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-- This is my rec letter for Jacob for graduate school. I think it suffices for this award too.

11/26/18
Leo Rebholz
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Dear Hiring Committee,

I am happy to strongly recommend Mr. Jacob Honeycutt to be accepted into a 1st tier graduate program in Mathematical Sciences. Jacob is a first rate undergraduate student here at Clemson, with strong mathematical talent and an exceptional scientific curiosity. He has a 3.8 GPA, with all A's in math classes he took as a junior and senior, and has done successful year-long undergraduate research with me in numerical analysis as a junior, and currently is working on a research project in algebra with Sean Sather-Wagstaff. (Jacob has interests across the spectrum of mathematical sciences!)

I know Jacob from being his curriculum advisor, and advising his undergraduate research during his junior year. The project was on data assimilation for the fluid transport problem, and Jacob worked on a team of 3 students. After getting the students up to speed on basic PDEs, finite difference methods, and finally finite element methods with freefem, I introduced them to continuous data assimilation (the recent idea of Titi and his group). The students applied the idea to the fluid transport problem, and were able to prove a nice result – for enough measurement points, the data assimilated solution with 0 initial condition will converge to the true solution, exponentially fast in time. This means in the context of contaminant/pollutants that if you don't know the initial spill location exactly (in order to predict where it goes in time and where to send cleanup crew), you can quickly determine the correct concentrations over a domain and in time by combining the PDE with the data measurements. The students also did numerical tests that illustrated their results. The work ended with a poster presentation by Jacob at a local MAA meeting, and a nice paper:

J. Honeycutt, H. Johnson, and S. Kelly, Using Data Assimilation to Better Predict Contaminant Transport in Fluids, *SIAM Undergraduate Research Online*, Volume 11, 1-16, 2018.

Jacob was the leader of the team on this project. He came in every week fully prepared, and with many questions. He has a lot of mathematical and physical insight, and his enthusiasm was contagious. He picked up finite elements and the associated analysis very quickly, in fact

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quicker than most graduate students at Clemson do. Overall I was extremely impressed by him. I should also mention he got along very well with the other students.

Comparing Jacob to all Clemson undergraduate math majors, I put him in the top 5%, maybe higher. I have been at Clemson for 11 years, and served as Undergraduate Director for 2 of them, so I have known a lot of math majors here. I think Jacob compares very well to recent Clemson students I have known that went to graduate programs at Pitt, NC State, Emory, Oklahoma and Georgia, and in particular I put Jacob at the same level of a recent undergraduate researcher of mine, Nathan Heavner, who will finish a Ph.D. this year at UC Boulder applied math. Jacob is easily better than most 1st year Clemson graduate students I have taught over the years.

In conclusion I have no reservation in strongly recommending Jacob for a 1st tier grad program in Mathematical Sciences. He is sharp, loves math and learning, has an outstanding scientific curiosity, is level headed, and is polite and respectful.

Please do not hesitate to contact me if you have any questions about Jacob or this reservation.

Sincerely,

Leo Rebholz

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