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January 17, 2017

To whom it may concern,

The letter below is a letter I wrote for Patrick for his application to Ohio State. Though not geared towards Clemson awards, it should get the point across.

I am writing this letter in strong support of Patrick Dynes's application for the doctoral program in mathematics at The Ohio State University. I spent two years as a postdoc at OSU and Patrick is as strong or stronger than any of the graduate students I encountered in my time there with the exception of Ameya Pitale. He would be a great addition to the program.

I have known Patrick since his first year at Clemson when he was introduced to me by a fellow faculty member. Patrick was interested in doing a reading course in number theory. We ended up setting this up as a creative inquiry group. Clemson University sponsors teams of undergraduates to work with faculty on interesting projects. The creative inquiry group Patrick was a part of consisted of four undergraduates total. They spent the year going through an elementary number theory book working the most difficult exercises. Their final project was to code the RSA system into SAGE and set up a display with two computers side by side demonstrating the system to a general audience. Patrick was the leader of the group. He did almost all of the coding and he often gave short mini-lectures at the board on new topics for the other participants. While the others were still struggling with induction and proofs on divisibility, Patrick was already reading about quadratic reciprocity and solving all of the problems from the book. The typical set up was the group would read some sections and work problems during the week. We met on Fridays and they presented solutions at the board. After that was done, they would pick some more problems to work through as a group. Patrick has a keen eye for interesting problems and was often able to solve them on the spot at the board. The other students were not fast enough to help him solve the new problems, but he was extremely patient at explaining his ideas to the other students. He is also very gifted at explaining complex ideas in multiple ways. While elementary number theory and coding RSA may not be impressive for all undergraduates, Patrick was a freshmen at the time!

Since that first year Patrick has worked on another creative inquiry group in coding theory that I co-supervised, taken numerous graduate classes in which he excelled, and worked on a senior thesis project. In terms of comparison, Patrick took the second semester graduate algebra course with me. We covered modules, field extensions, Galois theory, and some extra commutative algebra. The source book was Dummitt and Foote's Abstract Algebra. Patrick was right at the top of the class that consisted of graduate students that ended up studying number theory or applicable algebra. This graduate course was at the typical graduate abstract algebra sequence level.

Last year and the first semester of this year Patrick worked on a senior thesis with myself and

Kevin James. The original goal was to investigate the Lang-Trotter conjecture for Siegel modular forms. As I was on sabbatical last year in New York, the project did not progress as smoothly as I would have liked. It ended up with Patrick spending most of his time writing computer code to do calculations with Siegel modular forms and did not progress to the theoretical questions I would have liked to look into. This did give me a healthy appreciation for Patrick's programming skills (which are quite advanced), but also reinforced Patrick's feeling that he is more interested in theoretical mathematics than computer programming.

Patrick participated in two REUs during his time at Clemson. He was a part of the SMALL program at Williams College, one of the strongest REU programs. This REU experience resulted in two publications, one of which Patrick wrote almost entirely on his own. He also participated in an REU at Oregon State University, but I do not believe any papers resulted from that REU. However, I believe it was a good experience in that Patrick learned projects do not always lead to results and sometimes one must move on to something else to work on.

Patrick is a bit shy at first, but once he gets comfortable he is very giving with his ideas and a pleasure to have around and work with. I was able to watch him interact with members of his SMALL REU group at a conference they attended; he clearly got along with everyone and made a lot of friends. I feel that is worth mentioning because often the best students can be difficult to deal with; Patrick is definitely not one of those students. Patrick is the first in his family to attend college, so I believe the graduate school process is a bit overwhelming to him and he suffers from a lack of confidence sometimes. (He was in my office earlier this semester completely panicked about how he would pay for graduate school, completely unaware graduate students work as teaching assistants!) He is interested primarily in number theory and I believe the group at OSU would be a perfect fit for him. I always found the group there encouraging and welcoming and this is exactly the type of environment in which I feel Patrick would excel.

As a final note, I indicated that Patrick's record did not reflect his abilities. The only discrepancy I believe is his GRE subject test scores. He knows a great deal of mathematics, but he put so much pressure on himself for this test I think it had a fairly substantial negative impact on his score. I still feel he did fine, but I expected a top level score from him.

Please don't hesitate to contact me if you have any questions about Patrick's qualifications.

Sincerely,

Jim Brown
Associate Professor
Department of Mathematical Sciences