1154-05-969 **Alyssa N Adams** and **Bonnie C Jacob*** (bcjntm@rit.edu). *Failed zero forcing on oriented and directed graphs: results, applications, and open questions.*

Let Γ be a simple directed graph with vertex set V and edge set E where $n = |V|$, and each edge is assigned one or more orientations, $e = (u, v)$ or $e = (v, u)$. The *closed out-neighborhood* of $u \in V$ is $N^+(u) = \{u\} \cup \{v : v \in V \text{ and } (u, v) \in E\}$. For $S \subseteq V$, $B^0(S) := S$ and for $i = \{0, 1, \ldots\}$, $B^{i+1}(S) := B^i \cup \{w : \{w\} = N^+[v] \backslash B^i(S) \text{ for some } v \in B^i(S)\}$. If $B^i(S) \neq V$ for any i, then S is a *failed zero forcing set*. In this talk, we introduce the *failed zero forcing number* $\mathrm{F}(\Gamma)$ on a directed graph, which is the maximum cardinality of any failed zero forcing set in Γ. We characterize oriented graphs that have $\mathrm{F}(\Gamma) < \mathrm{Z}(\Gamma)$ and directed graphs with $\mathrm{F}(\Gamma) = n - 1$, $\mathrm{F}(\Gamma) = n - 2$, and $\mathrm{F}(\Gamma) = 0$. We also show that for any integer $n \geq 3$ and any non-negative integer k with $k < n$, there exists a directed graph Γ whose underlying undirected graph is a cycle with $\mathrm{F}(\Gamma) = k$. Finally, we discuss potential applications of the failed zero forcing number and some open questions. (Received September 12, 2019)