Mathematics and Computer Science — by Michael C. Strayer

Dr. Robb Koether and **Dr. Rebecca Jayne** coauthored the paper “Iterating the Locker Problem,” which was accepted by *Mathematics Magazine*. The well-known locker problem, on which this paper was based, asks the question: If there is a hallway with 1000 closed lockers and we send 1000 students down the hallway one at a time, with the k^{th} student changing the state (either open or closed) of every kth locker, then which lockers will be open after all students have gone down the hallway? The answer is that locker *m* will be open exactly when m is a perfect square. Drs. Koether and Jayne extended this problem in two ways. First, they allowed the lockers to be in *q* varying degrees of openness for some prime number *q*. Second, they posed the reverse question, namely, for a given set of locker doors, which students should be sent down the hallway so that exactly those lockers doors are left open?

Dr. Sarah Loeb shared her love of graph theory by giving mathematics colloquium talks at Longwood University last spring and Christopher Newport University last fall. She coauthored the paper “On Edge-Colored Saturation Problems,” which was accepted to the *Journal of Combinatorics*. Last summer, Dr. Loeb attended two funded research workshops. One was intended for faculty at undergraduate institutions and the other for women in graph theory. She has continued to meet with the resulting collaborators over video conference calls. For teaching development, Dr. Loeb has organized a small regional group to read and discuss the *Instructional Practices Guide* published by the Mathematical Association of America (MAA); Dr. Michael Strayer also participates. This January, Dr. Loeb joined the MAA Classroom Resource Materials Editorial Board.

Dr. Michael Strayer joined the Department in 2019.

Dr. Michael Strayer joined the Mathematics and Computer Science Department this past August as an Assistant Professor. Dr. Strayer comes to Hampden–Sydney College from the University of North Carolina where he completed his Ph.D. last spring. His research is in the overlap of two areas of mathematics: representation theory (of Kac–Moody algebras, which are also studied by Dr. Jayne) and combinatorics. A representation of a Kac–Moody algebra transfers the algebra’s structure to the setting of linear algebra, which includes vector spaces, matrices, and linear transformations. Many results are known in linear algebra, so a wealth of available techniques and results can be applied to a representation to recover much information about the original Kac–Moody algebra. Dr. Strayer uses combinatorial objects known as partially ordered sets to explicitly construct representations of many different Kac–Moody algebras. His work focuses on describing the interplay between the combinatorial structure of the partially ordered sets and the algebraic structure of the representations they are used to construct. Over fall break, Dr. Strayer gave a colloquium talk at Longwood University where he showcased some of the ways in which partially ordered sets can be used to illuminate mathematical structure and solve difficult problems. This past January he presented his research in an American Mathematical Society Special Session at the Joint Mathematics Meetings in Denver. He is currently participating in Project NExT put on by the MAA and Section NExT put on by the MD–DC–VA Section of the MAA. These programs are both a series of pedagogical workshops designed for early career mathematicians.