



BENTLEY
UNIVERSITY

**Seventeenth Annual Undergraduate Research
Conference Abstracts**

**Co-Sponsored by
The Honors Program
The Liberal Studies Major (LSM)
&
The Valente Center**





We are incredibly proud of the hard work and dedication to research shown by all of the students who submitted proposals to participate in the Seventeenth Annual Undergraduate Research Conference this year. Sadly, because of COVID-19, the Undergraduate Research Conference was cancelled this year. However, we still wanted to share this program highlighting the projects that our students completed this year.

With gratitude,

Susan Capolino-Cocuzzo, Executive Academic Events Coordinator
Professor Rob DeLeo, Associate Director, Honors Program
Professor Jane De León Griffin, Associate Dean of Arts and Sciences
Professor Hans Eijmberts, Director, Valente Center for Arts & Sciences
Neelangi Gunasekera, Senior Program Assistant, Valente Center for Arts & Sciences
Professor Christian Rubio, Director, Honors Program
Michelle Yestrepky, Honors Program Manager

Aman Ailani

Business Management with a Concentration in Entrepreneurship

No Longer Jacob: The Evolution of a Bentley Scholar

Faculty Advisor: Professor Tzarina Prater

I came to Bentley entrepreneurially-minded. I knew that my career path would eventually lead me to working for myself in some regard. I come from a tradition of Asian family owned and operated businesses that is three generations deep and was immersed in "business" during my upbringing in Dubai. This is the story I want to tell. Combined with generations of industriousness, I was made to understand the necessity for taking core business courses that would lay a solid foundation for the start-ups I would eventually run. Through exploring personal interests and passions, I have been able to carve out a niche for myself at the intersection of business, media, and culture. My journey as a "businessman" begins with a friend and I starting our own comic book in the sixth grade with me as a salesman and continues today with my becoming a founder of a coffee start-up in my senior year at Bentley University. Along the way, I've made pit-stops in sports media, collegiate athletics, the world of "mascot-ing", and digital marketing. Each pit stop has been instrumental in my becoming a business-owner, but most importantly, I have gotten to follow my dreams. I have stood firmly by my principles of faith and hard work. My story is unique to me. It is mine, and it is also my responsibility to share with the world – this capstone aims to do that through a lens that emphasizes the historical and cultural factors that made it possible.

Brian Apple

Management Major with a Concentration in Human Resources

Artificial Intelligence in Recruiting

Faculty Advisor: Professor Jeffrey Proudfoot

In recruiting, there exists a fundamental balance between cost effectiveness and quality of hire. On the one hand, modern day organizations change and evolve at such a rapid rate, that most companies need a recruitment system that is fast and fills vacancies with minimal negative impact to the bottom line. On the other hand, investing the resources into finding quality applicants can yield long term profitability as employees become adequately challenged and engaged. Artificial Intelligence offers an exciting new field of products to the recruiting landscape that might be able to bridge the gap between cost effectiveness and quality of hire. The following project researches, creates, and experiments with Artificial Intelligence in a recruiting context to better understand its place in Human Resources, its ability to overcome hiring bias, and its over feasibility for corporate America over the next several years.

Natasha Bajaj
Computer Information Systems

RideSplit: Implicit Biases & Application User Profiles
Faculty Advisor: Professor Aaron Nurick

There are major costs for students associated with breaks and holiday seasons. Students often have no option but to spend approximately \$20-\$100 extra on Ubers/Lyfts just to get to designated airports, bus, or train stations. Most students do not have cars on campus and will pay however much necessary to get home on time. Additionally, the more common and reliable options such as Uber often engage in price surging, causing even more frustration when students cannot find others to rideshare with during common times of travel.

To avoid these extra costs, I have created RideSplit, an application which connects students who are traveling to the same location around the same time. A safe and non-stressful way to coordinate rides in advance depending on how the users want to rideshare and save money during busy times of travel. I have analyzed the market need for this application and answered the following questions with my research:

- What specifically would a user like to see on a profile to use the application?
- What aspects of an individual's profile lead to the creation of a first impression?
- What would lead to a user connecting with another student to save on a ride? What factors would make them feel more comfortable?

To create the most successful application, I analyzed what factors lead to the first impression of an online profile. I specifically focused on the potential impact of implicit biases, or unconscious attitudes and their impact on the way application users view each other's profiles.

Emily Barthelmes
Corporate Finance and Accounting

Redefining the Honors Experience at a Business School
Faculty Advisor: Professor Christian Rubio

The argument over whether a liberal arts education is more valuable than a more specialized education or vice versa is one that could go on forever. It seems impossible to objectively decide that one is better than the other, which proves exactly how important integration is. Liberal learning develops the individual and their capacity to succeed in a changing environment. On the other hand, professional studies focus on developing vital skills and knowledge to potential employees; students are able to begin their desired career paths because of how prepared and employable they are upon graduation. It is imperative that students receive both types of education in order to achieve continued success and become contributing members of society. Specifically for students at business institutions, the divide between professional studies and liberal arts can lead to a hazy distinction between good for business and good for society. One way to achieve effective integration is through an Honors education. This is precisely what this paper will address. I will emphasize that the primary goal of any honors program should be to create a comprehensive learning experience for students that is both challenging and rewarding, providing members with high-level intellectual stimulation as well as the practical knowledge and skills needed to be a highly successful member of society. An Honors education should equip students with a well-rounded perspective of the world upon graduation, with the end goal of cultivating the mindset of bettering that same world.

Rowan Billingsley
Corporate Finance and Accounting

Mark Read
Faculty Advisor: Professor Erica Arkin

Mark Read is a historical fiction novella centered loosely on the stories of the pirates Mary Read, Anne Bonny, and Jack (Calico Jack) Rackham. This novella focuses on the character development and story of the main character Mary Read. The main goal of the novel would be to accurately represent someone who's gender identity is somewhere in the middle, even though at the time she wouldn't be able express that with the language available to her at the time. Mary Read disguises herself as a man and goes on a journey as a pirate in the Caribbean during the 1700s, the Golden Age of Piracy.

Mary follows along the journey that this woman had given her to try and understand why the woman knew her as Mary. Along the way, Mary's identity is thinly hidden behind her disguise. Mary views her identity as Mark Read as both necessity and also subversive. Without having language to express it due to the time period, Mary's identity is as both Mary and Mark Read. She is a character who at her core identifies as neither and both. Throughout the novel the reader sees Mary find her identity and understand what the journey she is sent on means.

Sarah Black
Economics and Finance

Making a More Equal World: Completion Rates and Inequality
Faculty Advisor: Professor Mike Quinn

The rising inequality across the world is reaching crisis levels. Getting a college degree has been seen as a way to increase peoples' social mobility and a way to combat inequality. While this is a topic of political debate and public interest, there has been a shortage of research on the topic. This paper examines the complex relationship between rising tuition costs, college completion rates, and inequality. A panel dataset is constructed across all U.S. states from 2006 to 2012. The analysis found that higher completion rates decreased income inequality. Economic factors such as income and unemployment were significant in driving completion rates. The impact of public and private tuition costs on completion rates was mixed. These results have implications for policy and the literature. Increasing college completion rates needs to be a focus of public policy. However, some of the political plans regarding free tuition may not be the most efficient way to increase completion rates. Government programs need to focus on creating economic growth and increasing higher education funding when there are economic downturns.

Marissa Burack
Data Analytics

Understanding Salary Determination in the NFL
Faculty Advisor: Professor Scott Callan

There is a general understanding that professional football players in the National Football League (NFL) make substantial amounts of money. However, understanding what influences those players' salaries is not as well known. For example, how much does a player's athletic performance affect his salary? Or, out of a plethora of performance statistics, which specific performance factors matter the most in determining a player's salary? These are but a couple of the questions addressed in my research investigation.

In order to answer these questions, my project builds an economic model of salary determination which is based on a well-developed theoretical foundation. Following previous literature, my model uses the salary cap compensation of the player as the dependent variable. As defined, the salary cap compensation measure is composed of the average annual value of a player's salary plus any pro-rated guaranteed bonuses. To help explain variabilities in an NFL player's salary, the statistical model employs multiple independent variables that capture a variety of on-field performance metrics, player physical characteristics, and some team-specific measures.

