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*Fermat vs Waring: An Introduction to Number Theory in Function Fields*

Let  $\mathbb{Z}$  be the ring of integers. For a prime number  $p$ , let  $\mathbb{F}_p[t]$  be the ring of polynomials in one variable defined over the finite field  $\mathbb{F}_p$  of  $p$  elements. Since the characteristic of  $\mathbb{Z}$  is 0, while that of  $\mathbb{F}_p[t]$  is the positive number  $p$ , it is a striking theme in arithmetic that these two rings faithfully resemble each other. The study of the similarity and difference between  $\mathbb{Z}$  and  $\mathbb{F}_p[t]$  lies in the field that relates number fields to function fields. In this talk, we will investigate some Diophantine problems in the settings of  $\mathbb{Z}$  and  $\mathbb{F}_p[t]$ , including Fermat's last theorem and Waring's problem.