Pseudo-Frobenius numbers versus defining ideals
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**Introductory talk:** Saturday, December 5, 2020
9:00 am - 10:00 am (Eastern Time USA)

**Research talk:** Saturday, December 12, 2020
9:00 am - 10:00 am (Eastern Time USA)

**Abstract:** Let $\mathbb{N}_0$ denote the set of non-negative integers. A submonoid $H$ of $\mathbb{N}_0$ is called a numerical semigroup if $\mathbb{N}_0 \setminus H$ is a finite set. Let $k$ be a field. For a numerical semigroup $H$, we set $k[H] = k[t^h \mid h \in H] \subseteq k[t]$, where $t$ is an indeterminate over $k$, and call it the numerical semigroup ring of $H$ over $k$. $k[H]$ is a 1-dimensional Noetherian integral domain (hence is a finitely generated $k$-algebra and Cohen-Macaulay) and is usually regarded as a graded ring by $\deg t = 1$. For a numerical semigroup $H$, we set

$$PF(H) = \{ \alpha \in \mathbb{Z} \setminus H \mid \alpha + h \in H, \forall h \in H \setminus \{0\} \}.$$  

An element $\alpha \in PF(H)$ is called a pseudo-Frobenius number of $H$.

In the first talk, we will explore the basic properties of numerical semigroups and numerical semigroup rings. Especially, let me show some characterizations of ring-theoretic properties of $k[H]$ in terms of $PF(H)$. In the second talk, we will deal with a problem to find a connection with the behavior of $PF(H)$ and the defining ideal of $k[H]$. Let me give a partial answer and a conjecture on the problem. The second talk is based on joint works with Shiro Goto, Do Van Kien, and Hoang Le Truong.