All statistical models are estimated using the software R. Model estimates are then used to predict the market valuation for NFL players who are under contracts. Once these market valuations are obtained, a comparison is made to the player's actual salary. This comparison reveals the impact of player salary rigidities (such as rookie minimum salaries, non-free agent or other contract restrictions) on a player's ability to freely negotiate their salary. The results allow us to see the differences in what players are actually being paid under their current contract versus the amount they would theoretically deserve if the rigidities were removed.

Finally, from a practical/real-world perspective, the Buffalo Bills' NFL football analytics team has asked to see the underlying model, statistical findings and subsequent conclusions in an attempt to assist them in their decision-making with respect to future player contracts and trades.

Joseph Chamma
Finance

Gotham: Nothing is real; everything is true.
Faculty Advisor: Professor Tzarina Prater

This creative capstone will have two components and involve generating a two dimensional discovery-focused digital simulacrum of New York City that incorporates fantastical elements as well as elements informed by the city's economic, political, and cultural history such as visual sites which render images, familiar and symbolic images, from today and the historical past. It will be a large scale, multi-layered, hand-drawn illustration of the city that will then be transformed into a digital project. The second component will be the transformation of this two dimensional map into a digital project that will deploy "Easter eggs," in the form of QR codes and hyperlinks, that will take the reader/viewer/participant/visitor to a variety of digital spaces, to learn more about the city, or rather an alternative New York. For example, there may be an image of graffiti used to locate the borough of Queens, the birthplace of graffiti. The reader will be able to "click" on this image and taken to a digital node showcasing 5Pointz, a historical landmark for graffiti and hip-hop culture that was destroyed by a developer in 2013. After a court victory in which the developer was found guilty of destroying "art," a group of graffiti artists were awarded \$6.7 million." The "visitor" will then be able to access the hyperlink to read details about the space, its history, import, and place in an "alternative" imagining of New York City.

Community Based Research Class:

Tara Boyle, Corporate Finance and Accounting; **Swathi Chikoti** Finance and LSM: Earth, Environmental, and Global Sustainability; **Lauren Goodchild**, Information Systems Audit & Control; **Samuel Kilborn**, Corporate Finance and Accounting; **Amy Nguyen**, Mathematics; **Christina Noll**, Corporate Finance and Accounting; **Kristen Page**, Accountancy; **Connor Quinn**, Finance; **Lucenea Robinson**, Corporate Finance and Accounting; **Samuel Sigel**, Economics-Finance and LSM: Earth, Environmental, and Global Sustainability; **Morgan Smithwick**, Accountancy; **Justin Walch**, Finance

Business Perspective on Climate Change Adaptation in Massachusetts

Faculty Advisor: Professor Rob A. DeLeo

In partnership with the Greater Boston Chamber of Commerce, the Community Based Research class investigated climate change resilience within the Massachusetts business community. Whereas previous studies have examined the role of the private sector in supporting sustainability and clean energy, ours is the first project to explore ongoing efforts by private companies to adapt to existing climate risks, including sea level rise, flooding, extreme heat, and extreme precipitation. Our study reveals employees in Massachusetts are far more concerned with climate change than the rest of the country, and that many believe climate change will have an immediate impact on their place of business. In light of these concerns, we suggest the Greater Boston Chamber of Commerce develop a series of workshops to help educate the business community on “best practices” for preparing for climate related hazards. Additionally, the Greater Boston Chamber of Commerce should facilitate opportunities for businesses to partner with government agencies to fund important hazard resilience programs.

Palak Devi
Economics - Finance

Can Game Theory Predict Love
Faculty Advisor: Professor Jeffrey Livingston

This study works to use game theory to understand and predict how people make choices in reality TV, focusing on the popular UK based show, “Love Island”. Throughout this show, contestants are expected to find their “perfect match” and stay with them throughout the show to win the grand prize of love and money. This “perfect match” is a concept that is judged throughout the show by the audience and contestant connection. It is tested every time a new person enters the show. While theory would suggest that a partnership forged early on would result in a win, the data shows otherwise. Through research and a detailed analysis of 250 episodes displaying each contestant’s decision point, this paper examines how contestants are making decisions, and what factors contribute to certain people winning or losing. With regression analysis and a focus on factors like age, gender, and popularity, it strives to understand if risk seeking decisions or risk averse decisions result in a better outcome. Overall, it studies if contestants act in their own self-interest to find love or win the game, and how either strategy works for them.

Elizabeth DiTomasso

Finance

LSM: Earth, Environment, and Global Sustainability

Comparison of microplastic extraction methodologies for commercially valuable shellfish

Faculty Advisor: Professor Elizabeth Stoner

Microplastics are becoming increasingly well-studied, in part because the global community recognizes the pervasiveness of the plastics pollution problem and want to understand the impacts plastics may have on ecological integrity and human health. In the last decade, there has been an exponential increase in the number of published studies on microplastics, yet methodologies to extract and evaluate microplastics are inconsistent and lack standardization. We aim to investigate this issue by comparing the extraction of microplastics from locally caught shellfish using a standard nitric acid method, to other (published) studies using different methods used to extract microplastics from shellfish. We used simple search terms in Web of Knowledge (*shellfish and *microplastics) to find scholarly literature pertaining to microplastic extraction from shellfish and compared methods and findings to microplastics data from locally caught blue mussels (*Mytilus edulis*). Preliminary findings indicate that microplastics, particularly filamentous plastics (microfibers) are prevalent in all shellfish evaluated. However, there are concerns with how caustic the nitric acid used in our analyses is on plastic filaments, potentially making them brittle or breaking them apart which could influence data. Further, a prevalent issue in microplastics literature is the problem of environmental contamination. It is imperative that all microplastics be evaluated using both visual identification and micro-Fourier transform infrared spectroscopy (FTIR) to analytically evaluate polymeric composition of plastics retrieved from shellfish samples. Ultimately, standardization of protocols will help create consistencies in data collection and analysis of microplastics, which are necessary in order to better understand this important environmental problem.

Taylor Donahoe

Managerial Economics, Concentration in International Business

“Beyond Griswold v. Connecticut: The Impacts of Social and Technological Change on the Right to Privacy”

Faculty Advisor: Professor Franklyn Salimbene

The word privacy is not mentioned once in the Constitution. Why then, do citizens of the United States have this right to privacy, one that many hold dear? The constitutional right to privacy was first described in Samuel D. Warren and Louis D. Brandeis’s *The Right to Privacy* published in the *Harvard Law Review*. This right, they asserted, extends from the right to own and manage property, and the right to be let alone. The Supreme Court established this right in the landmark case *Griswold v. Connecticut*, 381 U.S. 479 (1965). Certain amendments, the First, Third, Fourth, Fifth, Ninth, and Fourteenth, have penumbras that create a zone of privacy. This right has both been expanded and refined over time as society has changed and technology has developed. It has led to the women’s right to choose in *Roe v. Wade*, 93 S.Ct. 705 (1973). It has led to both the reinforcement of older norms in *Bowers v. Hardwick*, 106 S.Ct. 2841 (1986) and the increase in citizen liberty in *Obergefell v. Hodges*, 135 S.Ct. 2584 (2015). The constitutional right to privacy changed with cultural norms, but it also was refined by advances in medical expertise, police surveillance equipment, and public use of technology. The current constitutional right to privacy is socially broad. However, this right is, for the first time since *Griswold*, being continually, gradually refined by the Court. This contraction is always in light of compelling governmental interests narrowly tailored to the issue.

Ryan Farrar

Information Systems Audit and Control

“Running for Reduction:” Acute exercise, passive relaxation, and anxiety reduction

Faculty Advisor: Professor Aaron Nurick

Anxiety is a chronic issue with college students today, and their increasingly busy schedules make it hard to find time for reduction methods. Prior research has shown acute exercise and passive relaxation to be effective methods of anxiety reduction, but rarely compared to see which is more effective. In order to do this, we measured the anxiety of 21 college students, with some performing a treadmill run and others reading for 25 minutes. The results of this study show whether one of the tested activities should be used more for student’s anxiety reduction or if both running and relaxation reduce anxiety by the same magnitude. This information could help other students make a decision about what to prioritize in order to feel better.

