4th Annual SJC
Student Research Symposium

May 11, 2016
Brooklyn Campus
Tuohy Hall 5–7PM
**Agenda**

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The Next Stop Is...

Abstract: Conducting this visual ethnography of the New York City subway culture opened my eyes to many issues and curiosities. I was forced to carefully observe an environment that I thought I was already familiar with. These ethnographic studies are very valuable because they allow you to go out and analyze real world environments and situations. When you’re in the field, you know you are being exposed to facts. All that matters is how you make meaning of those facts. In the future, if I decided to conduct a similar study, I would be interested in comparing different train lines because I am sure that each line has its own characteristics and identity. After conducting this study, my advice is to be more observant of the world around you. Just because you frequent a particular commute or place doesn’t mean you have learned all you can from those places. You never know what the next stop has to offer. Keep your head up and your eyes open or else you might miss it.

Shunned by Superstition: Black Cats

Abstract: An action that may harbor superstition is animal adoption. Avoiding black cats out of the belief that they are bad luck is a common construct in Western culture (Rudski, 2004). In a Gallup and Newport (1990) poll of approximately 1000 adults, the belief in bad luck associated with a “black cat crossing your path” is one of the most highly endorsed superstitions (Vyse, 1997). The proposed study will manipulate control in an attempt to determine the effects that perceived control has on the adoptability of black cats and on superstitious thought. It is hypothesized that an increased sense of control would lead to a rise in the desire to adopt black cats in the face of potential adopters. It is also hypothesized that increased perceived control would correlate negatively with superstitious belief, such that participants who feel a greater sense of perceived control will report being less superstitious than participants who feel a diminished sense of perceived control.
Synthesis of Artificial Anthocyanidins with an Amine or Nitro Groups for Dye Sensitized Solar Cells

Abstract: As the world turns continuously to green energy, solar energy sticks out because of its renewability and accessibility. The Dye Sensitized Solar Cell (DSSC) in particular is a very cheap and easy method to solar energy; however they are less than efficient. A DSSC operates using conventional solar panel concepts in conjunction with a dye that collects light as well as an electrolyte solution. In order to optimize the cell, the different functions that make up the cell must be optimized. This particular paper focuses on the synthesis of dye. The goal of this experiment is to synthesis a dye which increases the efficiency of light collection of the DSSC. Using different reaction materials, anthocyanidins are synthesized through aldol condensation. A gas bubbling apparatus was built in order to bubble HCl gas as a catalyst for the reaction. Six different products were synthesized and their Photochemical properties will be studied using IR and UV-Vis spectroscopies.

Exploring Comics Culture

Abstract: Comic art has been part of human communication since we were huddling in caves for warmth and safety. In its most distilled form comics are sequential art, making them the perfect candidate for a visual ethnographic study.

Graffiti in Brooklyn

Abstract: This is an ethnographic project regarding observations I made about graffiti, street art, and advertisements around Brooklyn.
6. Aia Shalan
   Department: Chemistry
   Faculty Mentor: Jeonghee Kang
   Honors Program

**Synthesis & Photochemical Properties of Artificial Anthocyanidins with a Phenyl ring for Dye Sensitized Solar Cells**

Abstract: Solar cells have been researched heavily as a way to produce an environmentally friendly cell that can harness energy for a variety of uses. A popular solar cell, the Dye Sensitized Solar Cell (DSSC) can be easily manufactured with accessible material due to its low cost and conversion efficiency. Anthocyanidin is the main pigment used to power the DSSC and is responsible for the coloration of flowers, fruits, etc. The single basic core structure of Anthocyanidin is the 2-phenylbenzopyrylum (Flavylium) ion. Six different Anthocyanidin compounds with a bulky benzene ring were produced containing different functional groups. These six compounds are capable of absorbing light and exciting electrons to the Titanium Oxide lining the DSS cell. Certain functional groups will indicate how efficient the DSSC is in producing electricity as well as their efficiency in electron transfer and absorbing visible light. Each structure will be confirmed using UV/Vis, IR, CV and NMR spectroscopy.

