Hannah Worrall (Class of 2014)

**2012-2013 Nominees:** Vladislav Bouchouev (Class of 2013); Kevin Bao (Class of 2013); Zachary Branson (Class of 2014); Avery Calkins (Class of 2014); Nancy Geronian (Class of 2014); Jung Moon Jang (Class of 2013); Kidong Justin Kim (Class of 2013); Ela Kulkarni (Class of 2013); Elizabeth Lorenzi (Class of 2013); Joon Su Min (Class of 2013); Karthik Nagarajan (Class of 2013); Eunhyun (Erin) Ryu (Class of 2014); Sarah Peko-Spicer (Class of 2013); David Sandor (Class of 2013); Ahmad Shamsuddin (Class of 2013); Nikhil Tibrewal (Class of 2014); Paraj Tyle (Class of 2014); Emily Wright (Class of 2014); Lydia Yi (Class of 2013) ;

**2011-2012 Nominees:** Prabhvir Singh Anand (Class of 2012); Victoria Baggio (Class of 2013); Michelle Berman (Class of 2012); Jae-Eun (Jenny) Chang (Class of 2013); Zhijun Huang (Class of 2015); Rohan Kalra (Class of 2012); Sang Yup Kim (Class of 2012); Margaret Kowalski (Class of 2013); Oshamimi Mayaki (Class of 2013); Jen Sung (Class of 2012); Justin Wang (Class of 2012); I-Ta Yang (Class of 2013); Steven Yang (Class of 2012); Cen (Kayco) Zhou (Class of 2013); Xiaoyu (Jecky) Zhu (Class of 2012);

**2010-2011 Nominees:** Blake Artushin (Class of 2012); Nicole Bayley (Class of 2012); Brittanie Boone (Class of 2012); Courtney Chin (Class of 2012); Theodore Dasher (Class of 2012); Alisa Deychman (Class of 2012); Mary Carmen Easterwood (Class of 2012); Shomik Ghosh (Class of 2012); Oliver Haimson (Class of 2012); Bing-Chun (Jean) Hou (Class of 2011); Hanny Kamal (Class of 2011); Karen Khalaf (Class of 2012); Chun Wa (Davy) Mok (Class of 2012); Yaqi Niu (Class of 2012); Sonam Rajpal (Class of 2011); Risa Shen (Class of 2012); Kyra Singh (Class of 2011); Ashish Thakrar (Class of 2012); Akshay Upadhyay (Class of 2011); Brandon Wirakesuma (Class of 2011); Abbas Zaidi (Class of 2012)

**2009-2010 Nominees:** Bryce Aisaka (Class of 2010); Kevin Bachovchin (Class of 2010); Marinos Bernitsas (Class of 2010); Thais Canedo (Class of Dec 2009); Atishe Chordia (Class of 2010); Christina Eng (Class of 2010); Claire Herdeman (Class of 2011) ; Gabriel Herman (Class of 2011); Luke Johnson (Class of 2010); Utku Karagoz (Class of 2010); Alexandra Kontopoulos (Class of 2010); Christopher Lako (Class of 2010); Zhi Yang Lim (Class of 2011); Jai Woo Lee (Class of 2011); Dina Megretskaja (Class of 2011); Bassem Mikhael (Class of 2011); Gabriella Moskowitz (Class of 2010); Seungjin Park (Class of 2010); Michael Rednor (Class of 2011); Lauren McMicken (Class of 2010); Lindsey Reese (Class of 2010); Shweta Suresh (Class of 2011); D. Scott Taylor (Class of 2010); Sebastian Wai (Class of 2011); Karolos (Charlie) Waldron (Class of 2011); Sean Wu (Class of 2011)

**2008-2009 Nominees:** Engin Levent Altinoglu (Class of 2010); Vinith Annam (Class of 2010); Richard M. Katzwer (Class of 2010); Smita Kumar (Class of 2010); Dongmin Lee (Class of 2010); Brian Moon (Class of 2010); Daniel Park (Class of 2010); Hon Ming (Robin) Quek (Class of 2010); Vivek Raval (Class of 2009); Athip Tantivorawong (Class of 2009); Alexandra Tronetti (Class of 2009); Calvin Wong (Class of 2010); Shawn Yoon (Class of 2009)