Mihir Gonsai

Finance

Factor Investing: Treating ESG as a Factor

Faculty Advisor: Professor Otgo Erhemjamts

Globally, Sustainable, Responsible, and Impact (SRI) investment assets reached \$30.7 trillion by the start of 2018, up 34% from 2016 (Global Sustainable Investment Alliance, 2018). Currently, 26% of all assets under management in the United States are managed using sustainable investing strategies (2018, 3). According to Eurosif, the definition of ESG integration is the explicit inclusion by asset managers of ESG risks and opportunities into traditional financial analysis and investment decisions based on a systematic process and appropriate research sources (2014, 17). For this paper, I will be applying ESG data to a financial valuation through a 'dual decision model' where both financial data and ESG factors are considered sequentially (Nielsen and Noergaard, 2011). For the financial component of the dual decision model, I am using Fama and French's Five Factor Model. This multifactor model states that there are multiple sources of risk inherent in an investment. The five factors in this model are market risk premium, size, book-to-market, profitability, and investment. The empirical tests of the model aim to explain the average returns constructed using portfolios based on size, book-to-market, profitability, and investment. Fama and French found that running time-series regressions on the Five Factor model left about 20% of the cross-section variance of expected returns unexplained (Fama and French, 2015, 10). By integrating ESG data into the Fama and French Five Factor Model, I aim to reduce the percentage of the cross-section variance of expected returns that are left unexplained.

Sara Goodno
Public Policy & Business

The H-2A program: The relationship between employers and laborers
Faculty Advisor: Professor Johannes Eijmberts

The H-2A temporary guest worker program has allowed agricultural entities to hire temporary workers from other countries since the passage of the Immigration Reform and Control Act in 1986, though guest workers have been an integral part of American farm labor for much longer. There are many benefits of the H-2A programs for both the employers and the workers, including increased economic output for the farms and higher wages for workers than they may be able to access in their home countries. However, the system is also rife with bureaucratic red tape and exploitation of workers. Based on survey responses and phone interviews, this research specifically focuses on the employers of H-2A workers, and how they interact with their workers and the system.

Abby Hill
Marketing

Gender, Generation, and Giving: A Study of Nonprofit Messaging
Faculty Advisor: Professor Laurel Steinfield

Previous literature demonstrates men and women in older generations tend to respond differently to different types of nonprofit messaging. These differences are often tracked based on traditionally masculine and feminine traits. However, modern researchers have yet to examine whether these differences persist in younger generations. Considering Generation Z's reputation as the most socially and politically progressive cohort and the most likely to reject a gender binary and gender roles, further study is needed.

Through the use of a survey, this research studies members of Generation Z as well as those older than Generation Z. To determine whether Generation Z exhibits traditional gender roles through masculine and feminine traits, each participant receives a masculinity, femininity, and androgyny scale score using the Bem Sex-Role Inventory. Survey questions also determine levels of empathy and provide scores to compare across gender and age. Finally, two vignettes, which exhibit self-focused and others-focused benefits, differentiate types of nonprofit messages. The differences in willingness to give is then analyzed based on each variable.

Researchers have previously attempted to draw conclusions about factors that influence responses to nonprofit messaging. Many tie results to sex, but do not investigate the impact of gender and gender roles. Empathy is central in many nonprofit messaging studies, but this research specifically connects empathy and gender identity, not just sex. Research that compares others-benefits and self-benefits has also made assumptions about gender and gender identification that undermine conclusions. This research bridges these gaps while investigating the understudied Generation Z.

Aleksandra Jalinskas

Finance

***Rape Prevention Education Programs at Post-Secondary Institutions & Their
Perceived Effectiveness***

Faculty Advisor: Professor Miriam Boeri

This report details the results of a mixed-methods study on rape prevention education (RPE) programs at post-secondary institutions. The study's two aims were to: (1) examine post-secondary institutions' policies surrounding interpersonal violence on campus and how these policies vary between schools; and (2): examine the perceived effectiveness of institutions' RPE programs from the people who administer them. A survey was sent to the Title IX Coordinators of 400 randomly selected institutions, and secondary content analysis was completed on 16 schools' websites. In general, this study found that school administrators believed that their programs are effective at increasing students' knowledge of campus programs and policies. However, there was an insufficient amount of evidence regarding whether the programs help to reduce the number of on-campus incidents of interpersonal violence. This report also discusses current federal regulation of sexual assault prevention, as well as existing methods of prevention education and theories surrounding the issue.

Nikhil Karnane
Economics – Finance

Economic Inequality and its Effects on Human Capital in the United States
Faculty Advisor: Professor Dhaval Dave

Over the last 30 years, rising economic inequality in the United States has paved the way for many social and financial discrepancies. The annual income differential between the 80th and 20th percentiles has widened by \$35,000 over this period. Discourse on economic inequality and the “left-behind” working class has dominated recent elections. A large literature has established that the level of household income matters for health and human capital acquisition. Economic theory further posits that it is not only individual income that plays a role in limiting resources related to health and education accessibility, but also the disparities of income across households. This study adds to the limited empirical evidence on the potential adverse effects of rising economic inequality on population health and higher education. While it is common to compare the U.S. with other nations on such measures, this study analyzes income disparities across states and over time within the country. Labor market data from the Bureau of Labor Statistics will be utilized to create income inequality measures on a state level. Multivariate models will then relate those measures to college enrollment data and tuition rates (National Center for Education Statistics) and that of overall health (Center of Disease Control and Prevention). Given the importance of health and education in raising an individual’s earnings, preliminary results imply a “vicious cycle,” such that the adverse effects of economic inequality may further depress earnings potential and widen the income gap. These results have implications for social and economic policy.

Alyssa Kastner
Creative Industries, Law minor

***An International Study of Gun Regulation Policy: Putting America in the
Spotlight***

Faculty Advisor: Professor Kiana Pierre-Louis

The controversy over guns in the U.S. has reached a pinnacle; however, the overwhelming evidence that there exists a gun problem—especially impacting low-income neighborhoods—shows that policy implementation is a necessary step to ensure the safety of American lives. Current statistics reveal that the US holds 4.4% of the world's total population, but has almost 50% of the civilian-owned guns worldwide. On any average day in the US, around 300 Americans are shot and 100 die from gunshot wounds in crimes ranging from murders to suicide attempts and accidents. This research project will look at existing gun policies in the United States and will analyze the success of international gun law policies in order to answer the following questions: What are the most tangible, effective gun restrictions policies that the United States could implement to address the current gun violence problem? How can the United States implement these laws, while respecting the rights granted by the Second Amendment to the Constitution? Additionally, this study will address whether guns are actually a major factor at play in American crime, analyze what laws are currently in place to regulate gun use, and provide solutions on how to address problems associated with gun possession, including school shootings and the prevalence of suicide attempts. The Second Amendment will be a central factor of the discussion, which will also revolve around the successes and failures of international gun policies. The audience will learn the history of gun regulation, the many sides of the gun regulation debate, and new ways to think about the gun issue on an international scale.

Lynn-Yen Koh
Managerial Economics

Which Factors of a Bentley Student's Career Affect Their Starting Salary as a Recent Graduate?

Faculty Advisor: Professor Jeff Livingston

Research has shown that there are many different factors that affect starting salaries of fresh college graduates across the United States. However, what are companies even looking for in a candidate before extending a job offer and deciding on a new hire's starting package? As the job hunt continues to get more and more competitive, particularly in the world of business, many are finding that simply attaining a bachelor's degree, even at an accredited institution with a prestigious reputation, is no longer enough to secure a decent job after graduation. Through my research, I will be studying the experiences of Bentley students in particular, documenting certain aspects of their journey in order to determine how much of an influence each of their qualifications, achievements, and activities had on their intern and full time salary. Although there are a vast amount of characteristics that make each person unique, I will solely be focusing on a few of those factors that appear to be some of the most important determinants for companies, which are GPA, major, number of internships secured in the past, school year during which that internship was completed, salaries of those internships, the industry of work, and the number of leadership positions held during one's time at Bentley.

