

“The thing is, it’s very dangerous to have a fixed idea. A person with a fixed idea will always find some way of convincing himself in the end that he is right. ”

— Atle Selberg

The Trivial Notions Seminar  
Proudly Announces

Proving the Riemann-Roch using the Selberg  
trace formula

A talk by  
Yihang Zhu

**Abstract**

Consider a compact Riemann surface  $X$  of genus greater than one. Then  $X$  has the Poincaré upper half plane  $\mathbb{H}$  as its universal cover. It turns out that the Riemann-Roch theorem on  $X$  has an interpretation in terms of the representation theory of the group  $SL(2, \mathbb{R})$  (or rather covering groups of it), which naturally acts on  $\mathbb{H}$ . On the other hand, Selberg’s trace formula, generalizing the classical Poisson summation formula, is an extremely powerful tool in harmonic analysis, as well as differential geometry and number theory. As discovered by Garth Warner, it can be applied in this situation, together with knowledge from representation theory, to prove the Riemann-Roch for  $X$ . In the talk I will explain the representation theoretic background and the Selberg trace formula restricted to our specific situation, so no prior knowledge in either is needed.

Thursday, February 25<sup>th</sup>, at 12:00 pm  
Science Center 232