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To the Postdoctoral Search Committee:

I am applying to the Postdoctoral Research Associate in Number Theory position, because I am excited about the recent advances in automorphy theorems by Jack Thorne and his collaborators and their Diophantine applications. While my dissertation was not on the topic of automorphy, many of the tools I used are related, including Hida families, Galois representations and their images, and p -adic interpolation. In fact, a key result I prove in my thesis is a certain "lifting theorem." My proof uses an interplay between deformation theory and automorphic techniques, inspired by the philosophy of automorphy lifting theorems. I am interested in working with Jack Thorne to develop new applications of these tools.

I expect to receive my Ph.D. in June 2016. My dissertation, supervised by Haruzo Hida, is in the area of algebraic number theory, specifically on the images of Galois representations associated to ordinary p -adic families of modular Galois representations. The main results of my thesis are written up in a paper that is currently under review at the journal *Algebra and Number Theory*. The tools that I developed to prove my result will likely be useful in proving additional "big image theorems." Please see my research statement for more detailed information.

I have some research experience outside the area of my dissertation. I was a member of the Shadow Lines project group at Women in Numbers 3, led by Mirela Çiperiani and Jennifer Balakrishnan. We used explicit class field theory to develop and implement an algorithm to compute the "shadow line" associated to certain elliptic curve data, an invariant first introduced by Mazur and Rubin at the 2002 ICM. Through this project I gained experience working with the arithmetic of elliptic curves, explicit class field theory, and Iwasawa theory. In 2014, I was a member of Bjorn Poonen's project group at the Arizona Winter School. We proved a generalization of Poonen's analogue of Bertini's Theorem over finite fields, so I have some experience working with arithmetic geometry, particularly over finite fields.

In addition to the above research projects, I have participated in a number of classes and seminars at that are relevant to the post. I have taken classes from Chandrashekhara Khare on the proof of Serre's Conjecture and Modularity Lifting Theorems, and I participated in number theory learning seminars on topics including completed cohomology, the Taylor-Wiles method, and arithmetic duality theorems. Furthermore, I have attended numerous conferences and graduate student workshops dedicated to automorphy lifting theorems including the MSRI summer school on New Geometric Techniques in Number Theory (2013) and the Arizona Winter School (2013).

Thank you for your time and consideration.

Sincerely,



Jaclyn Lang