Adam Levesque

International Affairs; Business Studies

A Geographic Comparative Analysis of Opioid Treatment Options and Demographic Variances in the Commonwealth of Massachusetts

Faculty Advisor: Professor Zoë Folchman-Wagner

The opioid epidemic is well acknowledged as one of the most significant challenges facing the US healthcare system. This national crisis has far-reaching implications that may change the face of policy, regulation, treatment, and healthcare. Part of the response to the opioid epidemic has been an increased focus on treatment facilities and best practice in addiction treatment. The issue of how best to treat opioid addiction to ensure equal access to quality care, comprehensive and integrated treatment approaches, and mitigate relapse is a topic of considerable discussion. This discussion becomes more important when we consider recent legal settlements against opioid manufacturers such as Purdue Pharma and Johnson & Johnson, in which portions of these settlements were earmarked for the development of opioid abuse treatment centers. The Substance Abuse and Mental Health Services Administration (SAMHSA) recently published the National Survey of Substance Abuse Treatment Services (N-SSATS) for the first time. This is a list of all facilities in the United State offering substance abuse treatment along with a list of specific services offered at each location. As this is the first time such a database has been published, it offers a plethora of opportunities for novel areas of inquiry.

This work focuses specifically on opioid treatment data from the N-SSATS directory, with particular attention paid to pharmacotherapy for opioid treatment, detoxification services, and payment/insurance mechanisms. These N-SSATS data will be combined with local census data examining demographic factors surrounding each treatment facility, focusing specifically on age, gender, ethnicity, and socioeconomic status. By comparing the services of each facility to the local demographics, we will be able to understand and visualize how treatment need overlaps with treatment opportunity, and how treatment options vary across demographic areas. This has the potential to inform both policy and distribution of any settlement or government funds.

Zoe Levine
Economics-Finance

How to Make the Good Times Last: Factors Behind America's Drop in Crime Rates

Faculty Advisor: Professor Michael Quinn

Crime affects millions of people in the United States. And yet there are still too few explanations for what drives crime rates. This study addresses several possible factors that impact both violent and nonviolent crime. The goal of this study is to provide insight into what factors have the largest impacts on crime rates in order to better maintain the current low rates that America is experiencing. Panel regression techniques are used to examine the determinants behind violent crime rates, nonviolent crime rates, and the composition of crime. The analysis combined several variables which had previously been tested only separately. There is indeed a negative time trend for both violent and nonviolent crime, but this negative time trend does not affect the composition of violent to nonviolent crime. Contrary to expectations, economic factors had an equal impact across violent and nonviolent crime. Alcohol and substance abuse were found to have a strong significant impact on increasing crime rates. This suggests that the government needs to be putting more resources into substance abuse intervention programs in order to further lower crime rates. The paper also points to the need for further in-depth research into the effects of capital punishment on crime rates.

Yana Levushevska

Corporate Finance and Accounting

Actual and Perceived Audit Failures

Faculty Advisor: Professor Len Pepe

The research focuses on the issue of increasing audit failures and the expectation gap between public and professional perceptions of audit failures. It provides an overview of various attempts to define “audit failure” and examines potential connections between public perceptions of audit quality and restatements as the most commonly used proxy for audit failures. The research includes such indicators of public perceptions of audit quality as stock returns, audit and non-audit fees, issuance of going concern opinions, auditor tenure, and other. The hypothesis is that there is no relationship between restatements and public perceptions of audit failures and audit quality. The hypothesis is tested by analyzing randomly selected records from the Wharton Research Data Services Audit Analytics database, which contains information about auditors, audit clients, audit opinions, and restatements. The results of the research show that while restatements are commonly used as proxies for audit failures, there is no significant correlation between restatements and public perceptions of audit quality. Hence, there is a need for a formal definition of audit failure in order to avoid wrong attribution of business failures to auditors’ mistakes and draw a line between audit and business failures.

Suyi Lim
Marketing
LSM: Media Arts and Society

Infinite Scroll
Faculty Advisor: Professor Tzarina Prater

"Fandom" is a word that, thanks to the evolution of digital media, has become part of our common parlance. The internet is the source of both creation and discussion for many active fandom members, whether creating their own original work or building off another's, the internet allows a bridging of distance between original cultural texts and fan engagement as well as creating a common place for fans to gather that is not bound by geographical proximity. Fans connect, converse, and create through wireless connections, and multiple industries benefit. The internet industry commodifies engagement and interaction between participants and can exploit the bonds that the creator has with the audience.

My project, *Infinite Scroll*, is a web-comic that will engage the world of fandom and community formation on the internet. Through the use of comic book generators on the internet and hand drawing, *Infinite Scroll* will metanarratively engage with online community and art production and interrogate structures of fandom, reception, and construction in mass media. To that end, one of the challenges my project levies is to take seriously the affective work of on-line fandom and its personal, interpersonal, and communicative meanings. *Infinite Scroll* combines autobiographical narrative with theoretical engagements about form, content, and materiality. Specifically, I will be working through the utility of the graphic novel as a form. An Artist's Statement will provide aesthetic and historical contexts for my graphic novel.

James P. Lunetta

Global Management, minors in Finance and Sociology

Increased Risk and Economic Insecurity in the American Labor Market

Faculty Advisor: Professor Curtis Smith

This paper is an expansive literature review on the economic and social implications of the changing labor market in the United States over the past century by considering income inequality, underemployment, racial disparities of work, and various forms of increased risk in the workforce, that also have major health ramifications on today's workers. This paper focuses on the nature of work in today's society by considering average real wages and fringe benefits of workers, economic and firm-level policy, and qualitative research from communities where jobs have been lost. The labor market that majority of Americans are now subject to is characterized by lower wages, less fringe benefits, and a decline in the presence of unions, among other factors. While the financial cost is high, the social cost that joblessness has on communities is destructive, with increased rates of social disorganization, crime, and an ultimate effect on education and health. American workers have felt these hardships for decades but minority groups, especially blacks, have been experiencing these negative effects at significantly higher rates than their white counterparts have. Finally, the Center for Disease Control shows that increased risk and stress felt on the job along with general reduction in healthcare coverage, poor living standards, and lack of social safety nets, ultimately contributes to poor physical health and shortened life expectancy. As the labor market and the future of work continues to change, the economic, social, and physical costs of an unequitable labor market show no signs of improving anytime soon.

Kyle McDougall
Corporate Finance & Accounting

Fundamental Factors and Alpha: A Brief View at the Modern Market
Faculty Advisor: Professor Alain Chinca

Fundamental analysis has been the cornerstone of investment management for decades, yet there has been a major shift in the industry with the increasing use of alternative data sets. Big Data has been revolutionizing the way that people look at securities, but have they been reducing the effectiveness of traditional valuation metrics? By looking at the ability of four fundamental metrics representing market value (market capitalization), book value and profitability (free cash flow from operating activities), the relationship between the two (price to earnings), and cash flows to the investor (dividend yield) to correlate with above the market returns in FactSet's Alpha Testing, I will compare their ability to generate alpha through regression analysis. The hope is that this can better direct investment managers to allocate their resources towards the most effective manner of research. With new legislation being introduced globally requiring dollar amounts placed on analyst research and increasingly tight budgets, managers need to be cognizant of what is most vital to their investment processes and cut out the dead weight. This is especially poignant with a wide range of vendors bringing new and expensive data sets with promises of better predictions of the market.

Brodie McPherson
Sustainability Science
Alex Peary
Management

***The Role of Benthic Jellyfish in Coastal Marine Food Webs Assessed with
Baited Remote Underwater Videos***

Faculty Advisor: Professor Elizabeth Stoner

Gelatinous zooplankton (hereafter referred to as jellyfish) are ubiquitous in marine ecosystems and have increasingly been recognized as playing an important ecological role in marine food webs. Although traditionally considered trophic dead ends, several studies have indicated that various species consume jellyfish. To date, most literature has evaluated the role that pelagic (open ocean) jellyfish have on marine trophic dynamics, however, there is a paucity of literature indicating the role of benthic jellyfish in the marine food web. The aim of this research is to elucidate whether benthic (bottom-dwelling) jellyfish (*Cassiopea* spp.) are utilized as prey in nearshore marine ecosystems, and whether predators will preferentially consume alternate prey sources if given a choice. To elucidate this question, we employed baited remote underwater videos (BRUVs) in a nearshore mangrove-lined tidal creek in Abaco, The Bahamas. The camera system was baited with one of four treatments: a single jellyfish, a jellyfish and fish prey, fish prey only, or a single control tile. Preliminary results from videos demonstrates that Four-eye butterflyfish (*Chaetodon capistratus*) prey on benthic jellyfish, while other typically piscivorous fish prey on the fish bait. Further, we are finding that the presence of fish bait does not influence the predation of benthic jellyfish by *C. capistratus*. We anticipate seeing similar behavior in videos taken at a second nearshore location in The Bahamas. These findings are particularly important to understand, as anthropogenic activities, such as eutrophication, have led to an increase in benthic jellyfish populations, which may have a pronounced impact on nearshore marine trophic dynamics.

