

7th Annual

Student Independent Research Symposium



The future belongs to young people who know where the knowledge is, how to get it, how to think about it, and how to turn it into better work, better products, better lives.

-- Rexford Brown, Educator and Author



May 20, 2019
Dundalk High School

7th Annual Baltimore County Public Schools Independent Research Symposium - May 20, 2019

- 6:00 - 6:10 Sign-in and Refreshments**
- 6:10 - 6:30 Welcome and Recognition of Student Researchers**
- 6:30 - 8:00 Student Research Presentations**

*Please feel free to ask questions about students' research following the presentations,
and use the provided Comment Cards to share feedback with student researchers.*

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Talha Ahmed

Senior, Catonsville High School

Title: Teenage Depression: Is it “just a phase” or should we seek help?

Abstract:

Depression is on a rise in the 21st century more than ever before. After various interactions with peers and friends at school, I started to see a pattern. There are far too many teenagers who feel vulnerable and are haunted by depression, yet they can't find a safe place. The purpose of this research is to enlighten the audience on the minute symptoms that most of us notice but we willingly ignore. These symptoms are tragic for teen victims and only get worse from there. Looking at all the data and statistics, I will analyze the signs and typical reasons for such cases, so that I can better help in our community to shed light on this national resurgence.

Chabi Baskota

Senior, Catonsville High School

Title: A Study of Procrastination and How to Overcome It

Abstract:

Procrastination is a serious “disease” spreading across the world in the twenty-first century. The idea of postponing tasks that you're responsible for is the description of this famous sport. This activity is common in adolescents and can start as early as age two, but with further experience, teens and adults become professionals at it. In my research, I investigated how to minimize and terminate behaviors that lead to deferment of responsibilities. Your last chance to end procrastination is by being present at this symposium.

Ravdeep Panesar

Senior, Catonsville High School

Title: Hidden Flaws in Legendary People

Abstract:

Have you ever learned something shockingly unexpected about a famous person? We all have a certain point of view on legendary people. However, in school we often are not exposed to their bad sides. Of course, flaws are common in people, but the extent of those flaws may affect a legacy and potentially tarnish it. Many historical figures have some negative aspects that are not shared with students at school. But, due to the contribution of the internet, the whole truth about more and more modern-day famous people is coming out and being shared. This research aims to raise awareness for education systems to teach both the positive and negative facts about historical figures, to limit bias and give you some pause for thought and reflection.

Kalei Files

Senior, Dundalk High School

Title: Improving the Quality of Life in Patients with Schizophrenia

Abstract:

Schizophrenia is a mental disorder that is characterized by hallucinations, delusions, disorganized speech, and disorganized behavior. Many people diagnosed with schizophrenia suffer from a low quality of life. This project aims to help improve the quality of life in people with schizophrenia by combining three treatments commonly used in schizophrenic patients together for maximum benefit; Cognitive-Behavior Therapy, the antipsychotic medication, Clozapine, and Supportive Employment Programs. Cognitive-Behavior Therapy is when the trained therapist attempts to change the way the patient thinks and acts. Clozapine is an antipsychotic medication that alters neurotransmitters in the brain. Supportive Employment Programs are programs designed for mental health patients who are having problems obtaining and maintaining a job. Extensive research was done on each of these individual treatments, including an interview conducted with the Johns Hopkins Schizophrenia Center. The combination of these diverse treatments will treat the different aspects of schizophrenia such as the hallucinations, delusions, deviant behavior, and depressed feelings. Combining Cognitive-Behavior Therapy, Clozapine, and Supportive Employment Programs in treating schizophrenic patients will increase their quality of life by giving patients a holistic approach to their care, addressing the chemical imbalances in their brains, and helping them to develop coping strategies to fully participate in society.

Briana DeMarcy

Junior, Franklin High School

Title: The Future is Neurodiverse

Abstract:

Throughout history, those with intellectual disabilities have faced discrimination in the work force, schools, and daily life. This project aims to redefine society's views on those with intellectual disabilities, who are also referred to as the "neurodiverse." The term neurodiverse emphasizes differences in cognitive functioning as normal and natural variations in humanity. The neurodiversity movement is a new civil rights movement dedicated to gaining more rights for the neurodiverse. By highlighting the benefits that neurodiversity brings into the work force, this movement has been urging businesses and society to employ more individuals with intellectual disabilities. With an unemployment rate as high as 66% for those with intellectual disabilities, this has become a major problem in society. Furthermore, there is an 85% unemployment rate among those with autism. So, what is the neurodiversity movement doing to help aid this problem, and what can we do, as a society to help? Today's youth are tomorrow's bosses and it is society's job to educate youth about the capabilities of those with intellectual disabilities and their potential in the work force.

