SOUTHERN ILLINOIS UNIVERSITY EDWARDSVILLE

Excellence in Undergraduate Education (EUE) Proposal

Project ID# (*leave blank*)

25-06

Project Title

A Classroom Response System for Student Engagement, Active Learning, and Real-time Intervention in CHEM 121A/B

Project Director	ID Number	Telephone	Email
Thomas C. Holovics	800390710	650-2589	tholovi@siue.edu

Department	Campus Box	School College
Chemistry	1652	College of Arts and Sciences

Course or Program

CHEM 121A General Chemistry I and CHEM 121B General Chemistry II

Project Co-Director	ID	Department	Email

Student Impact:	~650 students/year

Priority Rating (If Submitting Multiple Proposals):	

Project Budget

Salary	Wages	Travel	Equip.	Comm	CServ	Auto	Tele	Awards	Total
5528	1400								6928

Cost-Sharing

Salary	Wages	Travel	Equip.	Comm	CServ	Auto	Tele	Awards	Total
		1000							1000

Prior EUE Support

Project Director	Project Number	Award Amount	Project Dates
None in the past 5 years.			

Applicable 2024-2025 Priorities (*check all your proposal fits, if any*):

- ☑ Course redesign project that uses inclusive, student-centered pedagogies to address equity gaps, improve student learning outcomes, & enhance retention
- ☑ Project involves courses that have high number of sections, a high ratio of D/F/W grades, or key required courses with high enrollments and opportunities to improve equitable student success

Project Summary

General Chemistry (CHEM 121A and CHEM 121B) is a two-semester general chemistry sequence for science majors. These lecture-based courses have large enrollments (~250 students in 121A and ~100 students in 121B each Fall and ~150 students in 121A and ~150 students in 121B each Spring) and typically have high DFW rates, sometimes greater than 30%. This situation is not unique to SIUE, and chemical educators everywhere have tried a variety of strategies to help students succeed in chemistry.[1] To address this concern, the SIUE Department of Chemistry already employs several inclusive, student-centered pedagogies in CHEM 121A/B: Supplemental instruction (SI),[2] peer led team learning (PLTL),[3–10] online homework problem sets,[11–13] and low-stakes quizzing.[14]

An additional tool that has shown great promise is the classroom response system (CRS).[15–25] A CRS uses software running on electronic mobile devices (laptop computers, tablets, and smart phones) to provide continuous feedback from students to the lecturer. The CRS replaces traditional feedback methods such as show of hands, coded cards (flash cards), and dedicated electronic devices (clickers), and has the advantages that it allows numerical answers, provides detailed tracking of student participation, and gives the instructor the ability to completely change the direction of instruction based on student performance on a problem worked in real-time. The CRS that is provided (free) with the current CHEM 121A/B Pearson textbook is *Learning Catalytics*.[26]

Tom Holovics has taught the CHEM 121A/B sequence for many years, and has developed extensive student resources (PLTL workshop materials and a detailed course pack) that are specifically tailored to these SIUE general chemistry courses. This Excellence in Undergraduate Education (EUE) proposal requests funds for the development and implementation of in-class CRS resources for CHEM 121A/B. EUE funds will be used to

support Tom Holovics for one month in Summer 2024 to write CRS problems aligned to the CHEM 121A/B curriculum, and to pay an undergraduate worker to attend CHEM 121A lectures in Fall 2024 and CHEM 121B lectures in Spring 2025 at least two days per week (and other times as needed) and to assist Holovics in implementing and assessing the impact of the CRS. The overall goals of this project are to address equity gaps, improve student learning outcomes, and enhance retention of students in CHEM 121A/B.

Proposal Narrative

a. Current Situation:

First and second year chemistry courses are very challenging to students everywhere, and the discontinuation of the use of standardized test scores for placement into these courses at SIUE has led to an increased number of underprepared students enrolled in them. Also, after COVID there seem to be more students who fail to engage in courses, sometimes to the point of never attending class or completing any online assignments. One consequence is high DFW rates in CHEM 113, CHEM 121A, CHEM 121B, and CHEM 241A. This situation is not unique to SIUE, and chemical educators have tried a variety of strategies to help students succeed in chemistry.[1] To address this concern, the SIUE Department of Chemistry already employs several inclusive, student-centered pedagogies: Supplemental instruction (SI),[2] peer led team learning (PLTL),[3–10] online homework problem sets,[11-13] and low-stakes quizzing.[14]

General Chemistry I (CHEM 121A) is a first-semester general chemistry course for science majors. This lecture-based course has large enrollments (~250 students each Fall and ~150 students each Spring) and has DFW rates that sometimes exceed 30%. The second-semester general chemistry course, General Chemistry II (CHEM 121B) also has large enrollments (~100 students each Fall and ~150 students each Spring). Tom Holovics has taught the CHEM 121A/B sequence for many years, and has developed extensive student resources

(PLTL workshop materials and a detailed course pack) that are specifically tailored to these SIUE general chemistry courses. It is estimated that 650 undergraduate students per year will be affected by this project upon implementation.

Learning Catalytics[26] is an interactive student response tool (also called a classroom response system or CRS)[15–25] that encourages team-based learning by using students' smart phones, tablets, or laptops to engage them in interactive tasks and thinking. *Learning Catalytics* features open-ended, multiple-choice, and image upload questions that encourage collaboration among students for team-based and group learning. It also enables instructors to monitor student responses and keep tabs on how well students understand what is being taught and discussed. If a topic has low understanding by students, faculty (having the immediate in-class feedback) will be able to offer immediate intervention to help aid students with their knowledge retention. This will also hold students accountable for not only attending lecture, but also keeping up with understanding the concepts that are being discussed. In a large classroom it may be easier for students to feel detached or distracted and hopefully this will help students feel more "connected". As an instructor, you can also pose a variety of open-ended questions that help your students develop critical thinking skills, while monitoring responses with real-time analytics to find out where they're struggling. With this information, you can adjust your instructional strategy in real time and try additional ways of engaging your students during class. *Learning Catalytics* also lets you manage student interactions by automatically grouping students for discussion, team-based learning, and peer-to-peer learning. *Learning Catalytics* is included with the course textbook materials at no additional cost, and the developed questions can be used from year-to-year so this project is sustainable after termination of the EUE grant.

b. Proposed Project:

This Excellence in Undergraduate Education (EUE) proposal requests funds for the development and implementation of in-class *Learning Catalytics* resources for CHEM 121A and CHEM 121B. EUE funds will be used to support Tom Holovics for one month in Summer 2024 to write *Learning Catalytics* problems aligned to the CHEM 121A/B curriculum, and to pay an undergraduate worker to attend CHEM 121A lectures in Fall 2024 and CHEM 121B lectures in Spring 2025 at least two days per week (and at other needed times outside of the classroom) to assist Holovics in implementing and assessing the impact of *Learning Catalytics*. The overall goals of this project are to address equity gaps, improve student learning outcomes, and enhance retention of students in CHEM 121A and CHEM 121B.

There are three main areas that this development will make an impact on our general chemistry courses. The first area of improvement is student engagement and involvement. Students will be able to "click in" with a smart device and they will feel connected with the main lecture. This will also promote good attendance with proper commitment to the lesson at hand. The second area that we will focus on is students building knowledge during the lecture so that they will be able to navigate complex chemistry problems on their own. Students will be tasked with up to five questions during the lecture, which will assess how students are keeping up with the new concepts and problems that are being introduced. This should also maintain some impact on how students are gaining their new knowledge. The third aspect will be faculty intervention. The big advantage of real-time data on how students are understanding the material is a very valuable piece of information. Students also have the ability to mark "this topic is not clear to me". Being armed with this data, instructors can try to go over a difficult topic again and try to intervene when student understanding is low. This will also give instructors another aspect to trigger advanced warning systems for students that are consistently struggling with the

material. This way these students can be presented with new avenues for help (examples are supplemental instruction, tutoring, and faculty office hours).

During a small pilot study in CHEM 121B in Spring 2024, we have been learning how to utilize *Learning Catalytics* through Pearson. Within this tool students can answer questions and hit a button when they are confused about a particular topic. This can give the instructor immediate feedback about when students are confused, and they do not have to overcome the barrier of asking a question in a 250+ person lecture. During this limited trial we have observed an increase in attendance. We tracked a very preliminary increase from around 85% attendance in the first few weeks to up to 95% attendance at the halfway point in the semester. The ability to reinforce unclear topics has also shown to increase results on exams and assessments (albeit a small sample size).

In Fall 2024 we plan to build and implement the infrastructure to roll out a full trial of *Learning Catalytics* for General Chemistry I (CHEM 121A). In Spring 2025 we plan to continue use of *Learning Catalytics* for General Chemistry II (CHEM 121B). This will involve creating a large pool of specifically designed questions aimed to help students be successful in this scholarship. This pool needs to correlate well with the previously implemented structure of general chemistry. We also will require the support of an undergraduate student worker to facilitate the seamless integration of this methodology in the large 250+ student classroom.

c. Evaluation and Dissemination

We plan to assess the success of *Learning Catalytics* by comparing CHEM 121A student retention in Fall 2024 to Fall 2023 (the control population before implementation). We feel that the addition of faculty intervention with the reinforcement of difficult student concepts will be a major factor in increasing retention. We also plan to use interventions when we identify students

that are lacking course engagement. We hope to use much earlier flag systems to try and correct behavior that is detrimental to success. We also plan to use student surveys to gauge the effectiveness of the *Learning Catalytics* program.

The project director and/or the student researcher will disseminate project results externally to other chemical educators at an American Chemical Society regional or national meeting after completion of the project.

Budget and Budget Justification

Salary:	1 month faculty salary, Summer 24	$5,528
Student Wages:	$14/hour x 50 hours/semester, Fall 24, Spring 25	$1,400
	Total	**$6,928**

Cost Sharing

Travel:	Dissemination at regional or national meeting	$1,000

The requested funds are to support one faculty member and one undergraduate student worker to complete the activities described in the Proposal Narrative. The faculty salary line is for one month of Summer 2024 support for project director Tom Holovics. The student wages are based on 50 hours of support per semester in Fall 2024 and Spring 2025 for a chemistry undergraduate student at the prevailing wage for undergraduate teaching assistants.

The Department of Chemistry is providing cost sharing of $1,000 for the project director and/or the student researcher to travel to a regional or national meeting to disseminate project results.

References

1. Vyas, V. S.; Reid, S. A. What Moves the Needle on DFW Rates and Student Success in General Chemistry? A Quarter-Century Perspective. *J. Chem. Educ.* **2023**, *100*, 1547−1556.
2. Anfuso, C.; Awong-Taylor, J.; Savage, J. C.; Johnson, C.; Leader, T.; Pinzon, K.; Shepler, B.; Achat-Mendes, C. Investigating the Impact of Peer Supplemental Instruction on Underprepared and Historically Underserved Students in Introductory STEM Courses. Internat. *J. STEM Educ.* **2022**, *9* (55), 1–17.
3. Gosser, D. K.; Roth, V. The Workshop Chemistry Project: Peer-led Team Learning *J. Chem. Educ.* **1998**, *75*, 185.
4. Woodward, A.; Gosser, D. K.; Weiner, M. Problem Solving Workshops in General Chemistry *J. Chem. Educ.* **1993**, *70*, 651.
5. Gosser, D. K.; Cracolice, M.; Kampmeier, J. A.; Roth, V.; Strozak, V. S.; Varma-Nelson, P. Peer-led Team Learning: A Guidebook; Prentice Hall: Upper Saddle River, NJ, 2001.
6. Gafney, L.; Varma-Nelson, P. Peer-Led Team Learning: Evaluation, Dissemination, and Institutionalization of a College Level Initiative; Springer Science: Dordrecht, 2008.
7. Lewis, S.; Lewis, J. E. Departing from Lectures: A Peer-led Guided Inquiry Alternative *J. Chem. Educ.* **2005**, *82*, 135-139.
8. Wamser, C. C. Peer-led Team Learning in Organic Chemistry: Effects on Student Performance, Success, and Persistence in the Course *J. Chem. Educ.* **2006**, *83*, 1562-1566.
9. Hockings, S. C.; DeAngelis, K. J.; Frey, R. F. Peer-led Team Learning in General Chemistry: Implementation and Evaluation *J. Chem. Educ.* **2008**, *85*, 990-996.
10. Lyon, D. C.; Lagowski, J. J. Effectiveness of Small-Group Learning in a Large Lecture Class *J. Chem. Educ.* **2008**, *85*, 1571-1576.
11. Arasasingham, R. D.; Martorell, I.; McIntire, T. M. Online Homework and Student Achievement in a Large Enrollment Introductory Science Course. *Journal of College Science Teaching* **2011**, *40* (5), 70−79.
12. Cole, R. S.; Todd, J. B. Effects of Web-based Multimedia Homework with Immediate Rich Feedback on Student Learning in General Chemistry. *J. Chem. Educ.* **2003**, *80* (11), 1338−1343.
13. Eichler, J. F.; Peeples, J. Online Homework Put to the Test: A Report on the Impact of Two Online Learning Systems on Student Performance in General Chemistry. *J. Chem. Educ.* **2013**, *90* (9), 1137−1143.
14. Theobald, E. J.; Hill, M. J.; Tran, E.; Agrawal, S.; Arroyo, E. N.; Behling, S.; Chambwe, N.; Cintrón, D. L.; Cooper, J. D.; Dunster, G.; Grummer, J. A.; Hennessey, K.; Hsiao, J.; Iranon, N.; Jones, L., II; Jordt, H.; Keller, M.; Lacey, M. E.; Littlefield, C. E.; Lowe, A.; Newman, S.; Okolo, V.; Olroyd, S.; Peecook, B. R.; Pickett, S. B.; Slager, D. L.; Caviedes-Solis, I. W.; Stanchak, K. E.; Sundaravardan, V.; Valdebenito, C.; Williams, C. R.; Zinsli, K.; Freeman, S. Active Learning Narrows Achievement Gaps for Underrepresented Students in Undergraduate Science, Technology, Engineering, and Math. *PNAS* **2020**, *117* (12), 6476–6483.

15. Moredich, C.; Moore, E. Engaging Students Through the Use of Classroom Response Systems. *Nurs. Educ.* **2007**, *32* (3), 113−116.
16. MacArthur, J. R.; Jones, L. L. A Review of Literature Reports of Clickers Applicable to College Chemistry Classrooms. *Chem. Educ Res. Pract*. **2008**, *9* (3), 187−195.
17. Freed, J. E. Teaching with Classroom Response Systems: Creating Active Learning Environments. *Rev. High. Educ.* **2009**, *33* (2), 288−289.
18. Towns, M. H. Crossing the Chasm with Classroom Response Systems. *J. Chem. Educ.* **2010**, *87* (12), 1317−1319.
19. Emenike, M. E.; Holme, T. A. Classroom Response Systems Have Not "Crossed the Chasm": Estimating Numbers of Chemistry Faculty Who Use Clickers. *J. Chem. Educ.* **2012**, *89* (4), 465−469.
20. Vital, F. Creating a Positive Learning Environment with the Use of Clickers in a High School Chemistry Classroom. *J. Chem. Educ.* **2012**, *89* (4), 470−473.
21. Murphy, K. Using a Personal Response System to Map Cognitive Efficiency and Gain Insight into a Proposed Learning Progression in Preparatory Chemistry. *J. Chem. Educ.* **2012**, *89* (10), 1229−1235.
22. Sutherlin, A. L.; Sutherlin, G. R.; Akpanudo, U. M. The Effect of Clickers in University Science Courses. *Journal of Science Education and Technology* **2013**, 22 (5), 651−666.
23. Morrison, R. W.; Caughran, J. A.; Sauers, A. L. Classroom Response Systems for Implementing Interactive Inquiry in Large Organic Chemistry Classes. *J. Chem. Educ.* **2014**, *91* (11), 1838−1844.
24. Gibbons, R. E.; Laga, E. E.; Leon, J.; Villafane, S. M.; Stains, M.; Murphy, K.; Raker, J. R. Chasm Crossed? Clicker Use in Postsecondary Chemistry Education. *J. Chem. Educ.* **2017**, *94* (5), 549−557.
25. Schwartz, G. Interface Model and Implementation Framework for Classroom Response Systems. *J. Chem. Educ.* **2021**, *98*, 2122−2127.
26. https://www.pearson.com/en-us/higher-education/products-services/learning-catalytics.html.

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Curriculum Vitae

Thomas C. Holovics

833 Glencorse Dr.
St. Peters, Mo, 63304
Cell: (636) 284-0490
Work: (618) 650-2589

Education:

- PhD in Chemistry, the University of Kansas (09/2006)
  Concentration areas: Synthetic Inorganic / Organometallic Chemistry
  Dissertation Title: Low-Valent Coordination Chemistry of Nonbenzeniod Isocyanides, a New Class of Aromatic Isocyanide Ligands
- B.S. in Chemistry with minor Mathematics, Niagara University (2001)

Research Experience:

- Postdoctoral Research Associate, the University of Kansas
  Research advisor: Prof. Mikhail V. Barybin (09/2006 - 05/2007)
- Graduate Research Assistant, the University of Kansas
  Research advisor: Prof. Mikhail V. Barybin (06/2002 - 08/2006)
- Undergraduate Research Assistant, Niagara University
  Research advisor: Prof. Joseph Krause NU (Spring 2001)
- Undergraduate Research Assistant, the University of Kansas
  Research advisor: Prof. Brian Laird KU (Summer 2000)

Teaching/Mentoring Experience:

- Instructor Tier II, undergraduate general chemistry I & II, general chemistry laboratory I & II, general organic and biochemistry and engineering chemistry, SIUE (Fall 2007-present)
- Instructor, undergraduate advanced inorganic chemistry lab, KU (Spring 2007)
- Head Graduate Teaching Assistant, undergraduate organic lab, KU (Summer 2005)
- Graduate Teaching Assistant, general, organic and advanced inorganic chemistry lab, KU (2001-2007)
- Graduate Student Mentor for:
  Tiffany Maher (2004)
  David McGinnis (2006)
- Undergraduate Student Mentor for:
  Ryan L. Shook (2003)
  Alexandre S. Vorouchilov (2004)
  Edward C. Wientrob (2005)

Awards/Scholarships/Recognitions:

- The Ernest and Marvel Griswold Award for outstanding graduate research in Inorganic Chemistry, KU (2005)
- The Reynold T. Iwamoto Scholarship for outstanding academic performance KU (2004)
- Cornelius Armstrong and Martha Kidwell McCollum for excellence in research, KU (2003)
- Chemistry Graduate Student Organization President, KU (2002)
- Bailey Scholarship, KU (2001-2002)
- NSF REU Summer Fellowship Award, KU (2000)
- Niagara University Presidential Scholarship, NU (1997-2001)
- Graduated Cum Laude, NU (2001)

Publications:

(1) Toriyama, M.; Maher, T. R.; Holovics, T. C.; Vanka, K.; Day, V. W.; Berrie, C. L.; Thompson, W. H.; Barybin, M. V." Multipoint Anchoring of the [2.2.2.2] Metacyclophane Motif to a Gold Surface via Self-Assembly: Coordination Chemistry of a Cyclic Tetraisocyanide Revisited,". *Inorganic Chemistry*,**2008,** 47, 3284-3291.

(2) Holovics, T. C.; Robinson, R. E.; Weintrob, E. C.; Toriyama, M.; Lushington, G. H.; Barybin, M. V. "The2,6-Diisocyanoazulene Motif: Synthesis and Efficient Mono- and Heterobimetallic Complexation with Controlled Orientation of the Azulenic Dipole". *J. Am. Chem. Soc.* **2006**, *128(7),* 2300-2309.

(3) DuBose, D. L.; Robinson, R. E.; Holovics, T. C.; Moody, D. R.; Weintrob, E. C.; Berrie, C. L.; Barybin, M. V. "Interaction of Mono- and Diisocyanoazulenes with Gold Surfaces: First Examples of Self-Assembled Monolayer Films Involving Azulenic Scaffolds". *Langmuir*; **2006**, *22(10),* 4599-4606.