7. Tina Wong
   Department: Mathematics
   Faculty Mentor: Elizabeth Zollinger

**SIR Model of an Epidemic**

Abstract: Throughout history, the human race faced many epidemics. Only a couple of people are sick at first, but the number of infected people will grow rapidly. Once the epidemic has peaked, the number of cases will begin to decline. The SIR model was introduced by Kermack and McKendrick in 1927. The model consists of a system of three differential equations that models the number of people infected with a contagious illness in a closed population over time. It was proposed to explain the rapid rise and fall in the number of infected patients observed in epidemics such as the plague and cholera.\(^4\) It assumes that the population size is fixed (i.e., no births, deaths due to disease, or deaths by natural causes), incubation period of the infectious agent is instantaneous, and duration of infectivity is same as length of the disease. It also assumes a completely homogeneous population with no age, spatial, or social structure.
Modeling Crowd Behavior and Crowd Crush

Abstract: Every year, since the start of the 21st century, there have been tragic incidents of people stampeding and crushing each other during large events. Whether it is people at a sports stadium, celebrating New Year’s Eve, or participating in a religious event, crowd crush is always a danger. Crowd crush is the phenomenon when humans are packed too tightly in the area that they occupy and the individual loses control over their movement. The crowd dictates where it goes and the combined force that people exert on each other is deathly. Another consequence of this is that people will become stuck in an exit or hallway and the crowd keeps trying to push itself into the crowded space. As cities grow and population density increases, this threat is only getting bigger.

In this presentation, we attempt to model crowd behavior and crowd crush using an automata approach. We built a simulation in JavaScript where we model individual humans as rectangular pieces in 2 dimensional space, each with its own set of rules and decisions to make. “Humans” are placed in a closed room with limited number of exits. Their goal is to exit the room safely in a short amount of time. Movement is performed individually as each piece finds the nearest exit and changes its X and Y position based on a vector with two components (x-velocity and y-velocity). The movement of the pieces is calculated non-sequentially, that is, a record is kept of every movement that a rectangle plans to take before moving so as not to perturb the calculations of the next piece.

To model the crowd crush, when two or more pieces are touching, their vectors are combined together to show much force the crowd exerts on the pieces. For example, if a piece is unobstructed in the front, but has 5 pieces directly behind it and they’re all touching, the piece in the front is experiencing pressure and force from all the pieces behind it. In the simulation, we explore how multiple exits and the width of the exits impact the way that pieces are able to exit the room. We also find conditions that lead to the pieces getting jammed in an exit, as well as conditions that will allow them to exit safely.
The Sequencing of Traffic Lights

Abstract: Our mathematics seminar, led by Dr. David Seppala-Holtzman, at St. Joseph’s College investigated the sequencing of traffic lights. The purpose of our study was to ascertain ways of maximizing efficiency and productivity of traffic lights and minimizing the amount of time and level of effort exerted by drivers on the road. During the process, our class recognized specific properties, observed qualitative and quantitative properties, developed formulas to express mathematical behavior, and altered parameters to examine extenuating circumstances.

By starting with the simplest cases and adding layers of complexity and challenge, we were able to recognize patterns and trends, find strategic solutions, determine formulas, and analyze mathematical properties. In order to have an efficient flow of traffic, we needed to consider, study, and research many interconnected factors that contribute to traffic. Throughout the process, we added layers of complexity to the study of traffic lights. We considered the interconnected factors of traffic familiar to drivers and passengers alike (road conditions and closures, construction zones, weather conditions, visual acuity, auditory issues, and reaction time). In order to analyze these traffic conditions, we constructed space–time graphs and recognized the effect of the dependent variable distance on the independent variable time.

How Can Teachers’ Understanding of “True Colors” Tailor Instruction to Maximize Student Achievement?