Kelly Rice

Senior, Franklin High School

Title: It's All in the Family: Socioeconomics and Academic Success

Abstract:

Academic performance is one of the single largest determining factors in the college admissions process. With a college education becoming increasingly necessary due to our changing economic climate, how well one performs in school is extremely important for those that are college-bound. Research shows that teens with only one parent may be at a disadvantage without even knowing it. Those not in nuclear families or those with socioeconomic disadvantage tested lower on national standardized tests, including the SAT. I spent this school year studying socioeconomic issues related to academic performance, for example, how interfamilial dynamics affect grades. In addition, I studied the correlation between higher household income and higher SAT scores. My investigative research summarizes the "issue" at hand: the disadvantageous position that teens born into low income/one parent households face, and proposes a solution.

Abigail Klink

Senior, Hereford High School

Title: Oleophilic Bacteria: The Microscopic Environmentalists of Tomorrow

Abstract:

Oil spills in the ocean are often combatted by skimmers, fire, and chemical dispersions. These tactics can be costly and dangerous to aquatic ecosystems. This project evaluates the use of bioremediation, the use of microorganisms to break down environmental contaminants, as a cost-effective and safe alternative for oil spill cleanups. By introducing oleophilic microbes to a spill site, the bacteria provide an eco-friendly tool for environmental restoration. Audience members will be introduced to the future of rehabilitation in a comprehensive and engaging presentation.

Haley Mabe

Senior, Hereford High School

Title: What are the consequences when parents choose to not vaccinate their children?

Abstract:

A disturbing new trend has emerged in recent years of parents choosing not to vaccinate their children, or to delay the vaccination schedule. By doing this, they have allowed diseases that were eradicated 50 or more years ago to return with a vengeance. Many parents have been given false information about vaccinations, and they don't understand the consequences of choosing not to vaccinate. Children suffer and die from these easily preventable diseases, because parents don't believe in science but buy into conspiracy. In this presentation, I will be debunking the myths about vaccines, and sharing the truth of the horrible diseases that are spread when vaccinations aren't received. I want parents to make educated decisions for their children, and know the truth about what vaccines really do. They are not dangerous, and they don't hurt your child. They protect your child from vicious diseases. Vaccines are important and necessary to keep children, and everyone else, safe from harm.

Corinne Zibell

Senior, Hereford High School

Title: Why are captive breeding programs necessary for the conservation of animal species?

Abstract:

For centuries, animal species have been disappearing at a rapid rate, one that far exceeds the natural extinction rate. Statistics show that recreational hunting, habitat loss, and pollution are the leading cause of extinction amongst animal species. It is necessary that species are protected in order to maintain the balance of our ecosystems. This presentation will explore why diversity is key to maintaining the integrity of our ecosystems, and how captive breeding programs are an essential part of the equation. An in-depth introduction to the plight of the Tasmanian Devils, African Wild Dogs, and Hellbenders awaits.

Eryka Emilien N. Tchuosi

Senior, New Town High School

Title: Does the Current U.S. Education System Help or Hurt Society?

Abstract:

Today, the standard of life in the United States is determined by its education system. It shapes how individuals think and see the world around them. Although the education system has undergone changes, the current U.S. education system has proven to be ineffective and outdated, negatively affecting the identity and performance of youth. The purpose of this research is to explore the question, "How has the current US education system affected the identity and performance of its youth in the 21st century global society?" The goal is to educate the public on the effects of the education system and to propose several means by which it can be improved. Current research shows that the system affects the lives of everyone in ways people never consider. It shapes how children think, what they think, and why they hold beliefs. Through a comprehensive review of the literature, as well as interviews conducted with students at all levels of education, this study shows that the system impacts identity and society more than the government, as it sets the status quo. In this century, employers prefer more creative and innovative people who can adapt to changing circumstances, but the education system doesn't prepare students for this new work environment. For students to be prepared for careers, the U.S. education system needs to prioritize each individual's personal development in society over facts people don't really need.

