

We would like to dedicate this year's symposium to the many teachers along the way who have fostered and encouraged the development of our curiosity.

We owe each of you a debt of gratitude for the kindness, wisdom, and support you have brought to the Science Research students.

Warwick Valley High School

University in the High School Science Research Program



“The important thing is to not stop questioning. Curiosity has its own reason for existing”
- Albert Einstein

Monday June 5, 2023

Notes

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Schedule for the Evening

Poster Session **7:00 pm**

Guest Speaker **7:30 pm**

Senior Presentations

8:00 pm

Amelia – Room 117

Megan – Room 119

Daniel – Room 121

Tabitha – Room 123

8:25 pm

Kayla – Room 117

Courtney – Room 119

Benjamin – Room 121

Senior Mentors

Courtney Evans

Dr. Daniel Kalman, PhD., Professor in the Department of Pathology and Laboratory Medicine at Emory University School of Medicine

Daniel Callaghan

Dr. Claire Kaplan, Ph.D., Research Fellow in Johns Hopkins University

Tabitha Peterson

Dr. Mitch Earleywine, Ph.D., Professor for the Department of Psychology at University at Albany

Amelia Januario

Monty Vacura, MS, Professor of Biology at SUNY Orange

Senior Mentors

Kayla Schmitt

Dr. Keshav Singh Ph.D., Department of Genetics at University of Alabama

Benjamin Walter

Dr. Robin K. Yuan, Ph.D., Research Fellow in Medicine at Harvard Medical School;
Dr. Jeanne F. Duffy, M.B.A., M.S., Ph.D., Associate Professor of Medicine at Harvard Medical School

Megan Desrats

Dr. Brenna Traver, PhD., Associate Professor, Biology at Pennsylvania State University

Courtney Evans

Dr. Daniel Kalman, PhD., Professor in the Department of Pathology and Laboratory Medicine at Emory University School of Medicine

Course Overview

The Science Research course, a component of the University in the High School program, is offered through SUNY Albany. Science Research is a three-year program that provides high school students with the opportunity to participate in the scientific research community by engaging in authentic research of their own design. This unique experience is recognized by the New York State Board of Regents.

In addition to advanced research skills, students develop numerous life skills such as problem solving, critical thinking, communication, time management, and public speaking. The final year culminates in the completion and presentation of a long-term project.

Course Expectations

Students complete the following:

- Select and investigate topic of interest
- Develop skills in research protocol
- Read and summarize peer reviewed journal articles and critique professional scientific papers
- Practice formal presentations of peer reviewed articles or independent research
- Maintain a professional laboratory notebook
- Build a scientific portfolio
- Communicate with professionals
- Design and conduct original research
- Discuss and analyze results at symposia
- Write a final research paper

Goodbye Seniors!!!

Tabitha Peterson	→	University of South Florida
Daniel Callaghan	→	Ohio State University
Ben Walter	→	Boston College
Courtney Evans	→	Quinnipiac University
Megan Desrats	→	SUNY Oneonta
Amelia Januario	→	Northeastern University
Kayla Schmitt	→	Boston College



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Scholarships and Awards



Orlowski Science
Research Senior
Scholarship
Tabitha Peterson

Orlowski Science
Research Junior
Scholarship
Ava Gell

Sophomores

Evan Grundfast

Year: First

Topic: Diagnosis of Prion Disease

Mentor(s): Dr. David Jaeger, M.D., Ph.D., Neurology of Crystal Run Healthcare

Evan is a sophomore, in his first year of the Science Research Program. He is currently studying the transmission, diagnosis, mechanisms, symptoms, and potential treatments for prion disease. Prion disease is most well known for infecting cattle, called “bovine spongiform encephalopathy” or colloquially as mad cow disease. Evan is a Summa Cum Laude student who is a member of Model United Nations and Mu Alpha Theta. Evan is also co-captain of the varsity tennis team and enjoys playing the drums in his free time.

Angie Ortiz

Year: First

Topic: Frost resistance at the genetic level in winter wheat

Mentor(s): Dr. Maricelis Acevedo, Ph.D., Research Professor, Department of Global Development at Cornell University

Angie is a sophomore, in her first year of the Science Research Program. She is currently researching the genetics behind spring freeze tolerance in wheat. She hopes to conduct an experiment circulating around using PCR machines to mark specific genetic sequences that could point to freeze injury resistance. Angie is enrolled in various AP and honors courses. In her free time, she enjoys running and weightlifting, but when she spends time at home, Angie enjoys reading and cooking.

