AFTER YEARS OF PAINSTAKING RESEARCH, Casey Mann and Jennifer McLoud-Mann were beginning to wonder if they were looking for something that just didn’t exist.

It had been three decades since the last discovery of a five-sided figure that could interlock with identically shaped pentagons infinitely in every direction without leaving any gaps, something that mathematicians call “tiling the plane.”

Not long after joining UW Bothell’s faculty two years ago, the associate mathematics professors invited one of their undergraduate students to join them in their search for a tile-planing pentagon that would become the 15th type ever discovered – if only they could find it.

They started by asking David Von Derau, a math major and professional software developer, if he could write a program to compute various aspects of an algorithm they’d developed. He embraced the challenge, writing line after complex line of code.

They spent more than a year exchanging prototypes, meticulously sifting through each iteration. Every step of the way, they learned from each other’s work. One day, Jennifer spotted something new as she was reviewing data that David’s program cranked out.

Once they made a computerized picture of it and verified that the program hadn’t done anything wrong, they reached out to other experts in the field, asking them to confirm their findings.

A couple days later, they made math history and became the first mathematicians since 1985 to discover a new type of tile-planing pentagon. Their discovery electrified the math world and made news headlines across the globe.

Casey and Jennifer, who were married 22 years ago, are often asked about what real-world problems their pentagon might help solve someday. They patiently discuss potential applications in fields such as structural design and biochemistry.

But that’s not what makes their eyes light up. What excites them most is the idea that this discovery shows the world that mathematics is not some boring set of rules that’s already figured out. It’s a dynamic field of study with fascinating frontiers that are calling out to be explored – not just by high-level graduate students and tenure-track faculty but by undergraduates, too.

“Teaching and researching in an environment where faculty feel supported and encouraged to engage with undergraduate students in such meaningful ways is a very powerful thing,” Jennifer says.

It was a challenge at times to juggle a leading-edge research project with a full course load and a full-time job as a software engineer, says David, who graduated in June with a major in math and a minor in computer software systems. But in the end, he said that making such an historic discovery was beyond fulfilling.
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JENNIFER MCLoud-MANN, UW BOTHELL ASSOCIATE MATHEMATICS PROFESSOR