(4) Robinson, R. E.; Holovics, T. C.; Deplazes, S. F.; Powell, D. R.; Lushington, G. H.; Thompson, W. H.; Barybin, M. V. "Five Possible Isocyanoazulenes and Electron-Rich Complexes Thereof: A Quantitative Organometallic Approach for Probing Electronic Inhomogeneity of the Azulenic Framework". *Organometallics,* **2005**, *24(10),* 2386-2397.

(5) Barybin, M. V.; Chisholm, M. H.; Dalal, N. S.; Holovics, T. H.; Patmore, N. J.; Robinson, R. E.; Zipse, D. J. "Long-Range Electronic Coupling of MM Quadruple Bonds (M = Mo or W) via a 2,6-Azulenedicarboxylate Bridge". *J. Am. Chem. Soc,* **2005**, *127(43),* 15182-15190.

(6) Holovics, T. C.; Deplazes, S. F.; Toriyama, M.; Powell, D. R.; Lushington, G. H.; Barybin, M. V."Organometallic Isocyanocyclopentadienides: A Combined Synthetic, Spectroscopic, Structural, Electrochemical, and Theoretical Investigation". *Organometallics,* **2004**, *23(12),* 2927-2938.

(7) Robinson, R. E.; Holovics, T. C.; Deplazes, S. F.; Lushington, G. H.; Powell, D. R.; Barybin, M. V. "First Isocyanoazulene and Its Homoleptic Complexes". *J. Am. Chem. Soc.* **2003**, *125(15),* 4432-4433.

(8) Barybin, M. V.; Holovics, T. C.; Deplazes, S. F.; Lushington, G. H.; Powell, D. R.; Toriyama, M. "First Homoleptic Complexes of Isocyanoferrocene". *J. Am. Chem. Soc,* **2002,** *124(46),* 13668-13669.

Selected Presentations:

(1) Holovics, T. C.; Robinson, R. E.; Barybin, M. V. "Controlling mono- and dinuclear complexation of the 2,6-diisocyanoazulene motif". *231st ACS National Meeting, Atlanta, GA,* **2006**

(2) Holovics, T. C.; Robinson, R. E.; Weintrob, E.; Barybin, M. V. "The 2,6-Diisocyanoazulene Motif: Synthesis and Efficient Mono- and Heterobimetallic Complexation with Controlled Orientation of the Azulenic Dipole". *40th Midwest Regional Meeting of the American Chemical Society, Joplin, MO,* **2005**

(3) Holovics, T. C.; Barybin, M. V.; "Toriyama, M. Organometallic isocyanocyclopentadienides: New opportunities in the chemistry of organic isocyanides". *227th ACS National Meeting, Anaheim, CA,* **2004**

(4) Deplazes, S. F.; Holovics, T. C.; Barybin, M. V. "First Planar-Chiral Isocyanides". *39th Midwest Regional Meeting of the American Chemical Society, Manhattan, KS,* **2004**

(5) Holovics, T. C.; Barybin, M. V. "Isocyanocymantrene and isocyanofferocene: A combined synthetic, spectroscopic structural, and theoretical investigation". *38th Midwest Regional Meeting of the American Chemical Society, Columbia, MO,* **2003**

(6) Holovics, T. C.; Deplazes, S. F.; Barybin, M. V. "Multinuclear NMR and electrochemical studies of $[Cr(CNR)_6]^{0,1+,2+}$ (R = ferrocenyl, 2-azulenyl, 6-azulenyl) and related complexes". *225th ACS National Meeting, New Orleans, LA,* **2003**

(7) Holovics, T.C.; Deplazes, S. F.; Powell, D. R.; Lushington, G. H.; Barybin, M. V "First Homoleptic Complexes of Isocyanoferrocene: Probing Spin Delocalization within a Nonbenzenoid Aromatic π-system by Multinuclear NMR". *37th Midwest Regional Meeting of the American Chemical Society, Lawrence, KS,* **2002**

(8) Chlebowski, M.; Holovics, T.C.; Krause, J. G. "Preparation of Modified Cantharidin Analogues to Test for Anticancer Activity". *55th Annual Eastern Colleges Science Conference, Wilkes Barre, PA,* **2001**

SOUTHERN ILLINOIS UNIVERSITY
EDWARDSVILLE

Date: February 26, 2024

To: EUE Review Committee

From: Eric J. Voss, Professor and Chair of the Department of Chemistry

Re: Letter of Support for EUE Project from Thomas Holovics

I strongly support the EUE proposal submitted by Dr. Thomas Holovics, "A Classroom Response System for Student Engagement, Active Learning, and Real-time Intervention in CHEM 121A/B". If funded, the PI and an undergraduate student worker will develop and implement in-class resources for *Learning Catalytics*, the Pearson classroom response system that is available for use in the general chemistry courses CHEM 121A and CHEM 121B. These courses impact about 650 students per year, and this project promises to address equity gaps, improve student learning outcomes, and enhance retention. The project also involves courses that have a high number of sections, a high ratio of D/F/W grades, and high enrollments, with opportunities to improve equitable student success.

The work described is consistent with the funds that are requested, and funding for Dr. Holovics and an undergraduate student worker is reasonable and appropriate. I am confident in the successful development and implementation of the proposed work. The Department of Chemistry is committed to a $1,000 cost share to support travel by the PI and/or student researcher to disseminate results from this project at a regional or national American Chemical Society meeting.

Dr. Eric J. Voss, Department of Chemistry, Southern Illinois University Edwardsville, 618-650-2099, evoss@siue.edu

SOUTHERN ILLINOIS UNIVERSITY
EDWARDSVILLE

Date: February 29, 2024

From: Kevin Leonard, Dean, College of Arts and Sciences 

Subject: EUE Dean Memo of Support

The College of Arts and Sciences supports the application of Dr. Thomas Holovics for an EUE grant for expanded implementation of new learning technology into two Chemistry courses that have had historically high DFW rates, General Chemistry I (CHEM 121A) and General Chemistry II (CHEM 121B). The department has already engaged in a small pilot study of the new tool, *Learning Catalytics*, and has seen a significant increase in student attendance and engagement. The EUE grant would enable Dr. Holovics to expand the number of students who are served by this pedagogical tool. As such, this project contributes to student success initiatives on campus and supports EUE priorities.

The budget includes faculty salary over the summer to develop the content and assessment questions needed to enhance student engagement and assess student learning in the classroom. Given the size of these courses (250+ students), the budget also includes wages for a student worker to support the integration of the technology into classes in the Fall 2024 and Spring 2025 semesters. The department has also agreed to provide cost share for travel so that the results of this expanded pilot project can be disseminated at a national conference.

College of Arts and Sciences
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Chemistry	1652	College of Arts and Sciences

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CHEM 121A General Chemistry I and CHEM 121B General Chemistry II

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- ☑ Project involves courses that have high number of sections, a high ratio of D/F/W grades, or those key required courses with high enrollments and opportunities to improve equitable student success.

Title: Environmental Equity: Integrating Justice and Inclusivity into *Principles of Environmental Science*

Summary

The goal of this project is to continue to bring in additional mechanisms for inclusive practices and environmental justice themes to a primarily online course: *ENSC 220-Principles of Environmental Sciences*. In Spring of 2024, the course began utilizing an Open Educational Resource (OER) textbook and, through that program, a select number of case studies regarding Native Americas were developed. This EUE aims to continue to improve and adjust these efforts in three ways 1) further develop three more Native American case studies, 2) develop five environmental justice case studies, and 3) create guided lecture and reading questions for each of the chapters and 4) develop exam reviews for credit. Each of these added components will provide additional structure to the course so it is more inclusive for the student population.

According to literature regarding inclusive practices in courses, adding structure to a course helps student retention and success (Hogan & Sathy, 2022). The three goals proposed here will help create additional structure in a course that students often struggle with due to its online nature. First, the current textbook does not have any related chapter forms of assessment because it is OER. Therefore, I propose to develop a set of guided lecture questions that will both create structured deadlines so students stay on task, help them prepare for their exams, and be a low stakes assignment that can improve their grade overall. Second, my recent deployment of the OER textbook and the Native American case studies has made it clear that the students enjoy this work and I believe there are at least three more topics in which I can develop three additional case studies. In addition, I would like to add five case studies that expand beyond Indigenous issues into environmental justice issues more generally. And finally, I will develop exam reviews that can be offered for credit to provide additional mechanisms for students to improve their grade.

I include here a request for 3 weeks of summer salary to develop the guided questions, case studies and exam reviews and the purchase of a book for reading in preparation of case studies. In addition, I plan on testing the new case studies with students from my ENSC 220 course from the Fall 2024 throughout the semester to determine if they are successful. I also plan on sharing these methods with fellow faculty so that they might incorporate additional methods of structure as well as case studies in their courses.

This course is required for all ENSC majors and minors and serves many non-majors as a Breadth-Physical Sciences and has an accompanying lab (220L) that students use to fulfill lab requirements. It reaches approximately 100 students per year and is taught every semester. This many not be one of SIUE's most highly enrolled courses, but it is one of the largest course sections in Environmental Sciences and it reaches large groups of non-science students that often require additional supports for success. The course also serves as one of the main mechanisms to draw students into the major and minor.

I. Current Situation

Principles of Environmental Sciences (ENSC 220) has been a long running course that switched primarily to online teaching within the last five years due to the desire of students to complete a course of this nature online. In addition, in Spring 2024 I implemented the use of an Open Educational Resource (OER) textbook for the first time as part of an initiative to decrease textbook costs University wide. I am the primary instructor for the course and we typically see enrollments of 100 students per year. As part of the OER initiative, I evaluated and implemented the textbook *Introduction to Environmental Sciences and Sustainability* (Harris 2023). As part of the OER program I will be reaching out to a handful of students at the end of Spring 2024 to evaluate the OER textbook. In addition, I developed five Native American case studies where students read about a current event regarding a Native American tribe and an environmental issue or topic and then answer reflection questions about the reading materials. The current case studies are as follows:

1) Klallam Olympic Cougar Project: tracking cougar populations due to habitat fragmentation;
2) Navajo Nation Water: Navajo Nation and the effect of water rights and drought;
3) Salmon and dam removals: the politics behind funding to reintroduce salmon and restore salmon habitat in the Columbia River basin;
4) Quinault sea level rise: a tribal town is relocating due to sea level rise;
5) Seminole Everglades: tribe grapples with water quality issues in the Florida Everglades.

ENSC 220 is a required course for all undergraduate Environmental Science majors and minors. In addition, the course serves many non-majors as a Breadth-Physical Sciences and has an accompanying lab (220L) that many students opt to take to fulfill their Experiences-Laboratory requirement. The department currently has approximately 30 majors, a number which has been steadily increasing since 2020 and all of which are required to take the course. In addition, anecdotally, I can say that the course reaches a large number of minoritized students, primarily African American. For this reason, I wish to continue to make the course more accessible and inclusive for students. Given that this is an online course, I believe that

additional structure (Hogan & Sathy, 2022) to a completely online course will help students stay focused, and provide additional assignments within which their grade can be distributed.

This semester I scheduled individual five-minute meetings with all students so I could begin to develop a relationship with them despite the course being online. In many of these meetings, the students expressed excitement around the Native American assignments and project (they will write a two-page paper on a topic of their choosing regarding a tribe). Therefore, I believe further developing case studies will greatly add to the attractiveness of the course.

II. Proposed Project

To further develop the course past the OER goals, I wish to 1) create guided questions for each lecture, 2) create three additional Native American case studies, 3) create five new environmental justice case studies, and 4) create exam reviews that the students can turn in for credit. Each of these objectives will create structure to the course and make the course more inclusive.

Objective 1: Guided Lecture Questions. Because we are utilizing an OER textbook, no chapter questions are provided to use with the textbook. Therefore, I wish to create a set of assignments associated with each of my recorded lectures that helps the students stay on track with lecture watching and chapter reading. There are 14 chapters so I will create assignments associated with at least each chapter, though in some cases, for lengthier chapters, I may create additional comprehension assignments. Assignments will be a mix of multiple choice and short answer and will be designed to prepare students for the exam so that they see examples of questions that are similar to those on the more significant course assessments. These will likely be graded for completion once deployed in the course because a teaching assistant is not provided and I wish to concentrate my grading efforts on the case studies that involve more reflection.

Objective 2 and 3: Case Studies. Through the SIUE OER program I developed five case studies on current events of Native American tribes either dealing with an environmental issue or conducting environmental restoration. I wish to create three additional Native American (NA) case studies and supplement these with other environmental justice (EJ) current event topics. Both the NA and EJ topics will expand the student's current knowledge on not only current environmental events but also how marginalized communities are disproportionately affected by environmental issues. I first implemented Native American environmental topics three semesters ago. That took the form of a short paper the students wrote on a tribe and environmental topic of their choosing. I have received great enthusiasm on this project; students often state that it had not occurred to them that tribes could be affected by their local environment. In one extreme case, a student did not know that tribes still existed. Due to this enthusiasm and clear gap in education, I chose to implement the added case studies in Spring 2024. This EUE funding would allow me to expand the case studies and begin to incorporate other marginalized communities through the EJ case studies.

First, I will read the book *Wildlife Stewardship on Tribal Lands: Our Place Is in Our Soul,* edited by Hoagland and Albert (2023) to brainstorm ideas and prepare to create additional case studies. Because I want students to interact with current news, these case studies consist of reading 1-2 current event articles on the topic and answering 3-5 reflection questions that I have written for them. This not only brings in a current event but also allows them to engage with current event publications. This is the very definition of experiential activity that SIUE uses in undergraduate reports in which students learn by doing, reflect upon the learning, and get feedback while encountering real world problems. These case studies will be graded by me once deployed so I can ensure students are reflecting on the topics. In addition to new case study creation, I will adjust and edit the previous case studies given any new information I have learned from my reading of the Hoagland and Albert book. In addition, the students will not be required to complete all the case studies. For a more flexible and inclusive course, I plan on

allowing the students to choose the case studies they complete. For example, they will be required to complete only eight out of the 13 case studies and can choose those they find most interesting.

Potential case studies are as follows: 1) Dakota Access Pipeline and Standing Rock Sioux, 2) recovery from oil spills (several tribes to choose from); 3) Standing Rock Sioux and restoration of black footed ferret habitat; 4) Ojibwe and their relationship with wild rice; 5) Yup'ik and melting permafrost. Additionally, my aim is to center the environmental justice case studies around brownfield and superfund sites and highlight how they relate to environmental legislation such as the Clean Air and Clean Water Act. While many of these case studies are tragedies, I do intend to highlight areas of success and where tribal nations have played a role in restoration. But, like many environmental topics, the news is not good.

Objective 4: Exam Reviews. To add additional structure to the course, Hogan and Sathy (2022) recommend the use of exam reviews for a grade. This added structure, again, keeps students on track in an online course, gives them additional points for their total grade, and helps prepare them for each exam. The exam reviews will take the form of a list of topics as well as open ended questions posed where students will be asked to explain concepts learned from the course material. Once deployed in the course, these will be graded for completion and not correctness in order to minimize grading. Additional work will be required for these because rather than a list of topics I typically provide on an exam review, I will be formulating questions the students can use to study and prepare.

III. Alignment with EUE emphases

This project will reach at least 100 students each year as a requirement for ENSC majors/minors as well as students taking the course for breadth or lab credit. In addition, it is taught every semester and at times in the summer. While this is not a large number compared to other courses, it is one of the largest enrolled courses in Environmental Sciences and often serves as science credit for non-science majors. Therefore, I have the opportunity to reach a

large number of students beyond a single semester. In addition, it is a science course that incorporates indigenous stories and knowledge which is innovative, inclusive, and as described above, experiential learning. I have taught the course almost every semester since 2013, moved the course online shortly after I began teaching it, and have tried to be innovative throughout. Most recently this was accomplished by moving this course to OER and I hope to continue to make the course more inclusive through this proposed EUE. The methodologies described above allow me to incorporate additional structure into the course so that I can improve student learning outcomes and support students in a completely online course. My hope is that these methods will help address equity gaps by creating more contact with students, adding in additional assessment methods, and walking through primarily freshman in what may be one of their first online courses.

In addition, this EUE aims to create structure for courses to improve student learning and retention. Nationally, approximately one-third of students are first generation (National Center for Education Statistics). In addition, at SIUE as a whole 33.1%, and within the College of Arts and Sciences 38%, are non-white students. This EUE aims to support these students through the proposed activities.

IV. Evaluation and Dissemination Plan

To evaluate the proposed assignments, I will implement them in Fall 2024. Following the first exam, I will distribute a Qualtrics survey asking for student's feedback on the guided lecture questions and exam review so that I can adjust them for student needs before the remainder of the semester. In addition, at the end of the semester I will deploy a Qualtrics survey to ask for feedback on the remainder of the guided questions, exam reviews, and case studies. I will not deploy questions on the case studies with the first survey because the first set of case studies is not due until after Exam 1. Surveys will not be collecting any personal information. Once I have received feedback, I will improve the assignments and share this

information with my department and other professors for those interested in incorporating these methods.

V. Budget and Budget Justification

To complete the guided questions, case studies, exam reviews and surveys, I expect the following hours for each of the associated tasks. This ultimately results in 3 weeks work in the summer and therefore I request 3 weeks of summer salary.

Item	#	Hours (each)	Total Hours/cost
Guided Questions	16 (estimated)	3	48
Case Studies	NA (3), EJ (5)	6	48
Exam Reviews	3	3	9
Qualtrics survey creation and response compiling	2	3	6
Hoagland and Albert book			$60
Total Hours			**111 hours**
Request in summer salary			**3 weeks $6,433.55**
Total $ Request			**$6,493.55**

References

Harris, Emily P. 2023. Introduction to Environmental Sciences and Sustainability. University of West Florida Pressbooks.

Hogan, Kelly A and Sathy, Viji. 2022. Inclusive Teaching: Strategies for Promoting Equity in the College Classroom. West Virginia University Press.

Hoagland, Serra J. and Albert, Steven (eds). 2023. Wildlife Stewardship on Tribal Lands. Johns Hopkins University Press.

National Center for Education Statistics.Parents' Highest Education Level by Race/Ethnicity and Gender. National Postsecondary Student Aid Study: 2016 Undergraduates. U.S. Department of Education. Accessed March 2023.

SIUE. Fact Book 2024 Edition. Institutional Research and Studies. https://www.siue.edu/inrs/factbook/pdf/ FbCurrent.pdf

ADRIANA E. MARTINEZ

Associate Professor
Department of Geography and GIS ⁜ Department of Environmental Sciences
Southern Illinois University Edwardsville ⁜ Edwardsville, Il 62025
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EDUCATION

Doctor of Philosophy, Spring 2013, University of Oregon, Department of Geography; Advisor: Dr. Patricia McDowell
Master of Science, Spring 2008, Texas A&M University, Department of Geography; Advisor: Dr. Anne Chin
Bachelor of Science, Spring 2005, Texas A&M University, Environmental Geosciences, Minor: Earth Sciences

POSITIONS

2019-Present	Associate Professor, Southern Illinois University Edwardsville, Joint Position: Department of Geography and Geographic Information Sciences and Department of Environmental Sciences
2013-2019	Assistant Professor, Southern Illinois University Edwardsville, Joint Position: Department of Geography and Department of Environmental Sciences

AWARDS AND ACHIEVEMENTS

2023	Elevate the Discipline, American Association of Geographers. (Competitive program designed to enhance skills in policy, advocacy, media, and leadership so the cohort can make significant contributions to the field of geography).
2022-2024	River Scholar, RIVER (River-based ImmersiVe Education & Research) Field Studies Network, Instructor and Curriculum Professional Development Program. (Workshops, field instruction, river field trip to Flagstaff, AZ and San Juan River to practice field methods and safety).
2021-2027	Principal Investigator, At the Confluence: Supporting Critical Transitions for Graduate Students in Sustainable Watersheds Research, National Science Foundation ($1,500,000.00) with Rohan Benjankar, Alan Black, Carol Colaninno-Meeks, and Sharon Locke.