Aanchal Deol

Senior, Owings Mills High School

Title: Identification of Bacterial Presence to Facilitate Effective Sterilization Practices

Abstract:

Antibiotic resistant bacteria are making a rise in the healthcare industry. More people are being infected with CRE (Carbapenem-Resistant Enterobacteria), Multidrug-Resistant Acinetobacteria, and MRSA than ever before. Many new bacterial infections are drug resistant and can survive in an environment that typically kills other types of bacteria. These bacteria are especially rampant in the healthcare industry. Typical healthcare facility cleaning procedures consist of cleaning rooms with a hospital grade disinfectant that no longer works effectively. 21 out of every 1000 hospital patients have developed a MRSA infection while they were in the hospital. With the increase in dangerous bacteria in healthcare settings, the importance of identifying the presence of these bacteria has significantly increased. One way to identify bacteria in these settings is to develop an identifying spray. Reichardt's Dye is a dye that has solvatochromic properties. The spray can be sprayed on a surface to test for the presence of bacteria; change in the coloration of the spray shows the presence of bacteria. If the spray turns clear from its original blue color, then there are bacteria present. The time it takes for the spray to turn clear helps identify which type of bacteria is present. As a fourth step in the cleaning process, the healthcare industry can insure proper safety and care for all patients.

Madison Borkowski

Junior, Parkville High School

Title: Decreasing Insulin Resistance in Women with PCOS

Abstract:

Polycystic Ovarian Syndrome (PCOS) is a hormone disorder and causes an imbalance of the estrogen and testosterone that leads to many fundamental pubescent complications. Women with PCOS often have insulin resistance, where their pancreas does not act appropriately with glucose. The research focuses on the decreasing rate of insulin resistance in women with PCOS. This will be done through an experiment, testing out different medications. At first, the combination of Metformin and Avandia will be tested to confirm the results from past experiments. Previous studies have noted that cinnamon can decrease insulin resistance. A test group will add this supplement to their medication regiment. This will take place over six months to a year. Previous experiments with Metformin and Avandia have shown a 60% decrease in average blood glucose levels; the addition of the cinnamon supplement increased this to 70%. The total estimated budget for such a study including the medications and personnel would be \$70,414.18. The data would be collected through glucose level blood tests. If the level decreases from the levels before the experiment, then we know the experiment has had success.

Kylie Buchta

Junior, Parkville High School

Title: Mental Health in American High Schools

Abstract:

Many students in American high schools suffer from mental illnesses such as anxiety and depression. School can be a contributing factor for flare-ups such as panic attacks or dissociation that students experience. Few schools have made an effort to destigmatize mental health in their community. In short, they do not offer the support needed to reduce these flare-ups and help students to manage or improve their mental health. Often schools' attempts yield the opposite effect, harming students instead. A space must be provided for students to learn coping mechanisms, with the goal of decreasing the frequency of flare-ups. The cost of this proposed project would be approximately \$15,207.18 USD for journals, personnel, and materials in the overall attempt to provide coping mechanisms to decrease a students' symptoms and flare-ups. This will be accomplished through journal entries and biweekly mental health checkups. The overall success of this project is to be measured through the results of polls and surveys.

Emma Evans-Nolet

Junior, Parkville High School

Title: Applying Clean Energy to a Developing Country

Abstract:

It is imperative that energy consumption be shifted from fossil fuel use to cleaner sources, especially in underdeveloped countries which are predicted to consume more electricity than developed countries. Nigeria is one of those countries. It has a rising presence in the world but is not yet considered a developed country, and is soon to consume significantly more energy, with all of its energy currently coming from petroleum. It was proposed that hydropower and bioenergy be implemented, but due to much political conflict, these plans have gone forgotten. This proposal includes a strategy for beginning to implement bioenergy in the west of the Anambra state of Nigeria. It answers the question of "How can clean energy be implemented in countries which are currently developing in order to avoid additional pollution?" This research includes setting up a biofuel production factory which would send electricity to the farmers who contribute to it, and the results would be measured in the particulate matter at the factory location before and after and its development, as well as in the neighboring city, Onitsha. The goal is to have safe levels of particulate matter at the factory location, and dependable electricity for the area as a whole. Overall the long term and sustainable project should cost approximately \$27,730,200 and would take five years.

