

# OBJECTIVE LENS

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# INTRODUCTION

“This issue I have selected to use a metaanalysis by Hanna G. DeWitt (B.S., Biology, Ball State University, 2019) to provide a bit of a status report on our journal’s impact and logistics to interested readers.” -JLM

## BENEFITS OF UNDERGRADUATE RESEARCH PARTICIPATION

The Council for Undergraduate Research (CUR) has been supporting undergraduate research initiatives since 1978 and supports over 900 colleges and universities in their endeavors and found that the benefits of undergraduate research are numerous (1). CUR published a book in 2009 entitled “Broadening Participation in Undergraduate Research: Fostering Excellence and Enhancing the Impact” in which they list twenty seven benefits in four categories: gains in knowledge and skills, academic achievement and educational attainment, fostering professional growth and achievement, and promoting personal growth (4). These benefits included a range of areas such as the increase in critical thinking and problem solving skills, enhanced oral and written communication skills, improved ability to apply knowledge from the classroom to practice, enhanced professional credentials, elevated confidence, higher graduation rates, and possibly one of the most important, higher rates of acceptance into and enrollment in graduate and professional schools. The Survey of Undergraduate Research Experiences (SURE) collected data on undergraduate researches and their progress over a 9-month period. They found that of the 1135 students that they surveyed (with a 75% response rate), over 87% responded that they had plans or had already begun further education in the sciences. An overwhelming response from students showed that their undergraduate research experiences were a positive influence in this decision with 29% stating that their decision to pursue a PhD was directly

connected to the experiences of their research project (5). As students become more confident in their field of study they gain a better understanding of the potential work that might interest them in the future, leading them to continue their education to pursue a passion they might not have experienced without an undergraduate research opportunity. Having the opportunity to explore research in a safe, structured environment allows for exploration and personal discovery. Only 4.2% of students responded that their plans to pursue a postgraduate education had changed after their undergraduate research experience but even that information is valuable. This demonstrates that research experiences are key for students to be able to explore their field of study outside of the standard classroom structure to discover if research is the path they want to take. Learning that a passion for research exists is equally as important for a student as learning that research might not be the career path they want to take.

Publishing as an undergraduate can have lasting effects on future endeavors. Publishing research findings is a crucial part of expanding our understanding of the world, especially for those in the STEM (Science, Math, Engineering, and Technology) field. If a student does have the opportunity to publish work they have been conducting they gain a permanent example of their commitment to their research field. Publishing early can show graduate school and employers that a student has dedicated their spare time and effort into advancing their understanding of the scientific world to benefit the collective base of knowledge. This collaboration and show of commitment can enhance their professional credentials and establish a network of scientists that they can rely on for mentorship and further education (4). Students also become familiar with the process of scientific peer review and publication early. This can improve their understanding of what is needed to construct a solid, publishable article before it is a requirement of their education or career field. SRI International, a nonprofit scientific research institute, conducted a nationwide study of STEM undergraduate research opportunities with over 15,000 respondents. Their results showed that “(88%) of the respondents to the NSF follow up survey reported that their understanding of how to conduct a research project increased a fair amount or a great deal, 83% said their confidence in their research skills increased, and 73% said their awareness of what graduate school is like increased” as well as 29% reporting that they

had new expectations for pursuing a PhD (9). This increased confidence and awareness of scientific process elevates their potential success in future careers.

## COURSE-BASED UNDERGRADUATE RESEARCH EXPERIENCES

What is CURE? CURE is defined as course-based undergraduate research experiences. They are designed to incorporate an entire classroom of students on a research topic within the course-work itself, allowing an increasing amount of students to participate in gaining experience working on research related to their field of study (2). Course-based opportunities allow institutions to provide research experience to underrepresented minorities, first generation, and at-risk students which has been found to improve retention rates in these groups significantly (7). According to the Course-Based Undergraduate Research Experience Network (CUREnet), an organization founded in 2012 to better understand the benefits and potential roadblocks to CUREs, there are five elements that must be present to enhance student learning: the use of scientific practices, discovery of knowledge previously unknown to the student and often the faculty member, work that was relevant or important to the field of study, collaboration amongst students and faculty, and iteration of the research conducted (3). CURE has been implemented across the country with positive results. The Genomics Education Partnership (GEP) has created a structure of nearly 100 universities in the United States to provide students a unique way to explore the field of genetic research. Students worked on sequencing the genome of the *Drosophila*, commonly known as the fruit fly. As a result of their work, more than 100 students and faculty have become coauthors on a paper that compares the F element of four species of fruit fly (8). CUREs can also come in the form of field research, such as is the case in a program started by the University of Minnesota which sought to provide students interested in ecology, animal behavior, and

aquatic biology with an opportunity for hands-on work within a course-based curriculum (9). The five-week summer course resulted in positive feedback from the students and high-quality written reports that they will be able to use for future research and publication.