CURRICULUM DEVELOPMENT

2021-2023	"A Youth-Led Citizen Science Network for Community Environmental Assessment: Curriculum for High School Students." Editor: Charlie Blake. Part of Y-City Sci NSF iTEST Grant. Contributed to multiple lessons in five different units on soil, air, and noise pollution.
2019	GEOG 444: Drones for Mapping and Communication. Developed new undergraduate level drones course.
2016-2017	GEOG 417: River Landscapes. Developed new fluvial geomorphology course.
2016	GEOG 418: Geographic Information Systems. Developed new labs using local data for existing course.
2015	GEOG 573: GIS Modeling of the Natural Environment. Developed course for cross listing with ENSC 573.
2015	ENSC 220: Principles of Environmental Science. Developed online course for online administration every semester and in the summer.

SELECTED PEER REVIEWED PUBLICATIONS

2023 **Martinez, Adriana E.** and Martinez, Alejandra O. Inspiring the Next Generation: Teachers in the Field and Scientists in the Classroom. Science Scope. Accepted, in press.
efforts of seasonal wetlands along the Mississippi River," *Conservation and Society*, 17 (1): 73-83.

2018 AP GIS&T Study Group*, "Bridging High School and Introductory Undergraduate Courses in Geographic Information Science and Technology," *Journal of Geography*, 117 (4): 165-173.
*AAG Study Group for AP GIS&T included: Alqvist, O**,** Cassetta, D., Housel, J., Huyn, Niem, Keen, J., Luebbering, C., **Martinez, A.E**., Shultz, R., and Solem, M.

CONFERENCE PARTICIPATION & PRESENTATIONS

2023 **Martinez, Adriana E**. Panel: "Addressing Barriers to Minoritized Scholars' Advancement and Success in Physical Geography Fields," Annual conference of the American Association of Geographers, Denver, CO, March 23-26.

2022 **Martinez, Adriana E.** "SIUE's CAFÉ: BIPOC Inclusion through a Community for Advancing Faculty Equity." AGU Annual Conference. AGU LANDInG Academy invited presentation. Chicago, IL, December 11-16, 2022.

TEACHING EXPERIENCE- Southern Illinois University Edwardsville

Drones for Mapping and Communication, GEOG/ENSC 444, GIS Modeling the Natural Environment, ENSC/GEOG 573, Geographic Information Systems, GEOG 418, River Landscapes, GEOG 417, Geomorphology, GEOG 315, Introduction to Physical Geography, GEOG 210, Environmental Sciences Seminar I, ENSC 505, Environmental Sciences Seminar II, ENSC 506, Principles of Environmental Science, ENSC 220, Applied Research Methods, ENSC 210, Introduction to Physical Geology and Geography, ESCI 111

FACULTY DEVELOPMENT ACTIVITIES - Teaching

2023 "Being and Becoming in the Field: Student Negotiations of Belonging and Identity," RIVER Field Studies Network, January 26th.

2023 "Beneficial Risks: The Evolution of Risk Management for Outdoor and Experiential Education Programs," RIVER Field Studies Network, January 20th.

2022 Inclusive Pedagogy, Continuous Improvement Conference, March 18th

2022 Open Education Resources Workshop, SIUE Center for Faculty Development and Innovation, November 16th.

2022 The Racial Healing Handbook: Practical Activities to Help you Challenge Privilege, Confront Systemic Racism, and Engage in Collective Healing book club, Participant.

2021 Inclusive STEM Teaching Project Course, Inclusive STEM Teaching Project.

2021 Unintended and Hidden Biases Influence Over Faculty Evaluation Practice and Processes, Faculty Development Center, SIUE.

2020 Student Engagement in Synchronous Online Course Delivery, July 22, 2020.

Results from Prior EUE Support

2019: The Future of Mapping Technology: Upgrading to ArcGIS Pro $8,750

We are requesting funding to update the course GEOG 418 Geographic Information Systems to the latest major software change from ArcMap to ArcGIS Pro. Environmental Systems Research Institute (ESRI) is a major company that develops the premier software for mapping known as ArcGIS. Two years ago, ESRI completely overhauled their suite of mapping software and developed the new mapping program known as ArcGIS Pro. This new program is an online-based system for mapping and is significantly different from the ArcMap system previously used. In order to bring students up to date on the latest software and tools within the Arc system, we aim to first learn the new software and then update the associated labs to reflect the new system. By redesigning the course to ArcGIS Pro, we are ensuring that students are learning the latest technology and are completely prepared for the workforce where a growing number of employers are switching to the ArcGIS Pro system. This course is offered every semester and during the summer session. Geographic Information Systems instructs students in basic GIS techniques and tools and serves as the introductory course to a suite of courses in Geospatial Technologies that we offer in Geography. Topics in the course include: vector and raster data, projections, queries, geocoding, GPS, and spatial analysis. In addition, this is a foundational course that serves not only our major, but other SIUE students within engineering and the natural and social sciences. This course is one of three required courses for the GIS minor at SIUE.

Outcomes: We successfully upgraded to the new software and still use it today. Labs were updated and are also still used (in some form) today. This software is still the industry standard and students are prepared for the workforce when they finish the intro course. Now all Geography courses with regard to GIS have updated to the ArcGIS Pro software.

2017: Geospatial Technologies: Going from Global to Local with New Lab Development $8,000

We are requesting funding to develop and improve the labs associated with Geography (GEOG) 418: Geographic Information Systems, a computer based course in which students learn the basics behind map making using ESRI's software ArcMap. This course is offered every semester and during the summer session. Geographic Information Systems instructs students in basic GIS techniques and tools and serves as the introductory course to a suite of courses in Geospatial Technologies that we offer in Geography. Topics include: vector and raster data, projections, queries, geocoding, GPS, and spatial analysis. In addition, this course serves our major and is the prerequisite for many courses required for the GIS minor at SIUE. Throughout the course, students complete approximately 8 lab exercises to become familiar with the software. Current labs are a combination of lab exercises from GIS textbooks and online tutorials. We would like to develop a set of fully independent labs using local geographic data that specifically targets the course and lecture objectives and allows students to hone their writing and presentation skills. Such labs would better prepare students for the GIS workforce, increase familiarity with the local area, increase rigor, expose students to the latest techniques and create a unique course.

Outcomes: A version of these labs are still used today but have been updated to the newer version of the software (see above).

SOUTHERN ILLINOIS UNIVERSITY
EDWARDSVILLE

MEMORANDUM

Date: February 14, 2024

To: Kevin Leonard, Dean of College of Arts and Sciences

From: Nicholas Guehlstorf, Professor and Chair

Subject: Dr. Adriana Martinez's Excellence in Undergraduate Education Grant

Dr. Adriana Martinez of the Department of Environmental Sciences and Geography & GIS has submitted a very encouraging and ambitious internal grant titled, "Environmental Equity: Integrating Justice and Inclusivity into *Principles of Environmental Science."* This brief memo is to summarize my evaluations of the proposal and support her efforts to make the Department more inclusive and technologically robust. Dr. Martinez has invested a great deal of effort in seeking teaching-focused grant funding, this is perhaps best demonstrated by receiving a National Science Foundation-funded GeoPATHs grant that provides undergraduate students greater access to field experiences and to study abroad opportunities. Notably, her teaching-related grants center Diversity Equity and Inclusion (DEI) in Science, Technology, Engineering and Math (STEM) education. This commitment to ensuring that diverse students in STEM have equitable access to innovations in technology and high impact practices is also showcased in Dr. Martinez's most recent Excellence in Undergraduate Education (EUE) proposal.

First, as Dr. Martinez explains in her narrative (through the use of three goals) she wants to develop new chapter reviews, quizzes and in accordance with her recent use of Open Educational Resources (OER) incorporate more Native American case studies in order to expand beyond Indigenous issues as an attempt to better explain environmental justice. Second, as Dr. Martinez notes in her grant, the course helps DEI success because Environmental Sciences (ENSC) 220: *Principles of Environmental Science* is a course required by the major but used for general education and reaches a large number of minoritized students, primarily African American. Thirdly, as mentioned in Martinez's promotion dossier the retention or DFW rates in Dr. Martinez's classes indicate that she has worked to facilitate student learning and success. DFW rates in her courses are generally consistent with DFW rates for courses taught at the same level in our department. For example, the DFW rate for on-line sections of ENSC 220 taught by Dr. Martinez is 20.21% and the DFW rate for all sections of ENSC 220 over the past three years has been 18.90%. I can only expect that her funded EUE grant will help in lowering than the three-year average for the course.

Dr. Martinez's commitment to including diverse voices and perspectives in her courses, including feminist and minority approaches challenges the white male dominated field of Environmental Sciences. I am in support of this grant and summer salary because it is needed for Martinez's commitment to ADEI in ENSC. Dr. Martinez's integration of high impact activities in an on-line course is a noteworthy achievement.

c: Dr. Adriana Martinez
Dr. Stacey Brown Amilian

SOUTHERN ILLINOIS UNIVERSITY EDWARDSVILLE

Excellence in Undergraduate Education (EUE) Proposal

Project ID# (*leave blank*)

25-02

Project Title

Improving a human osteological collection to increase high-impact practices in teaching

Project Director	ID Number	Telephone	Email
Corey Ragsdale, PhD	800618766	650-2933	cragsda@siue.edu

Department	Campus Box	School College
Anthropology	1451	College of Arts and Sciences

Course or Program

Anthropology Major/Minor, Forensic Science Minor, Forensic Science Master's

Project Co-Director	ID	Department	Email

Student Impact:	260

Priority Rating (If Submitting Multiple Proposals):	

Project Budget

Salary	Wages	Travel	Equip.	Comm	CServ	Auto	Tele	Awards	Total
	$2,240		$9,813						$12,053

Cost-Sharing

Salary	Wages	Travel	Equip.	Comm	CServ	Auto	Tele	Awards	Total
			$1,963						$1,963

Prior EUE Support

Project Director	Project Number	Award Amount	Project Dates

Applicable 2024-2025 Priorities (*check which priority your proposal fits, if any*):

- ☑ Course redesign project that uses inclusive, student-centered pedagogies to address equity gaps, improve student learning outcomes, & enhance retention
- ☑ Project involves courses that have high number of sections, a high ratio of D/F/W grades, or those key required courses with high enrollments and opportunities to improve equitable student success.

Improving a human osteological collection to increase high-impact practices in teaching

Project Summary

Current trends in high-impact practices involve, in part, preparation for real-world problems and engaging students in active learning. For the Anthropology Department, these objectives are achieved through high-quality educational experience in laboratory courses and courses that include student analytical exercises. In today's world, many of these courses serve students interested in fields within anthropology, museum studies, forensic science, and health- and sports medicine-related careers. These courses serve hundreds of students each year. Recent research regarding effective instruction in courses designed for these students have found that realistic examples and variation in materials using hands-on models are key to success. In recent years, these learning objectives have been met, to some extent, with the aid of a historic human skeletal collection on loan from the Illinois State Museum. In January 2020, the Anthropology Department received notice that all of these materials needed to be returned, likely resulting from updated provenience information and changes in federal policy regarding potential prehistoric human remains. Although the return of these materials is consistent with ethical standards, and is in accordance with federal law regarding the Native American Graves Protection and Repatriation Act (NAGPRA), it also had a significant negative impact on the quality of instruction for several courses, some of which are necessary for graduation. The COVID-19 pandemic that followed the return of the collection provided some relief for the lack of materials necessary to deliver high quality, hands-on instruction. Since fully in-person classes have resumed, the issue of adequate materials has returned, especially with the relevant courses filling to capacity during the 23-24 academic year. Additionally, the development of the new Forensic Science Master's degree will add the participation of graduate students.

The proposed project will not only maintain current high-quality standards for students at Southern Illinois University Edwardsville (SIUE), but will enhance high-impact practices by allowing students access to exceptional materials in the laboratory setting. The objective of this project is to obtain and employ a collection of human skeletal models produced through Bone Clones Inc. These materials are high-resolution models based on specimens held at the University of New Mexico Maxwell Museum of Anthropology and the San Diego Museum of Man, among others. The proposed materials include examples of real human variation (accompanied by full osteological reports), trauma (fractures) and pathology, and other anatomical features such as musculature. The addition of developing individuals, referred to as juveniles or subadults, will also allow for experiential learning related to growth and development. Finally, these high-quality reproductions will contribute to accessibility for students that may be uncomfortable, for cultural or ideological reasons, handling real human remains. The materials produced by Bone Clones are an excellent proxy for real human bones, but are more resistant to damage through handling. Additionally, the proposed project will allow funding for an undergraduate research assistant to produce virtual models of the purchased materials, increasing access and availability to students and faculty alike. The scanning will be completed in a secure and established space with previously purchased equipment.

Improving a human osteological collection to increase high-impact practices in teaching

Current situation

The Department of Anthropology at Southern Illinois University Edwardsville (SIUE) has an excellent reputation for delivering high quality, hands-on instruction. Key to the success of experiential learning outcomes consistent with the vision of SIUE, and Anthropology, are the teaching and research laboratories along with the materials therein. The proposed project seeks to improve these experiential learning opportunities. Since the dissolution of the Anthropology department at Southern Illinois University Carbondale, SIUE has become the only Anthropology department in Southern Illinois, and as such, the primary producer of students entering into the various fields within the various professional, academic, and government markets.

The human skeletal collection in Anthropology at SIUE being used for instruction consists of plastic, Bone Clones, and real human remains. The plastic skeletons (10) are low-quality generic molds that do not exhibit trauma (such as fractures and healed fractures), pathology (evidence of health or stress on the bone), attachments for muscle or other soft tissue, or any measurable or observable elements of human variation. As such, the plastic skeletal materials are useful only in the introductory sense, and many are interred at a site used every two years for a field-based course (Biological Anthropology Field School). The measures described above, however, are increasingly important variables in anthropology, forensic science, and various health-related professions. The ability to demonstrate human variation, as well as provide students the opportunity for hands-on, experiential learning in health/lifestyle and violence is currently limited. Teaching the aforementioned aspects of human osteology was previously achieved with the help of a real human skeletal collection on loan from the Illinois State Museum (ISM). These remains, containing historic and probable prehistoric components, have transferred between the ISM and SIUE a number of times since 1994 (ISM collection number 2003.051). On

January 29, 2020, the ISM sent a formal request for the permanent return of the collection in accordance with changes in federal protocols. The return of these materials on March 30, 2020 fulfilled the ethical and legal obligations of both the Department of Anthropology and the ISM, but has had a significant negative impact on the experiential learning potential of a large number of students per year. A previously awarded Excellence in Undergraduate Education (EUE) grant in 2020 was proposed to aid in this transition, but unfortunate budget circumstances led to an unfunded award at that time.

The Anthropology department maintains real human remains housed in a secure lab/storage space, the Forensic Anthropology and Bioarchaeology Lab (FABL). This collection includes only four real human skeletons. Of the four human skeletons, two are incomplete, and two are excellent specimens recently purchased (Summer 2023) with funds provided to support the newly established Forensic Science Master's degree. With the addition of graduate students in the 400-level courses in Anthropology, these two skeletons will be useful for study materials, with the anticipation that undergraduate students will be handling (primarily) materials acquired through Bone Clones. The proposed project seeks funding to develop/improve a skeletal collection suitable for both undergraduate and graduate student training in several courses, using anatomically accurate models that exhibit trauma, pathology, musculature, and elements of human variation. These materials will not only replace those lost in the return to the ISM, but additionally enhance the breadth of the collection and target specific learning objectives for a number of courses, provided in the table below. Finally, this project will allow a funded undergraduate student to gain laboratory experience in the FABL by producing 3d models of some of the specimens purchased, as well as those purchased prior (Summer 2023).

Course	Course Title	Frequency	Cap	Applications
ANTH 360B	Biological Anthropology Lab	Fall	20	ANTH major/minor, BLS & EH
ANTH 369	Intro to Forensic Anthropology (4 sections)	Spring/Summer/Winter	35-50	ANTH major/minor, ForSci minor, BLS & EH. SIUC exchange.
ANTH 366	Human Variation	Spring (alternating)	20	ANTH major/minor, ForSci minor, BLS & EH
ANTH 368	Archaeology of Death	Spring (alternating)	20	ANTH major/minor, ForSci minor, BLS & EH
ANTH 467	Dental Anthropology	Spring (alternating)	20	ANTH major/minor, ForSci minor & MS, BLS & EH
ANTH 468	Osteopathology	Spring (alternating)	20	ANTH major/minor, ForSci minor & MS, BLS & EH
ANTH 469	Forensic Anthropology Applications	Every Fall	20	ANTH major/minor, ForSci minor & MS, BLS & EH
ANTH 474	Biological Anthropology Field School	Summer (alternating)	15	ANTH major/minor, ForSci minor & MS, BLS & EH

Table 1. Relevant courses in need of the materials proposed in this project.

Proposed project

The proposed project will be focused on the development of materials necessary to improve hands-on learning in increasingly high demand courses at undergraduate and graduate levels. The materials acquired through EUE funds would enhance high-impact practices by improving the experiential learning component of courses across departments, and provide a more realistic (real-world) experience for students projected in multiple career paths (forensic, medical, and anthropological). High-impact practices in education are particularly important when reaching a diverse group of students, including those that are first generation or non-traditional. Anthropology courses with a laboratory component are essential in reaching these goals, and this project seeks to improve laboratory and distance learning/digital education.

Laboratory course materials

One aim of this project is to obtain anatomically accurate model human skeletons to be used in courses necessary to the Anthropology major and minor, the Forensic Sciences minor, and the new Forensic Science Master's degree. As indicated in Table 1, these courses also serve general education needs, fulfilling requirements in Breadth Life Sciences (BLS), Breadth Social

Sciences (BSS), Experience Laboratory (EL), and Experience Health (EH). The skeletal materials to be acquired are produced by Bone Clones Inc., a company that has a stellar reputation of producing high- quality replicas of actual cases (original specimens) housed in various museums. The collection proposed here will allow SIUE students to gain an excellent laboratory educational experience that is competitive with high-ranking universities around the United States, while maintaining firm ethical procedures. A hands-on, laboratory environment is ideal for understanding trauma, health, and human variation in human remains. All of these courses consistently meet enrollment caps, and lead to a high degree of retention and graduation. Departments involved in Forensic Sciences, including Anthropology, are developing strategies that will allow SIUE to provide educational opportunities for law enforcement agencies and the broader community. These opportunities may range from short courses (such as Summer and Winter), to other participatory opportunities in courses related to investigative and laboratory procedures. The need for a diverse skeletal collection such as that proposed here will be critical for success of this initiative.

Digital skeletal repository

Another aim for this project involves the creation of a digital repository of three-dimensional (3d) models of the collection. This portion of the project is designed primarily to improve high-impact practices in larger courses for which a laboratory component is not practical. The COVID-19 pandemic made apparent the need for online, virtual materials for hands-on and laboratory experiential learning. However, the need for accessible virtual materials goes beyond completely online courses. A consistent limitation to these courses regarding learning objectives, identified in student evaluations, is the desire for a more hands-on component and limited time to study with the materials. With the advances in digital modelling

of human skeletal materials, it is now possible to produce a measurable representation of bones that can serve as research and educational resources. The 3d images are produced in relatively small files, and can be accessed through free downloadable software. For this project, the lab materials to be purchased will be 3d scanned, and placed into a drive that will serve as a digital repository. The drive will be accessible to courses at all levels, allowing students the opportunity to gain experience with the materials from home, as well as in the classroom. 3d scanning will be achieved with the help of an undergraduate research assistant in the Anthropology Laboratory. The undergraduate research assistant will be familiar with the 3d scanner, and human skeletal anatomy. A digital skeletal repository used as a resource in undergraduate experiential learning is both innovative and rare, and will provide a unique experience for SIUE students.