Year: Third

Topic: Cannabis and Parkinson’s disease

Title: The potential effect of Cannabis on symptomatic progression of tremors in Parkinson's Disease

Mentor(s): Monty Vacura, MS, Professor of Biology at SUNY Orange

Amelia is a senior in her third year of the Science Research Program. Her research focuses on Parkinson’s disease and the potential effect of Cannabis on its symptomatic progression. Amelia’s research has shown that CBD has little binding affinity for either CB1 or CB2 receptors but is capable of antagonizing them with THC and that CBD behaves as a non-competitive negative allosteric modulator of CB1 receptor. Amelia is in the top 5% of her class and is a Summa Cum Laude student enrolled in all Dual Enrollment, Advanced Placement, and Honors classes. She is an active member of the National Honor Society. Over the summer, she also completed a Medicine and Healthcare course at Northwestern University’s Summer Program. She was also a member of the Medachieve Excel program at Touro College of Osteopathic Medicine. Along with this, Amelia works part time at a restaurant. She also has shadowed an orthopedic surgeon and a pain management doctor for over 50 hours. Amelia has competed in The NYSSMA music festival for both Piano and Saxophone and has received mastery scores. Amelia has volunteered a lot of her time at Warwick Physical Therapy. Amelia swam competitively for The New York Sharks Association from seventh grade to junior year and has won multiple awards. In her free time, Amelia enjoys playing the piano, traveling the world, and spending time with her family and friends. In the future, Amelia hopes to continue her research as an undergraduate in college. She will be attending Northeastern University as a Health Science major and hopes to use her education towards a career as a doctor.

Tabitha Peterson

Year: Third

Topic: Adult ADHD and Cannabis Use

Title: Assessing Cannabis Expectancies for ADHD Symptoms in Adults

Mentor(s): Dr. Mitch Earleywine, Ph.D., Professor for the Department of Psychology at University at Albany

Tabitha is a senior, in her third year of the Science Research Program. The aim of Tabitha's research is to assess the correlation between adult ADHD and the use of cannabis, ultimately evaluating if cannabis use is more common for those who display ADHD symptoms, as well as if cannabis is beneficial for daily functioning. Furthermore, she analyzed the differences in the ADHD subtypes, focusing on the benefits of cannabis use for the hyperactive-impulsive subtype versus the inattentive subtype. Tabitha is a Summa Cum Laude student currently enrolled in multiple AP and dual enrollment courses. She is a member of the National Honors Society and the honors Meistersingers choir. Last year, Tabitha received the Orłowski Science Research Junior Scholarship. She has also been named a NYSPPHA Scholar Athlete and a U.S. Army All-American Scholar Athlete. In addition to academics, Tabitha has been on the varsity track team for four years and has recently competed at both the New York State Championships and Nike Indoor Nationals track meets, placing 13th in the nation in the weight throw. She has been awarded both the Indoor and Outdoor Field Event MVP in 2022 and holds five school records. Outside of school, Tabitha works a part-time job at a local restaurant and coaches K-6 track athletes with the Warwick Youth Track Club. Tabitha will be attending the University of South Florida in the fall, where she will major in psychology with an advanced research concentration.

Abigail Kadus

Year: First

Topic: Sleep Deprivation in Adolescents

Mentor(s): Dr. Arturo Arrona-Palacios, Ph.D., Division of Sleep Medicine at Harvard Medical

Abby is a sophomore, in her first year of the Science Research Program. She is currently researching the effects of sleep deprivation on adolescents in high school, which includes various effects on cognition, mood, and attention. Abby is a Summa Cum Laude student who participates in student government and is the treasurer of her class. She is a part of the high school tennis, basketball, and lacrosse teams, and spends much of her free time volunteering, as well as spending time with family and friends.

Olivia Martino

Year: First

Topic: Isotretinoin and Mental Health

Mentor(s): Dr. Rashek Kazi, MD., PhD., Dermatology of Crystal Run Healthcare

Olivia is a sophomore, in her first year of the Science Research Program. Her research focuses on the association between the use of isotretinoin and the risk of depression in adolescent patients with acne. Outside of this course, she is a Summa Cum Laude student. She is the starting pitcher on the Varsity Softball team and also plays on the Girls JV Tennis team in the fall. She enjoys working at Mount Peter during the winter to teach kids and adults to ski as well as volunteering throughout her community, and hanging out with friends and family.

