

## 2022-2023 Outstanding Thesis Award Winner Chelsea Schweer



Chelsea Schweer's enthusiasm for mathematics is apparent the moment the topic comes up. As a math teacher at Alta Vista Innovation High School, she loves to find instances of how mathematics is part of our everyday lives and incorporate them into her lessons. But her curiosity leads her to delve deeper into mathematics theory, the questions that lurk beneath the surface of seemingly simple problems. Her thesis topic, *Verifying Sudoku Puzzles*, suited her perfectly.

Chelsea's topic addresses the question of how to verify solutions to Sudoku puzzles with the minimum number of checks, a deceptively simple question.

"My advisor, Dr. Aiken, gave me the question," Chelsea said. "It was something he had come across in an online math forum and felt there was more to it beneath the surface. I like to think that he was waiting for the right person to come along and solve this puzzle."

While answering the original question was relatively simple (for a mathematician), Chelsea's thesis digs deeper; she explores matroid theory and develops a detailed proof to support her solution.

"The answer we were trying to prove was that this was a matroid," Chelsea said. "This would mean that there's a larger type of matroid out there that hasn't been discovered."

There were many challenges exploring this new territory, and Chelsea said the search for the right solution took her on a two-year journey into matroid theory and weekly meetings with Dr. Aiken to review solutions.

"In math you have to come up with a theory, then prove it based on what others have done. In this case there were no resources to refer to. We had to come up with the names, definitions, and structure. It gave the whole thing an interesting twist."

Chelsea's M.A. in Mathematics has landed her a position at CSUSB as a part-time lecturer teaching Intro to Mathematics courses; she also continues to teach at Alta Vista. Her goal is to be a professor or lecturer at a community college or university. She credits the success of her thesis topic to the dedication of her thesis adviser: "I'd like to give a shout-out to Dr. Jeremy Aiken – without him, it wouldn't have happened."