**2007-2008 Nominees:** Iulia Degeratu (Class of 2009); Robert L. Jefferson (Class of 2008); Akshaya Jha (Class of 2009); Christine Lee (Class of 2009); David Mirsky (Class of 2009); AndréTartar (Class of 2009); Nate Tower (Class of 2009)

**2006-2007 Nominees:** Gagandeep Anand (Class of 2007); Justin A. Berka (Class of 2007, M.P.P.M 2008); Matthew C. Corbett (Class of 2006, M.S.Q.E. 2007); Deniz Duygu (Class of 2007); Gerardo Laperal (Class of 2008); Michael C. Lee (Class of 2008); Han Chun Lim (Class of 2006); William Lutz (Class of 2008); Sudeep Paul (Class of 2007); Rebecca H. Radkoff (Class of 2008); Henry Tsai (Class of 2007); Sara Wille (Class of 2008); JoE Wong (Class of

2006)

**2005-2006 Nominees:** Andy Butler (Class of 2006); Mercy Chang (Class of 2007); Tsun Wah (Terence); Chang (Class of 2007, M.S.Q.E. 2008); Tathagata Chaudhury (Class of 2006); Vickie Chiang (Class of 2006); Matthew C. Corbett (Class of 2006, M.S.Q.E. 2007); Maxwell Egan (Class of 2006); Dana Guffey (Class of 2007); Sheila H. Ip (Class of 2007); Randall Jones (Class of 2007); Rahul Kapur (Class of 2006); Jack Kocerka (Class of 2006); Michal Lementowski (Class of 2006); Andrew Leung (Class of 2006); Aileen Ma (Class of 2006); Eugene Shiu (Class of 2006); Lin Tian (Class of 2006); Seng Keat Teh (Class of 2007); Raz Tirosh (Class of 2006); Brandi M. Tish (Class of 2007); Minghong Toh (Class of 2006); Maria Veronica Urenda Valdes (B.S. 2005, M.S.Q.E 2006); Charles Wright (Class of 2007); Marie Yetsin (Class of 2006); Chris Zhang (Class of 2006)

## 1.5 Richard M. Cyert Award for Excellence in Teaching

Description of Award: The Richard M. Cyert Award for Teaching Excellence is given annually to a faculty member who is recognized by economics students and the Undergraduate Economics Program Administration for outstanding pedagogy in economics courses. This honor is awarded during the Undergraduate Economics diploma ceremony

Eligibility: Faculty teaching in UEP who have not received the award within the past five years.

Criteria: Outstanding pedagogy will be evaluated based on the following measures: FCEs, class size, innovation in the classroom/syllabus, grade distribution, whether the class is required or not, and contributions to extra- and meta-curricular activities.

Selection Committee: Head of Economics (non-voting member), Head of UEP Curriculum Committee (voting member), past three Cyert Award Winners, Senior Associate Dean of Education (voting member), and UEP Executive Director (non-voting member)

Faculty titles are current at the time of the award.

