**School of
MATHEMATICAL and
STATISTICAL SCIENCES
College of Science**

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To the School of Mathematical and Statistical Sciences Award Committee:

It is my pleasure to RECOMMEND Jackson Leaman for a school of mathematical and statistical sciences award. I have known Jackson since the spring of 2020, when he took my section of MATH 4560: Topology. Since then, he also took my graduate algebra (MATH 8510), graduate computational algebraic geometry (MATH 8500), and topics in geometry (MATH 4550) with me. Jackson is also signed up to take graduate algebraic topology (MATH 9860) with me in the spring of 2021. In addition, Jackson worked with me during the summer of 2020 as part of Clemson's COURAGE REU, and our work continued through the fall and spring semesters.

Jackson is a very strong, motivated, and independent student. He earned A's in all classes he completed with me. When the COVID-19 pandemic hit, Jackson was initially in a situation where he was not able to attend class synchronously on every day. Many students would fall behind in this scenario, but not Jackson. He watched my video lectures religiously, and it often seemed that he was more up-to-date with the material than many students who were attending class! It is a special student who is self-disciplined and intelligent enough to succeed in this situation.

While we were still holding in-person classes, I was also able to obverse Jackson interact with his classmates. Jackson is very friendly and enthusiastic and I would often see him chatting with his classmates alternately about mathematics and a wide range of (sometimes eclectic) topics. Jackson has been a great member of the student body of the school of mathematical and statistical sciences.

During the summer of 2020, Jackson participated in a solo project with me at Clemson's COURAGE REU. Clemson's COURAGE REU grew in response to the cancellation of many REU's due to the COVID-19 pandemic. The REU was a completely virtual experience that wasn't backed by a funding agency. Therefore, all of the participants received no credit or funding, but were there for the love of mathematics and learning. In addition, many of the students didn't even know the available projects when they applied. At the beginning of the REU, I met with Jackson every day, but after we went over the background material, we transitioned to meeting three times a week.

Jackson worked on a solo project because he was the only student brave enough to sign up for a project on SAGBI bases. SAGBI bases are particularly nice generating sets for polynomial algebras, but they are not trivial to compute. Jackson's project was to take existing code in the Macaulay2 programming language for computing SAGBI bases and add some key functionality so that the implementation could be stopped and restarted from the middle of a computation. This functionality is important because SAGBI bases can take a long time to compute and this additional feature can significantly cut down time spent on repeating calculations.

For this project, Jackson was required to learn both the Macaulay2 programming language and the background of the graduate-level material of SAGBI bases, and, additionally, to become an expert on existing (but very messy) code for computing SAGBI bases. Jackson unquestionably succeeded in all of these tasks and successfully added the desired functionality to the SAGBI bases package. This feature (as part of the SAGBI bases package) is now included in Macaulay2 distributions. As part of the project, Jackson presented his material at a virtual conference and produced a write-up of his work, which will be incorporated into a journal submission complementing the SAGBI bases package. Jackson and I continued to work on the project through the spring of 2021, meeting weekly to continue to improve the SAGBI bases package

I believe that Jackson will also develop into a quality and responsible instructor. In order to prepare for his presentation on SAGBI bases, I asked Jackson give a practice talk every week. This was his first time speaking about mathematics, and he worked very hard to improve and adapt his presentation. For example, he might try a new approach to explain the material and adapt his subsequent presentations to incorporate the parts of this approach that worked and ignoring what didn't. I expect that Jackson will continue to develop his exposition skills as he continues his career.

Overall, I find Jackson to be an strong and motivated student who is genuinely interested and excited about learning mathematics. He has both the interpersonal skills and the drive to succeed in his upcoming career. Overall, I RECOMMEND JACKSON WITHOUT HESITATION for an award in the school of mathematical and statistical sciences. Please feel free to contact me if you have any questions.

Sincerely,

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