Edward Michael Jakubowski

Junior, Parkville High School

Title: The Effects of Chronic Pain and its Solutions

Abstract:

Chronic pain affects up to 50 million people in the United States. Chronic pain is a pain that is always present in one's life. These pains can inhibit people with such severity that they cannot perform basic life tasks. This research will give more insight on the knowledge of chronic pain in the head, and what can be done to minimize it. Currently, there are two major treatments to minimize the effects of chronic pain. First is Botox injections, which reduces pain in the head by injecting botulin. Second is spinal cord stimulators, which minimize pain in the body by obstructing pain traveling in the nerves. With this knowledge, would it be possible to use both treatments to help minimize chronic pain throughout the body? The proposal offered is to combine said treatments, so that those living with extreme pain can be offered more resistance against it. To do this, a blind study will ensue where the patient will be required to come in every three days to monitor the effects of the devices. For every check-in, the researchers will have the patient rate their pain using a 0-to-10 scale. If the patient gives their pain a 3/10 or lower, then it is considered a success. This study will go on for 10 years to guarantee that there are no bad side effects of the two devices. This procedure will cost anywhere from \$30,000-\$60,000. This procedure will hopefully help those who have few options to minimize their chronic pain.

Kiara Jones

Junior, Parkville High School

Title: Mental Health in African Americans

Abstract:

Ethnic and racial disparities in mental health are driven by social factors such as housing, education, and income. Many of these social factors are different for minorities and whites. Policies that address gaps in these social factors therefore can address mental health status disparities. Analysis of three policies shows their impact on minorities: The Individuals with Disability Education Act, Section 8 housing vouchers, and the Earned Income Tax Credit. Two of the three policies appear to have been effective in reducing social inequalities between whites and minorities. Expansion of public policies can be the mechanism to eliminate mental health status disparities for minorities. Past research revealed that African Americans are disproportionately more likely to experience societal circumstances that increase their chances for developing mental illness, and they are less likely to utilize mental health services. This may be due to stigmas surrounding mental illness, strong religious ties, and a lack of resources and proper knowledge of the issue. The goal of this study is to aid in improving mental health in African American citizens who lack resources and/or the knowledge necessary to receive relief on their own. African Americans must be able to receive services in a non-judgmental, safe environment from people who are sensitive, culturally aware, and who are willing to accommodate their unique needs. The data that will be gathered is from a digital survey. The data will be analyzed, and a summary used to provide a clear picture of the barriers/factors experienced by African Americans and what could be done to improve their lives. Further research in the effectiveness of the services and engagement of African Americans is required. The overall cost of this project will be approximately \$13,000. The money will go toward incentives for getting people

to volunteer their services and paying web designers, surveyors and data analyst experts. If incentives do not produce the number of participants needed for the survey, the second option is to have doctors or social workers enlist people who are willing to contribute to the study and aid in providing data to analyze. After the surveys have been taken, there will be a website to which those surveyed will be able to access help and guidance. The website's success will be measured by the number of hits the webpage receives after the seminar has taken place, how often visitors come back to the website, the number of newcomers, the bounce rate, the average amount of time spent on the site, and how engaged each visitor was.

Fransisco Olivares

Senior, Parkville High School

Title: The Effects of Christianity on Western Society

Abstract:

Christianity has impacted the world, from the creation of the first church to present-day America. The question then becomes the reach of its impact on western society. Through polls, public forums, anecdotes, and interviews, this research will seek to find the impacts that are alleged to have affected western society. This will also seek to find whether there were any impacts found in the first place. The focus of this proposal is, what are the impacts of Christianity on Western Society? The research will show whether society has felt emotional benefits or downsides. Current research shows that people experienced positive impacts in their lives, from better moods and lower divorce rates, to negative impacts like crushing guilt. However more research is prudent. Society is generally getting worse and more people are being brought into the world. The more people in society, the more people can be impacted. The continued effects, in any, must be analyzed. This will provide our future leaders with the information to make this world a better place. One part of this research will consist of public forums. At these forums different types of people will be asked to answer a variety of different questions that will lead the research to answer the original question. Secondly there will be interviews with a variety of people, pastors and other religious leaders like Rabbis, and persons with different levels of education. In order to full conduct this research it will cost \$4,401.22-\$5,211.22 over the course of three months. The survey results will be analyzed to determine if there are any patterns that emerge. The public's view of Christianity will inform the determination of whether Christianity continues to have a positive impact or any impact on society. All of these answers are considered successful because it shows that people are not just uninterested, and it shows to what impact Christianity has had on western society.