**2021:** John Gasper, Associate Teaching Professor of Economics  
**2020:** Chris Sleet, Professor of Economics  
**2019:** Selman Erol, Assistant Professor of Economics  
**2018:** Alexey Kushnir, Assistant Professor of Economics  
**2017:** Karam Kang, Assistant Professor of Economics  
**2016:** Joachim Groeger, Assistant Professor of Economics  
**2015:** Ariel Zetlin-Jones, Assistant Professor of Economics  
**2014:** Chris Sleet, Professor of Economics  
**2013:** Christoph Mueller, Assistant Professor of Economics  
**2012:** Laurence Ales, Associate Professor of Economics  
**2011:** Not Awarded  
**2010:** Karen Clay, Associate Professor of Economics  
**2009:** Onur Kesten, Assistant Professor of Economics  
**2008:** Stephen E. Spear, Professor of Economics  
**2007:** Marvin Goodfriend, Professor of Economics  
**2006:** George-Levi Gayle, Assistant Professor of Economics  
**2005:** Stanley E. Zin, The Richard M. Cyert and Morris H. Degroot Professor of Economics and Statistics, and Professor of Economics and Finance.  
**2004:** Not Awarded  
**2003:** Ronald L. Goettler, Assistant Professor of Economics  
**2002:** Stephen E. Spear, Professor of Economics  
**2001:** Cheng Wang, Associate Professor of Economics  
**2000:** H. Scott Matthews, Research Scientist  
**1999:** W. Robert Dalton, Associate Teaching Professor of Economics  
**1998:** Harold Zhang, Assistant Professor of Economics  
**1997:** Keith Poole, Professor of Politics and Political Science  
**1995:** Stanley E. Zin, Associate Professor of Economics and Finance  
**1993:** Anthony Smith, Assistant Professor of Economics  
**1992:** Kathryn Shaw, Associate Professor of Economics  
**1991:** Robert Miller, Associate Professor of Economics  
**1990:** W. Robert Dalton, Associate Teaching Professor of Economics  
**1989:** Stephen E. Spear, Associate Professor of Economics  
**1988:** Barton Lipman, Assistant Professor of Economics  
**1987:** Praveen Kumar, Assistant Professor of Economics  
**1986:** Guilherme Sedlacek, Assistant Professor of Economics  
**1985:** Thomas Palfrey, Assistant Professor of Economics and Political Economy

## 1.6 Undergraduate Economics Program Academic Achievement Award

The Outstanding Academic Award is given to a graduating student by the Undergraduate Economics Program in recognition of exemplary academic achievement. This recognition is announced during the Undergraduate Economics diploma ceremony.

**2021:** Vassily Potanin  
**2020:** Not Announced  
**2019:** Gordon Wissinger  
**2018:** Alexandra Ulven and Yan Zhao  
**2017:** Sung Jin Hong  
**2016:** Richa Mohan and Samuel Walters  
**2015:** Danielle McKinney  
**2014:** Nancy Geronian and Zachary Branson  
**2013:** Oliver Haimson and I-Ta Yang  
**2012:** Ashish Thakrar  
**2011:** Bassem Mikhael, Shweta Suresh, and Karolos (Charlie) Waldron  
**2010:** Richard M. Katzwer  
**2009:** Akshaya Jha and André Tartar  
**2008:** Rebecca H. Radkoff  
**2007:** Tsun Wah (Terence) Chang  
**2006:** Lin Tian  
**2005:** Maria Veronica Urenda Valdes  
**2004:** Maxim Dolgosheev  
**2003:** Carl R. Peterson  
**2002:** Ee Thian Lim  
**2001:** Choon Hong Tey  
**2000:** Francis Goh  
**1999:** Yakov Arnopolin  
**1998:** Mindy Marks  
**1997:** Vittorio D. Bernardino  
**1996:** Aidan E. Palmer  
**1995:** Christa M. Sober  
**1994:** Marisa A. Fisher  
**1993:** John D. Sabo  
**1992:** John R. Rosenberger  
**1991:** Charles H. Daniels

## 1.7 Undergraduate Economics Program Distinguished Pedagogical Service Award

The Outstanding Teaching Assistan Award is given to undergraduate students who demonstrate excellence and dedication in their instructional responsibilities for the Undergraduate Economics Program.

**2021:** Jack Dunbar, Parvathi Meyyappan, and Prisha Singh

**2019:** Gordon Wissinger

**2016:** Richa Mohan

**2015:** Danielle McKinney

**2014:** Hannah Loo

**2013:** Sarah Peko-Spicer (Awarded in 2014)



## 1.8 Distinguished Service to the Undergraduate Economics Program Award

The Distinguished Service Award is given annually to a graduating Economics student in recognition of outstanding service to the Undergraduate Economics Program. This recognition is announced during the Undergraduate Economics diploma ceremony.

