# A Tale of Two Monoids: A Friendly Introduction to the Theory of Non-Unique Factorizations 

## Undergraduate Math Club CORNELL UNIVERSITY

## SPEAKER

Professor Scott Chapman, Sam Houston State University
ABSTRACT
Arithmetic sequences are among the most basic of structures in a Discrete Mathematics course. We consider here two particular arithmetic sequences:

$$
\begin{gather*}
1,5,9,13,17, \ldots  \tag{H}\\
\text { and } \\
4,10,16,22,28, \ldots \tag{M}
\end{gather*}
$$

In addition to their additive definitions, these sequences are also multiplicatively closed. We show that both have multiplicative structures much different than that of the regular system of the integers. In particular, both fail the celebrated
Fundamental Theorem of Arithmetic. While this is relatively easy to see, we will show that while factoring elements in the set $\mathbf{H}$ is fairly straightforward, factoring elements in $\mathbf{M}$ is much more complicated. This gives us a glimpse of how systems which fail the Fundamental Theorem of Arithmetic are studied and analyzed.

$$
\text { APR } 15 \cdot 4: 30
$$

Malott 5th floor lounge • refreshments served

