CLEMSON
UNIVERSITY

January 11, 2016

Dear Colleagues,

It is my pleasure to write this letter of recommendation for **James Stevens** for an undergraduate award from the Department of Mathematical Sciences at Clemson. It was not clear from the email I got specifically what awards we offer, so I will assume that one of them is something like "top senior math major". At Clemson, we have two senior math majors who stand out head and shoulders above their peers: James Stevens and Patrick Dynes. Both have very similar records and similar abilities. James did two top REUs: Minnesota and Chicago. Patrick did a top REU at Williams, and another very good one at Oregon State. Both regularly take grad classes and outperform our grad students. Both will end up at a top PhD program next fall. Both are equally deserving of an undergraduate award at Clemson. Trying to pick which one of these two gets our top award and which one gets left out is a losing battle. *The only right answer, which I would strongly recommend you do, is to make James and Patrick co-awardees.* That said, this letter is about James, as I have had him in two of my classes, and I have never had Patrick in a class.

James is one of the brightest undergraduates I have ever seen. He showed up in my Abstract Algebra (Math 4120) class in the spring of 2014 as a freshman, and basically aced everything. His cumulative score of 100.01% was over 9 percentage points higher than the 2nd highest student, out of a class of 30. The mean was 68.5%. What struck me the most about James' work was the quality of his proofs and his meticulous attention to detail. Somehow, a 19-year-old freshman, who hadn't even taken Intro to Proofs, was writing flawless proofs (and in LaTeX!) that would be *indistinguishable* from mine, had I written up solutions. This is unheard of! Even our top seniors, and most of our grad students, write proofs that read like they were written by students, even if they are essentially correct.

Let me pause to say an important word about James' background. Unlike many students who show up to college with graduate school ambitions their freshman year, *James does not come from a family of privilege*. When I learned that he grew up near Spartanburg, SC, I fully expected him to tell me that his parents were both academics at nearby Wofford or Converse College. I couldn't have been more wrong. His father is a high-school graduate who works in landscaping, and his mom has a 2-year Associates degree, and works as some sort of tech at the regional hospital. James spent his high school years on his own accord learning how to program and doing math for fun. He estimates that he has solved over 100 challenge problems for Project Euler, and Rosalind, which is the "Project Euler of Bioinformatics." I really wanted James to experience the Budapest Semesters in Mathematics (BSM) program like many of our students do, but him and his family simply couldn't afford it. In fact, James has privately confided in me about the stress he has had of just paying for in-state college tuition, especially

DEPARTMENT OF MATHEMATICAL SCIENCES
College of Engineering & Science O-106 Martin Hall Clemson, SC 29634-0975
Phone: 864-656-3434 *Fax:* 864-656-5230

when his parents divorced and his mother lost her job. Seeing James succeed at Clemson over the last 3 years and now prepare to go off to a top PhD program is truly an inspirational and heartwarming story. I should also mention that like James, Patrick Dynes is also a first generation college student who faced similar financial obstacles to programs like BSM.

During the spring of his freshman year, I encouraged James to take graduate classes right away – the graduate counterparts of his graduation requirements. I especially wanted him to take Combinatorics (Math 8550), which Svetlana Poznanovic was teaching out of Richard Stanley's classic *Enumerative Combinatorics I* book. However, James had only sophomore standing and the graduate school dean wouldn't let him enroll in graduate classes until he had senior standing, citing "*it's policy and we can't make exceptions*." [perhaps that's above their pay grade?] I recruited my then-department chair, Jim Coykendall, to help fight, but we lost. However, we found a key administrator ally (yes, they do exist!) who agreed to override such vetoes going forward. But back to the graduate combinatorics class: I told James to take it anyways – sit in on the course, do the work, take the exams. We created a special section of Math 4810 (Seminar in Mathematics) so he would get credit for it. Basically, I wanted James to learn the material, and also see how he would do against our graduate students, only one of whom was a first-year. And I knew he would get hooked. Not surprisingly, Svetlana reported back that James beat all 13 of his graduate student classmates. Keep in mind that *though this class (Math 8550) does not appear on James' transcript, he has, for all intents and purposes, taken it and gotten an **A** as a 19-year-old*.

The strategy of having James unofficially take Math 8550 paid off. He got into the highly competitive combinatorics REU at the University of Minnesota. Students from this REU regularly attend top PhD programs. James worked with Pavlo (Pasha) Pylyavskyy on a project involving a conjecture of him and Thomas Lam. This REU had 3 students from MIT, 2 from Yale, and one each from Harvard and Harvey Mudd, and a few others (Trinity Dubln, Grinnell, Rochester, Albion). Halfway through the summer, Vic Reiner sent me an email saying that James was doing very well at the REU, and in the fall, James told me that he felt right at home academically.

In Spring 2015, James took my graduate-level linear algebra (Math 8530) course as a sophomore. There were 23 students and he was the only undergraduate. The proofs on his homework assignments were without a doubt better written than any of the grad students. On my final exam, the mean score was 57.5%, with the highest graduate student score being 90%. James got a 99%. In his junior year, James took our graduate real analysis sequence (taught by Mishko Mitkovski), our undergraduate topology course (we don't offer a grad version), and a topics grad class on manifolds. These last two courses were taught by Michael Burr, who bemusingly told me how guilty he felt about how bored James must have been in topology because he had to teach to the class. I asked Mishko for his candid assessment of James, and he

DEPARTMENT OF MATHEMATICAL SCIENCES
College of Engineering & Science O-106 Martin Hall Clemson, SC 29634-0975
Phone: 864-656-3434 *Fax:* 864-656-5230

CLEMSON UNIVERSITY

replied "*I can confidently say that even at this stage [1st semester junior] he would be one of the best graduate students in schools like Texas A&M and Georgia Tech (those are the ones that I have experience with).*"

James has only one blemish on his transcript at Clemson -- a **B** in our required statistics class, and there's a funny story behind that. We teach a dozen sections of that class each semester, and James showed up to the wrong final exam. Unfortunately, this was *after* his class' exam, so he got a zero on his final. The instructor, one of our grad students, didn't know what to do with the clear best student missing the final, so he just gave him a **B**. James told me later he was very thankful that he didn't get a **D**, which the instructor could have given him.

After his junior year, James participated in the Mathematics REU at the University of Chicago, where he worked on a project titled "Schur-Weyl duality" under the supervision of a graduate student, Minh-Tam Trinh. Part of me felt torn and slightly guilty for encouraging James to do summer REUs, given his background and financial situation. Maybe I should have pushed him to take an internship with Google or Amazon, where he would have made 6 times as much money. [seriously! did you know that Facebook pays their interns $8k/month, and Snapchat pays $10k/month?] However, James really *wanted* to do an REU, and he wants to get a PhD in mathematics, and he has such incredible talent. The only lingering question I have about James is just how truly spectacular he really is. For example, I'm quite confident that if he were an undergraduate at my alma mater of Harvey Mudd, he would be one of the top students in his class. Would he be *the* top student? Or the top student in 5 years? I don't have a good way to answer this; all I know is that I would recommend him without reservation to ANY mathematics PhD program in the country. If you have any other questions, please don't hesitate to contact me.

Sincerely,

Matthew Macauley
Associate Professor
Department of Mathematical Sciences
Clemson University

DEPARTMENT OF MATHEMATICAL SCIENCES
College of Engineering & Science O-106 Martin Hall Clemson, SC 29634-0975
Phone: 864-656-3434 *Fax:* 864-656-5230