**2021:** Parvathi Meyyappan

**2020:** Shlok Goyal

**2019:** Gordon Wissinger

**2018:** Joseph Pickens

**2017:** Gujri Singh

**2016:** Jillian Ward

**2015:** Stanley Krasner

**2014:** Dong Jin (Michael) Shin

**2013:** Sarah Peko-Spicer

**2012:** Abbas Zaidi

**2011:** Karolos (Charlie) Waldron and Brandon Wirakesuma

**2010:** Richard M. Katzwer

**2009:** Vivek Raval

**2008:** Robert Jefferson, William Lutz, and Sara Wille

**2007:** Dmitry Nulman

**2006:** Eugene Shiu

## 1.9 Distinguished Service to the University Award (2005-2019)

This Outstanding Leadership Award was given by the Undergraduate Economics Administration to a graduating economics student in recognition of leadership in all areas of university life during the 2005-2019 period. In 2020, the Undergraduate Economics Program discontinued this award due to a very positive reason. The fact is our students participate in and contribute significantly to many areas of university life, and it is no longer possible to subjectively identify any individual student. We congratulate all of our students for their dedication to the CMU academics, meta-curricular activities, and student life activities.

**2019:** Seth Henry

**2018:** Andrew Affable

**2017:** Vaasavi Unnava

**2015:** Anusha Kukreja

**2015:** Andres Anzola

**2014:** Zachary Branson

**2013:** William Weiner

**2012:** Blake Artushin and Courtney Chin

**2011:** Shweta Suresh

**2010:** Smita Kumar

**2009:** Daria Maximov and David Mirsky

**2008:** Olivia J. Ostrand

**2007:** Justin A. Berka

**2006:** Matthew C. Corbett

**2005:** David Michael Ebersole

## 2 University-Level Recognition

### 2.1 Andrew Carnegie Society Scholars

The Andrew Carnegie Society Scholars are selected by their deans and department heads. These undergraduate seniors embody high standards of academic excellence combined with multi-dimensional characteristics such as volunteerism, involvement in student organizations, participation in sports or the arts and leadership.

**2020-2021:** Parvathi (Paru) Meyyappan

**2019-2020:** Shlok Goyal

**2018-2019:** Seth Henry

**2016-2017:** Gujri Singh

**2014-2015:** Stanley Krasner

**2013-2014:** Zachary Branson

**2011-2012:** Brittanie Boone and Mary Carmen Easterwood

**2010-2011:** Bassem Mikhael and Shweta Suresh

**2009-2010:** Smita Kumar

**2007-2008:** Olivia J. Ostrand

**2006-2007:** Brandi M. Tish

**2005-2006:** Sheila H. Ip

**2004-2005:** Maria Veronica Urenda Valdes

**2002-2003:** Jeffrey Crilley

## 2.2 Carnegie Mellon Senior Leadership Awards

Carnegie Mellon University Senior Leadership Awards are presented annually to graduating seniors who have demonstrated extraordinary leadership and made substantial contributions to the Carnegie Mellon community in the following categories: academics, arts, athletics, campus involvement and community service.

**2021:** Milinda Bhopatkar; Carlo Duffy; Jack Dunbar; Marc Edwards; Sarah Gough; Chloe Ireland; Ananya Krishna; Timothy Kusuma; Parvathi Meyyappan; and Prisha Singh

**2020:** Selina Du; Shlok Goyal; Yedin Lui; Shreya Nandi; Vinaya Rao; Neha Srivastava; Amy Tsai ; Cooper Williams; and Sarah Zebar

**2019:** Katherine Boyle; Amelia Gilson; Seth Henry; Eric Huang; Mayowa Hannah Osinowo; Zachary Roop; Jules Ross; Daniela Salazar De Luna; William Shancey; Jia Shi; Andrew Wissinger; Gordon Wissinger; and Megan Yelsangikar;

