GEAR Research Experience for Graduate Students (REGS) Projects
Summer 2018

Project Supervisor	Project Title	Project Location	Project Dates	Project Description	# of Positions Available	More Information
Moon Duchin moon.duchin@tufts.edu	Moduli spaces of metric partitions	Tufts University	June 4 - July 13, 2018 (with extension possible)	In this project, we seek to study the geometry and topology of the moduli space of graph partitions under various constraints. The basic problem is to begin with a weighted graph embedded in a planar domain and to partition the domain into a fixed number of connected, simply connected pieces called "districts" whose nodes sum to roughly equal weight. We will incorporate ideas from the topology of configuration spaces and from Teichmüller theory to put a metric on the space of partitions and study its properties.	3	moon.duchin@tufts.edu
Florent Schaffhauser florent.schaffhauser@gmail.com	Bundles over orbi-surfaces	Universidad de Los Andes (Bogota)	July 16 - August 31 (7 weeks)	The goal of the project is to understand the usual Narasimhan-Seshadri and Mehta-Seshadri maps/functors, from representation of co-compact Fuchsian groups to vector bundles over the corresponding quotient of the hyperbolic plane, when one removes the assumption that the Fuchsian group under consideration is torsion-free. We will study this map from the point of view of orbifold fundamental groups and orbifold vector bundles. Time permitting, we will also study the case of Fuchsian groups of finite covolume. A concrete objective for the project is: given a cocompact Fuchsian group Γ and the orbi-surface $X=\mathcal{H}/\Gamma$ where $\mathcal{H}$ is the hyperbolic plane, relate the unitary representation variety of Γ to the unitary representation variety of the fundamental group of the surface X' obtained from X by removing its orbifold singularities.	3	florent.schaffhauser@gmail.com