Caroline Rourke

Year: First

Topic: Assessment of the Public's Perception of the usage of CRISPR Technology

Mentor(s): Dr. Evan Merkhofer, Ph.D., Assistant Professor, Department of Biology at Mount Saint Mary College

Caroline is a sophomore, in her first year of the Science Research Program. She is currently researching the biotechnology CRISPR, and hopes to conduct a survey aiming to assess the public's opinion on its usage clinically. Her interest in genetic-engineering and CRISPR technology began when she had to conduct a project centered around it in 8th grade. Since then, she has been a Summa Cum Laude student and has participated in the girls junior varsity tennis as well as varsity golf. She is also a member of the book club, math team, and the interact club at the high school. In her free time she enjoys spending time with her friends and family.

Ashley Fitzgerald

Year: First

Topic: Adenosine Kinase and Epileptogenesis

Mentor(s): Dr. Detlev Boison, Ph.D., Vice Chair of Research and Training, Dept. of Neurosurgery at Rutgers University

Ashley is a sophomore, in her first year of the Science Research Program. Her current research entails studying epilepsy, specifically the effects of the ketogenic diet and adenosine on seizure control and stopping the progression of epilepsy. Outside of this course, she is a Summa Cum Laude student and scholar athlete involved in many extracurriculars. She enjoys participating in the highschool's soccer and track programs, as well as playing travel soccer. She also is an avid volunteer throughout her community and loves spending time with her friends and family.

Daniel Callaghan

Year: Third

Topic: Epilepsy surgery and quality of life

Title: Epilepsy Surgery and its Effects on the Quality Of Life of patients with drug resistant epilepsy: A Systematic Review

Mentor(s): Dr. Claire Kaplan, Ph.D., Research Fellow in Johns Hopkins University

Daniel is a senior in the Science Research program at Warwick Valley High School. His research assessed the effects of epilepsy surgery on various aspects of quality of life. He also analyzed the effectiveness of epilepsy surgery on seizure freedom. Daniel is in the top 8% of his class and is a Summa Cum Laude student enrolled in all AP, dual enrollment and Honors courses. He is involved in various extracurricular activities including being the president and four year member of Students Against Destructive Decisions (SADD club), and the secretary of National Honor Society. Daniel is also a co-founder of the sit and chat club, which touches on mental health awareness. He is a four year varsity baseball player, being a NYSPHSAA scholar athlete, and a U.S. Army All American Scholar Athlete. Daniel also won the Warwick Silver Slugger Award for the school's baseball team in his junior year. Outside of school Daniel devotes his time to volunteering, playing travel baseball, going to the gym and spending time with his friends and family. Daniel will attend The Ohio State University's Honors Program to major in neuroscience on a pre med track.

Benjamin Walter

Year: Third

Topic: Neuroscience/Sleep

Title: Assessing the Short-Term Cognitive Performance of High School Students Based on Sleep Duration Using the Montreal Cognitive Assessment (MoCA®)

Mentor(s): Dr. Robin K. Yuan, Ph.D., Research Fellow in Medicine at Harvard Medical School;

Dr. Jeanne F. Duffy, M.B.A., M.S., Ph.D., Associate Professor of Medicine at Harvard Medical School

Ben is a senior, in his third year of the Science Research Program. His research focuses on sleep duration of adolescents and their resulting short-term cognitive performance/memory. Benjamin is in the top 2% of his class, and participates in numerous clubs throughout the school. He is the President of the National Honor Society and participates in the Students Against Destructive Decisions Club. He also plays on the Varsity Lacrosse Team, winning two Section IX NYSPHSAA championships and has been named a NYSPHSAA Scholar Athlete as well as a U.S. Army Scholar-Athlete All-American. Outside of school, Ben completed the MedAchieve Program at Touro College of Osteopathic Medicine, as well as the Summer Residential Pre College Program at Cornell University and the Academic Immersion Pre College Program at Columbia University. He is also a lifeguard for the Town of Warwick, volunteers at Garnet Health Medical Center, and is involved with Warwick's Junior EMS Corps. He is the recipient of the University of Rochester Bausch and Lomb Honorary Science Award, Supperentientents Community Service Award, Spanish SEAL of Bilingualism, and the AP Scholar with Honor Award. He will be attending Boston College in the fall to major in Neuroscience and will be contracting as a Cadet in the U.S. Army ROTC. Benjamin hopes to continue neurological research in college, and plans on attending medical school and serving his country in the future.