Elizabeth Mitas
Sustainability Science

***Evaluation of microplastics from commercially valuable shellfish, blue mussels
(Mytilus edulis)***

Faculty Advisor: Professor Elizabeth Stoner

Due to heightened consumer demand for plastic since the 1950's, there has been substantial increase in plastic waste in the oceans. One of the most pervasive problems is microplastics, or small fragments of plastic <5mm in size. Microplastics have been found in many benthic (bottom-dwelling) species, as their feeding strategy of filtering the water makes them especially susceptible to microplastic ingestion. However, more work needs to be done on the role of microplastics in commercially valuable benthic species, and the impact that microplastics have on the marine food web. One locally-consumed species that is potentially susceptible to microplastic ingestion is the blue mussel (*Mytilus edulis*). The aim of this research is to determine whether blue mussels ingest microplastics. We have worked to elucidate this question through a combination of visual identification and quantification methods. The data in this study was extrapolated from blue mussels that were caught locally in Chatham Bay, Massachusetts. Preliminary results from 210 samples revealed a significant number of microplastics found in blue mussels, particularly black and red filamentous fibers. These fibers are likely from textiles, entering the marine ecosystem through waste water. This work will further expand on our growing knowledge of microplastics in marine biota, and allow resource managers to more adequately monitor the shellfish fishery for microplastic pollution.

Kristen Moldovan
Finance

Breaking the Glass Ceiling in the Financial Services Industry
Faculty Advisor: Professor Trevor Larkan

“A 2011 McKinsey report noted that men are promoted based on potential, while women are promoted based on past accomplishments.” –Sheryl Sandberg, Lean In

This quote from Sheryl Sandberg, and the study that it references, in a way summarize the whole preface of the following paper. The quote defines a concept known by most in the business world as the glass ceiling. The glass ceiling represents the barriers that women face in many different industries, which make it harder for them to advance in their careers compared to men. While female experience with the glass ceiling varies broadly across industries, it has been known to be prominent in financial services. Much previous research has been performed on the glass ceiling; however, none seem to be able to connect the causes of this phenomenon with potential solutions. This paper seeks to pinpoint specific ways in which women can go about breaking the glass ceiling in financial services. Society has seen an increase in both women with financial-related majors in college, and overall women entering the industry. However, the problem lies with female advancement and promotion rates in the financial services industry itself. Overall, through analysis of both previous and primary research this paper aims to show how the implementation of female sponsorship programs and various training programs for both female financial professionals and their peers, could allow for companies to tap into the potential of gender diversity by allowing for more women in executive and upper-level roles.

Grace Murphy
Economics-Finance

Business Schools and Gender Equity
Faculty Advisor: Professor Patricia Flynn

Though the business world is slowly but surely making progress in terms of female representation, there is still a lot of work to be done. As one climbs the corporate ladder, the number of women placed in senior level positions quickly diminishes. Some corporations are making the shift to putting into practice greater attention to diversity and inclusion efforts and making a goal to promote more women to the top. For my capstone, I wanted to study the ways in which undergraduate business schools could also help lift women to achieve the equality of opportunity to reach those coveted C-Suite and upper management positions. By conducting a series of interviews with senior women to detail their challenges in climbing the corporate ladder today as well as their advice as to how undergraduate business schools can better prepare women to be the ideal candidates to be placed in what this project coined as the “female pipeline to management.” This capstone aims to explore this concept of “female pipeline to management,” where women are positioned to be promoted quickly throughout their career.

Ha Minh Anh (Minerva) Nguyen
Finance

Title of Project: Does a rising tide carry all boats: Who is being left behind in Vietnam?

Faculty Advisor: Professor Michael Quinn

From the 1975 reunification until now, Vietnam has undergone rapid changes, most notably the transitioning from a centrally-planned economy to a market economy. The reform successfully transformed Vietnam into a vibrant and booming economy. But is this growth captured by the whole population? Who has gained the most and who has been left behind? Are there any factors that could have dampened the positive effect on specific groups of the population?

Using data from the Vietnam Access to Resources Household Survey (VARHS) from 2008-2014, this paper tests the effects of urban/rural status, ethnicity, education, and migration on household's income and wealth accumulation. The results find positive income growth over time for the whole population. However, only the ethnic majority (Kinh) has captured asset growth, not the ethnic minorities. Being both an ethnic minority and a rural household has particularly negative effects on both income and asset. There is hope for the rural and ethnic minority, however, as education is found to be a significant factor in improving households' financial situation and future gains. Migration is found to be another promising option as well.

This research calls for attention on the welfare and policies that could benefit the minority groups. It suggests that economic growth alone may not be enough. There is a pressing need for programs targeting rural and/or minority groups, especially in education. There is no simple solution for inequality, and this research makes it clear that market forces alone will not eliminate inequality between social groups in Vietnam.

Brendan O'Connell
Economics-Finance

Face-to-Face Photography: A Qualitative Look at the Evolution of Social Interaction and Communication in the Digital Age

Faculty Advisor: Professor Casey Hayward

As a result of the digital age, statistics show that communication and social interactions have evolved, but there remains little research on how individuals feel about this change and the impact it had. The goal of this study is to understand the perspectives of nine randomly selected individuals on communication in the digital age. Qualitative data was collected through face-to-face interviews which were guided by a standardized set of questions. The results show age related differences in subject responses in regards to the long term outlook of communication and social interaction. There was a common perspective on the utilization of digital communication channels. Channels such as texting, email, or social media improve overall convenience and efficiency in staying connected with others, but they do not foster “genuine” connections. The consensus was face-to-face interaction is the best method for establishing deeper connections. In addition, this study examined how every individual possesses a unique story that helps define who he/she is. Along with the qualitative research, this study collected the personal stories and photographs of each subject. The purpose is to show that we as a society are missing the chance to meet many great people because we are so consumed by the comfortability that comes with digital technology. This experimental study proves to people that it can be necessary to disconnect from the digital world at times. In order to achieve this, we all need to become comfortable with being uncomfortable. These nine subjects, along with myself, did just that.

Steven Obadiah
Economics-Finance

Effects of Capital Investment on Indian Employment
Faculty Advisor: Professor Bryan Snyder

India has rapidly developed over the past few decades, and it has attracted the attention of international as well as domestic investors. With this rapid development, both employment and capital across industries have fluctuated – some industries more so than others. In some industries, investment in capital should represent an expansion of industry and, thus, an increase in employment. In others that are being revolutionized under the fourth industrial revolution, increases in capital may be displacing workers. This study examines individual industries in India in order to determine which industries have been employing more workers and which have been going through a series of automation. Further, with India's cheap but developing workforce, it's possible that some industries have not been automated but rather have been relocated to other countries with cheaper labor. This study also investigates whether foreign direct investment, specifically, is correlated with employment in these industries, as there is a possible moral dilemma in foreign companies automating away the jobs they created by offshoring to India.

Nicole Perez-Torres
Computer Information Systems
LSM: Health & Industry

Artificial Intelligence to Improve Patient Care in the Healthcare Industry
Faculty Advisors: Professor Chris Skipwith and Professor Xinru Page

This research explores a wide range of possible applications of Artificial Intelligence in the Healthcare industry. The main focus will be patient care and the improvements that could arise with the implementation of this technology. There are so many problems surrounding the current healthcare system; however, patient care remains a priority in an industry that should always prioritize high-quality human care. In order to strengthen the understanding of the possible areas in which artificial intelligence could be applied, various professionals in related fields such as physicians, data scientists and psychology experts were interviewed. The primary research methodology is based on quantitative data and a software was used to determine patterns and identify main concepts discussed throughout the interviews. Furthermore, current applications of artificial intelligence in similar practices were also evaluated to identify possible areas of improvement. The study aims to recognize and encourage professionals to study more areas and practices within medicine in which artificial intelligence could be applied to improve patient care. Although many studies examine how artificial intelligence can improve diagnosis, there are so many other direct and indirect uses of this technology that could benefit multiple specialties.

