



Editorial Note: Journal of High School Research

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It is my pleasure to launch the *Journal of High School Research* as its founding editor. The *Journal* is a fully open access online-only journal published by SAM Publishers, New Jersey, USA. The primary objective of the journal is to promote, encourage, and facilitate critical thinking and research among high school students in 10th through 12th grades in all areas of their interest. Unique and outstanding research work done by high school students, including research papers, are eligible for consideration. Papers cannot be a summary or essay of material available openly; they should include critical analysis of available information based on one's own research. Papers can be on engineering, science, mathematics, or public policy issues of significant importance. It is advisable that high school students interested in submitting a paper perform the work under the guidance of a teacher or researcher. However, independent research papers are also welcome. All submitted papers will undergo peer review by at least one expert, which will be communicated to the authors for revision to address review comments. All accepted papers will be published online generally within two weeks of acceptance. High school students from all around the world are invited and encouraged to submit their original research papers meeting the scope of the journal.

The broader objectives of this journal are to promote critical writing and critical thinking among high school students. Although there are several journals publishing research by high school students, a unique feature of this journal is to provide mentorship to students submitting their research papers towards improving their paper to not only make it publishable but also to encourage them to be involved in critical aspects of the research they are pursuing. This mentorship will be limited to the theme of their paper and will be in the form of detailed feedback on potential further research that they can carry out. The journal will also try to connect them with researchers and professors doing research in the area of the paper.

For this founding issue, we are publishing four articles submitted by outstanding high school students. The paper entitled "Case Studies on Disproportionate Impact of Cyberattacks in the Healthcare Sector" by Aditya Rai of Ridge High School, Bernards, NJ, USA analyzes the

issue of cybersecurity in the healthcare sector through several case studies. Healthcare organizations store valuable data on patients' protected health information. This paper uniquely investigates the outsized impact of cyberattacks on the healthcare sector through numerous case studies by exploring their impact across all segments of the healthcare industry. These attacks, targeting computer systems or networks, result in significant financial losses and compromise highly sensitive personal information. Within healthcare, they pose a grave threat to patient privacy, enabling unauthorized access to Protected Health Information (PHI) and other confidential data. With the rising frequency of cyberattacks in healthcare, immediate action is urgently needed and is imperative. A comprehensive understanding of the issue and critical evaluation of existing policies are both pivotal in formulating effective and equitable strategies for counteraction.

In the paper entitled "Analysis of the effectiveness of different biosynthetic techniques on altering natural products to create novel antibiotics," Sanskriti Singh, West Windsor-Plainsboro High School North, Plainsboro, NJ, USA, has critically analyzed the literature on techniques for altering natural products to create antibiotics. Antibiotics are ubiquitous in modern medicine due to their usefulness in combating sickness and disease. They vary greatly in structure and function, permitting their use in the treatment of a wide variety of bacterial infections. However, due to the development of resistance in bacteria, antibiotics must constantly be updated to remain effective. Many strategies have been applied to alter natural products and subsequently create novel antibiotics, including precursor-directed biosynthesis, genetic engineering, and combinatorial biosynthesis. Different techniques have been proven effective on different natural products due to the diverse structures of these natural products, each ranging in effectiveness. This review compiles several studies where naturally occurring β -lactams and glycopeptides have been modified through the previously mentioned techniques to create new antibiotics. The studies impart insight into the effectiveness of each of these techniques and their potential utilization in the future of the medical field.

The paper entitled "Optimizing Quantum Key Distribution Networks Using Quantum Annealing and Gate-Based

Quantum Computing” by Aadi Shah of Jayshree Periwai International School, Jaipur, India, analyzes the current Quantum Key Distribution Model, which is widely used. This paper proposes integrating quantum annealing and gate-based quantum computing to optimize the process. The paper presents the basics of QKD, Annealing, and Gate-based quantum computing, their significance in today’s world, and the existing research in this area. Based on this review, the paper proposes a new approach for integrating gate-based computing and quantum annealing in QKD, which might not be feasible with the current state of technology, but the approach will be efficient, effective, and will have the least energy consumed when implemented.

The paper entitled **“Effects of Developments in Artificial Intelligence on Climate Change”** by Siddhi Agrawal of Ridge High School, Bernards, NJ, USA, presents potential benefits and adverse effects of recent developments in artificial intelligence. Reviewing recent research in this area, the paper identifies numerous beneficial impacts that artificial intelligence may have. However, the paper also identifies significant potential impacts of AI on climate change because of the very high demand for computational resources to implement AI through language models such as ChatGPT.

The journal plans to publish papers on a rolling basis as submitted papers are accepted for publication, and all papers will be grouped in one issue for a particular year. Through this founding issue, I am inviting all high school students to participate in critical thinking and writing and submit their work to the journal for publication. All submitted papers will undergo review and publication process as soon as they are received by the journal. The journal charges an article processing fee for papers accepted for the journal, which covers the cost of review, hosting of the journal, and production of publication-ready papers. For high school students facing economic difficulties, the journal has a policy of discounting the article processing fee. The editor of the journal is a professor of Civil Engineering at the City College of the City University of New York. However, the journal has no affiliation with the City College of the City University of New York besides his affiliation with the university.