Charlotte Wendt

Year: First

Topic: Anesthesia and its effects on the developing brain

Mentor(s): Dr. Dusica Bajic, PhD., Principal Investigator, Department of Anesthesiology at Boston Children's Hospital

Charlotte is a sophomore, in her first year of the Science Research Program. She is currently researching Anesthesia and its effects on the developing brain. Anesthesia is known to cause many issues in the brain such as memory, cognitive thought/ processing, and behavior issues when used on children 3 and under. Charlotte is a Magna Cum Laude student who has been in many clubs such as SADD, Interact, and Student Senate. She also plays soccer, indoor and outdoor track, as well as flag football for the school. Outside of school she is also on a club soccer team and she likes to volunteer, and hang out with friends and family.

Reese Berman

Year: First

Topic: Stress in Secondary Scholars

Mentor(s): Dr. Mark Leary, PhD., Professor of Psychology and Neuroscience at Duke University

Reese is a sophomore, in her first year of the Science Research Program. She is currently researching the effects of stress on high school aged students. She is interested in further researching how the students respond to the stress. Reese is a Magna Cum Laude student who is also a part of the Varsity Ski team and the JV Volleyball team. Outside of school, she enjoys skiing with her friends in Vermont, traveling the world, and spending time with her family.

Beren Munkatchy

Year: First

Topic: Transcranial Direct Current Stimulation

Beren is a sophomore, in his first year of the Science Research Program. His studies focus on the positive effects of transcranial direct current stimulation on different cognitive abilities. These include precision in acute motor movements, visual and aural reaction times, and multitasking performance. In his free time, Beren enjoys watching movies, spending time with family, and having casual competitions with friends.

Alexa Keys

Year: First

Topic: Factors That Affect Cyanobacterial Growth

Alexa is a sophomore, in her first year of the Science Research Program. She is researching the indicators of harmful cyanobacterial blooms in lakes in Orange County. She hopes to test the Greenwood Lake water over the next two summers for cyanobacteria and is currently working with the Mayor of Greenwood Lake to do so. Since childhood, she has felt a connection to lakes, especially in the Hudson Valley, which is why she chose this topic. In fourth and eighth grade, her team won the World Title for Odyssey of the Mind as well as New York State Titles in fifth and sixth grade. Currently, she competes on both the cross-country and track varsity teams. She also participates in Student Council, Empty Bowls Club, and Model UN. In her free time, she loves spending time with friends, reading, and cooking for her family.

Kayla Schmitt

Year: Third

Topic: Longevity/Aging

Title: Evaluating the extent of the mitochondria's role in aging by observing structural differences in Caucasian and ethnic skin and how such differences are modulated between both natural intrinsic aging and extrinsic photoaging

Mentor(s): Dr. Keshav Singh Ph.D., Department of Genetics at University of Alabama

Kayla is a senior, in her third year of the Science Research Program. Her research focuses on promoting longevity by targeting the mitochondria's pivotal role in intrinsic, chronological aging. Her research examines how restoration of mitochondrial health can combat the skin aging phenotype and photoaging. Kayla is in the top 1% of her class and is a captain of the Orange County Academic League and Warwick Girls Varsity Tennis Team. She is an active member of Mu Alpha Theta, National Honor Society, and is a class senator in Student Government. Kayla was distinguished as an AP Scholar, a US Army Scholar-Athlete All-American, a recipient of the Junior Orłowski Science Research Scholarship, and was selected as a candidate for the US Presidential Scholar Program. Over the summer, she also completed an Introduction to Laboratory Research in Biomedicine course at Brown University's Summer Program. In her free time, Kayla enjoys playing tennis, reading a good book, and spending time with her family and friends. In the future, Kayla hopes to continue her research as an undergraduate in college and focus on mitochondrial outlets in reproductive longevity and technology. She will be attending Boston College as a Human Centered Engineering major and hopes to use her education towards a career in Women's Health.