Laura Pianin
Marketing
LSM: American Studies

Title of Project: Brand Activism: What are Gen Z's attitudes towards brands taking a stance?

Faculty Advisor: Professor Poh-Lin Yeoh

Historically, most consumer appeals have been about performance: a car's zero to sixty time, a cream's wrinkle-reducing characteristic, a shoe's comfort. While brands who do take stands on sociocultural issues (Tom's, Warby Parker) have a CSR integrated into its business models, many brands that typically rank in the Fortune's list of "Most Admired Brands" are known more for their productivity and low costs over their sustainable or socially conscious practices. However, more than half of iGens say that a brand's involvement with social causes influences their purchase decisions. Recognizing this, brands without CSR-driven missions are starting to take a on global developments. Reaction has been mixed with brand activism sparking controversy and disagreement. The aim of this research is to understand how Gen Z views brand activism and if they think engaging in brand activism makes a brand more authentic.

Gianni Polhemus
Marketing

How Electronic Nicotine Delivery Systems (ENDS) brand identity effect young adult's positive expectancies and brand loyal purchasing behavior

Faculty Advisor: Professor Laurel Steinfield

The purpose of this study is to better understand the effects of brand self-identity among college-age nicotine vape users. To this point, research has involved social and internal perceptions of vaping itself, however, have not considered the impact of brand on self-identity. E-cigarettes, vaping, or Juuling are forms of Electronic Nicotine Delivery Systems (ENDS), products sold alongside traditional tobacco products that provide users nicotine. In the age demographic of 18-25 year olds, ENDS are a growing first time use alternative to traditional tobacco products, such as, combustible tobacco and “chewed” tobacco. In 2012, the United States Food and Drug Administration deemed ENDS as meeting the definition of a tobacco product; however, a study showed 33% of sampled vape users aged 18-24 began using ENDS due to perceived health benefits over combustible tobacco products.

Therefore, our study is looking to better understand psychological reasons for young adults consuming increased amount of nicotine vape products. From inquiry into research literature, gaps in research are evident surrounding how users brand identity influences emotional expectancies. Furthermore, we will explore how insights into brand identity may help influence future public health messaging.

Kimia Pourshadi
English

Hearts Have a Way of Finding Each Other – Collection of Poems
Faculty Advisor: Professor Ralph Pennel

I spent the past year writing what felt like both a chaotic, yet graceful, release of stories I have always wanted to share. Through this written art, I have cultivated an appreciation for where I was, who I am, and what I see in the future. I have spent most of my life searching for similarity, relatability, and understanding. Writing is vulnerable, and here I share my greatest vulnerabilities in an attempt to better understand my diasporic identity. In light of the most recent news regarding Iran, my collection feels more relevant to me than it ever has before. I hope my poems will offer readers a look at what it means to grasp both my Middle Eastern ancestry and tradition while being a first-generation natural-born American in my family. I hope by sharing these intimate poems, reader will be able to see that difference may not appear as they would expect it to. During a time of crippling division and animosity, I hope the poems in my collection can fuel our empathy. In Farsi we say, “del be del rah dare” or “hearts have a way of finding each other” when we speak to those that are so far away. The idea is that hearts find each other when there’s a will, not matter the distance. I hope people will see how these poems are my way to find the hearts of my ancestry, culture, and people.

Rustam Rasulmukhamedov
Managerial Economics-Law

Strength of Prosocial Preferences in Charity-Based Dictator Games
Faculty Advisor: Professor Jeffrey Livingston

Dictator games are frequently used as a test of prosocial preferences and altruism in individuals, as proposers choose the amounts both themselves and the other participant receive. Typically, dictator games happen with two individuals as both the proposer and the recipient on an anonymous, double-blind basis. Results across studies vary, but given the option to give a certain amount of money, individuals typically choose to send portions of the amount to the other player, exhibiting altruism and inequity aversion. Further studies in the field that utilize lab experiments, such as the work of John List “On the Interpretation of Giving in Dictator Games” (2007), include a take treatment in dictator games to show that given the option to take in dictator games, the mean amount sent to the recipient decreases. List’s work shows that the amount sent is not necessarily a measure of prosocial preferences, but that individual decision-making is also dependent on the context and options provided to the participants, which is crucial in a lab experiment. This research project seeks to specifically expand on his work, by using lab experiments where Bentley students are partnered with charities instead of other individuals in dictator games with both giving and taking as treatments, creating a new context for individuals. Prosocial preferences should increase as both external social pressures and inherent altruism should be strengthened by the charity being the second recipient as compared to other individual agents.

Patricia Redondo Moro
Economics-Finance

The Collapse and Recovery of Venezuela: What are the next steps to reach economic stability?

Faculty Advisor: Professor Michael Quinn

Venezuela's poor policies, the heavy state control of the economy, and disregard for the law has led to poor economic conditions. The ongoing crisis in Venezuela has caught international attention. Many economists around the world are studying what policy recommendations would lead Venezuela to economic stability and recovery. These economists are developing policy recommendations within their own area of specialization. This type of siloed research can lead to researchers giving contradictory recommendations and missed linkages between the works. This paper represents the first attempt to synthesize, reconcile and connect all these different lines of research in Venezuela. After a thorough analysis of the different policy recommendations it can be concluded that the policies suggested for the monetary and fiscal policies, exchange rates, the oil industry, international trade, and businesses produce contradictions and feasibility problems. The economists propose recommendations that only attack their area of study, without acknowledging that their decisions both affect and are affected by other areas. This paper creates a recovery plan that considers all areas of the economy and it is feasible given the current situation. First steps include changes to the legal system, education and economic liberalization. This will give investors the incentive to put money on the country which will create employment and it will develop other industries in the country. Once those areas are stable, the government can then implement tight monetary policy which will stabilize inflation and exchange rates and will generate international trade.

Charlie Regan
Economics-Finance
LSM: Quantitative Perspectives

Do State-Level Politics Have an Impact on Infant Health? An Empirical Investigation

Faculty Advisor: Professor Onur Altindag

Existing evidence suggests that U.S. state-level political environments have profound impacts on the economic wellbeing of its residents through welfare distribution. I investigate whether governor or state legislature party affiliation has a causal impact on infant health, using birth weight as a proxy and taking a random sample of 10,000 from every birth year from 1968 through 2012. My empirical strategy relies on a difference-in-differences approach and uses close gubernatorial elections to proxy a regression discontinuity design. I find no meaningful impact of party affiliation on infant health, neither from the gubernatorial nor legislative level, across all major racial groups.

Brady Ryan

Major: Economics-Finance

More than Subsistence: The Role of Economic Research in Setting the Federal Minimum Wage

Faculty Advisor: Professor Juliet Gainsborough

The first minimum wage set by federal policymakers in the U.S. was \$0.25/hour, passed in 1938 as part of the Fair Labor Standards Act. President Franklin Roosevelt asserted such a provision was necessary to establish a national minimum standard of living and increase the purchasing power of consumers. Without built-in indexes to increases in inflation or productivity, however, policymakers were granted significant latitude to determine how, when, and why to adjust this national wage floor. In recent decades, this has become an intensely disputed process resulting in irregular and seemingly arbitrary increases with no clear basis in economic research. This project evaluates the role that academic research on the minimum wage has had on the policymaking process. In a case study of two recent policy proposals, in 2007 and 2019, I analyze testimony before the House Committee on Education and Labor to evaluate how research is shaping the legislative debate. I closely examine who is being called to testify, what evidence is being cited, and how receptive lawmakers are to individual accounts. This provides further insight into what, if any, relevant economic research is being considered and sheds light on other factors that may have influenced policymakers as well. The project aggregates these data points before concluding with a report on how members of Congress tend to integrate existing economic research into their decision-making processes when considering whether or not to raise the federal minimum wage.