The course that will benefit the most from the proposed project is ANTH 369: Introduction to Forensic Anthropology. This course is offered in-person every Spring, and online sections are also offered during the Summer and Winter sessions. Both in-person and online sections can be greatly enhanced by the virtual specimens, and the in-person section, as well as other courses (Table 1). These sections range in enrollment between 35 to 50, and enrollment for all sections have filled and waitlisted since Fall 2016. Poor performance and DFW rates in this course have long been tied closely to lack of hands-on learning, specifically insufficient time with materials that provide examples, even prior to development of online sections. Student feedback has reinforced this need for materials.

Evaluation and Dissemination

The quality and impact of the proposed project will be evaluated through student surveys, and with data analysis of success rates in the affected courses. The student surveys to be administered in addition to the standardized student evaluations (SETs) will focus on the utility

of the materials used in courses with a laboratory component, and the utility of the digital repository in the large lecture courses. In the case of lab courses, the evaluation will focus on student reporting data regarding their success in the course, as well as real-world experience in the course through the use of the Bone Clones Inc. materials. In the case of the larger courses, such as ANTH 369: Introduction to Forensic Anthropology, the evaluation will focus on the usefulness and accessibility of the online digital resources in the overall success of the course and the applicability to potential career paths in Forensic Sciences. Additional evaluation will compare success and student feedback between online and in-person formats of the course, in order to examine and assess the potential for digital, online learning. Data from previous student SET scores and comments will be compared to those from the courses offered with the new materials in order to identify improvement in learning outcomes. Student success data will also be analyzed to evaluate the usefulness of the materials in traditional lab vs. online settings. The courses offered during the 2024-2025 academic year for which the materials will apply have been offered in prior semesters, including those during the COVID-19 pandemic. Student success rates and attendance will be compared among the lab and lecture courses prior to and after the acquisition of the materials. These indirect measures will be used to analyze the direct effects of the new materials and digital resources on overall student success.

Finally, the need of these materials was initially demonstrated for a similar application for the EUE application period in 2020. Unfortunately, although awarded, budget changes at the time did not allow for funding of the award. The need for these materials has increased since this time, as both sections and seats for course like ANTH 369 have increased. With students more accustomed to both laboratory and virtual resources, this proposal is timely as it is necessary for the overall success of our students here at SIUE.

Improving a human osteological collection to increase high-impact practices in teaching

Budget Justification

Equipment $9,813

The following items will be purchased from Bone Clones Inc. Bone Clones models are realistic models based on actual skeletons housed at the University of New Mexico Maxwell Museum of Anthropology and the San Diego Museum of Man. A cost share of **$1,963**, 20% of the equipment cost, will be provided by the College of Arts and Sciences.

Human Female European Skeleton, Disarticulated	SCM-191-D	$1,838
Human Male European Skeleton, Disarticulated	SCM-192-D	$1,838
Human Female Asian Skeleton, Disarticulated	SC-211-D	$1,675
Human Male Asian Skeleton, Disarticulated	SC-092-D	$1,675
Human 14 to 16-month-old Child Skeleton, Disarticulated	SC-187-D	$1,497
Skeleton Storage Case (x5)	S-16	$1,290

Student Wages $2,240

Undergraduate Research Assistant (Fall semester, 10 hours/week)

Student will assist in the 3-dimentional scanning of all materials and the creation of an online, digital collection to be shared and used in classes of varying size and level. Student will also have the option for course credit through ANTH 483: Independent Research.

TOTAL **$12,053**

BIOGRAPHICAL SKETCH-COREY RAGSDALE, PH.D.

A. PROFESSIONAL PREPARATION:

Cal-State University, San Bernardino	Anthropology	B.A.	2008
University of New Mexico	Anthropology	M.S.	2011
	Anthropology	Ph.D.	2015

B. APPOINTMENTS:

Associate Professor, Southern Illinois University Edwardsville, Edwardsville, IL, 2022-present.

Assistant Professor, Southern Illinois University Edwardsville, Edwardsville, IL, 2016-2022. Visiting Assistant Professor, University of Montana, Missoula, MT, 2015-2016.

C. PRODUCTS:

Refereed Journal Articles

1. Ragsdale CS. 2017. Regional Population Structure in Postclassic Mexico. *Ancient Mesoamerica*. Online. doi:10.1017/S0956536117000013.
2. Ragsdale CS, Willermet C, and Edgar HJH. 2019. Detecting population replacement in Colonial Valley of Mexico and Morelos. *International Journal of Osteoarchaeology*.
3. Altschul JH, Kintigh KH, Aldenderferd M, Alonzie E, Armit I, Barcel JA, Beekman CS, Bicklef P, Bird DW, Ingram SE, Isayevk E, Kandell AW, Kiddey R, Kienon-Kabor HT, Niccolucci N, **Ragsdale CS**, Scaffidi BK, Ortman SG. 2020. To understand how migrations affect human securities, look to the past. *PNAS*.
4. Ragsdale CS, Willermet C, and Edgar HJH. 2019. Detecting population replacement in Colonial Valley of Mexico and Morelos. *International Journal of Osteoarchaeology*.
5. Ragsdale CS and Velemínský P. 2023. The effects of cultural networks on migration among Early and High Medieval populations in Central Europe based on dental phenotypic data. *International Journal of Osteoarchaeology*.

Refereed Book Chapters

1. Ragsdale CS, Edgar HJH. 2018. Population Continuity and Replacement in the prehistoric Valley of Mexico. In C Willermet and Cucina (editors), *Bioarchaeology of Pre-Columbian Mesoamerica: An Interdisciplinary Approach*. University of Florida Press.
2. Ragsdale CS. 2020. Population structure of El Palacio based on dental morphological data. In M Forest (editor), *El Palacio: Historiography and new perspectives on a pre-Tarascan city of northern Michoacán, Mexico*. Paris Monographs in American Archaeology 53. Oxford: British Archaeology Series.
3. Willermet C, Moes E, Rusk KM, Edgar HJH, and **Ragsdale CS**. 2022. A View of Stress and Inequality in Colonial Mexico City Through Cranial Fluctuating Asymmetry. In C. Willermet and HJH Edgar (editors), *1521: Biocultural Consequences of contact in Colonial Mexico*. University Press of Florida.
4. Ragsdale CS, Noldner LJ, Edgar HJH. 2024. Changes in population structure in the Jemez region. In Ann Stodder (editor), *Readings in Southwest Bioarchaeology*. Global Bioarchaeology Series. University of Florida Press.
5. Ragsdale CS, Velemínský P, Justice J. *In press*. Female mobility networks and their contribution to population and cultural growth in Central Europe during the Early and High Middle Ages. In Christine Lee and Katie Wolf (editors), *A Bioarchaeological Exploration of Women's Roles and Life Histories in Ancient Times: The Hidden Lives of Women*. Routledge Press.

D. SYNERGISTIC ACTIVITIES:

1. *Reviewer for journals, books, and funding agencies*. I have reviewed a text book, "How Humans Evolved, 7th Edition" as well as a refereed book, "Holes in the Head: The Art and Archaeology of Trepanation in Ancient Peru", Published in *Journal of Anthropological Research*. 2016. I have also served as a reviewer for the *International Journal of Osteoarchaeology*. I have also reviewed an external grant application for the *Social Sciences and Humanities Research Council of Canada (SSHRC)*.
2. *Coordinator for integrative studies program*. I am currently the coordinator and director for the Forensic Science program at SIUE. My responsibilities include assessing curricular aspects of the minor and developing bachelor's degree, coordinating inter-departmental collaborations, and connecting SIUE with law enforcement and medico-legal agencies.
3. *Faculty Advisor, Veteran Honor Society (SALUTE)*. I am the faculty advisor for the newly established veteran honor society (SALUTE) at SIUE, as well as a faculty mentor for the veteran student association. My responsibilities include veteran student mentorship and co-organizing opportunities for veteran student involvement in projects on campus.
4. *External Member, Saint Louis University's Institutional Biosafety Committee (IBC)*. I represent the interests of the surrounding area of St. Louis Metro East, as well as assess scientific validity and potential risks to the population regarding biological research at St. Louis University.
5. *Community leader in mortuary archaeology*. Along with my students, I am leading a restoration and preservation project for local cemeteries in the St. Louis Metro East region with historic components.
6. *International Coalition for Archaeological Synthesis*. Selected research member of a coalition appointed to research human migration, broadly, to develop a better scientific program and influence public policy.

Collaborators and Co-Authors

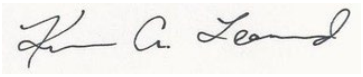
Dr. Andrea Cucina, Universidad Autonoma de Yucatan; Dr. Heather Edgar, University of New Mexico; Dr. Ann Stodder, Office of the State Archaeologist, New Mexico; Dr. Cathy Willermet, Central Michigan University; Dr. Lara Noldner, Office of the State Archaeologist, Iowa; Dr. Marion Forest, Arizona State University; Dr. Emiliano Melgar Tisoc, Museo del Templo Mayor; Dra. Josephina Bautista, Instituto Nacional de Antropologia e Historia, Mexico City; Dra. Estella Martinez Mora, Escuela de Antropologia e Historia; and Alexis O'Donnel, University of New Mexico.

Graduate advisor. I have served on master's committees for students not at SIUE: Brittney Eubank; Paula Specht; and Alejandro Arguelles (Mexico). I am currently a member of a PhD committee for a student at the University of New Mexico.

Undergraduate advisor. I have mentored senior theses at SIUE: Nigel Knudson; Kylie Heruth; Angel Nihells, non-traditional; Shanon Cronin, non-traditional; Molly Rench, non-traditional; Shawn Williams, underrepresented minority; Sarah Padgett, non-traditional; Hanna Oneal; Haley Ott; Allison Mitchell, non-traditional; John Justice; Caitlin Martin; Cody Bush; Carrington Gillam, non-traditional; Megan Walsh, non-traditional; Lydia Wegel; Emil Halasey, non-traditional; Shea Keener, non-traditional; Lauren Russel; and Robert Moorehead.

SOUTHERN ILLINOIS UNIVERSITY
EDWARDSVILLE

Date: February 28, 2024

From: Kevin Leonard, Dean, College of Arts and Sciences 

Subject: EUE Dean Memo of Support

The College of Arts and Sciences strongly supports the application of Dr. Corey Ragsdale for an EUE grant for the purchase of high-quality skeletal materials for the Anthropology department. As the proposal notes, this equipment will significantly enhance and expand high impact practices in a variety of courses, supporting improved student learning in face-to-face and online courses, as the skeletal models will be digitized as well. Given that this proposal was approved, but unfunded in 2020, this funding request is a high priority. Notably, it will enable the department to address the required return of skeletal remains to the Illinois State Museum and ensures their ability to continue supporting majors and minors in the department, as well as our General Education and new Forensic Sciences program.

The budget goes directly to purchasing the needed equipment and to wages to support the student worker tasked with digitizing the skeletal materials for online course use. The Department of Anthropology and the College of Arts and Sciences are each contributing $981.50 as cost share for a total of $1,963. The proposal provides benefits beyond the project year, as the materials purchased and digitized would continue to be used in future years across a wide range of courses and modalities.

College of Arts and Sciences
t 618.650.5044 **w** siue.edu/cas
a Office of the Dean, Suite 3409, Box 1608, Edwardsville, IL 62026-1608

SOUTHERN ILLINOIS UNIVERSITY EDWARDSVILLE

Excellence in Undergraduate Education (EUE) Proposal

Project ID# (*leave blank*)

25-06

Project Title

A Classroom Response System for Student Engagement, Active Learning, and Real-time Intervention in CHEM 121A/B

Project Director	ID Number	Telephone	Email
Thomas C. Holovics	800390710	650-2589	tholovi@siue.edu

Department	Campus Box	School College
Chemistry	1652	College of Arts and Sciences

Course or Program

CHEM 121A General Chemistry I and CHEM 121B General Chemistry II

Project Co-Director	ID	Department	Email

Student Impact:	~650 students/year

Priority Rating (If Submitting Multiple Proposals):	

Project Budget

Salary	Wages	Travel	Equip.	Comm	CServ	Auto	Tele	Awards	Total
5528	1400								6928

Cost-Sharing

Salary	Wages	Travel	Equip.	Comm	CServ	Auto	Tele	Awards	Total
		1000							1000

Prior EUE Support

Project Director	Project Number	Award Amount	Project Dates
None in the past 5 years.			

Applicable 2024-2025 Priorities (*check all your proposal fits, if any*):

- ☑ Course redesign project that uses inclusive, student-centered pedagogies to address equity gaps, improve student learning outcomes, & enhance retention
- ☑ Project involves courses that have high number of sections, a high ratio of D/F/W grades, or key required courses with high enrollments and opportunities to improve equitable student success

Community Pharmacy Curriculum Transformation

Miranda Wilhelm, Pharm.D., Clinical Professor
SIUE School of Pharmacy

Summary

Community pharmacy practice is currently undergoing a transformation from an emphasis on medication delivery to a patient care focused model. Southern Illinois University Edwardsville School of Pharmacy graduates need to be prepared to practice pharmacy today and for the future as healthcare advances to provide optimal care for patients. This will especially be true in the rural communities of Central and Southern Illinois where pharmacists have an opportunity to provide medication and patient care services to underserved populations. A needs assessment of the community pharmacy related content within the School of Pharmacy curriculum will be conducted utilizing alumni focus groups. Alumni are a valuable resource to know how the current pharmacy curriculum fits with contemporary community pharmacy practice. Additional content areas identified by the focus groups will be utilized to develop a survey that will be distributed on a larger scale to pharmacists across the state of Illinois. This will provide validation to the focus group results and provide direction for enhancement of the community pharmacy related content within the School of Pharmacy curriculum. Faculty development will be required to redesign and implement the new content in addition to student-centered active learning activities and assessments within the curriculum. By creating a faculty expert in current methods for student pharmacist skill development, the School of Pharmacy curriculum will improve student learning outcomes, enhance retention, and empower graduates to meet the unique needs of patients in rural Central and Southern Illinois.

Proposal Narrative

Current situation

The community pharmacy is often the first place our neighbors, patients, and future students meet a pharmacist – and it is the common image society has for the profession. On average, the portion of Southern Illinois University Edwardsville (SIUE) School of Pharmacy (SOP) graduates that enter community pharmacy practice has been 70% (50+ students/year) for the past 5 years. The business model supporting medication dispensing is rapidly changing due to declining reimbursement rates. This is changing how pharmacies operate. Community pharmacy practice is experiencing tremendous transformation into a place where patients receive comprehensive patient care and other services in addition to medications. Care and services include test/treat protocols for various infectious diseases (e.g., COVID-19, influenza, strep throat), pharmacist administered immunizations, pharmacist prescribed oral contraceptives, pharmacist prescribed HIV pre-exposure prophylaxis (PrEP)/post exposure prophylaxis (PEP), pharmacist recommended over-the-counter hearing aids, and cannabidiol (CDB) dietary supplements as well as others.

There is a well-documented shortage of health care providers in rural primary care environments. Student pharmacists attending SIUE SOP are predominantly from rural and small urban areas of Central and Southern Illinois. Many return to practice in these same communities upon graduation. Rural areas are experiencing additional needs for healthcare providers, creating an opportunity for expanded roles for community pharmacists with advanced skills. Specialized training of student pharmacists, with a focus on enhanced community pharmacy patient care services, has the potential to meet the needs of communities and patients with limited access to primary care in Central and Southern Illinois. Pharmacists could help provide these underserved populations with the opportunity for equity in healthcare.

Over the last few years, the American Association of Colleges of Pharmacy (AACP) has seen a decline in the number of students applying for and graduating as pharmacists. In contrast, the United States Bureau of Labor Statistics projects employment growth of 3% for the next 10 years; with 13,400 openings for pharmacists anticipated each year. The resultant shortage of pharmacists can lead to barriers to healthcare access and will be especially magnified in rural and underserved areas.

Healthcare is one of the most rapidly changing industries and therefore the study of pharmacy must constantly adapt and improve. Advances in technology, new medications and treatments, as well as changes with laws and regulations are factors that impact change in pharmacy. In order to prepare students for a career in the pharmacy field that will be constantly changing, the SIUE SOP needs to structure the curriculum to ensure that every graduate is prepared to practice pharmacy in today's world but also pharmacy of the future.

PHEL 779E: Advanced Self-Care and PHEL 790E: Community Pharmacy Application and Skills are two, two-credit hour elective courses for student pharmacists in the third professional year of the pharmacy program. Each course has an enrollment of 25 students. Advanced Self-Care focuses on appropriate assessment and selection of a nonprescription medication and subsequent patient counseling. Community Pharmacy Application and Skills is a practice-based course where students actively perform test and treat services for a variety of health conditions: influenza, strep throat, HIV, and cholesterol. Hands-on and active learning strategies have been used to simulate real-world patient scenarios.

Proposed Project

The objectives of this project are threefold: (1) to evaluate the current community pharmacy curriculum elective courses utilizing stakeholder (comprised of alumni and community pharmacy practice leaders) focus groups as a needs assessment to prioritize content and skills development (2) utilize the focus

group results to develop a survey distributed to practicing pharmacists across the state of Illinois to further identify and prioritize content and skills development and (3) provide faculty development for the community pharmacy specialist within the SIUE SOP.

SIUE SOP alumni and community pharmacy practice leaders representing various parts of Central and Southern Illinois will be invited to participate in the needs assessment focus groups to identify and prioritize content and skills development within the two community pharmacy elective courses. The purpose is to determine what additional content would have been beneficial to them as practicing pharmacists. What topics were helpful as they entered pharmacy practice and now that they have been in practice for a few years. How did these courses prepare them to enter pharmacy practice? What do they need to know as a practicing pharmacist now to care for their patients? What is their boss/corporate saying they need to know now to care for their patients? The themes identified from the focus groups will then be developed into survey questions. The survey will be distributed on a broader scale to alumni and practicing pharmacists throughout the state of Illinois, regardless of taking the two community pharmacy elective courses, to identify potential gaps in knowledge and topic areas for expansion of the community pharmacy related content within the pharmacy curriculum. The community pharmacy specialist within the SIUE SOP will use a train-the-trainer approach to become a subject matter expert in the additional content areas identified by completing a variety of certificate training programs. The faculty member will then implement student-centered, hands-on, active learning activities, assignments and assessments within the two community pharmacy elective courses.

Timeline:

Date	Milestone
June 2024	Focus group question development for alumni and community pharmacy practice leaders.
July / August 2024	Stakeholder (alumni and community pharmacy practice leaders) community pharmacy curriculum evaluation focus groups.
September 2024	Survey question development for practicing pharmacists within Illinois.

October – November 2024	Survey distribution for practicing pharmacists within Illinois.
December 2024	Analyze survey results.
January – May 2025	Faculty development completion of certificate training programs and update of content in the two community pharmacy elective courses.
Fall 2025	Implement elective course content.

Evaluation and Dissemination

Multiple methods will be used to evaluate the impact of this project. The full impact of this project will be realized in approximately four to five years as students complete the community pharmacy elective courses, graduate and practice pharmacy for a few years. In the short-term to assess the objectives, questions will be added to the Student Evaluation of Teaching (SETs) for the two courses to determine the student's perception of the content aligning with what they are seeing in pharmacy practice at their work and experiential education sites. In addition, student scores on the active learning activities and assessments will be evaluated to determine if students are successfully meeting the course objectives and whether internal remediation is required for students to be considered competent with the content and skills. Students will be required to meet a minimum competency to demonstrate proficiency with the active learning activities and assessments. If the minimum competency is not demonstrated, internal remediation will occur. Internal remediation will improve student performance and ensure that all students achieve the designated minimal competency before moving on in the curriculum.