## WHAT IS *FINE FOCUS*?

**Scope:** *Fine Focus* is a digital and print journal dedicated to showcasing the research of undergraduate students, internationally, in all fields of microbiology. *Fine Focus* is managed entirely by undergraduate students from production to print and coordinates double-blind peer reviews by our Editorial Board of experts from all subdisciplines of microbiology.

**Mission:** *Fine Focus* publishes original research by undergraduate students in microbiology. This includes works in all microbiological specialties and microbiology education. Research in other biology disciplines will not be accepted unless the main emphasis of the work centers on microorganism(s).

**At a Glance:** *Fine Focus* is comprised of 10–20 undergraduate Ball State University students under the direction of the faculty advisor, Dr. John McKillip. Each semester, the students serve as managing editors for the manuscripts that are submitted via the Open Journal System (OJS). The journal is managed entirely by undergraduate students from production to print, but utilizes an external editorial board of experts for double-blind peer review of manuscripts. Submission of manuscripts to *Fine Focus* is free and acceptance into the journal carries no page charges, indicating that it qualifies as an Open Access journal. Those who wish to read the journal or select manuscripts are able to receive free paper copies in the mail or access the material for free online at [finefocus.org](http://finefocus.org). Manuscripts that are published in *Fine Focus* are indexed and searchable through Cardinal Scholar, Ball State's online institutional repository for scholarly works contributed by students and faculty.

## META-ANALYSIS

For this project, we focused on the data that has been collected on each manuscript submitted to *Fine Focus*, which included the author's names, what institution they were submitting from, the time between decisions, and a list of decisions that had been made for each manuscript. We also took time to look at the composition of each journal issue. This allowed us to dissect the information into quantifiable points that showed the progress of the journal. These points included: acceptance vs. rejection rate, international submission numbers, location of international submissions, and the composition of each journal (page numbers and manuscript type). The graphs below show the results of this analysis:

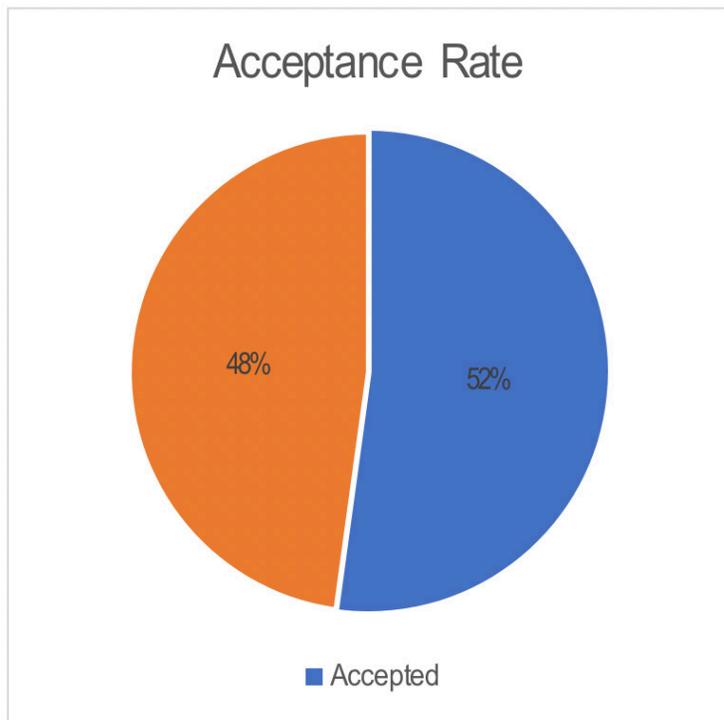


Figure 1: Acceptance rate of the *Fine Focus* journal from Issue 1 to current issue.