Title: The Danger of Political Polarization in American Society**Abstract:**

Political polarization in America is tearing our society apart, and causing people to increasingly be hurt, attacked, and killed. I believe it is the single biggest problem in America today, and is made worse by the fact that it encompasses issues in politics that people feel so strongly about and make them hurt others to achieve some sort of political gain. Looking in the news there is clear proof of this as everyday people in the two political parties are in constant battle over their differing ideas. This is the source of people pushing away from each other and becoming less tolerant of their political opposition, leading to even further division and hate between people who disagree with each other. In its entirety, there is likely no realistic way a single person or group can stop the influence of polarization in our society, because it stems from the way people think and feel about subjects in politics. Most people are set in their political views due to confirmation bias, meaning a solution would have to be one that could change the way hundreds of millions of people already think. But if polarization cannot be stopped or removed from society, some form or effort must be made to counter or hinder the harm it has on American society to prevent further damage. If a solution is found on a local level to lessen polarization or its effects, maybe it could be nationalized in an attempt to create a more civil and united country where people can discuss politics and think freely without being attacked in some way for thinking the way they do. To do this, a seminar will be conducted regarding the effects of political polarization on our society and how people's upbringings shape their political views. That can be accomplished by mailing invitation to registered voters that are representative of Baltimore County's population, with an incentive to come to the seminar. An audience large enough for realistic results will gather and be polled before and after the seminar as a measurement to see if the seminar is an effective way to make people more willing to have civil political discussions with people they disagree with. After the seminar and the polls are conducted, the answers to the poll prior to the seminar will be compared to the poll responses after the seminar. If at least 30% of the poll responses show that audience members became more willing to have civil political discussions with people they disagree with, then the seminar can be viewed as a success. Based on the 2018 gubernatorial general election, about 70% of registered voters in Baltimore County are registered Democrats, so 70% of the invitations will be sent to Democrats in the county and the other 30% will be sent to registered Republicans. Setting up and sending 1000 invitations with cash incentives for the seminar will cost just about \$11,000. This includes hiring workers to help put the invitations together, and a supply of materials like paper and envelopes to make the invitations themselves. If successful, \$11,000 is not a bad price to pay for working toward a solution to a serious American problem that constantly splits society into two factions that seek to harm and destroy one another.

Alyssa Hecht

Senior, Perry Hall High School

Title: The Psychology of Recycling: Subtle Characteristics that Influence Recycling Behaviors

Abstract:

Recycling compliance seems straightforward, yet existing research shows that a variety of factors influence recycling behaviors. The purpose of the proposed study is to analyze the influence of the psychological interventions of convenience and identity on recycling behaviors at Perry Hall High School. In the study, the weight of the contents of paper recycling bins, prior to and after manipulation of convenience and identity variables, will be compared. The baseline and intervention periods will each last 10 school days. To manipulate convenience, the previously separated recycling and trash bins will be placed adjacently in five classrooms. To manipulate identity, signs will be placed on and above recycling bins in five different classrooms. The signs, depicting an alligator, the school mascot, with the message "Gators Recycle," will appeal to school identity. The null hypothesis is that there will not be a significant difference in the change in the weight of the recycling bin contents between the two methods. It is recommended that organizations use a variety of psychological factors to promote recycling. Steps must also be taken to limit cross contamination, which makes recyclables unusable. Simple recycling changes are vital for conserving resources, saving money for the community, and preventing landfill overflow.

Namra Fiaz

Junior, Randallstown High School

Title: Plugged-in and Over-charged: Teens and Technology Addiction

Abstract:

I have often heard teachers say that students are not achieving academically, because they are distracted by and addicted to their cell phones. When I started high school, I still wanted to keep in touch with my friends, so I would be on my cell phone as often as I could to feel connected to them. However, this had a negative impact on my grades and I knew I had to make a change. This led me to wonder if the need for social connectivity contributes to students' obsession with their digital devices and smart technologies.