**2018:** Luis Arreaga; Joey Pickens; Benjamin Pierce; Joshua Ragen; Alexandra Ulven; Jinyuan Wang; and Boyan Zhang;

**2017:** Jack Kroger; Ryan Lupre; Theodore Peterson; Shaan Phagura; Mariana Robelo; Vaasavi Unnava; and Kunal Wadwani

**2016:** Maksim Horowitz; Anusha Kukreja; Richa Mohan; Brooke Tsu; Jillian Ward; and Benjamin Zhang;

**2015:** Andres Anzola; Manuel Garber; Brent Heard; Radowan Khan; Stanley Krasner; Jonghwan (Brian) Lee; Tammy Lew; Karn Mishra; and Danielle McKinney

**2014:** Zachary Branson; Avery Calkins; John Foo; Joseph Frick; Nancy Geronian; Hannah Loo; and Kit Ying (Stephy) Wong

**2013:** Victoria Baggio; Aditya Goyal; Abhi Jain; Margaret Kowalski; Elizabeth Lorenzi; Alexander Murray-Watters; Sarah Peko-Spicer; Bryan Wade; William Weiner; and Crystal Wray

**2012:** Blake Artushin; Nicole Bayley; Brittanie Boone; Claire Chin; Courtney Chin Alisa Deychman; Mary Carmen Easterwood; Benjamin Guterman; Karen Khalaf; Risa Shen; Ashish Thakrar; Crystal Wray Abbas Zaidi; Lyubov Zeylikman; and Xiaoyu (Jecky) Zhu

**2011:** Jack Anderson; Eduardo Benatuil; Siddhartha Gupta; Hanny Kamal; Mark Hepburn; Claire Herdeman; Sumegha Koppolu; Dina Megretskaia; Michael Rednor; Shweta Suresh; Sebastian Wai Karolos (Charlie) Waldron; and Brandon Wirakesuma

**2010:** Vinith Annam; Eshna Bhaduri; Claire Bouffard; Richard M. Katzwer; Shweta Kumar; Andy Lee; Lauren McMicken; and Seungjin Park

**2009:** Iulia Degeratu; Akshaya Jha; Tarun Bhan; Sophie Chen; Jesse Chorng; Alexander DiClaudio; Christopher Donelan; Kendal Fowler; Christine Lee; Daria Maximov; David Mirsky; Mansour Nehlawi; Vivek Raval; Athip Tantivorawong; and André Tartar

**2008:** Robert L. Jefferson; Scott Kuppe; William Lutz; Olivia J. Ostrand; Sudeep Paul; Colin Sternhell; Ann Stieh; and Sara Wille

**2007:** Deniz Duygu; Dana Guffey; Dmitry Nulman; Sagar Shah Heinrich Te; Seng Keat Teh; and Henry Tsai

**2006:** Vickie Chiang; Michal Lementowski; Aileen Ma; Shedisha Matthias; Tommy Oliver; Omar Parris-Dione; Eugene Shiu; and Marie Yetsin

### **2.3 Carnegie Mellon Women's Association Award**

The CMWA Awards began in 1964 to "honor an outstanding girl at the university." The tradition continues today and each year, the Carnegie Mellon Women's Association Scholarship Fund awards scholarships to selected graduating senior students, with a preference for students who demonstrate a commitment to the advancement of women in their academic pursuits.

The awards are presented by CMWA Honorary President at the end of the academic year in April at the Annual CMWA Award Reception. The Undergraduate Economics Program is eligible to nominate a student every other year, beginning in 2017.

**2021:** Parvathi Meyyappan

**2019:** Amelia Gilson

**2017:** Vaasavi Unnava

## 2.4 Carnegie Mellon University Undergraduate Research Office Awards

Carnegie Mellon University's Undergraduate Research Office offers undergraduates

- SURA - Summer Undergraduate Research Apprenticeship "course awards tuition-free elective to undergraduates at Carnegie Mellon for existing faculty projects focused on undergraduate research or creative inquiry under the direction of a Carnegie Mellon faculty member." [SURA homepage](#)
- SURF- Summer Undergraduate Research Fellowships "program awards \$3500 to undergraduates at Carnegie Mellon for 8-10 full-timeE weeks of summer research in any field of study." [SURF homepage](#)
- SURG - Summer Undergraduate Research Grant "program offers grants for materials and supplies to undergraduates at Carnegie Mellon for research in any field of study." [SURG homepage](#)
- Jennings Brave Companions Fund "allow[s] students to travel to developing countries during their summer breaks, to study, travel, conduct research, and or participate in service work." [Jennings Brave homepage](#)

