

1154-VU-1295      **Mark Hughes** and **Thomas Liddle\*** (thomasliddle34@gmail.com),  
thomasliddle34@gmail.com, and **Jamison Moody** and **Spencer Reschke**. *Using reinforcement  
learning to find the slice genus.*

One interesting problem in topology involves studying the types of surfaces which can be bounded by a given knot. If the surfaces are orientable and contained in 3-dimensional space then we call them Seifert surfaces. If we allow our surfaces instead to sit inside 4-dimensional space, then we call them slice surfaces. The smallest genus of any slice surface for a knot  $K$  is called the slice genus of  $K$ . One way to find the slice genus of a knot is by reducing a braid word that represents the knot, though there is no clear procedure for doing this optimally. In this talk, I will discuss an approach to using reinforcement learning for accomplishing this task. Reinforcement learning is a form of artificial intelligence that learns from repetition, with good decisions being reinforced in the learning to facilitate quick improvement. In this talk, we will focus on different algorithms in reinforcement learning that could be used to solve this problem and why some could be more effective than others. (Received September 16, 2019)