The acceptance rate was found to be 52%. There were no concerns with the current percentage. This number will be used to track future progress of the journal and can be used to market to potential authors who wish to publish.

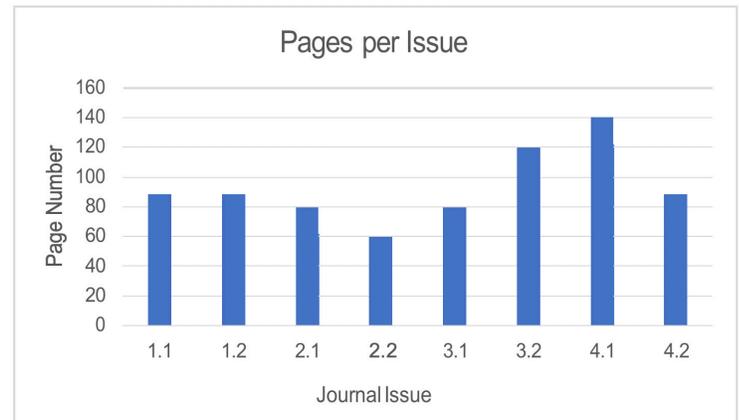


Figure 2: Number of pages for each issue of the journal.

The number of pages per issue have varied significantly from issue to issue. The average number of pages was roughly 94, with the lowest number of pages being issue 2.2 with 62 pages and the highest being issue 4.1 with 143 pages. Based on these numbers, we can suggest that if the journal were to move from publishing twice a year to just once a year, the number of pages would need to stay relatively high to ensure the quality and number of manuscripts is not sacrificed.

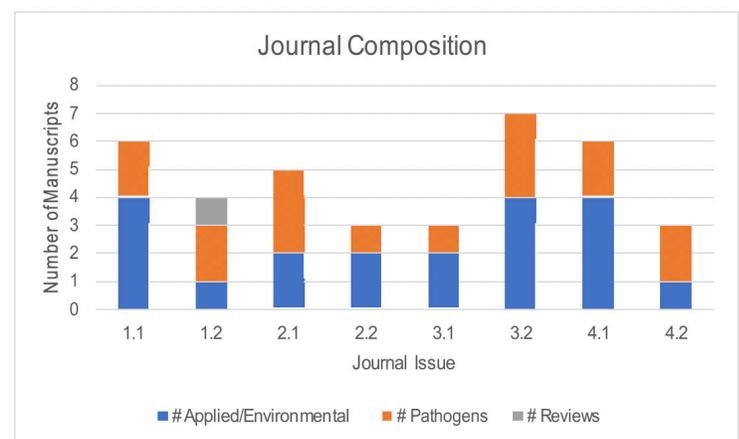


Figure 3: Composition of each journal issue based on type of manuscript published.

The graph above shows the composition of each journal based on the type of manuscript that was accepted and published in that issue. Manuscripts for *Fine Focus* tend to fall into two categories: applied/environmental and work conducted on pathogens. The journal also accepts reviews on topics related to microbiology as well as manuscripts on microbiology education. In the past, the journal has only accepted one review that

