Lowell Milken Center for Unsung Heroes
ARTEFFECT

# Impact Statement

Chloe Steele, Grade 8
***Math IS for Women,*** 2026
Acrylic, graphite, colored pencil, lights on cardboard, 12 x 8 inches
Paragould Junior High School, Paragould, AR
Unsung Hero: Dr. Sofya Kovalevskaya

Sofya Kovalevskaya was a Russian mathematician and one of the best of her time. I chose her as my Unsung Hero because of how courageous she was. She fought for women's rights and women's education. She was the first woman to have a doctorate in mathematics in Europe. She persevered through all the tough times she was faced with. She never let a man tell her what to do. These are all examples of why I chose Sofya Kovalevskaya as my Unsung Hero.

Sofya was born in Moscow, Russia 1850. She grew up in a very noble family and loved math at a young age. Her father's old calculus notes were all over the walls in her nursery. Her uncle would often help her come up with advanced mathematical ideas. At just 14, she could understand her physics books, and she taught herself trigonometry. Her teachers were impressed greatly with her knowledge of math. Her teachers had to convince her parents to support her and her studies of math.

The women in Russia were not allowed to attend universities. With not being able to attend university she faced many more obstacles, but each one that was thrown at her, she faced very courageously. She was put into a marriage of convenience in 1868, where she would marry Vladimir Kovalevsky, a young scientist and paleontologist, and one of the first adopters of Charles Darwin. Sofya married Vladimir only so she could study, and travel abroad. The couple had gone to Austria, only before settling in Germany for Sofya to study mathematics. While in Germany, she went to the University of Heidelberg, and tried to go to Berlin, but they would not admit women.

Karl Weierstrass, a famous mathematician, offered to tutor her privately. Sofya would go on to study with him for four years, producing the work for her doctoral dissertation. Later, in 1874, she would earn her Ph.D. in mathematics, after attending the university of Gottingen. Her dissertation came with three very important papers, one on Saturn's rings, partial differential equations, and one on elliptic integrals. Her work on differential equations was later named the Cauchy-Kovalevskaya Theorem. Despite all her accomplishments she could still not find work in Russia because she was a woman.

Her husband died in 1883, widowing young Sofya. After Vladimir passed away, she would focus even more on her studies and move to Paris. While in Paris she would study and work with many other mathematicians. The same year, she accepted an invitation to be a teacher at Stockholm University. She became an editor of the ACTA Mathematica. She was the first

woman to hold a position in the board of major scientific journals. In 1885, she would solve a very difficult equation about the rotation of a solid object. This work would earn her the Prix Bordin from the French Academy of Sciences in the year 1888. Sofya became a full professor for the Stockholm University in 1889, the first woman to ever reach that rank. Although she was never offered professorship in Russia, she was nominated for the Russian Academy of Science.

While not only studying mathematics, Sofya also wrote plays, novels, and essays. She believed that women could succeed in fields that were dominated by men. She fought for women's rights, education, and equality. One of her greatest achievements is the Cauchy-Kovalevskaya theorem. The Cauchy-Kovalevskaya theorem explained that there was existence and a uniqueness to solutions, the solutions were to certain partial differential equations, better known as PDEs. Another great accomplishment was the Kovalevskaya top. The Kovalevskaya top was a problem about how spinning objects move. Her discoveries remain very important in physics and math today.

Sofya Kovalevskaya fell ill from influenza that later led to pneumonia and died in 1891, at the young age of 41. A contributing factor to her death was how depressed she had gotten after Vladimir had passed. She lived a short, but eventful life. She created new ideas in mathematics, paved the way for women in science, and she would continue to inspire generations to come. She was the most important and influential woman scientist of the 19th century, she gained that title with her courageous, intelligent, and determined mind.

My art project is made up of paper, cardstock, acrylic paint, colored pencils, fairy lights, and a shoebox lid. I came up with my project by looking at pictures of Sofya, all the pictures were the same, until I found the one I used for my inspiration. I used other photos to get more exact details. On the painting around the portrait of Sofya, I wrote a mathematical equation, this mathematical equation was the Riemann hypothesis, invented by a man in the same period as Sofya, I thought that it could go together. My artwork expresses her love for math which Sofya and I share. I chose to do a white colored pencil on the grayish black acrylic paint because I thought that it would resemble a chalk board. I tried to capture her expressions from the paintings and pictures of her I found. It was hard but I did my best to do it.

I researched a lot of stuff for this impact statement. Sofya changed my outlook on the world, not only by showing me that women can do quite literally anything, but if I want to do something I have to have the right mindset for it and I believe that everyone should have a mindset like Sofya's. Sofya was a very admirable person, she was writing plays and books while studying math. She was doing all of this while juggling the loss of her husband. She persevered through the darkest times where some people would give up, she didn't, she kept fighting. She may have not gotten to be a professor in Russia, but she got to be a professor in Germany and I think that's just as good.