Bailey Saponaro
Marketing

***Title of Project: Mind the Gap: An Analysis of Bentley Students' Attitudes
Towards Gender Inequities in Business Leadership***

Faculty Advisor: Professor Poh-Lin Yeoh

It is well documented that systemic sexism has shaped the gendered world in which we operate. Despite exponential growth concerning the involvement and success of women in the academic and corporate realms, sizable disparities still exist between the opportunities afforded to men and women. In recent years, the landscape of business has reflected some change, with many statistics demonstrating record-high numbers of women in high leadership positions. Yet, the data shows that the pipeline for women is an ever-widening funnel, and very few female leaders reach the top. In the interest of exploring how young business students view this dynamic, this study examines the perceptions, attitudes, and experiences of Bentley University students. The aim of this research is to identify and analyze discrepancies between students' beliefs and the realities of the business world as it currently stands.

Oskar M. Serbin
Creative Industries

***Exploring NFL Concussion Issue and Relevant Legal Approaches for Current
Players***

Faculty Advisor: Professor Steve Weisman

This project explores the NFL's history of handling issues of concussions, CTE, and overall player safety from legal and ethical standpoints. It explains the different perspectives behind the inherent risks to the game of football, as well as the potential of the NFL's assumption of risk defense in case of future lawsuits, like the 2013 class action settlement. Oft compared to Big Tobacco, this project dives into the NFL's independent research organizations, searching for possibilities of legal repercussions for falsifying scientific research. As the NFL attempts to shift the perception of its player relations image from "villainous corporation" to "concerned partnership," I uncover a significant flaw in its attempt to provide the public with transparency. The concussion protocol and/or its reporting structures are flawed, not including statistics for players who receive multiple concussions in a given season.

After analyzing the reporting of concussions on the 2019 Injury Report, and comparing to the summarization of concussion incidences on the NFL Play Smart, Play Safe website, I discovered the numbers simply did not add up. As reporting methods continue to be questionable, the NFL is clearly uninterested in the long-term health of players. It provides misleading information under the false pretense of acting more transparent, regarding injuries sustained playing football. This project seeks to connect the dots regarding these reporting discrepancies and suggest improvements to the current system.

Prateet Shah

Corporate Finance & Accounting, minor in Health & Industry

Economic Returns from Biotechnologies Licensed by Academic or Government Institutions under Bayh-Dole

Faculty Advisor: Professor Fred Ledley

This research compares the economic returns from biotechnologies licensed by academic and government institutions with those licensed by biotechnology companies. The Bayh-Dole Act of 1980 authorized the patenting of inventions made with federal funding, and the licensing of those patents to industry for commercialization. These licenses return research funding, payments of cash or stock, or a percentage of consequent product revenues (royalties) to public-sector institutions.

We examined 1092 licenses from 1987-2012 related to the discovery or development of new medicines (Bioscience Advisors, Inc.). This set included 229 academic licenses and 863 corporate licenses. Licensed academic research ranged from discovery to products in phase 2 clinical trials with average royalties of 3.1%-5.12%. Licensed corporate research ranged from discovery to approved products, with average royalties of 8.1-16.4% through phase 2, and 16.4%-24.4% for phase 3 or approved products. At comparable stages, the royalty rates and other payments from academic licenses were significantly less than from corporate licenses.

Previous studies demonstrate that the NIH funded basic research underlying every new drug approved from 2010-2016. This work was undertaken in response to a question from Representative Ocasio-Cortez (D-NY), asking whether the public received a return on that NIH investment comparable to other early-stage investors. While the public receives returns from licenses under Bayh-Dole, these results suggest that the terms of these licenses are less favorable than corporate licenses. Further research is required to understand the reasons for this disparity and how to ensure an equitable return on public sector investments in new drugs.

Sameera Shah

Corporate Finance and Accounting

Agricultural Sustainability in Developing Countries

Faculty Advisor: Professor Johannes Eijmberts

As the focus of this research project is agriculture in the 21st century as it faces numerous challenges as the world population continues to rise, a review of existing statistics and data on this subject is a relevant step towards understanding the issues at hand. Not only does agricultural production have to keep up with the rising market demand of food production, it must take into account other factors such as the decreasing rural labor force, demand for biofuels for a massive bioenergy market, contributions to overall development in the many agriculture-dependent developing countries, adoption of more efficient and sustainable production methods, adaption to climate change, and the conservation of land in good conditions for future generations (How to Feed the World in 2050).

According to the Global Sustainable Information Society, over 70% of the world's food population relies on smallholder farmers (Tsioumani). According to a World Bank report in 2007, despite the fact that about 75% of the world's poor live in rural areas and are predominantly engaged in agriculture, these sectors have suffered neglect and underinvestment over the last two or more decades with merely 4% of official development assistance going to agriculture in developing countries (World Bank 2007). This is the issue and focus of this research- to better understand the factors of this disparity in agriculture and possible solutions to combat this underinvestment.

The focus of this research project is to look at prior and current foreign direct investment (FDI) in agricultural production, especially in developing countries where farmers are expected to produce food at a national level, is a crucial factor in ensuring agricultural sustainability at a global scale.

Juliette Smieszek
Economics-Finance

Fast Fashion vs High Fashion: Inventory in the Apparel Industry
Faculty Advisor: Professor Monire Jalili

This project is centered around collecting, illustrating, and analyzing different inventory trends within different companies within the apparel industry based on different company classifications (fast fashion, high fashion, retail, wholesale, etc.), with an additional exploration of the industry practice of disposing (burning, shredding, putting into landfill, donating, etc.) of unused/unsold merchandise (overstock inventory). This is ultimately a multidisciplinary approach (utilizing statistics, ethics, and sustainability valuation) to establish existing fashion industry trends and their sustainability implications.

Emily Spinelli
Accountancy

Is globalization really good for the economy? The case of over tourism.
Faculty Advisor: Professor Christian Rubio

At the beginning of the twenty-first century, Thomas Friedman lauded the effects of globalization. Although, one would argue that this could bring economic benefits to the world, it could be claimed that it may also cause social inequalities. It is precisely the latter that this interdisciplinary paper will address. Under the scope of tourism, I will use the case of Machu Picchu as a potential downfall of globalization. In effect, my paper will analyze the effects of globalization and the use of technology on this ancient site.

The situation is so critical that UNESCO warned the government of Peru about this dire situation that now there are two set schedules where people can visit, morning and afternoon and several other restrictions have been put in place. It is because of this reason that through my research, I would like to find clearer evidence of how globalization is impacting tourism in the world, and I will use Machu Picchu as an example. I intend to find out if the results of globalization are damaging historical sites. Furthermore, I will propose some solutions and as to what can the Peruvian government do to prevent the failure of Machu Picchu. Additionally, I hope to outline guidelines in order to promote sustainable tourism meaning that current guests can enjoy Machu Picchu, but future visitors can as well. It is important to note that I will address what is the extent of the political corruption that has caused this damage to take place.

Josh St. Marie
Data Analytics

Optimizing the Batting Order in Baseball – A Heuristic Study
Faculty Advisor: Professor Gregory Vaughn

Most of the effects of the analytics revolution in baseball (defensive shifts, less small ball, more home runs, etc.) are noticeable to even the most casual of fans, but very little is known about the ways in which analytics has begun to change the traditional batting order. This work analyzes the current strategies teams use to optimize the batting order in Major League Baseball. The ability of a batter to hit for contact, hit for power, and get on base in relation to the total offensive output of a team subject to that batters place in the batting order is studied using elastic net regression. The results of the regression analysis can be used to disseminate information to coaches of every level of baseball. Specifically, coaches will learn which skills to focus the most attention on developing in their own players in their efforts to set their own optimal lineup.

Sarah Stumpf
Corporate Finance and Accounting

***Public-Speaking Teaching Methods and the Impact on Public-Speaking Anxiety
in Bentley Students***

Faculty Advisor: Professor Greg Farber

This project aimed to evaluate the levels of public-speaking anxiety present in Bentley students and gather research on different Bentley courses that include a critical public-speaking element. Students were interviewed and surveyed to gain insight on the teaching methods used in these courses and their effectiveness in reducing public-speaking anxiety.