Abstract: The purpose of this research investigation was to identify if manipulating lesson planning to suit students’ personality would increase students’ achievement, specifically in the field of mathematics in an urban public school in Brooklyn, New York. The research questions included: (1) How will identifying a student’s personality type or “color” effect his or her learning? (2) Will differentiating instruction based on a student’s “color” improve achievement in a lesson? and (3) How does manipulating teaching methods to a specific “color” change the way the lesson is approached by the teacher? In order to answer these questions, several measures were given: The first measure was a pre–assessment (Appendix A) adapted from the Go Math textbook, a personality survey (Appendix B) in order to assess each students “color, Go Math workbook pages (Appendix C), which students use as homework, a data chart (Appendix D) which analyzes the student’s homework in the Go Math workbook and tallies the progression of skills, a post–test assessment (Appendix E) and a student survey (Appendix F) assessing if the student preferred the method of teaching toward their personality. The results collected from these measures suggest that there is a relationship between student achievement and personality–related learning preference.
The Fight for Future Generations: Advocating for the Struggling Children of Guatemala

Abstract: My thesis is based on the secondary data analysis I have conducted in order to study the problems faced by children in Guatemala who are living in poverty. My paper discusses the economic and political systems of Guatemala, the struggles children experience, and the organizations that are trying to help them.

Make A Man Out of You: Gender Performance and Audience Expectation in As You Like It

Abstract: As You Like It is intrinsically concerned with gender. The main manifestation of this concern comes from Rosalind deciding to disguise herself as a man to evade her murderous uncle. In doing so she elevates the idea of gender identity being performed rather than essential from subtext to text. My paper seeks to deconstruct this attitude towards gender performance exhibited in this play by imitating the way Rosalind elevates the subtext to actual text. Therefore, if gender is performance then who is the audience viewing it? Also, what is their role in upholding heteronormative ideas about gender? In my paper I argue As You Like It posits that gender is performed but the audience is paradoxically irrelevant because their expectations are rooted in heteronormativity and essential because they create the culture that determines gender.

"It is like this huge cloud that's always over me": Undergraduate Minority Students' Perceptions of Student Debt

Abstract: There are currently more Americans receiving college degrees than ever before. However, at the same time, increasing college costs have put many individuals in substantial debt. While students from all socioeconomic backgrounds suffer from student debt, the issue is particularly troublesome for undergraduate minority students, more specifically, African American and Latino students. There are several reasons for this including racial gaps in financial literacy, income, and wealth, in addition to being first-generation college students. Through the use of in-depth
This study explores how undergraduate African American and Latino students perceive student debt. By using Pierre Bourdieu's notions of habitus and various forms of capital it attempts to explain how students' ethno-racial backgrounds have shaped their ideas about student debt.

6:30 – 6:45  Ralph Guerrero  
Department: History  
Faculty Mentor: Quincy Lehr  

Occupation and Reconstruction of Japan  

Abstract: My thesis is about the American occupation of Japan soon after World War II. It describes and explains the occupation in four aspects: politics, economics, society, and culture. Also it leads up to Japan's eventual reconstruction into the global economic power it is today.

6:45 – 7:00  Joseph Guzman  
Department: History  
Faculty Mentor: Quincy Lehr  

The Desegregation of Higher Education: The NAACP's Efforts Preceding Brown v. Board of Education  

Abstract: This paper looks at the NAACP's efforts to desegregate education in the three decades prior to the Brown decision of 1954. It examines the long-term process that overturning the doctrine of "separate but equal" education entailed beginning with organizational attempts to fight segregation in Northern primary schools and investigations of the conditions of Southern Jim Crow schools in the 1920s. The next decade involved the formation of a legal team and the development and initial implementation of a legal strategy targeting segregated graduate and professional education. In the 1940s, the NAACP altered its legal strategy by directly attacking the constitutionality of segregated education and succeeded in setting additional and necessary legal precedents with three respective graduate school cases. As an institutional analysis this study examines the various organizational activities that made the legal campaign against segregated education possible and ultimately successful. It also emphasizes the significance of the graduate school cases in dismantling Jim Crow education.
Many thanks to Gail Moran, Assistant to the Vice President of Academic Affairs, who is essential to the success of this conference each year and the faculty mentors at St. Joseph’s College, Brooklyn Campus, who gave their time to enhance the research experiences of their students.

Thank you,

Elizabeth Zollinger, Ph.D.
Director of Undergraduate Research, Brooklyn