### **Summer 2021 SURA:**

Sean Birch (Class of 2023), Mentor: Jonathan Cervas (Institute for Politics and Strategy)

Yuvraj Mehra (Class of 2024), Mentor: Laurence Ales

Ethan Osier (Class of 2024), Mentor: John Chin (Institute for Politics and Strategy)

Stotra Pandya (Class of 2023), Mentor: Laurence Ales

Breana Valentovich (Class of 2024), Mentor: Peter Freeman (Statistics and Data Science)

### **Summer 2021 SURF:**

Divya Banerjee (Class of 2023), Mentor: David Creswell (Psychology)

### **Summer 2020 SURA:**

Daniel Kornbluth (Class of 2023), Mentor: Alexey Kushnir

Ricky Lee (Class of 2023), Mentor: Laurence Ales

Nicholas Pallotto (Class of 2023), Mentor: Laurence Ales

Lucas Jia (Class of 2022), Mentor: John Gasper

Jingchun Quan (Class of 2023), Mentor: Bill Hrusa (Mathematics)

### **Summer 2020 SURF:**

Lingfeng Gao (Class of 2021), "Difference Between Public Willingness to Pay for Marine Keystone Species and that of Charismatic Megafauna", Mentor: Nicholas Muller

Xinyu (Diane) Hu (Class of 2021), "The Effect of University Research on Industrial Innovation: Revisit the Importance of Geographical Proximity of Technology Spillover Effect", Mentor: Laurence Ales

Tian Xu (Class of 2021), "Coronavirus Economic Impacts on Industries" Mentor: Laurence Ales

### **Summer 2019 SURA:**

Malavika Mandapati (Class of 2021), Mentor: Maryam Saeedi

Tian Xu (Class of 2021), Mentor: Laurence Ales

### **Summer 2019 SURG:**

Taylor Dirks (Class of 2021), Mentor: Maryam Saeedi

### **Summer 2019 Jennings:**

Monica Sifuentes (Class of 2020)

### **Summer 2018 SURF:**

Jiyoung Kim (Class of 2020), "Analyzing the U.S. Income Inequality on Labor-Relevant Variables and Discovering the Main Roots of the Widening National Income Disparity", Mentor: Ali Shourideh

**Summer 2017 SURA:**

Jiyoung Kim (Class of 2020), Mentor: Ali Shourideh  
Amrutha Palaniyappan (Class of 2020), Mentor: Erik Thissen (Psychology)

**Spring 2017 SURG:**

Katterin White (Class of 2017), "Latinx Students' Experience at CMU", Mentor: Mariana Achugar (Modern Languages)

**Summer 2013 SURG:**

Avery Calkins (Class of 2014), "The Framingham Demonstration Project", Mentor: Karen Clay

**Summer 2012 SURF:**

Victoria Baggio (Class of 2013), "Project Yele"  
Oliver Haimson (Class of 2012), "Where are they Now? Analyzing Gender Differences in Executive Exit Patterns",  
Mentor: Carol Goldberg

**Spring 2012**

Jonathan Francis, Zhijun Huang (Class of 2015), Kenneth Wong, "Creating Virtual Marketplaces for the Commoditization of Rental Spaces", Mentor: Carol Goldberg

**Fall 2011**

Tadas Zolynas (Class of 2013), "Real Time Fluid Simulations", Mentor: Adrian Treuille (Computer Science)

**Spring 2011**

Shweta Suresh (Class of 2011), "Impact of Social Risk Aversion and Audience Effects on Generosity to the Poor",  
Mentor: Christina Fong (Social and Decision Sciences)