Juniors

Ava Gell

Year: Junior

Topic: Effect of Tryptophan Supplementation on Mood

Title: Elucidating the Effect of Food-Based Tryptophan Supplementation on Mood and Well-Being

Mentor(s): Dr. Rafael Bravo, PhD., Statistician at University of Texas

Ava is a junior, in her second year of the Science Research Program. She will complete a research project involving increasing the dietary tryptophan of participants with a family history of depression, and assessing its impacts on their mood. Tryptophan is an amino acid used to synthesize serotonin, a neurotransmitter responsible for emotional regulation. Supplementation of tryptophan (through high-content foods or synthetically) has shown promise as a method of improving mood, with a greater effect in those with increased susceptibility to depression. On this project, Ava is working with her mentor, Rafael Bravo. Ava is a Summa Cum Laude student enrolled in several AP courses. Outside of school, she has been involved in Odyssey of the Mind and has played the piano for many years. She also loves cooking, music composition, and spending time with her friends and family.

Zachary Johnston

Year: Second

Topic: Running Prosthetics

Title: The effect of an Inclined Slope on the Gait Values of a Kinetic Running Prosthetic

Zachary is a junior, in his second year of the Science Research Program. Zachary is studying prosthetic devices, specifically how wearing a prosthetic affects someone's gait patterns while running up a slope. Zachary is a member of both the National Honor Society and Mu Alpha Theta. In his free time, Zachary runs distance on the high school track team and plays bass guitar in a band

Seniors

Megan Desrats

Year: Third

Topic: Propolis and honey bee health

Title: The effect of the experience of a beekeeper, the number of hives they manage, and their opinion of propolis on if they modify their hives in order to promote propolis build-up

Mentor(s): Dr. Brenna Traver, PhD., Associate Professor, Biology at Pennsylvania State University

Megan is a senior, in her third year of the Science Research Program. Her research focuses on the importance of honey bees, a critical organism for humans as they pollinate 80% of crops in the United States. Their populations are at risk due to multiple factors. She conducted a project based on propolis, a substance bees produce which contains antibacterial properties, and beekeeping practices and what beekeepers can do to improve colony health. Megan is in the top 2% of her class and is a member of National Honor Society, Mu Alpha Theta, and the Sports Medicine Club. She is the secretary for the Student Senate and a senator for the senior student council. She has played varsity soccer for 4 seasons and varsity basketball for 5 seasons and was a captain for both teams her senior year. She volunteers as a rec soccer and basketball coach and as a counselor for the Warwick girls basketball camp. Megan will be attending SUNY Oneonta in the fall where she will be majoring in accounting with a finance concentration and minoring in spanish. She will also be playing for the Oneonta women's basketball team.

Courtney Evans

Year: Third

Topic: Healthspan/Gut Health

Title: The Effect of Gut Microbes on the Healthspan of Organisms: A Systematic Review of Literature

Mentor(s): Dr. Daniel Kalman, PhD., Professor in the Department of Pathology and Laboratory Medicine at Emory University School of Medicine

Courtney is a senior, in her third year of the Science Research Program. Her research focuses on the gut microbiota and its influence on the healthspan of different organisms. Courtney is a Summa Cum Laude student who is in the top 20% of her class and enrolled in only AP/dual enrollment courses and honors classes. She has been involved in the Sports Medicine Club and the SADD Club throughout her high school career. As a New York State Scholar Athlete, Courtney is a six year member of both the Warwick Soccer and Basketball programs and a three year varsity member and youth coach of the latter. She is a recipient of the Supperentientents Community Service Award with over 200 hours of community service. Courtney plans to attend the Quinnipiac University honors program in the fall while taking part in an accelerated dual-degree program in order to obtain her Bachelor's degree in Biology and her Masters degree in Molecular and Cellular Biology while on the pre-med track.

Maya Assaiante

Year: First

Topic: The Effects of Language Deprivation from lack of Parental Communication on Deaf Adolescents

Mentor(s): **Mentor Needed**

Maya Assaiante is a sophomore in the Science Research Program at Warwick Valley High School. She is currently researching language deprivation in deaf adolescents and adults. Especially in how language deprivation can cause chronic health problems like hypertension later in life. As well as mental conditions like depression and anxiety. She's currently in AP World as well as a prominent member of the Warwick Valley mock trial team. She aspires to be a disability advocate lawyer to better help the research she's currently conducting and improve lives. She spends her free time snowboarding, practicing archery and learning to play the guitar.

Nina LaVorne

Year: First

Topic: Carbon Sequestration and Soil Composition

Mentor(s): **Mentor Needed**