The project findings will be disseminated through presentation of the results at the annual national conference of the American Association of Colleges of Pharmacy (AACP) as well as submission of a manuscript in the *American Journal of Pharmacy Education*.

Budget and Budget Justification

The budget for this project is outlined in the table below. Estimated School of Pharmacy cost sharing of $750 to support travel to present the results of the project at a national professional conference and point-of-care testing supplies is included.

Budget Item	Category	Amount
Focus group question development for alumni and community pharmacy practice leaders. Justification: Use of professional service to develop focus group questions and analyze data.	Contractual Services	$3,000
Stakeholder (alumni and community pharmacy practice leaders) community pharmacy curriculum evaluation focus groups. Justification: Provide 20 focus group participants with a $50 gift card as incentive for their time in addition to food.	Contractual Services	$2,600
Survey question development for practicing pharmacists within the state of Illinois. Justification: Use of professional service to develop survey questions and analyze data.	Contractual Services	$3,000
Faculty development education and training via Certificate Training Programs • CEimpact: Advancing Women's Health: Pharmacist Prescribing of Hormonal Contraceptives • CEimpact: Pharmacist-in-Charge Bootcamp • CEimpact: A Sound Solution: OTC Hearing Aids for Pharmacy Professionals • CEimpact: Test and Treat Training for Pharmacists • APhA: Increasing Access to Hormonal Contraceptives • APhA: Pharmacy-Based OTC Hearing Aids • APhA: Pharmacy-Based Test and Treat Certificate Training Program • APhA: Pharmacists Getting Paid Through Collaborative Clinical Services • Pharmcon: Cannabis Pharmacy Specialist Justification: The certificate training programs will develop the faculty member's knowledge, skills and resources in a variety of pharmacy practice areas to incorporate the content along with subsequent active learning activities and assessments into the pharmacy curriculum.	Equipment	 $149 $149 $199 $199 $169 $149 $475 $599 $257
AACP Meeting Justification: Travel to a conference to present results of the project to a national audience of peers. Estimate includes cost of	Travel	$2,500

conference registration, airfare, and hotel. Estimated cost sharing from the School of Pharmacy in the amount of $500 to support travel has been committed to this project.		
	TOTAL FUNDS REQUESTED	$13,445

Biographical Sketch
Miranda Wilhelm, Pharm.D.

EDUCATION:

2002 – 2003	University of Kansas Community Pharmacy Residency B&K Prescription Shop, Salina, Kansas
1996 – 2002	Doctor of Pharmacy University of Kansas School of Pharmacy, Lawrence, Kansas

PROFESSIONAL EXPERIENCE:

2021 – Present	Clinical Pharmacist SIUE Health Services Pharmacy, Edwardsville, Illinois
2020 – Present	Clinical Professor Southern Illinois University Edwardsville School of Pharmacy, Edwardsville, Illinois
2014 – 2020	Clinical Associate Professor Southern Illinois University Edwardsville School of Pharmacy, Edwardsville, Illinois
2008 – 2020	Clinical Pharmacist Schnucks Pharmacy, Edwardsville, Illinois
2008 – 2014	Clinical Assistant Professor Southern Illinois University Edwardsville School of Pharmacy, Edwardsville, Illinois

HONORS:

2023 – Present	Academia Community Transformation – Community Pharmacy Practice Transformation Badge
2022	Southern Illinois University Edwardsville Friends of Student Affairs – Faculty Award Clinical Pharmacist, SIUE Health Services Pharmacy
2019	Outstanding Reviewer for 2018 for the Journal of the American Pharmacists Association
2018	Outstanding Reviewer for 2017 for the Journal of the American Pharmacists Association
2017	Illinois Pharmacists Association Educator of the Year
2017	American Association of Colleges of Pharmacy 2017 Award for Excellence in Assessment
2017	Southern Illinois University Edwardsville School of Pharmacy Capstone Mentor of the Year
2017	Southern Illinois University Edwardsville school of Pharmacy Service Recognition Award
2017	Southern Illinois University Edwardsville Teaching Distinction Recognition

PUBLICATIONS:

- **Wilhelm M**. Dietary Supplements and Diabetes: A Focus on Complementary Health Approaches. In: Cornell S, Miller DK, Urbanski P, eds. The Art and Science of Diabetes Care and Education. Chicago, Illinois: Association of Diabetes Care and Education Specialists; 2023.
- **Wilhelm M**, Arnoldi J. Reducing Dyspnea by Optimizing Treatment of Chronic Obstructive Pulmonary Disease. In: Margaret Campbell, ed. Respiratory Symptoms. New York, New York: Oxford Academic; 1 Apr. 2023.

- **Wilhelm M**. The Intricate Relationship Between Stress, Nutrients, and Health: What Pharmacists Need to Know. PowerPak. December 2023.
- **Wilhelm M**. Ensuring Health Equity in Vaccination Access: How Pharmacies Can Work With Community Organizations. Pharmacy Times. September 2023. p17-20.
- **Wilhelm M**. Therapeutic Advancements in Allergic Rhinitis: The Pharmacist's Role in Improving the Use of OTC Treatments. Pharmacy Times. February 2023. p70-86.
- **Wilhelm M**. OTC Medication Considerations for People with Diabetes. On the Cutting Edge Diabetes Dietetic Practice Group. 2022. 43(2): 31-34.
- Devraj R, **Wilhelm M**, Deshpande M. Consumer perceptions of a Shingles infograph intervention and vaccination plans in community pharmacy settings. Innovations in pharmacy. August 2022; 13(3): Article 1. P1-12.
- **Wilhelm M**. Exploring Novel Vaccines for Prevention of Hepatitis B Virus Infection: Updated Guidelines and the Role of the Pharmacist in Expanding Vaccination. Pharmacy Times. August 2022. P92-101.
- **Wilhelm M**. OTC Azelastine for Allergic Rhinitis. Contributing Faculty Member Weekly Continuing Education for Pharmacists. CEImpact. Des Moines, IA. July 2022.
- **Wilhelm M**. Updated Recommendations for Zoster Vaccine. Contributing Faculty Member Weekly Continuing Education for Pharmacists. CEImpact. Des Moines, IA. June 2022.
- **Wilhelm M**. Updated Recommendation for Pneumococcal Vaccines. Contributing Faculty Member Weekly Continuing Education for Pharmacists. CEImpact. Des Moines, IA. May 2022.
- **Wilhelm M**. Managing Seasonal Allergies with Nonprescription Medications. The Rx Consultant. May 2022.
- Mospan C, **Wilhelm M**. Handbook of Nonprescription Drugs Quick Reference. Washington, DC: American Pharmacist Association; 2021.
- **Wilhelm M**, Hunziker S. Prescription Drug Coverage. In: Gupta V, Nguyen T, Clark M, Williams E, Cone C, Desselle S. eds. Pharmacy Practice Sills: A Guide for Students and Instructors. New York, NY: McGraw-Hill; 2021.
- **Wilhelm M**. Sleep and Stress: Pharmacist Insights on Non-Prescription Treatment Options. PowerPak. December 2021.
- **Wilhelm M**. Huma Papillomavirus Vaccine Status and Sexually Transmitted Infection Outcomes. Contributing Faculty Member, "Brain Bolus" (weekly continuing education for pharmacists). CEImpact. Des Moines, IA. October 2021.
- **Wilhelm M**. Risks of Respiratory Syncytial Virus in Older Adults: Emerging Prophylactic Vaccines and Intervention Opportunities for Pharmacists. Pharmacy Times. August 2021.
- **Wilhelm M**. Immunization Update 2021. Pharmacy Today. August 2021; 27(8): 52-62.
- **Wilhelm M**. Oseltamivir Coming to an Aisle Near You? Contributing Faculty Member, "Brain Bolus" (weekly continuing education for pharmacists). CEImpact. Des Moines, IA. July 2021.
- **Wilhelm M**. Know Your D: Key Differences Between Vitamin D2 and Vitamin D3. Contributing Faculty Member, "Brain Bolus" (weekly continuing education for pharmacists). CEImpact. Des Moines, IA. July 2021.
- **Wilhelm M**. A Closer Look at Contact Lens Care and Solutions: Opportunities for Patient Counseling. Pharmacy Times. May 2021: 44-54.

Letters of Support:

Please find letters of support attached from:

1. Mark Luer, Dean, SIUE School of Pharmacy
2. Jennifer Hookstra, Chair, Department of Pharmacy Practice, SIUE School of Pharmacy

SOUTHERN ILLINOIS UNIVERSITY
EDWARDSVILLE

February 26, 2024

EUE Award Review Committee:

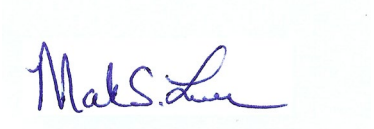
The Southern Illinois University Edwardsville (SIUE) School of Pharmacy (SOP) is in full support of the Excellence in Undergraduate Education (EUE) proposal titled "Community Pharmacy Curriculum Transformation". Dr. Miranda Wilhelm's proposal is timely and follows a rapid practice transformation that has occurred within the community pharmacy setting since the pandemic. The majority of pharmacists in the United States work within the community setting and the same holds true for the graduates of the SIUE School of Pharmacy.

Healthcare typically runs a fast course of evolution, but the pandemic shifted this pace for pharmacy into a higher gear and without much preparation. The scope of practice for the community pharmacist now includes topics such as COVID-19 testing and vaccination, over-the-counter (OTC) hearing aids, OTC contraception, cannabidiol (CBD), the influences of medical and recreational marijuana, point-of-care testing and treatment, pharmacist prescribed PrEP/PEP for HIV exposure, and much more. These changes are quickly leaving pharmacy education to play catch up. Historically, the SOP would rely on the literature, accreditation standards, surveys of new graduates, and the input of employers and alumni in all practice settings to help inform curricular content as a component of curricular revision. However, these inputs are slow to evolve, tend to be wide-ranging in nature and as a result, the new practice demands are outpacing our ability to keep an educational system relevant for the both today and tomorrow.

Dr. Wilhelm's proposal will employ both focus groups and a focused input from alumni in the community practice setting to identify curricular gaps. Once identified filling these gaps is not just a matter of determining which topic(s) should be substituted in a course. Instead, the faculty in the SOP must also be educated and trained to effectively position the new topics throughout the curriculum. Dr. Wilhelm's proposal would effectively establish a new norm for informing our curriculum to better educate our students and increase their readiness to enter the profession as a pharmacist upon graduation.

The SIUE School of Pharmacy is excited to support this innovative proposal. It is my hope that the review committee finds value in supporting this proposal as well.

Sincerely,



Mark S. Luer, Pharm.D., FCPP
Dean & Professor
SIUE School of Pharmacy

SOUTHERN ILLINOIS UNIVERSITY
EDWARDSVILLE

February 22, 2024

Excellence in Undergraduate Education (EUE) Program Review Committee
c/o Nicole Klein, Professor and Director for Faculty Development
2605 Lukas Annex, Vadalabene Center
Edwardsville, IL 62026

RE: EUE Award Application, Miranda Wilhelm, SIUE School of Pharmacy

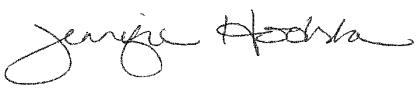
Please accept this letter of support for the SIUE School of Pharmacy project, "Community Pharmacy Curriculum Transformation." Not only is Dr. Wilhelm (Primary Investigator) highly qualified to lead this project, but this project will also create significant and impactful change in our curriculum to align student learning with real world practice. Dramatic changes have occurred in community pharmacy practice as a result of advances made during the pandemic putting pharmacists in direct patient care. As significant shortages of pharmacists in the community setting continue, our ability to produce graduates ready and willing to enter this practice setting is greatly needed. The time to transform our curricular content to address these changes is now. As Department Chair for the Pharmacy Practice Department, I can confirm our support for this work.

Dr. Wilhelm is as an experienced pharmacist and clinician in community-based practice, a recognized educator, and competent scholar in practice. She has been a prior co-investigator for multiple awards, and she teaches the majority of our curricular content related to community pharmacy practice. She is the lead pharmacist at the SUIE Counseling and Health Service clinic and is a member of the ACT Pharmacy Collaborative, a network of faculty, schools, and community pharmacies across the country involved in transforming pharmacy practice in the community-based practice setting.

SIUE School of Pharmacy is a regional leader in pharmacy education that is situated as the only pharmacy school in Illinios outside of the Chicago metro area. The school produces high quality graduates, most of whom go into community-based practice in the region. We are known for our engagement in community service and are well prepared to support this aim to serve our region with successful graduates ready to address health needs in southern Illinois communities. We look forward to collaborating with our alumni and other pharmacists in Illinios to train our students in innovative and state-of-the-art practices.

The Department of Pharmacy Practice will contribute support to this work with select resources available. I will work with Dr. Wilhelm to assure the time needed is available to carry out the aims of this project.

Sincerely,



Jennifer Hookstra Danielson, PharmD, MBA, CDECS
Department Chair and Professor
SIUE School of Pharmacy

SOUTHERN ILLINOIS UNIVERSITY EDWARDSVILLE

Excellence in Undergraduate Education (EUE) Proposal

Project ID# (*leave blank*)

25-06

Project Title

A Classroom Response System for Student Engagement, Active Learning, and Real-time Intervention in CHEM 121A/B

Project Director	ID Number	Telephone	Email
Thomas C. Holovics	800390710	650-2589	tholovi@siue.edu

Department	Campus Box	School College
Chemistry	1652	College of Arts and Sciences

Course or Program

CHEM 121A General Chemistry I and CHEM 121B General Chemistry II

Project Co-Director	ID	Department	Email

Student Impact:	~650 students/year

Priority Rating (If Submitting Multiple Proposals):	

Project Budget

Salary	Wages	Travel	Equip.	Comm	CServ	Auto	Tele	Awards	Total
5528	1400								6928

Cost-Sharing

Salary	Wages	Travel	Equip.	Comm	CServ	Auto	Tele	Awards	Total
		1000							1000

Prior EUE Support

Project Director	Project Number	Award Amount	Project Dates
None in the past 5 years.			

Applicable 2024-2025 Priorities (*check all your proposal fits, if any*):

- ☑ Course redesign project that uses inclusive, student-centered pedagogies to address equity gaps, improve student learning outcomes, & enhance retention
- ☑ Project involves courses that have high number of sections, a high ratio of D/F/W grades, or key required courses with high enrollments and opportunities to improve equitable student success

Section 2: Project Narrative

Project Summary

The proposed project supports curricular development in the undergraduate speech-language pathology and audiology (SPPA) program through the design of one and redesign of one undergraduate course. The project infuses two high impact practices (i.e., service and community-based learning; ePortfolios) and experiential, hands-on learning into the SPPA undergraduate curriculum. It also incorporates opportunities for students to develop important skills for clinical practice, including critical thinking, reflection, and observation. This work aligns with the Excellence in Undergraduate Education priorities as well as SIUE's strategic Plan and recommendations from the Academic Affairs Board of the American Speech-Language-Hearing Association. The project reflects SPPA faculty's commitment to 1) student-centeredness in undergraduate education; 2) improving student recruitment, retention, and success and 3) establishing and strengthening community partnerships.

Project activities include the development of one course (i.e., SPPA 414) and the redesign of one course (SPPA 446). SPPA 414, which will be offered for the first time in Fall 2024, is a service and community-based learning class. Course design will focus on structuring SPPA students' time supporting children at-risk for communication disorders in real-world, community settings and also designing time spent in the classroom reflecting on their service. Backwards design will be used to create and align assessments and activities with course learning objectives. Experiential learning and reflection frameworks will be utilized as the PI and Co-PI create learning activities and reflection assignments focused on a variety of contemporary issues in speech-language pathology.

SPPA 446, a key required course that all seniors in the major take, will be designed to provide frequent experiential, hands-on learning opportunities for students to actively engage in the clinical process and create an ePortfolio, another high impact practice. Funding from the EUE program will allow the PI and Co-PI to: 1) systematically review, evaluate, and select clinical videos for students to observe therapy; 2) create experiential, hands-on learning assignments for students to practice clinical skills; and 3) develop expectations and an assessment rubric for an ePortfolio, another high impact practice.

The outcomes of the proposed project will be evaluated upon student completion of SPPA 414 and SPPA 446 in Fall 2024. Learning outcome data will be used to determine how to modify activities and/or assignments going forward as well as to consider how to better scaffold and support student learning in these classes overall. *Teaching and Learning in Communication Sciences & Disorders* is a disciplinary publication that would widely disseminate this work to SPPA faculty nationwide. The outcomes from this work will be disseminated to the University through a presentation or webinar.

The narrative that follows includes detailed information on the curricular design for SPPA 414 and SPPA 446, a timeline for completion, and the budget and justification. This work will be completed in one month in Summer 2024. Thus, summer salary is requested for the PI and Co-PI so the curricular developments are completed prior to the start of the Fall 2024 semester, when both classes are offered. Finally, support statements are attached. Thank you for your consideration of our proposal.

Narrative

Current Situation

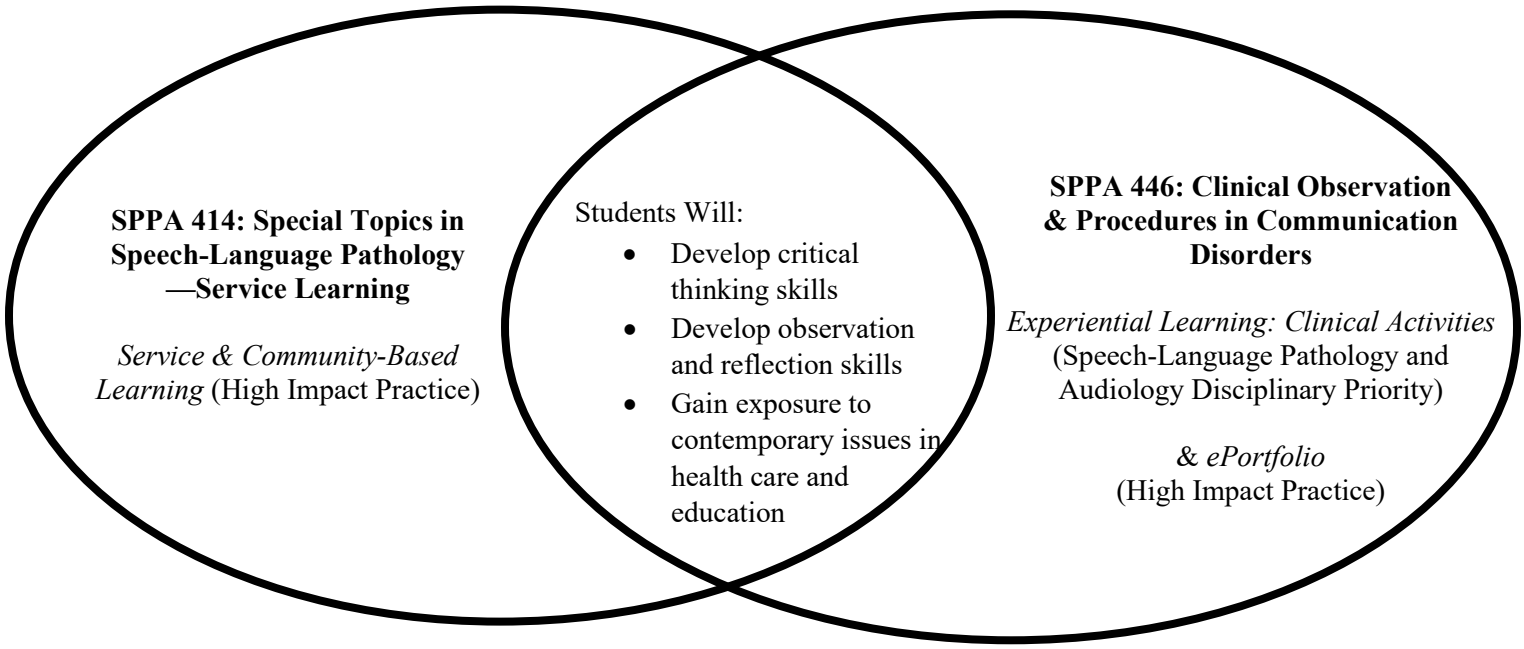
The proposed project supports curricular development and redesign in the undergraduate speech-language pathology and audiology (SPPA) program by infusing service and community-based learning (i.e., a high impact practice), experiential learning (i.e., active learning by doing), and ePortfolios (i.e., a high impact practice). This work aligns with Pillar #2 of SIUE's strategic plan (i.e., to "develop and enhance high impact experiential learning activities" so that every undergraduate student will "complete at least two high impact practices before graduation") and recommendations from the Academic Affairs Board of the American Speech-Language-Hearing Association, which call for experiential learning opportunities that promote engagement in the clinical process in undergraduate SPPA programs. This work further aligns with SIUE's Excellence in Undergraduate Education program by utilizing student-centered pedagogy, focusing on improving student success, and addressing equity gaps in the program by ensuring all students have access to key opportunities to develop vital clinical skills (i.e., critical thinking, observation, and reflection).