If there is a correlation between social connectivity and technology addiction, then schools and families can provide appropriate support services for students who have been identified as addicted to technology. Additionally, this could potentially change the negative perception teachers and administrators have of students who frequently use their cell phones and other technologies for non-educational purposes for during instructional time.

Isaiah Patterson

Junior, Randallstown High School

Title: The Hidden Competitor: Mental Illness in Sports

Abstract:

The aim of this research is to conduct a comparative study of mental illness in professional athletes vs. non-athletes. As a future neurologist and a student in the Academy of Health Professions I have always had an interest in health-related topics, especially mental illnesses. As an African American, an athlete, and basketball fan, I was inspired to examine this topic by my favorite basketball player, DeMar DeRozan, who suffers from mental illness. DeRozan challenges the negative mental health stigma in the African American community by speaking openly about his personal experiences. Anyone can experience a mental health condition. Often individuals who suffer from mental illness are stigmatized and depicted as weak. This misconception is perpetuated by a lack of information and misunderstandings about mental health conditions. In communities of color, seeking mental health care is often viewed as a weakness. To change this perception, more discussion and research needs to be conducted to dispel these beliefs. Additionally, more African American celebrities who suffer from mental illness need to share their personal stories.

Rayshaun Pettit

Senior, Western School of Technology

Title: The Impact of Air Pollution on Current and Future Generations

Abstract:

Humans, among many other species of organisms on Earth, have a distinct set of traits that have been passed down from parent to offspring/child. These traits, which are produced by genes in our DNA, have been naturally selected to ensure our survival over the years of evolution. Despite the mechanism of heredity, environmental impacts such as certain foods can alter these traits. One of the most prominent environmental influences that can change the genes responsible for our traits is pollution. Air pollution contains known pollutants that can cause cancer. These substances, when put into the body, can alter the genes responsible for normal cell behavior, making them more likely to become cancerous. After this effect, these genes can then be passed down to the next generation, making individuals more likely to contract cancer or other diseases. Specific lab experiments were examined to conclude that certain groups of people are more likely to encounter such substances based on proximity to urban air polluting areas. The objective of this research is to provide evidence that increased contact with air pollution is linked to an increased rate of inheritable disease.

Kristen Smith

Senior, Western School of Technology

Title: Can the way we eat affect the health of humans and our environment?

Abstract:

Resources are depleting from Earth at an astonishing rate and humans are to blame. Humans produce foods that may be preferred based on taste, but that may not be good for the environment. Food production requires many resources, causing a positive feedback loop in the environment because it adds to the problem of resource depletion and global warming. This study will connect the way we eat to the rapid depletion of resources. It will show how both our eating habits and declining resources contribute to many human and environmental problems. Several food groups served as variables for this research. The quantity of resources required to produce a representative from these food groups was determined in an effort to identify which foods are more environmentally-friendly. This research aims to increase awareness of the ways that the foods we eat affect our environment and its people. By conducting research on how common foods are produced and gathering survey data, this presentation will show the impact the human diet has on the health of the environment.

Anisah Weaver

Junior, Western School of Technology

Title: How have institutionalized racism and sexism affected job opportunities and pay for African American women in today's work force?

Abstract:

This study focuses on how the outcomes and effects of gender wage gaps affect African American women in the work place. Through a questionnaire that focused on the participants' perception of race in the workplace, valuable insights into attitudes towards race were revealed. The results of this survey along with additional relevant research aim to prove the hypothesis that black women are paid significantly lower than white men and women in the workplace, and receive fewer opportunities for advancement. The aim of this proposal is to identify the factors that influence potential inequalities in the work place. Although this study will provide some conclusions, the purpose of the study is to encourage further study to address root causes as well as to spread awareness of this topic.

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Independent Research Framework



Step 1
Encounter the Task



Step 2
Explore an Issue or Problem



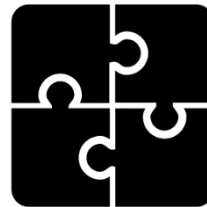
Step 3
Conduct a Literature Review



Step 4
Develop a Research Proposal



Step 5
Conduct Subject-Specific Research



Step 6
Apply New Understanding



Step 7
Communicate/Present/Share



Step 8
Reflect & Extend

Visit the Student Researchers wiki at <http://studentresearchers.pbworks.com> for Independent Research Seminar information and Symposium highlights.