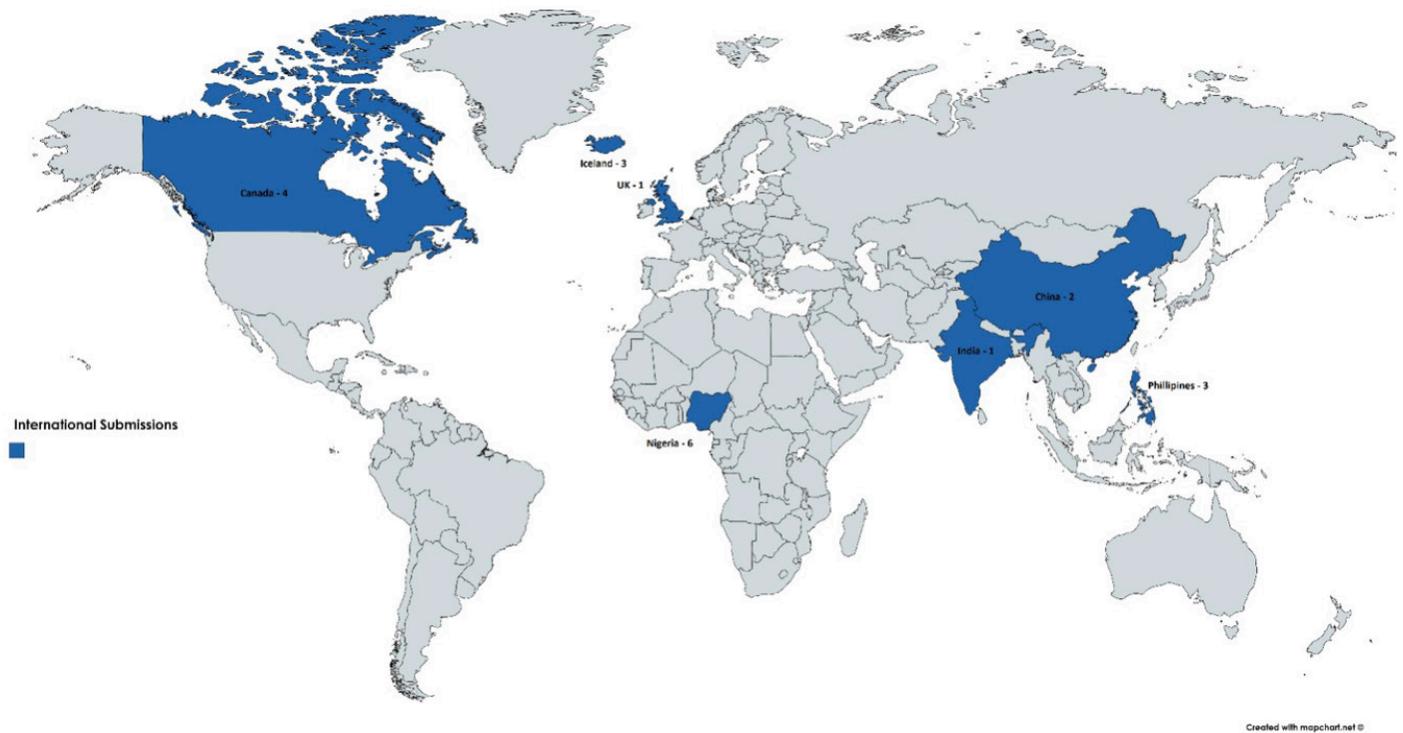


Figure 5: Map showing the location of each international submission received by the journal.

matched the standards of the journal. The recent issue showed a decrease in manuscripts published in the applied/environmental category. In the future, the journal hopes to increase this number by focusing efforts to encourage students and institutions that are working on research in this category to publish their work in the journal.

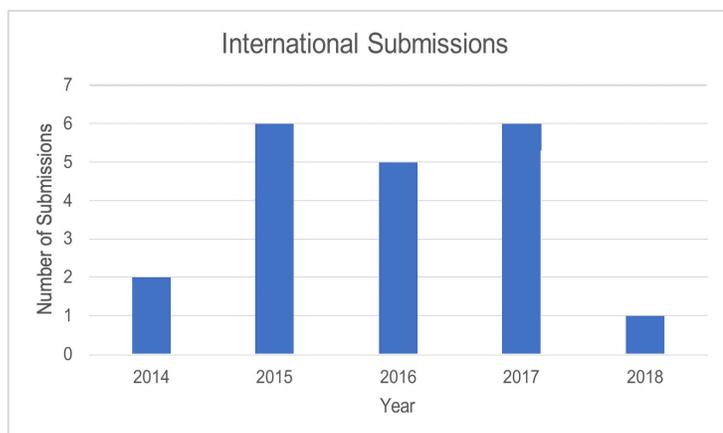


Figure 4: Number of international submissions by year.

*Fine Focus* is an international journal that not only has external reviewers from nine countries but features manuscripts from all over the world. Recently, we have seen a sharp decrease in international submissions with the reason being unknown. The class of students that manage the journal have begun a program called CAP, the Campus Ambassador Program, that is seeking to establish satellite groups of students at other universities that would encourage their fellow students and faculty to submit their research to *Fine Focus*.

The map above shows the distribution of international submissions that have been received by the journal from 2014–2018. The hope is to further the reach of the journal and encourage more countries to submit their research. To reach seven countries in four years is still significant and shows that the journal is a viable choice when undergraduates from across the world want an established journal to showcase their work.