To provide additional context, graduate programs in our field provide opportunities for students to complete internships and externships to gain clinical clock hours (i.e., direct contact with patients with communication disorders). Our undergraduate students, and even high school students who are considering majoring in SPPA at SIUE, regularly ask for more opportunities to engage in the clinical process to better prepare them for graduate school and work as professionals. SPPA faculty are committed to providing these learning opportunities for our undergraduate students to support recruitment, retention, and success. Two courses will be targeted to provide these opportunities, SPPA 414 (through initial development) and SPPA 446

(through redesign). SPPA 414 is a new elective course for undergraduate SPPA students that will be offered for the first time in Fall 2024. Our program goal is to scale this course to offer it multiple times a year and for as many students who wish to enroll. SPPA 446 is a key required course in the undergraduate curriculum that all SPPA students complete. Thus, all students in the SPPA major will benefit from this project upon implementation. Additional support will not be needed to support this project after the termination of the EUE award.

Proposed Project

The project goal is to use inclusive pedagogy in the undergraduate SPPA program to infuse service and community-based learning as well as experiential and clinical learning. Project activities include the development of one course (i.e., SPPA 414) and the redesign of one course (SPPA 446).



Activity 1: Design SPPA 414—Special Topics in Speech-Language Pathology: Service Learning

Two SPPA faculty, Dr. Allison Sauerwein and Dr. Steffany Chleboun, would collaborate to design SPPA 414 as a service and community-based learning class, a high-impact practice

(American Association of Colleges and Universities, 2024). Design will focus on how to structure SPPA students' time supporting children at-risk for communication disorders in real-world, community settings and also to design time spent in the classroom reflecting on their service. Although many SPPA undergraduate students seek out volunteer opportunities on their own, this course would intentionally integrate experiences in the community with the undergraduate curriculum.

This course was approved by administration in Spring 2024 and is in the course catalog for the Fall 2024 semester. Dr. Sauerwein has already begun working on the logistics for this course by meeting with Jennifer Wegner (SIUE Senior Associate General Counsel) to discuss the need for contracts and liability waivers for students to engage in the community. Further, she is currently building a community partnership with Cathy Blevens, Operations Director at Riverbend Head Start, to develop opportunities and locations for SPPA students to provide service. Riverbend Head Start supports children aged three to give from low-income families in multiple preschool centers in Madison County. Funding from the Excellence in Undergraduate Education program would support Drs. Sauerwein and Chleboun in designing the learning experience for SPPA students.

Backwards design (Wiggins & McTighe, 2005) will be used to align assessments and activities with course learning objectives. Key learning objectives include students' development of critical thinking, observation, and reflection skills—skills that are paramount to success as speech-language pathologists and audiologists. Drs. Sauerwein and Chleboun design the course to methodically engage students in the four-stage Experiential Learning Cycle described by Kolb (1984). These stages include having the service learning experience, reflecting on the experience, learning from the experience, and planning or trying out what is learned. They will also explore

Schön's Reflective Model (1983) and consider how it can be used to support students in developing reflection skills (i.e., reflection IN action and reflection ON action).

Students will also gain exposure to and think critically about contemporary issues in health care and education as identified by the American Speech-Language-Hearing Association (2024). These issues include: 1) anti-racism, diversity, equity, and inclusion; 2) inter-professional practice; 3) the World Health Organization International Classification of Functioning, Disability and Health framework (including activities, participation, environment); 4) social determinants of health; 5) evidence-based practice; 6) counseling for family and caregivers; 7) the scope of practice of the professions; and 8) ethics of the professions. Faculty would guide students in SPPA 414 through evaluating these issues in their individual service experiences.

Activity 2: Redesign SPPA 446—Clinical Observation & Procedures in Communication Disorders

SPPA 446 is an existing, key required course for undergraduate students in the major. Currently, the course provides a portion (approximately 8-10 hours) of the required (25 hours) guided observation hours students need for certification to become speech-language pathologists or audiologists. The course also provides an introduction to a wide variety of clinical topics (i.e., procedures for assessment and therapy, data collection, clinical documentation, materials selection) and contemporary issues (i.e., counseling; telepractice; and billing and coding for insurance and documentation purposes). After redesign, SPPA 446 will provide frequent experiential, hands-on learning opportunities for students to actively engage in the clinical process and create an ePortfolio, another high impact practice.

Funding from the Excellence in Undergraduate Education program would support Drs. Sauerwein and Chleboun in redesigning the learning experience for SPPA students. The first step will be to review, evaluate, and select programs that provide clinical videos (e.g., Master

Clinician, Simucase, the SIUE SLHC clinical archives; that the program has existing and ongoing access to) and select specific videos for observations and simulated cases to supplement observations. The purpose of this review is to intentionally select videos that 1) address the clinical topics and contemporary issues listed above, 2) represent diverse areas within our scope of practice and 3) include clinicians and clients with diverse identities and experiences.

Next, Drs. Sauerwein and Chleboun will create eight, bi-weekly assignments, paired to intentionally chosen observation videos (see above) that provide opportunities for students to actively engage in clinical work in the areas previously mentioned (procedures for assessment and therapy data collection, clinical documentation, and materials selection; counseling; telepractice; and billing and coding for insurance and documentation purposes). Using telepractice as an example, students in SPPA 446 currently read about telepractice and watch a telepractice therapy session using Master Clinician. Redesign would create an assignment that prompts students to develop a therapy activity for telepractice and trial it with a classmate using Zoom. Students would reflect on their learning and discuss the assignment in small and large groups during class meetings. Other assignments might include 1) actively collecting data while watching an observation video, 2) writing a therapy summary note based on an observation video, and 3) selecting additional therapy materials for a future session with a client whose video they observed. Emerick and Hatten's (1974) model of observation will be used to guide students in improving their clinical observations and completing hands-on activities.

Finally, Drs. Sauerwein and Chleboun will develop expectations and an assessment rubric for an ePortfolio, another high impact practice (AAC&U, 2024), that students and faculty can use to assess learning and growth. The ePortfolio is a method for students to gain scaffolded experience and reflect on their learning in SPPA 446.

Timeline for Work Completion

	SPPA 414 Activities	SPPA 446 Activities
Week 1	Create learning activities and reflection assignments focused on ADEI and inter-professional practice.	Review, evaluate and select clinical videos for observations.
Week 2	Create learning activities and reflection assignments focused on the WHO Classification System and social determinants of health.	Create 4 experiential learning assignments (expectations, instructions, and rubrics) paired to videos.
Week 3	Create learning activities and reflection assignments focused on evidence-based practice and counseling.	Create 4 experiential learning assignments (expectations, instructions, and rubrics) paired to videos.
Week 4	Create learning activities and reflection assignments focused on scope of practice and ethics.	Develop course ePortfolio (expectations, instructions, rubric).

Evaluation and Dissemination

The following are tangible products for the design of SPPA 414: 8 learning activity descriptions and 8 reflection assignments (including expectations, instructions, and rubrics). The following are tangible products for the design of SPPA 446: selection of 8 clinical videos, 8 experiential learning assignments (including expectations, instructions, and rubrics), and a course ePortfolio (expectations, instructions, and rubric).

Student learning outcomes from these activities, assignments, and ePortfolio will be evaluated by Drs. Sauerwein and Chleboun after these courses have concluded in Fall 2024. Learning outcome data will be used to determine how to modify activities and/or assignments going forward as well as to consider how to better scaffold and support student learning in these classes overall. *Teaching and Learning in Communication Sciences & Disorders* is a disciplinary publication outlet that would widely disseminate this work to other SPPA faculty nationwide. This outcomes from this project work will be disseminated to the University through a presentation and/or webinar.

Budget and Justification

The proposed project requires extensive time to design a new course and redesign an existing course. These curricular developments need to be completed prior to the start of the Fall 2024 semester, when both SPPA 414 and SPPA 446 are offered. A total of 150 hours will be used to complete the tasks below. Thus, the PI (Dr. Sauerwein) requests 0.75 months of summer salary at 100% effort ($5,591.24). The Co-PI (Dr. Chleboun) requests 0.25 months of summary salary at 100% effort ($1,853.68). Drs. Sauerwein and Chleboun have extensive experience in course design, teaching a wide variety of SPPA coursework, and directing SPPA programs. They regularly collaborate and will work cooperatively to carry out the activities described in the proposal.

Tasks and Proposed Work Hours

Week	Tasks	Dr. Sauerwein Hours	Dr. Chleboun Hours
1	• 414: Create learning activities and reflection assignments • 446: Review, evaluate, and select clinical videos for observations	28	9.25
2	• 414: Create learning activities and reflection assignments • 446: Create experiential learning assignments	28	9.25
3	• 414: Create learning activities and reflection assignments • 446: Create experiential learning assignments	28	9.25
4	• 414: Create learning activities and reflection assignments • 446: Develop course ePortfolio (expectations, instructions, rubric).	28.5	9.75
Total		112.5 hours	37.5 hours

Total Requested: $7,444.92 (all summer salary)

Cost-Sharing Summary

Not applicable.

Section 3: Support Statement from Chair and Dean

Please see the attached statements of support from Huaibo Xin, Applied Health Chair and Robin Hughes, Dean of the School of Education, Health, and Human Behavior.

Section 4: Results from Prior EUE Support

Not applicable.

SOUTHERN ILLINOIS UNIVERSITY
EDWARDSVILLE

February 28th, 2024

To Excellence in Undergraduate Education Review Committee,

I am writing this letter in support of Drs. Allison Sauerwein and Steffany Chleboun's grant application entitled "Infusing High Impact Practices and Experiential Learning in the Undergraduate SPPA Curriculum".

As stated in the proposal, the proposed course design and re-design will integrate high impact practices and experiential learning into SPPA 414 and SPPA 446 and "reflects faculty's commitment to 1) student-centeredness in undergraduate education; 2) improving student recruitment, retention, and success and 3) establishing and strengthening community partnerships". The proposed aims to advance students' critical thinking skills and observation and reflection skills in Speech-Language Pathology and Audiology and expose students to contemporary issues in health care and education. More importantly, the design/redesign will enhance the service provided to the high-risk populations and communities.

Dr. Sauerwein is our Undergraduate Program Director, and Dr. Chleboun is our Graduate Program Director. Both are teacher-scholars and experts in Speech-Language Pathology and Audiology and have extensive experiences working with students and local communities. They know their curriculum, their students' needs, and their community needs inside out. They always strive for excellence and look for opportunities for improvement.

I enthusiastically support Drs. Sauerwein and Chleboun's grant application. They are committed to make a difference for their students and their local communities in need. Please feel free to contact me if you have any questions.

Sincerely,

Huaibo Xin, DrPH, MD, MPH
Professor of Public Health
Department Chair
Department of Applied Health
School of Education, Health & Human Behavior

SOUTHERN ILLINOIS UNIVERSITY
EDWARDSVILLE

February 28, 2024

Dear Excellence in Undergraduate Education Review Committee,

I support the proposal submitted by Drs. Allison Sauerwein and Steffany Chleboun titled, "Infusing High Impact Practices and Experiential Learning in the Undergraduate SPPA Curriculum." This proposal will infuse two high impact practices and hands-on, experiential learning into two courses in the Speech-Language Pathology and Audiology curriculum.

My office has supported the addition of a new section of SPPA 414 for the Fall 2024 semester that is focused on service and community-based learning. This proposal will provide financial support to ensure this a high-quality learning experience for students. This project also supports SPPA 446, a key, required course in the SPPA curriculum that prepares undergraduate students for graduate programs and future practice as speech-language pathologists. All undergraduate students in SPPA complete 446.

Drs. Allison Sauerwein and Steffany Chleboun have extensive experience in course design, teaching a wide variety of SPPA coursework, and directing SPPA programs. They regularly collaborate and will work cooperatively to carry out the activities described in the proposal. Their efforts will positively impact student recruitment, retention and success.

With my full support,

Robin L. Hughes

Robin L. Hughes, PhD
Dean
School of Education, Health and Human Behavior

Allison Sauerwein, PhD, CCC-SLP

Department of Applied Health
Speech-Language Pathology & Audiology Program
Southern Illinois University Edwardsville
Box 1147 - Edwardsville, IL 62026
(618) 650-5751 – allsaue@siue.edu

Education & Professional Experience

Ph.D. Speech-Language Pathology 2018
University of Kansas, Lawrence, KS

Assistant Professor 2018-present
Department of Applied Health, Southern Illinois University Edwardsville

Board Certification – Speech-Language Pathologist 2014-present
Illinois Department of Financial and Professional Regulation, Missouri Board of Healing Arts

Teaching Award Nominations

SIUE Teaching Excellence Award Nominee (School of Education, Health & Human Behavior) 2023
SIUE Teaching Excellence Award Nominee (Applied Health Department) 2023

Recent Teaching Presentations

Scholarship of Teaching and Learning – How to Apply SoTL to your Teaching November 1, 2023
SIUE Faculty Development (Midweek Mentor)

Recent Funded Grant (Scholarship of Teaching and Learning project)

(2022-Summer – 2023-Summer). Seed Grants for Transitional and Exploratory Projects (STEP). *Effects of an Online Training and Written Feedback on Therapy Provided by Graduate Student Speech-Language Clinicians to Clients who use Augmentative and Alternative Communication (AAC).*
Role: Principal Investigator
Amount Requested: $12,898.08
Status: Funded

Recent Research (All Scholarship of Teaching and Learning [SoTL] Work)

Sauerwein, A., Leatherman, E., & Griffith, K.* (accepted). If a Clinical Decision is the Destination, Clinical Reasoning is the Journey. *Scholarship of Teaching and Learning in Communication Sciences & Disorders: Past, Present, and Future*. *SIUE student

Ginsberg, S. M., Visconti, C. F., & **Sauerwein, A.** (2023, November). *Looking in the Mirror: Scholarly Reflections in SoTL Literature*. Poster session presented at the American Speech-Language-Hearing Association Convention, Boston, MA.

Pitt, K., Brennan, S.*, **Sauerwein, A.,** & Weissling, K. (2023). Preservice training in augmentative & alternative communication for speech-Language pathologists & special education teachers: Prevalence & preferences. *Perspectives of the ASHA Special Interest Groups*.

Friberg, J., Hoepner, J. K., **Sauerwein, A. M.**, & Mandulak, K. (2023). The integration of the scholarship of teaching and learning into the discipline of communication sciences and disorders. *Teaching and Learning in Communication Sciences & Disorders, 7*(1), 1-28 (Article 10). https://ir.library.illinoisstate.edu/tlcsd/vol7/iss1/10

Sauerwein, A., & Thistle, J. (2023). Cognitive processes used by graduate students during case-based AAC assessment and intervention think-aloud tasks. *Teaching and Learning in Communication Sciences & Disorders, 7*(2), 1-21 (Article 4). https://ir.library.illinoisstate.edu/tlcsd/vol7/iss2/4

Sauerwein, A. & Viernow, C.* (2022, November). *Using Mind Maps to Explore Student Learning in a Graduate AAC Course.* Poster session presented at the American Speech-Language-Hearing Convention, virtual conference. *SIUE student

Brady, K., & **Sauerwein, A.** (2022, April). *Hearing the Voices of Black Students in an Undergraduate Speech-Language Pathology/Audiology Program.* Poster session presented at the Council of Academic Programs in Communication Sciences and Disorders Conference, Portland, OR.

Undergraduate Mentoring

Undergraduate Research and Creative Activities (URCA) Program Mentor (supervised 9 URCA assistants between Spring 2019 and Spring 2024)
Undergraduate Faculty Mentor (mentored between 20 and 32 undergraduate students annually between 2018 and 2024)

Undergraduate Courses Taught at SIUE

SPPA 101: Introduction to Human Communication & its Disorders (undergraduate – 3 credit hours)
SPPA 312: Normal Language and Speech Acquisition (undergraduate – 3 credit hours)
SPPA 322: Speech Science (undergraduate – 3 credit hours)
SPPA 441: Speech Sound Disorders in Children (undergraduate – 3 credit hours)
SPPA 444: Language Disorders Across the Lifespan (undergraduate – 3 credit hours)
SPPA 446: Clinical Observation and Procedures in Communication Disorders
SPPA 499: Senior Assignment Seminar (undergraduate – 2 credit hours)

Recent & Relevant Service

- SIUE Faculty Development: Equity-Minded Teaching Faculty Book Club Co-Facilitator (Spring 2024)
- SIUE Faculty Development: SoTL Faculty Learning Community Facilitator (Spring 2024)
- SIUE Faculty Development: Lead Teaching Peer Consultant (Fall 2023-present)
    - Provided an additional 11 Peer Evaluations of Teaching for colleagues between Fall 2018 and Fall 2023
- SIUE National Student Speech-Language-Hearing Association Chapter Advisor (Fall 2019-present)
- SEHHB Teaching Excellence Awards Committee Chair (Fall 2021-Spring 2023)
- SPPA Curriculum Committee Member (Fall 2018-present)
- *Teaching and Learning in Communication Sciences & Disorders* journal Editorial Board Member (Fall 2022-present)

Steffany M. Chleboun Ph.D., CCC-SLP

Southern Illinois University-Edwardsville
Box 1147
Edwardsville, IL 62026-1147
(618)650-3677
schlebo@siue.edu

CV: (selected, recent)

EDUCATIONAL HISTORY

Washington University—k30 Mentoring Training Program in Clinical Investigation
Fall 2007-Spring 2010

University of Nebraska-Lincoln, Ph.D., December 2006
Degree: Ph.D. Interdepartmental Area of Human Sciences
Dissertation: Impact of Familiar, Unfamiliar and Synthetic Voices on the Arousal and Awareness of Minimally-Conscious Survivors of Acquired Brain Injury

PROFESSIONAL EXPERIENCE

Professor, Department of Applied Health, SIUE, Edwardsville, IL
2021-current

RESEARCH:

Publication and presentation history in the areas of acquired communication disorders and teaching and learning.

