

OPENING

Regards

In this fifth volume of the Mountaineer Undergraduate Research Review, our students show the curiosity and creativity that drives all great discovery. Our University takes pride in helping undergraduates dig deeper and explore further while pursuing knowledge.

As one of just 115 Research 1 universities among the nation's more than 4,500 higher education institutions, we give our students hands-on research opportunities, as well as world-class mentors to guide them. In our nurturing environment, students follow their passions to great accomplishments.

The Mountaineer Undergraduate Research Review showcases these accomplishments while giving its staff an inside look at the academic publication process.

As a land-grant institution, West Virginia University's mission is improving lives. I am proud of our undergraduate scholars who are already pursuing discovery that will transform West Virginia and the world.



E. Gordon Gee
President, West Virginia University

Dear Mountaineers,

With the publication of this fifth edition of the Mountaineer Undergraduate Research Review, the Honors College is proud to see West Virginia University's vibrant undergraduate research community continue to grow and thrive.

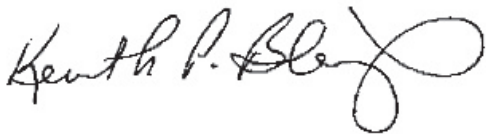
Student research plays an integral part in many Mountaineers' journeys as they explore their academic passions and find the path to their future goals and dreams.

We at the Honors College know that through academic exploration and experimentation, we are all able to reach further and accomplish great things, not just for ourselves, but also for our community, our state, and the world.

The Honors College believes supporting research endeavors is paramount, and we enjoy working closely with the Office of Undergraduate Research to expand opportunities for all students at WVU to get involved. Honors is gratified to continue to see great research from students participating in programs such as the Summer Undergraduate Research Experience, and through student-led projects in the Honors Experiential and Community Engaged Learning Program.

The student researchers who have been involved in creating this volume have pushed themselves to learn about research in new ways, cultivating skills in journal article writing and editing, providing constructive feedback for their peers and learning more about the overall journal publication process. We're proud of what you've accomplished here, and you should be too.

Keep researching. Keep learning.

A handwritten signature in black ink, reading "Ken Blemings". The signature is fluid and cursive, with a large loop at the end.

Dr. Ken Blemings
Honors College Dean

The Office of Undergraduate Research (UGR) is enormously proud to support the student-led efforts that have resulted in this publication, namely the fifth volume of the Mountaineer Undergraduate Research Review (MURR). We are humbled by all the students, past and present, who have strived for this outcome.

It is easy to justify why it was important for UGR to devote significant time and resources to supporting our students in this endeavor. MURR, in particular, demonstrates to the public what our students can achieve when they are introduced to and engaged in WVU's thriving research community. In addition, it reinforces WVU's land-grant mission of "providing access and opportunity" and "advancing high-impact research."

MURR was established in 2009 and was last published in 2014. Student-led from its inception, MURR was the brainchild of Molly Simis, then a junior biology and environmental geoscience double major within WVU's Honors College. In 2016, UGR supported the Undergraduate Research Association student club in its efforts to revive MURR. These early efforts provided a base of materials on which the present effort was built. Eventually, UGR partnered with Jeffrey Petty and Zachary Gilpin, two students enrolled in the Honors Experiential and Community Engaged Learning (EXCEL) Program (est. 2019), to publish MURR as their EXCEL project. It is important to note that the students led MURR publication efforts. They determined MURR's focus, timeline, and publication standards. They interviewed and approved volunteers, recruited reviewers and typeset journal articles. They worked together with UGR and EXCEL faculty and staff to foster institutional partnerships and mechanisms to enhance the sustainability of the journal.

Now in Fall 2020 and beyond, MURR will continue to advance opportunities for WVU students. It will provide an outlet for students to publish scholarly and creative works while deepening their engagement within their fields of study. In addition, it will allow students to experience the full editorial process from article submission, review and revision to formatting, proofreading, and publication. Through MURR, students will play an active and critical role in solidifying WVU's reputation as an R1, very high research activity, institution. In turn, we would like to sincerely thank all the students, faculty, administrators, and departments that have contributed their support to this endeavor.

Sincerely,



Michelle Richards-Babb, Ph.D.

Director of the Office of Undergraduate Research and Professor of Chemistry



Kevin J. Walden, M.S.Ed.

Office of Undergraduate Research Program Coordinator and EXCEL Program Mentor