**Spring 2007**

Robert L. Jefferson (Class of 2008), "Anti-Foreign Sentiment in the Calif. Gold Rush" Mentor: Karen Clay

**Fall 2006**

Pauline Law (Class of 2007), "Exploring Boston's Chinatown" Mentor: Donald Sutton (History)  
Sagar Shah (Class of 2007), "Estimating Price Distributions for the US Vehicle Fleet: Why Isn't Quality Job 1?"  
Mentors: Paul Fishbeck (Social and Decision Sciences) and David Gerard (Social and Decision Sciences)

## 2.5 Milton and Cynthia Friedman Fellowship

The Friedman Fellowship program was endowed by Mrs. Cynthia Friedman, a trustee of Carnegie Mellon, in memory of her husband, Milton Friedman, a Carnegie Mellon alumnus. The fellowship enables students to serve in internships in the public and non-profit sectors in Washington, D.C. to enhance their exploration of a career in public policy and contribute to their education at Carnegie Mellon.

**Summer 2015:** Vaasavi Unnava (Class of 2017; Internship: U.S. Senator from Ohio Sherrod Brown's Congressional Office)

**Fall 2011:** Mary Carmen Easterwood (Class of 2012; Internship: Millenium Development Corporation) and Caroline E. Roper (Class of 2012; Internship: U.S. Department of Commerce)

**Spring and Summer 2010:** Bassem Mikhael (Class of 2011; Internship: Center for Health Transformation)

**Summer 2009:** Lindsey Reese (Class of 2010, Internship: U.S. Census Bureau)



## 2.6 Phi Beta Kappa Society $\Phi BK$

Phi Beta Kappa was founded on December 5, 1776, at the College of William and Mary. Since then, Phi Beta Kappa has evolved to become the nation's leading advocate for the liberal arts and sciences at the undergraduate level. The Society's distinctive emblem, a golden key, is widely recognized as a symbol of academic achievement.

**2020:** Shlok Goyal (Class of 2020);

**2019:** Amelia Gilson (Class of 2019), Eric Huang (Class of 2019), Qian (Sara) Sha (Class of 2019), and Xinni (Echo) Wu (Class of 2019)

**2018:** Jules Ross (Class of 2019)

**2016:** Richa Mohan (Class of 2016) and David Moss (Class of 2016)

**2015:** Danielle McKinney (Class of 2015) and Stanley Krasner (Class of 2015)

**2014:** Wan Xin Teo (Class of 2013)

**2013:** Zachary Branson (Class of 2014); Margaret Kowalski (Class of 2013); and Karthik Nagarajan (Class of 2013)

**2012:** Brittanie Boone (Class of 2012); Mary Carmen Easterwood (Class of 2012); Karen Khalaf (Class of 2012); and Caroline E. Roper (Class of 2012)

**2011:** Dina Megretskaia (Class of 2011); Ashish Thakrar (Class of 2012); and Sebastian Wai (Class of 2011)

**2010:** Smita Kumar (Class of 2010); Bassem Mikhael (Class of 2011); and Shweta Suresh (Class of 2011)

**2009:** Richard M. Katzwer (Class of 2010); Akshaya Jha (Class of 2009); Christine Lee (Class of 2009); Dongmin Lee (Class of 2010); André Tartar (Class of 2009); and Nate Tower (Class of 2009)

**2008:** Michael C. Lee (Class of 2008); Rebecca H. Radkoff (Class of 2008); and Sara K. Wille (Class of 2008)

**2007:** Sheila H. Ip (Class of 2007); Randall C. Jones (Class of 2007); Seng Keat Teh (Class of 2007); Brandi M. Tish (Class of 2007); and Charles Wright (Class of 2007)

**2006:** Andy Butler (Class of 2006); Aileen Ma (Class of 2006); Lin Tian (Class of 2006); Minghong Toh (Class of 2006); Marie Yetsin (Class of 2006); and Chunhua Zhang (Class of 2006)

## 2.7 Phi Kappa Phi Honor Society $\Phi K \Phi$

The Honor Society of Phi Kappa Phi is the nation's oldest, largest, and most selective all-discipline honor society. Membership is by invitation only to the top ten percent of seniors and graduate students and 7.5 percent of juniors. The Society's mission is "To recognize and promote academic excellence in all fields of higher education and to engage the community of scholars in service to others."

