N16
Colloquium

Combinatorics as Geometry

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Abstract: We know, thanks to the work of A. Weil, that counting points of varieties over finite fields yields purely topological information about them. For example, an algebraic curve is topologically a certain number g of donuts glued together. The same number g, on the other hand, determines how the number of points it has over a finite field grows as the size of this field increases. This interaction between complex geometry, the continuous, and finite field geometry, the discrete, has been a very fruitful two-way street that allows the transfer of results from one context to the other.
In this talk I will first describe how we may count the number of points over finite fields for certain character varieties,parameterizing representations of the fundamental group of a Riemann surface into GL-n. The calculation involves an array of techniques from combinatorics to the representation theory of finite groups of Lie type. I will then discuss the geometric implications of this computation and the conjectures it has led to.
This is joint work with T. Hausel and E. Letellier

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Mathematics and Computer Science
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