Chleboun, S., Brady, K., & Zelenak, J. (2021) Quality of life following stroke: A qualitative study across 30 years. *Perspectives SIG 15*. doi: doi.org/10.1044/2020_PERSP-20-00206

Chleboun, S., King, A., Lukert, S., & Weber, W. (2020). Knowledge of mild traumatic brain injury among special educators. *Journal of Special Education, doi:* https://doi.org/10.1177/0022466920962782

King, A. & **Chleboun, S**. (2019). Speech-Language Pathology Students' Motivation for Learning. *Teaching and Learning in Communication Sciences and Disorders, 3(1). doi:* 10.30707/TLCSD3

GRANTS

Innovation Grant 2020
Title: Establishing a Fully-Functioning Audiology Clinic at SIUE
Objective: To meet community needs for audiology services in our region

Role: Co-Project Director (w/ James Panico)
Funding: $167,914.50
Status: recommended for funding; but not funded due to pandemic

SERVICE ACTIVITIES

PROGRAM

Program Director (Graduate) 2012-current
Academic Advisor and Undergraduate Mentor 2012-current

DEPARTMENT

Academic and Student Affairs Committee (Member, Chair)
Personnel Committee (Chair, Member)
Promotion & Tenure Committee (Member, Chair)

SCHOOL OF EDUCATION

Personnel/ Professional Affairs (Chair, Member)

UNIVERSITY

Graduate Scholar Award Committee (Member)
Graduate School Search Committee (Member)
Faculty Advisor for Student Speech-Language and Hearing Association (Faculty Advisor)

TEACHING EXPERIENCE:

SPPA 101—Introduction to Speech-Language Pathology and Audiology
SPPA 250—Cultural Diversity in Speech-Language Pathology and Audiology
SPPA 320/220—Anatomy and Physiology
SPPA 520/397—Neuroanatomy and Neurophysiology of Communication Disorders
SPPA 545—Adult Acquired Language Disorders
SPPA 547—Motor Speech Disorders

LICENSURE/ CERTIFICATION

ASHA Certificate of Clinical Competence
August 2001- current

State of Illinois- Speech/Language Pathology
August 2006-2017

SOUTHERN ILLINOIS UNIVERSITY EDWARDSVILLE

Excellence in Undergraduate Education (EUE) Proposal

Project ID# (*leave blank*)

25-06

Project Title

A Classroom Response System for Student Engagement, Active Learning, and Real-time Intervention in CHEM 121A/B

Project Director	ID Number	Telephone	Email
Thomas C. Holovics	800390710	650-2589	tholovi@siue.edu

Department	Campus Box	School College
Chemistry	1652	College of Arts and Sciences

Course or Program

CHEM 121A General Chemistry I and CHEM 121B General Chemistry II

Project Co-Director	ID	Department	Email

Student Impact:	~650 students/year

Priority Rating (If Submitting Multiple Proposals):	

Project Budget

Salary	Wages	Travel	Equip.	Comm	CServ	Auto	Tele	Awards	Total
5528	1400								6928

Cost-Sharing

Salary	Wages	Travel	Equip.	Comm	CServ	Auto	Tele	Awards	Total
		1000							1000

Prior EUE Support

Project Director	Project Number	Award Amount	Project Dates
None in the past 5 years.			

Applicable 2024-2025 Priorities (*check all your proposal fits, if any*):

- ☑ Course redesign project that uses inclusive, student-centered pedagogies to address equity gaps, improve student learning outcomes, & enhance retention
- ☑ Project involves courses that have high number of sections, a high ratio of D/F/W grades, or key required courses with high enrollments and opportunities to improve equitable student success

Project summary

Human Anatomy and Physiology (BIOL 240a and 240b), and Functional Human Anatomy (BIOL 440) are courses with the primary goal of annually teaching 800 students the structure and function of the human body. The students enrolled in these courses participate in several challenging programs across campus including nursing, pre-pharmacy, pre-medical, pre-dental, biological sciences, exercise science, and health education. The complexity of the course content has traditionally resulted in higher D/F/W rates. The proposal is for the purchase of new state-of-the-art models that would allow our undergraduate students more interactive learning and improved understanding of the course content.

Narrative File

Anatomy and physiology instruction forms the cornerstone of medical education, providing students with a fundamental understanding of the structure and function of the human body. However, traditional lecture methods and often fall short in effectively conveying complex anatomical concepts. As we strive to enhance the quality of education we provide to our students, we recognize the significance of updating our laboratory resources to ensure an enriching learning experience is available to every student that works through our courses. Utilizing state-of-the-art anatomical models can significantly enhance student engagement, comprehension, and retention of critical information.

Our current inventory of anatomical models is, unfortunately, missing a few key pieces that could really improve the way we teach, and the way our students learn and engage with the content. There are advanced models now available that can help us meet the demands of modern teaching practices. With advancements in medical technology and pedagogy, it is imperative that we equip our classrooms with innovative tools that align with contemporary educational standards. By investing in several new anatomy and physiology models, we aim to transform the learning experience for our students and empower them with the knowledge and skills necessary for success in their academic and professional endeavors. These models incorporate interactive features, such as removable parts and anatomical landmarks, enabling students to explore and comprehend anatomical structures with unprecedented clarity and depth.

The proposed funding will be utilized to purchase the following anatomical models:

- **3-D Printed Superficial Dissection of the Upper Limb Model:** This is an exciting opportunity to add something to our model collection that more closely resembles the arm of a human cadaver. Students will greatly benefit from this innovative experience because we do not have human cadavers on campus. This model realistically displays the skin partially removed, connective tissues, blood vessels, muscles, tendons, etc. With this model, we will be able to change how we approach the instruction of several biological systems within the lab environment. We are requesting 2 of these models.
- **Eisco® Human Lymph Node Model:** Currently**,** we do not have any lymph node models in our teaching labs and having something other than 2D drawings in the student lab manual could greatly improve student understanding of the structure as well as the impacts the lymph nodes have on the entire lymphatic system. Our students have

repeatedly expressed their difficulty and frustration in comprehending this underappreciated body system. We are requesting 2 of these models.

- **Altay® Human Head Section with Cranial Nerves**: While we have models of the brain, many of our students struggle to connect the anatomy of the brain and cranial nerves to the physiological changes seen throughout the body. This model not only displays the cranial nerves but allows students to follow those nerves to the muscles or structures they innervate with relation to the skull/face/neck rather than just how they innervate the brain. The model has excellent detail and features a removeable eye for improved viewing of the optic nerve. We are requesting 2 of these models.

Budget and Budget Justification:

Item	Justification	Total Cost Requested
3-D Printed Superficial Dissection of the Upper Limb Model	This model realistically displays the skin partially removed, connective tissues, blood vessels, muscles, tendons, etc. List price: $4,026.45 Quantity requested: 2	$8052.90 + $219.89 in shipping
Human Lymph Node Model	It would benefit student learning to be able to see the structure of a lymph node in 3D. List Price: $298.55 Quantity requested: 2	$597.10
Human Head Section with Cranial Nerves	This model displays the cranial nerves and the structures in the head and neck they innervate. List Price: $515.80 Quantity requested: 2	$1031.60
		Total requested: $9901.49

SOUTHERN ILLINOIS UNIVERSITY
EDWARDSVILLE

Date: **02/29/2024**

To: **Faculty Development Council**

From: **Jason Williams, Chair, Department of Biological Sciences**

Subject: **Chair support letter for EUE proposal submitted by Bethany Kassebaum**

This memo is in support of Bethany Kassebaum's EUE proposal to purchase unique and enhanced models for use in Biology 240a, 240b, and 440 (two semesters of Human Anatomy and Physiology and Functional Human Anatomy). I strongly support her proposal because it will positively impact a large number of students in courses with traditionally high D/F/W rates.

Ms. Kassebaum's EUE proposal is specifically requesting funds to purchase new and unique models that more closely resemble living tissue, organs, and organ systems. More realistic models will aide in student conceptualization of the content to aide in understanding and retention (Tripodi *et al.*). These courses, in particular BIOL 240a and 240b, serve a large number of students from many programs including nursing, pre-health professionals from biology (pharmacy, dental, medical, etc.), and exercise science among others. In addition, the content of these courses is challenging, resulting in traditionally high D/F/W rates that range between 30-40%. These new models will be an excellent addition to the department's overall effort to enhance student understanding, reduce D/F/W rates, and increase overall retention.

The department fully supports the purchase of the requested models as we tackle the high D/F/W rates in these courses. In addition, the department does have foundational account funds to cover the 20% price match, or $1,980, of the expected total costs of $9,901.

Literature Cited:

Tripodi N, Kelly K, Husaric M, Wospil R, Fleischmann M, Johnston S, et al. The impact of three-dimensional printed anatomical models on first-year student engagement in a block mode delivery. Anat Sci Educ 2020;13:769–77.

College of Arts and Sciences
t 618.650.5044 **w** siue.edu/cas
a Office of the Dean, Suite 3409, Box 1608, Edwardsville, IL 62026-1608

SOUTHERN ILLINOIS UNIVERSITY
EDWARDSVILLE

Date: February 29, 2024

From: Kevin Leonard, Dean, College of Arts and Sciences 

Subject: EUE Dean Memo of Support

The College of Arts and Sciences supports the application of Bethany Kassebaum for an EUE grant to purchase human anatomical models to be used across multiple Biological Sciences courses: Biology 240a, 240b, and 440. The purchase of these models would fill the gaps in the department's laboratory resources and would enhance student learning of anatomy by providing tangible tools to support integration and application of knowledge in courses that have had historically high DFW rates. Additionally, these courses serve a variety of programs that require hands-on learning to prepare students for careers in the medical fields in addition to biology (nursing, pharmacy, dental). The proposal is aligned with student success initiatives on campus and EUE priorities.

The budget goes directly to purchasing the needed anatomical models for classroom use. The Department of Biological Sciences will provide the 20% cost share for equipment. The proposal provides benefits beyond the project year, as the materials purchased would continue to be used in future years across a wide range of courses that serve students from across the university.

College of Arts and Sciences
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a Office of the Dean, Suite 3409, Box 1608, Edwardsville, IL 62026-1608

Bethany L. Kassebaum

908 Stone Briar Drive, O'Fallon, IL 62269 Phone: (618) 558-6934 Email: bethkass1@gmail.com

Education

- **Master of Arts in Teaching –** Southern Illinois University Edwardsville, Edwardsville, IL
  - May 2010
  - Endorsements include middle school and high school biology.
  - Certificate 2434696 - 09
- **Master of Science in Biology –** Southern Illinois University Edwardsville, Edwardsville, IL
  - May 2004
  - Masters Research – Thermal stress and conservation of darters in two thermally contrasting streams of a small midwestern drainage.
- **Bachelor of Science in Biology –**Southern Illinois University Edwardsville, Edwardsville, IL
  - December 2001
  - Undergraduate Research – Seed viability of *Schoenoplectus hallii.*

Employment and Experience

- **Instructor of Biology. January 2017 – Current, Southern Illinois University Edwardsville.**
  - Responsibilities – Organization and presentation of courses with laboratory component and evaluation of students' progress.
  - Courses Taught
    - Biology 140 – Human Biology
    - Biology 240a – Human Anatomy & Physiology I
    - Biology 240b – Human Anatomy & Physiology II
- **Field Supervisor. May 2018 – Current, Southern Illinois University Edwardsville.**
  - Responsibilities – Organization of undergraduate students, data collection, live-trapping of small mammals, and experimentation under the direction of Dr. D. Lee.
- **Adjunct Instructor of Biology. August 2010 – December 2016, Southern Illinois University Edwardsville.**
  - Responsibilities – Organization and presentation of courses and evaluation of students' progress.
  - Courses Taught
    - Biology 111 – Contemporary Biology
    - Biology 140 – Human Biology
- **Adjunct Instructor of Biology. August 2007 – December 2016, Southwestern Illinois College.**
  - Responsibilities – Organization and presentation of courses with laboratory component and evaluation of students' progress.
  - Courses Taught
    - Biology 100 – General Biology: Ecology, Evolution, & Genetics
    - Biology 101 – Principles of Biology I
    - Biology 102 – Principles of Biology II
    - Biology 157 – Human Anatomy & Physiology I
- **Faculty Development Committee Member August 2015 – December 2016, Southwestern Illinois College**
  - Responsibilities – Serve on a team that oversees the planning and production of all faculty development programs offered to SWIC faculty and other employees.

- **Learning Assistance Centers for Excellence (LACE) assistant for the Success Center – August 2014 – December 2016, Southwestern Illinois College.**
    - Responsibilities – Assist as a biology contact to students with difficult material.
- **Laboratory Manager in the labs of Dr. Jonathan D. Gitlin, M.D., Thomas Morgan, M.D., and Enrique Izaguire, Ph.D. May 2004 – June 2009, Washington Univ. School of Med.**
    - Responsibilities – Lab organization, genetic mapping, DNA extractions, supervising the work of undergraduate and graduate students, maintaining genetic inbred zebrafish lines (invitro fertilization) for experiments, small animal care, radiation techniques, water quality, and facility maintenance.
- **Research Assistant. April 2002-December 2003, U.S. Army Corp of Engineers and Southern Illinois University Edwardsville.**
    - Performed a complete faunal survey of Lake Wappapello. Managed the organization, collection, and identification of fish species. Other responsibilities included mammal trapping, mammal tracking, mammal identification, amphibian and reptile collection and identification. April 2002 – December 2003.

Current Committees

- **Biological Sciences Committee on Inclusivity and Equity.** Responsibilities include seeking out and engaging in antiracism work focused on facilitating systematic change, infusing curriculum with diverse modern examples and decolonize historical representations of biologists, and examining and rectifying practices that create and/or perpetuate inequities for students, staff, and faculty.

Publications

- Mendelsohn BA, **Kassebaum BL**, Gitlin JD: The zebrafish embryo as a dynamic model of anoxia tolerance. *Developmental Dynamics*. 2008 237: 1780-1788.
- Morgan TM, Xiao L, Lyons P, **Kassebaum BL**, Krumholz HM, Spertus JA: Investigation of 89 candidate gene variants for effects on all-cause mortality following acute coronary syndrome. *BMC Medical Genetics*. 2008 Jul 12; 9:66.

Awards

- SIUE Finalist for the Ed Roberts "Champions of Accessibility", Defender of Equity Award. 2019
- American Society of Ichthyologist and Herpetologists- Stoye Award finalist. 2004.

Jessica Wright
7355 Woodland School Road
Mascoutah, IL 62258
jchoudh@siue.edu
(618) 670-6332

Education

Master of Science in Biology, August 2015 Southern Illinois University Edwardsville
Foci: Ecology, Plant Biology, Invasive Species Biology, Botany
Thesis: Shade Tolerance and Physiological Response to Light Regime of the Invasive Species *Lonicera maackii* (Amur honeysuckle)

Bachelor of Science in Biology, cum laude December 2011 Southern Illinois University Edwardsville
Specialization: Ecology, Evolution, Environmental Biology

Biological Sciences Senior Award
Katherine Dunham Award in Anthropology
Fred Voget Award in the History and Theory of Anthropology

Experience

Publications

Schulz, K.E., Wright, J., and S. Ashbaker. (2012) Comparison of invasive shrub honeysuckle eradication tactics for amateurs: Stump treatment versus regrowth spraying of *Lonicera maackii*. *Restoration Ecology* 20(6): 788-793.

Schulz, K.E. and J. Wright. (2015) Reproduction of invasive Amur honeysuckle (*Lonicera maackii*) and the arithmetic of an extermination strategy. *Restoration Ecology* 23(6): 899-908.

Academic Mentorships

STEM Scholars Program at Southwestern Illinois College
A National Science Foundation funded program providing individualized academic mentoring to students pursuing goals in STEM careers.

Honors Thesis Program at McKendree University
A rigorous 2-semester curriculum culminating in an independent research project and scientific presentation within a discipline of interest.

Employment

Southern Illinois University Edwardsville Aug 2019 - Current
Instructor
Lab coordination for Human Anatomy & Physiology courses, supervision of teaching assistants to A&P courses. Instruction of Human A&P courses.

St Louis Community College Fall 2016 - Current

Adjunct Instructor of Biology

Instruction (in-person & hybrid) across a broad range of topics within introductory biology and areas of special interest in biology. Courses taught include Introduction to Biology and its accompanying lab, and the Biology of Human Sexuality. Topics covered include human anatomy and physiology, disease prevention, embryology, human sexual development, and social aspects of sexual identity, cell and molecular, thermodynamics, chemistry, microbiology, genetics, evolution, biodiversity, and ecology.

Lewis and Clark Community College Jun 2018 – Aug 2022

Adjunct Instructor of Biology

Online instruction and course development in the discipline of ecology. Instruction of general topics in biology for non-majors.

McKendree University Fall 2016 – May 2019

Adjunct Instructor of Biology

Face-to-face instruction of topics in biology and environmental science. Courses taught include Biology Lab for Majors (I & II), Environmental Science, and Field Botany.

Southwestern Illinois College Fall 2014 – Aug 2019

Adjunct Instructor of Biology

Face-to-face instruction in courses for biology majors and non-majors introduction to biology.
Classroom and laboratory instruction in a broad range of topics; including application of the scientific method, genetics, cell biology, evolution, biodiversity, phylogenetics, ecology, and the implications of modern technologies and problems, e.g. gene therapy, GMO organisms, and climate change.

St. Louis College of Pharmacy Aug 2015 – May 2016

Adjunct Faculty, Basic Sciences Department

Laboratory based instruction of biological topics and supervision of teaching assistants within the lab setting. Laboratory topics include cellular respiration, photosynthesis, enzyme activity, DNA replication, transcription/translation, plant anatomy and physiology, animal histology and physiology, and comparative vertebrate anatomy.

Southern Illinois University Edwardsville Jan 2012 – May 2015

Teaching Assistant, Dept. of Biological Sciences – Laboratory instruction of Biology 150 and 151 (Introduction to Biological Sciences I & II). Direct instruction of laboratory sections covering; comparative vertebrate anatomy with dissections, animal and plant histology, plant anatomy, ecology, phylogenetics, and other topics as assigned. Developed proficiency in the use of standard laboratory equipment (including microscopes, gel electrophoresis, and spectrophotometers), field equipment, Microsoft Office (Excel/PowerPoint/Word), and statistical software.

Research Assistant, Dept. of Biological Sciences – Conduct field, greenhouse, and laboratory research investigating hypotheses regarding *Lonicera maackii* biology, control of invasive plant species, forest restoration, population ecology, and community ecology.

Illinois State Archaeological Survey Sept 2011 – Sept 2012 and Oct 2010 – Apr 2011

Archaeological Field Technician – Conduct archaeological excavations of prehistoric features, map surface features of Mississippian and Late Woodland settlements, process and curate artifacts (prehistoric and historic), process flotation samples.

Applied Ecological Services, Inc. Apr 2011 – Sept 2011 and May 2010 – Oct 2010

Ecological Field Assistant on The Illinois Natural Areas Inventory Update – Assist in the assessment and evaluation of natural areas for potential inclusion in the Illinois Natural Areas Commission list of high-quality natural areas throughout the state. Evaluate natural communities by quadrat and belt transect, identify plants to species, and delineate site and community boundaries using GIS software.

Southern Illinois University Edwardsville Sept 2008 – Apr 2010

Department of Biological Sciences – Conduct field, greenhouse and laboratory research investigating topics related to invasive plant species biology, control, and removal.