<b>Name</b>	<b>Discipline</b>	<b>Free to publish?</b>	<b>Free to access?</b>	<b>Indexed and Searchable?</b>	<b>Undergrads involved in review?</b>
Advanced Journal of Graduate Research	STEM	✓	✓	✓	-
AnthroJournal	Anthropology	✓	✓	✓	
Berkeley Scientific Journal	STEM	-	✓	✓	✓
Bios+2:25	Biology	✓		✓	
Caltech Undergraduate Research Journal	STEM	-	✓		✓
Catalyst: Rice Undergraduate Science & Engineering Review	STEM	✓	✓		✓
Columbia Undergraduate Science Journal (CUSJ)	STEM	✓	✓	✓	✓
Dartmouth Undergraduate Journal of Science	STEM	✓	✓	✓	✓
DePaul Discoveries	Science and Health	✓	✓	✓	✓
Eastern Oregon University Science Journal	STEM	-	✓		
EvoS	Evolution	✓	✓	✓	✓
Illumin	STEM	-	✓		✓
Impulse	Neuroscience	✓	✓	✓	✓
International Journal for Undergraduate Research - Science, Engineering & Technology (IJUR-SET)	STEM		✓	✓	

International Journal of Exercise Science	Exercise Science	-	✓	✓	✓
Involve - A Journal of Mathematics	Mathematics	-	✓	✓	✓
Journal of Experimental Microbiology and Immunology (JEMI)	Microbiology, Immunology	-	✓		✓
Journal of Science and Health at The University of Alabama (JOSHUA)	STEM	✓	✓		✓
Journal of Undergraduate Chemistry Research	Chemistry		✓	✓	-
Journal of Undergraduate Research in Physics	Physics	-	✓		
Journal of Undergraduate Sciences	STEM		✓		✓
Journal of Young Investigators	STEM	-	✓	✓	✓
MarSci	Marine and Aquatic Science	-	✓		✓
Missouri Journal of Mathematical Science	Mathematics		✓	✓	
MIT Undergraduate Research Journal	STEM		✓		
National Undergraduate Research Clearinghouse	STEM		✓		
Penn Bioethics Journal	Bioethics	-	✓		✓

PUMP Journal of Undergraduate Research	Mathematics		✓	✓	
Rose-Hulman Undergraduate Mathematics Journal	Mathematics		✓		✓
RURALS: Review of Undergraduate Research in Agricultural and Life Sciences	Agriculture, Life Sciences	-	✓	✓	
Saltman Quarterly	STEM		✓		✓
Scientia	STEM		✓		
SPORA - A Journal of Biomathematics	Biology, Mathematics		✓	✓	
The Catalyst	Bioengineering, Biotechnology				✓
The Graduate Journal of Mathematics	Mathematics			-	

The chart above shows information on other undergraduate research journals in the STEM fields. All the criteria is based on elements that *Fine Focus* is able to offer to its authors and readers. Checkmarks represent characteristics which the journal shares with *Fine Focus* while empty spaces represent unshared characteristics. A dash (-) represents information that was unable to be obtained from the websites of each of the journals. Most information was collected directly from the respective websites that each journal maintained as emails requesting clarifications were mostly left without answer. The chart demonstrates how *Fine Focus* fits within the established realm of undergraduate research journals and can help potential authors understand what the journal has to offer.

## THE FUTURE

The future of *Fine Focus* is vibrant and powerful. *Fine Focus* was the first international journal specifically for undergraduates that wish to publish work related to microbiology. According to the Bureau of Labor Statistics, demand for microbiologists will increase by 8% between now and 2026 (11). With the growing demand for hardworking and dedicated researchers, publishing early and often has never been more important. As the journal continues to grow and develop, we hope to see an increase in submission overall as well as those from diverse countries. The class structure of the journal allows for new students to experience the publishing process, gaining a perspective on what happens to a manuscript that has been submitted for review. Not only are students able to work together to achieve a common goal of managing the journal from start to finish, they are able to gain a better understanding of what it will take to have their own research published in the future. The hope for this research is to inform the students that manage the journal semester to semester, as well as the Executive Committee, on how the journal should proceed in the future.

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