Abstract: A triangle group is a group of the form \( G = \langle x, y | x^{p_1}, y^{p_2}, (xy)^{p_3} \rangle \). If \( 1/p_1 + 1/p_2 + 1/p_3 < 1 \), then \( G \) admits a representation into \( PSL(2, \mathbb{R}) \). These groups are well-studied and provide a wealth of interesting examples, such as if \( p_1 = 2, p_2 = 3 \) and \( p_3 = \infty \), we get the modular group \( PSL(2, \mathbb{Z}) \).

The first talk will be a discussion of hyperbolic triangle groups and how to get nice \( PSL(2, \mathbb{R}) \) representations. While performing the construction, we will pay attention to the arithmetic data we can associate with these simple representations and end on a construction of congruence quotients for these groups.

The second talk will briefly discuss a problem in 3-manifold topology in service of restating and then resolving it entirely in terms of how prime ideals split in a restricted class of number fields.

This is joint work with Kate Petersen.