Xiao Tan
Finance

How Hong Kong – China Relation Tests Modernization Theory?
Faculty Advisor: Professor Johannes Eijmberts

The primary motivation of this research is to examine the validity of the Modernization theory under the context of Hong Kong's pro-democratic protest. The study attempts to answer the question: Is democracy the ultimate regime that every country will eventually adopt? This research will compare Hong Kong and Mainland China's political and economic environment and draw a possible conclusion that prosperity will not necessarily lead to democracy (other research papers that criticize the Modernization theory will also be addressed). On the one hand, if such a conclusion is well-founded at the end of the research, it might indicate that developed countries with increasing prosperity can establish political systems that fit their own circumstances, instead of imitating others' system. Thus, this practice will prompt a greater political diversity in the world. On the other hand, if such a conclusion is not well-grounded, and an opposite end is reached: prosperity will ultimately lead to democracy, it might help justify Hong Kong's pro-democratic movement and offer implications for Mainland China's future political change.

Nicole Theilkuhl
Management
LSM: Global Perspectives

Colombia and the effects of Narcotic Production
Faculty Advisor: Professor Gary Donato

To foreigners, Colombia is known and recognized as the capital of cocaine production. What they do not know is how much harm this drug has done. In this project, I will show the effects that drugs have had on Colombia in social, political, and cultural factors. The drug trade has caused a lot of damage, however foreigners are not as aware of the harm it has done and tend to partially idolize iconic figures like Pablo Escobar. I hope to show the correlation between corruption, lack of societal values, and political insurgent groups in relation to drug production.

Naomi Vakharia
Marketing

“A Thank You Note to the Indian Women Who Have Raised Me”
Faculty Advisor: Professor Tzarina Prater

Heteropatriarchy is the foundation of Indian culture. It defines and maps limits for brown women. This multimodal project weaves the threads of colonialism, patriarchy, and cultural expectations into a tapestry that illuminates the different levels and types of violence inflicted on the subaltern: the brown woman. It is imperative that we take into account the colonial origins of violence as it justifies and legitimizes continued gender oppression and neo-colonialism. This project is not only an exploration of the effects of culturally specific heteropatriarchal structures of oppression on my family and my own identity, but its multimodal form: part formal research, part ethnography, part creative writing serves as an interlocutor between my personal, ancestral, and societal formations of identity.

Time and time again, the brown woman's body is mapped and claimed by man, regardless of his racial, regional or cultural identity. My investigation illustrates the charting and conquest of the Indian woman by the elements around her: men, colonialism, culture, politics, and tradition.

Annette Vogel
Managerial Economics- Human Resources
LSM: Earth, Environmental, and Global Sustainability

Comparison of microplastic ingestion by two benthic marine invertebrates
Faculty Advisor: Professor Elizabeth Stoner

A growing body of literature has indicated that microplastics may influence the health of marine organisms, potentially affecting humans that consume them. However, less information exists regarding marine invertebrates, specifically those that are exposed to plastics that fall to the seafloor. Through both experimental research and data analysis, this project aims to understand patterns of microplastic consumption by benthic (bottom-dwelling) marine organisms, specifically benthic jellyfish and mussels. To elucidate this question, we processed jellyfish and shellfish using a nitric acid solution, filtered microplastics, and enumerated them, identifying shape, color, and plastic composition. Preliminary results indicate that both benthic marine invertebrates are ingesting a significant amount of microplastics, likely by filtering the water. With respect to the jellyfish, evidence shows that there is a direct correlation between bell size and the number of plastics found in the specimen. In addition, there is also a direct relationship with the number of plastics and wet weight of the mussel samples. Both sets of data show that the majority of the plastic found were filamentous, and also included angular fragmentations which suggests that textiles (microfibers) may be readily available in the marine environment. As plastic production is expected to increase globally, it is imperative that we continue to monitor marine organisms for the presence of microplastics to better understand the how the consumption of plastic contributes to the health of marine organisms, and possible implications for human consumption.

Aron Weiner
Managerial Economics-Law
LSM: American Studies

An Economic Proposal for Crisis Island
Faculty Advisor: Professor Gary Donato

In choosing to pursue a Liberal Studies Major in American Studies, I wanted to incorporate a more focused study of liberal arts along with my business major in Managerial Economics-Law and minor studies in Finance at Bentley University. The selections have also been motivated in light of Puerto Rico's ongoing economic and humanitarian crises. I have often felt a weight of responsibility upon the shoulders of my generation to contribute to our home's betterment. By utilizing my coursework, progressively building upon my knowledge and understanding of the factors and issues at play, I intended to formulate an economic analysis and proposal for a better future for the island upon my graduation.

Formulating such a proposal is no simple task by any means. The issues and dilemmas Puerto Rico faces are multifaceted and complex. This paper interprets and integrates what the more recent academic literature has to say about its massive debts, migration, unemployment, municipal bond market, federal intervention, infrastructural damage as a result of hurricanes, energy supply, tourism, and trade. To give Puerto Rico the best chance toward a recovery and sustainable economic success for the long-haul, continued intercreditor and federal collaboration must be sustained, statehood should be considered after addressing the bulk of the debt, cabotage should be repealed, a transition toward clean energy should be made, and the local tourism sector should be modernized and further regulated.

The Honors Program Capstone Research Project

As part of the Honors Program experience, all students must complete a semester-long capstone research project during their senior year as part of the program requirements. The capstone project is an opportunity to explore important, interesting, and emerging topics of a student's choosing. In particular, students are encouraged to explore unique or creative topics, using discipline-based methods working with faculty members who have expertise in that area. The project is typically a year or longer process from identifying the topic and writing the proposal to the completion of their projects.

To encourage high-quality student research, we offer a small number of highly competitive honors research fellowships each semester. These fellowships provide selected scholars dedicated funding to attend conferences or support other research-related expenses. In addition, some fellowships are also eligible for stipends.

There are countless benefits to the capstone research process. In addition to strengthening critical thinking and writing skills, students get a rare opportunity to conduct original research on topics in which they are interested. Unlike generic assignments, students discover that research often leads to unexpected problems or discoveries. As a result, through the research process students learn the value of project management and leadership, hone their problem-solving skills, and contribute original ideas and new discoveries to the academy. Many students use their capstone projects during job interviews to great success, and a growing number of our students are publishing their work in peer-reviewed academic journals, including *Fusio: The Bentley Undergraduate Research Journal*.



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The Bentley University Liberal Studies Major

The Liberal Studies Major (LSM) is a unique opportunity for Bentley students to differentiate themselves from other business majors and sharpen their competitive edge by demonstrating their ability to think analytically, critically, and creatively. This optional, integrated double major is available to all Bachelor of Science students. It does not stand alone, but is an interdisciplinary second major that is paired with a primary major in a business discipline or with the following arts and sciences majors: Actuarial Science, Data Analytics, and Mathematical Science. The impulse behind the LSM is to help students increase the value of their liberal arts education at Bentley by combining some required courses in the general education curriculum with some electives under specific themes or concentrations. These themes include: American Studies, Diversity and Society, Earth, Environment, & Global Sustainability, Ethics & Social Responsibility, Global Perspectives, Health & Industry, Media, Arts, & Society, and Quantitative Perspectives. In their fourth year, LSM students produce a culminating project synthesizing what they have learned in the program.



BENTLEY UNIVERSITY

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FUSIO

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Call for Papers for Future Issues!

Fusio is Latin for fusion, referencing Bentley's emphasis in both the Arts and Sciences and Business disciplines. We're looking for a few good papers that have elements of both, or are multidisciplinary in nature. **We are currently looking for high quality student research papers to publish in the upcoming issues!**

Fusio Aims and Scope

Established following Bentley University's mission of creating impactful knowledge within and across business and the arts and sciences, Fusio is a multidisciplinary undergraduate journal committed to the dissemination of original, high-quality undergraduate research. The journal is published by Bentley University's Honors Program and edited by both students and faculty across disciplines. Fusio encourages submissions from undergraduate students, with an emphasis on articles that span both business and arts and sciences topics as well as multidisciplinary topics. The journal is currently open only to (ALL) undergraduate students at Bentley and will consider original research by students as well as student/faculty joint work. All submissions undergo a blind peer review process.

FUSIO | The Bentley Undergraduate
Research Journal
Volume: I Spring 2017 Issue: II



Integrative and multidisciplinary undergraduate research
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