"If the final product is not as pleasing to the eye as one could wish, ... it indicates that much work remains to be done before this very promising topic reaches some degree of completion."

-A. Weil.

# The Trivial Notions Seminar
## Proudly Announces

# Tamagawa numbers and volumes of certain fundamental domains

A talk by
# Yihang Zhu

### Abstract

The famous fundamental domain of $\mathrm{SL}_2(\mathbb{Z})$ acting on the upper half plane has volume $\pi/3$ under the Poincare metric. We may re-interpret this number as $\frac{2}{\pi}\frac{\pi^2}{6} = \frac{2}{\pi}\zeta(2) = \frac{2}{\pi}\prod_p(1 - p^{-2})^{-1}$. This Euler product expression of the volume turns out to be really remarkable, and reflects the fact that $\mathrm{SL}_2$ has Tamagawa number one. In general, one can define the Tamagawa number of any reductive group over a number field, and Weil conjectured and Langlands-Lai-Kottwitz proved that the Tamagawa number of any simply connected semisimple group is equal to one. We will see how this result is related to various number theoretical problems, from classifying quadratic forms to counting the number of supersingular elliptic curves. We will also see how this result is in analogy with more grand conjectures such as the BSD conjecture. If time permits, I will talk about Langlands' strategy of the proof.

# Thursday September 25$^{\text{th}}$, at 1:00 pm
# Science Center 222