**2021:** Carnegie Mellon University did not nominate students to the  $\Phi K \Phi$  Society.

**2020:** Jack Dunbar (Class of 2021); Carlo Duffy (Class of 2021); Jack Murphy (Class of 2021); Shlok Goyal (Class of 2020); Anna Shao (Class of 2020); Yanan Shi (Class of 2020); Leah Varughese; and Yiming Zhao (Class of 2020);

**2019:** Brandon Hao (Class of 2019); Jules Ross (Class of 2019); Qian (Sara) Sha (Class of 2019); and Xinni (Echo) Wu (Class of 2019);

**2018:** Hanyu (Lyra) Jiang (Class of 2019); Benjamin Pierce (Class of 2018); Aileen Tan (Class of 2018); Isabelle Tseng (Class of 2018); Alexandra Ulven (Class of 2018); and Boyan Zhang (Class of 2018)

**2017:** Peter Brady (Class of 2017); Charlotte Townsend (Class of 2018); and Kunal Wadwani (Class of 2017)

**2015:** Danielle McKinney (Class of 2015); Ronald Fudala (Class of 2015); Jonghwan (Brian) Lee (Class of 2015); Richa Mohan (Class of 2016); David Moss (Class of 2016); Mei Huey (Michelle) Ong (Class of 2016); and Samuel Walters (Class of 2016)

**2014:** Zachary Branson (Class of 2014); Avery Calkins (Class of 2014); Stanley Krasner (Class of 2015); Ian Meeker (Class of 2015); Dong Jin (Michael) Shin (Class of 2014); and Emily Wright (Class of 2014)

**2013:** Victoria Baggio (Class of 2013); Jae-Eun (Jenny) Chang (Class of 2013); Margaret Kowalski (Class of 2013); and Cen (Kayco) Zhou (Class of 2013)

**2011:** Nicole Bayley (Class of 2012); Brittanie Boone (Class of 2012); Mary Carmen Easterwood (Class of 2012); Oliver Haimson (Class of 2012); Risa Shen (Class of 2012); Ashish Thakrar (Class of 2012); Steven Yang (Class of 2012); and Xiaoyu (Jecky) Zhu (Class of 2012)

**2010:** Vinith Annam (Class of 2010); Gabriel Herman (Class of 2011); Alexandra Kontopoulos (Class of 2010); Bassem Mikhael (Class of 2011); Shweta Suresh (Class of 2011); and Karolos (Charlie) Waldron (Class of 2011)

**2009:** Engin Levent Altinoglu (Class of 2010); Richard M. Katzwer (Class of 2010); Smita Kumar (Class of 2010); Dongmin Lee (Class of 2010); Brian Moon (Class of 2010); Daniel Park (Class of 2010); Vivek Raval (Class of 2009); Calvin Wong (Class of 2010); and Hon Ming (Robin) Quek (Class of 2010)

**2008:** Iulia Degeratu (Class of 2009); Akshaya Jha (Class of 2009); Christine Lee (Class of 2009); David Mirsky (Class of 2009); André Tartar (Class of 2009); and Nate Tower (Class of 2009)

**2007:** Sudeep Paul (Class of 2008); Rebecca H. Radkoff (Class of 2008); and Brandi M. Tish (Class of 2007)

**2006:** Tsun Wah (Terence) Chang (Class of 2007); Dana Guffey (Class of 2007); Sheila H. Ip (Class of 2007); Aileen Ma (Class of 2006); and Seng Keat Teh (Class of 2007)

**2005:** David Michael Ebersole (Class of 2005) and Maria Veronica Urenda Valdes (Class of 2005)

**2002:** Ee Thian Lim (Class of 2002) and Pikkwan Wong (Class of 2002)

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