National Great Rivers Research and Education Center Summer 2009, Summer 2007

Intern – (Topic 1) Invasive potential of tree species into oak-hickory bluff forest; (Topic 2) Invasive potential of bush honeysuckle in old-growth canopy gaps

Presentation of Research and Research Collaborations*

2015 *Ecological Society of America Annual Meeting*
Threshold light levels for growth of *Lonicera maackii* seedlings in forest understories.
Kurt Schulz and Jessica Wright

2015 *Thesis Defense: Master of Science, Southern Illinois University Edwardsville*
Shade Tolerance and Physiological Response to Light Regime of the Invasive Species *Lonicera maackii* (Amur honeysuckle)
Jessica Wright*

2015 *Illinois State Academy of Science Annual Meeting*
Understory light levels needed to promote the growth of invasive *Lonicera maackii* (Caprifoliaceae) seedlings.
Jessica Wright and Kurt Schulz

2014 *Natural Areas Conference Annual Meeting*
Propagule production and propagule pressure: A new perspective for managing *Lonicera maackii*.
Jessica Wright* and Kurt Schulz

2010 *Illinois State Academy of Science Annual Meeting*
Natural canopy gap formation facilitates Asiatic honeysuckle invasion of an old growth forest.
Jessica Wright* and Kurt Schulz

2010 *Illinois State Academy of Science Annual Meeting*
Efficacy of glyphosate injection to eradicate *Ailanthus altissima* (Simaroubaceae). Jessica Wright*, David Harroun, Kurt Schulz, Nathan Reese, Erin Dugan, Tim Tripp, Erica McDonald and Melissa Hall

2010 *Illinois State Academy of Science Annual Meeting*
A cautionary tale: ineffective stump treatments increase *Ailanthus altissima* (Simaroubaceae) density six-fold.
Nathan Reese, Jessica Wright, and Kurt Schulz

2009 *Ecological Society of America Annual Meeting*
Reproductive output, seed quality, and invasive potential of Asiatic honeysuckle [*Lonicera maackii* (Rupr.) Herder].
Kurt Schulz and Jessica Wright*

2009 *Ecological Society of America Annual Meeting*
Temporal and spatial pattern of Asiatic honeysuckle [*Lonicera maackii* (Rupr.) Herder] invasion in disturbed southern Illinois forests.
David Harroun, Kurt Schulz and Jessica Wright*

2009 *Illinois State Academy of Science Annual Meeting*
Reproductive potential, fruit and seed quality of *Lonicera maackii* (Caprifoliaceae) in sun and shade habitats.
Jessica Wright* and Kurt Schulz

2009 *Illinois State Academy of Science Annual Meeting*
Efficacy of Glyphosate injection to eradicate *Ailanthus altissima*.
Jessica (Choudhury) Wright*, Kurt Schulz and David Harroun

2009 *National Great Rivers Research and Education Center Intern Symposium*
Old-growth forest canopy openings as invasion opportunities for Asiatic shrub honeysuckle (*Lonicera* spp.).
Jessica (Choudhury) Wright* and Kurt Schulz

2008 *Illinois State Academy of Science Annual Meeting*
Invasion potential of introduced tree species in Oak-Hickory dominated forest at the Mississippi Sanctuary, Godfrey, Illinois. Jessica (Choudhury) Wright*, Peter Minchin and William Retzlaf

2007 *National Great Rivers Research and Education Center Intern Symposium*
Assessment of the invasion potential of introduced tree species in the bluff forests of the Illinois and Mississippi River systems.
Jessica (Choudhury) Wright*, Peter Minchin and William Retzlaf

Dr. James D. Enyart
8236 West Main Street
Belleville, IL 62223
618-910-9060 (cell)
drjenyart@gmail.com

Education:

Logan College of Chiropractic, St. Louis, Missouri
-Doctor of Chiropractic; April 2007
-Senior Research: Effect of Cold Laser Therapy on Temporomandibular Joint Dysfunction

Southern Illinois University, Edwardsville, Illinois
-Master of Science, Kinesiology; December 2013
-Emphasis: Exercise and Sport Psychology
-Thesis/Graduation Project: Developing a Mental Skills Training Program For Exercise in the General Population
-GPA: 4.0

Logan College of Chiropractic, Chesterfield, Missouri
-Bachelor of Science, Human Biology; 2005

Southern Illinois University, Edwardsville, Illinois
-Bachelor of Science, Psychology (honors); 1997

Experience:

Southern Illinois University Edwardsville **August 2021-Present**
Position: Instructor (Full-Time) **August 2022-Present**
Lecturer (Adjunct) **August 2021-May 2022**

Courses taught: Biology 440: Functional Human Anatomy
Biology 240a: Human Anatomy & Physiology I
Biology 240b: Human Anatomy & Physiology II
Biology 205: Human Disease
Biology 140: Human Biology

Southwestern Illinois College **August 2019-August 2023**
Position: Adjunct Professor, Biology

Courses taught: Biology 158: Anatomy & Physiology II with Lab
Biology 157: Anatomy & Physiology I with Lab
Biology 105: Human Biology with Lab

Workshops and Certifications:
-Instructional Design Certificate Program. 10 hour program in Blackboard course design completed August 2019.
-CATS I Workshop. Classroom Assessment Techniques 1 workshop completed August

2019.

Lindenwood University Belleville **January 2012-May 2020**

Position: Assistant Professor of Biology; **August 2015- May 2020**
Faculty Athletics Representative

Courses taught:
Biology 486: Senior Synthesis
Biology 228: Anatomy & Physiology II with Lab
Biology 227: Anatomy & Physiology I with Lab
Biology 121: Nutrition
Exercise Science 430: Physical Activity for Specific Populations
Exercise Science 340: Nutrition for Performance
Exercise Science 240: Nutrition throughout the Lifecycle
Physical Education 330: Psychological Aspects of Physical Education (Online)

Committees:
Educational Policies Committee
Faculty Council
Higher Learning Commission Accreditation Committee

Academic Advising: **August 2015-May 2020**

Responsible for academic advising to approximately 40 undergraduate students in the Exercise Science and Biology programs per semester to enable students to meet degree requirements.

Division of Sciences Admissions Liaison: **August 2015-May 2020**

Prepared and presented Biology and Exercise Science Program presentations for prospective students and families during Admissions recruiting events. These presentations were included in weekend Open Houses, Summer Overnights, and Homecoming activities each semester, including summer sessions. These programs maintained or increased enrollment each academic year.

Biology Department Assessment Coordinator: **May 2016-May 2020**

Responsible for collecting all assessment data for the Lindenwood University Belleville Department of Biology and writing the yearly departmental assessment report.

Interim Department Chair; Biology and Chemistry **Spring 2018**

Served as the interim Department Chair while the active chair was on maternity leave for the spring semester of 2018.

Faculty Athletics Representative **August 2018-May 2020**

Responsible for ensuring that all participants in intercollegiate competition are eligible in accordance with the rules and regulations of the NAIA prior to representing the institution in any manner for 30 campus teams.

Met with the institution's chief executive officer to review NAIA and conference issues regarding academics and athletics.

Participated in any conference-wide meeting set for the purpose of rules education.

Participated in conference meetings when items on the agenda are pertinent to the faculty member's role as the faculty athletics representative.

Illinois Science Olympiad Committee **October 2016-March 2019**

Served on the Lindenwood University Belleville Planning Committee for the Illinois Science Olympiad Regional tournaments 2017, 2018, and 2019.

Proctored several events during the competition as a volunteer.

Honors and Awards:

Faculty of the Year Award **2018-2019**

Lindenwood University Belleville Athletics Department

The recipient of the Faculty Award must be a current faculty member who goes above and beyond to support the Lindenwood Athletics Department. This can be demonstrated through attendance at athletic events, individual team support through faculty mentorship, or consistent commitment to assisting student athletes in the classroom.

The recipient's hard work and dedication to the Lindenwood athletics department is demonstrated through their consistent commitment to assisting coaches, student athletes, and fellow staff members throughout the year.

Position: Adjunct Professor, Biology **2012-2015**

Courses taught: Biology 228: Anatomy & Physiology II with Lab
Biology 227: Anatomy & Physiology I with Lab
Biology 121: Nutrition

St. Louis Community College-Meramec **January 2015-May 2015**
Position: Adjunct Professor, Biology

Courses taught: Biology 111: Introductory Biology I

-Did not return due to accepting full-time position at Lindenwood University Belleville.

Enyart Chiropractic **January 2008-January 2014**
Position: Owner, Chiropractic Physician

Clinical Duties and Responsibilities:
-Patient Care**:** history, consultation, clinical exams, diagnoses, treatment plans, treatment plan implementation, rehabilitation therapy, nutritional counseling, exercise/fitness plans.

Management Duties and Responsibilities:
-Clerical: Responsible for all patient documentation, insurance billing and documentation.
-Marketing: Responsible for the design and implementation of all internal and external marketing programs for Enyart Chiropractic.
-Clinic Operations: responsible for all day to day operations at Enyart Chiropractic.

Certification/Credentialing:

-State of Illinois: Licensed Chiropractic Physician
License Number: 038010976
-National Board of Chiropractic Examiners: Part I, II, III, IV
-National Board of Chiropractic Examiners: Physiotherapy
-BLS Provider (CPR/AED); American Heart Association
-Fitness Nutrition Specialist; National Academy of Sports Medicine
-Nutrition Specialist Certification; Logan College of Chiropractic

-**Professional Affiliations**

- American College of Sports Medicine
- American Association for Anatomy
- Human Anatomy and Physiology Society
- National Strength and Conditioning Association

Community Service

Signal Hill Education Foundation **May 2021-Present**

-Vice President

Signal Hill School District 181 Board of Education **April 2015-April 2019**
Position: Vice President
-Personnel Committee; Chair
-Policies Committee member

American Cancer Society Relay for Life-Belleville **May 2008-2013**

Position: Event Co-Chair, Planning Committee, Team Captain
-Mission Chair, Team Captain, Event Emcee and Keynote Speaker 2011
-Event Co-Chair, Mission Chair, Event Emcee and Keynote Speaker 2010
-Planning Committee, Mission Chair, Team Captain, 2008-2013

Tricia Altmansberger, MD

4140 Aberdeen Place Swansea, IL 62226 ♦ Phone: (618)-531-5349
taltmansberger@gmail.com

PROFESSIONAL EXPERIENCE

SOUTHERN ILLINOIS UNIVERSITY-EDWARDSVILLE Edwardsville. IL
Professor of Biology 2023-current

Courses taught:

- Biology 111 Contemporary Biology
- Biology 140 Human Biology
- Biology 240b Human anatomy and Physiology

Adjunct Professor of Biology 2022-2023

Courses taught:

- Biology 140 Human Biology
- Biology 205 Human Diseases

SOUTHWESTERN ILLINOIS COLLEGE BELLEVILLE Belleville, IL
Adjunct Professor of Biology August 2020- Current

Courses taught:

- Biology 105: Human Biology with Lab
- Biology 157 Human Anatomy and Physiology I with Lab
- Biology 158 Human Anatomy and Physiology II with Lab
- Biology 250 Microbiology with Lab

LINDENWOOD UNIVERSITY BELLEVILLE Belleville, IL
Adjunct Professor of Biology August 2010 – May 2020

Courses taught:

- Biology 227: Anatomy & Physiology I with Lab
- Biology 228: Anatomy & Physiology II with lab
- Biology 121: Nutrition
- Biology 100: Concepts in Biology

MCKENDREE UNIVERSITY Lebanon, IL
Adjunct Professor of Biology *January 2020-Current*

Courses taught:

- BIO-309 Human Anatomy and Physiology Lab
- BIO-101 Biology for Life

CARDINAL GLENNON CHILDREN'S HOSPITAL St. Louis, MO
Resident Physician 2006

- Managed medical care of pediatric patients in a hospital setting including emergency room, outpatient clinics, and inpatient care.

BELLEVILLE TOWNSHIP HIGH SCHOOL WEST Belleville, IL
Biology Teacher 2006-2010

- Planned lessons, presented information, promoted discussion, assessed performance and modified learning techniques in the study of biology for students in high school
- Developed engaging curricula including lab experiments and other scientific investigations

Tricia Altmansberger, MD

4140 Aberdeen Place Swansea, IL 62226 ♦ Phone: (618)-531-5349
taltmansberger@gmail.com

- Planned and implementated schools policies and regulations
- Prepared and graded examinations
- Maintained student engagement

BELLEVILLE TOWNSHIP HIGHSCHOOL WEST Belleville, IL
Varsity Girls Tennis Coach 2007-2010

- Provided drills and activities to enhance player skills on the tennis court
- Arranged student travel to tournaments, supervised students according to school policy, and worked with school administration

EDUCATION

Lindenwood University and Southwestern Illinois College 2006-2007
- Selective courses in Education, 2006-2007

Saint Louis University 05/2002
- Awarded Bachelor of Arts-Psychology
- Honors summa cum laude
- Medical Scholars Program

Saint Louis University School of Medicine 05/2006
- Awarded Doctor of Medicine

CERTIFICATIONS

Initial Secondary Teaching Certificate in the State of Illinois
United States Medical Licensing Examination: Step 1, 2 CK, 2 CS

HONORS AND AWARDS

Adjunct Faculty of the Year Award 2018-2019
- The Adjunct Instructor of the Year Award is presented to the adjunct instructor who, in the judgement of Lindenwood University colleagues, demonstrates the best combination of pedagogical innovations, student-centeredness, and effectiveness as a classroom teacher during the present and prior academic years.

PROFESSIONAL AFFILIATIONS

American Academy of Pediatrics
American College of Physicians

COMMUNITY INVOLVEMENT

Junior Service Club of St. Clair County 2007- Current
Treasurer 2014-2015
Corresponding Secretary 2015-2016
Board of Directors 2012-2014

- Participated in this service organization that provides an organized resource of volunteers and financial support for various non-profit organizations in St. Clair County.

SOUTHERN ILLINOIS UNIVERSITY EDWARDSVILLE

Excellence in Undergraduate Education (EUE) Proposal

Project ID# (*leave blank*)

25-06

Project Title

A Classroom Response System for Student Engagement, Active Learning, and Real-time Intervention in CHEM 121A/B

Project Director	ID Number	Telephone	Email
Thomas C. Holovics	800390710	650-2589	tholovi@siue.edu

Department	Campus Box	School College
Chemistry	1652	College of Arts and Sciences

Course or Program

CHEM 121A General Chemistry I and CHEM 121B General Chemistry II

Project Co-Director	ID	Department	Email

Student Impact:	~650 students/year

Priority Rating (If Submitting Multiple Proposals):	

Project Budget

Salary	Wages	Travel	Equip.	Comm	CServ	Auto	Tele	Awards	Total
5528	1400								6928

Cost-Sharing

Salary	Wages	Travel	Equip.	Comm	CServ	Auto	Tele	Awards	Total
		1000							1000

Prior EUE Support

Project Director	Project Number	Award Amount	Project Dates
None in the past 5 years.			

Applicable 2024-2025 Priorities (*check all your proposal fits, if any*):

- ☑ Course redesign project that uses inclusive, student-centered pedagogies to address equity gaps, improve student learning outcomes, & enhance retention
- ☑ Project involves courses that have high number of sections, a high ratio of D/F/W grades, or key required courses with high enrollments and opportunities to improve equitable student success

Multi-use stream table to quantify and demonstrate the interaction between stream and in-channel structures

Summary

The success of any academic program depends on its ability to train students, who are a primary part of the teaching process. Students undeniably derive inspiration and encouragement from motived faculty, available resources and teaching mediums. Engineering is an applied field where students learn theory and the fundamental concepts to solve real-world problems and they gain the greatest experiences through hands-on learning. Thus, teaching approaches balancing theory and hands-on training, such as laboratory experimentation, should be emphasized, which allow students to understand the physical phenomena by the theory, to learn through experimentation, to formulate and test hypotheses and to support decision processes and design.

The principle investigator (PI) proposes to modify the existing stream table located in the Fluid mechanics laboratory Civil Engineering (CE) Department, Southern Illinois University Edwardsville (SIUE). The proposed stream table can be used for multi-purpose application including CE 415L: Fluid mechanics laboratory experiment. Furthermore, the proposed project can be used to demonstrate impacts of in-channel structural design on stream bank erosion and sediment transport to K-12 via outreach, undergrad teaching, professional seminars and demonstrations. Also, it can help PI's teacher-scholars activity by providing joint research opportunities on river and ecosystem interactions. This proposal was recommended for SIUE EUE funding in 2020, which shows the significance of the project on SIUE CE undergraduate students, but had not been funded because of COVID-19 impacts on SIUE finances, scholarships and awards.

2. Proposal Narrative

A. Current Situation:

Civil engineering (CE) projects involve designing hydraulic structures (e.g., bridge, culvert, etc.) in natural waterways, such as streams and rivers. Construction of structures change the hydraulic processes in the channel and result in modifications to the stream elements, such as armoring, erosion and deposition of the stream bank or bed and reroute the stream flow in other direction. Regardless of the type of construction, the stream dynamics will be affected by the changes imposed on the stream by constructing hydraulic structure. These types of fundamental processes and changes can be modeled with a stream table and this tool provides useful data and insight into, however, modeling of nature is complex (Bertoldi et al., 2015; Cilliers et al., 2013).

The lab experiments guide students towards learning important skills that supplement engineering problem-solving techniques, such as a teamwork, conflict resolution and technical communication (written and oral) and also offer students the opportunity to understand the difference between the ideal examples presented in the classroom (numerical problem solutions) and non-ideal challenges likely to be encountered in the solving real-world issues. Generally, lab experiments are limited to topics open channel flow and flow rate measurement, pipe flow and head losses, flow over immersed bodies, and fluid statics and dynamic, etc. (Munson et al., 2010). Specifically, lab experiments on impacts of structure design on natural channel hydraulics including erosion/deposition are not part of curriculum of CE in majority of institutes.

The CE and Mechanical Engineering programs SIUE requires all graduates to complete CE315 (cross-listed as ME315) Fluid mechanics course accompanied by laboratory experiments. CE315 is a core course and mandatory for all CE engineering students and followed by

CE415L: Fluid mechanics laboratory. CE415L focuses on experiments on open channel flow energy calculations, hydraulic jumps formation, pipe flow and head losses, centrifugal pump hydraulic and stream and hydraulic structure interaction.

A stream table (Figure 1) is used to perform an experiment to observe interaction between stream and a hydraulic structure. One of the main purposes of this experiment is to initiate a variety of modifications to the stream (model) and to observe and describe how the stream responds to those changes. This experiment is focused on observing the basic erosion-deposition processes qualitatively. These processes are common to many civil engineering river projects.

Figure 1: General difference between existing (left) and proposed stream table (right). (Photo source: https://www.tes.com/lessons/NHnmiCKAE5kvVw/factors-influencing-river-erosion)

The existing stream table (Figure 1) is constructed from timber and marine-grade plywood with dimensions of 72 inches (Length), 36 inches (Width) and 26 inches (Height). This table was constructed in-house at the School of Engineering lab facility about 20 years ago. Because the base of the table is designed with a fixed angle, the slope of stream is constant, thus limited to

the modeling of a specific type of river. A physical model that has a capability of modeling different stream types (e.g., flat sloped low elevated rivers and steep slope mountainous rivers) holds more value for educational purposes. Flow in the current stream table is controlled using manual valves, but the water quantity is not measurable. The water hose is connected to a water line in the lab and after flowing through the existing stream table, the water is simply discharged into the drain. Due to the lack of recycling water and capturing sediment facility, some sediments flow into the drainage system, specifically because lightweight (low density) plastic materials are being used to represent heavier (high density) sand particles. Therefore, sandy materials has to be supplemented frequently, which adds cost for experiments. Furthermore, the existing experiment lacks quantitative analysis of erosion/deposition (change in topography), channel widening, sediment transport and flow measurement. The experiment is performed based on visual observation and judgement, photograph documentations and qualitative analyses.

The stream table experiment is not only used by Civil Engineering students, but also used for demonstration during School of Engineering Open Houses, Previews and High School Summer camps organized by the SIUE. These outreach efforts showed importance of stream lab experiment for prospective future undergraduate students. Since the PI joined SIUE in Spring 2017, the stream table has been used by a total of 336 undergraduate students (at least 48 per year) part of their CE curriculum and has been used for demonstration for 175 High School Summer camp students (25 each year). Furthermore, it has been used to demonstrate riverine processes to prospective students and their parents during School of Engineering building tour in open house and preview events (number of high school prospective students varies).

B. Proposed Project:

PI is proposing to build a new larger stream table, which is able to perform quantitative analyses of stream and structure interaction (e.g., erosion and deposition, bank erosion, sediment transport, surface erosion due to rainfall in watershed, etc.) (Figure 1 and Figure A1 in Appendix). The new stream table will consist measurement of different features such as discharge, channel length (along deepest part of channel), sediment load/transport, and water depths. The dimension of the Table will be 120 inches (L), 40 inches (W) and 26 inches (H) with maximum of 10^0 of manual tilting (longitudinal slope) (Figure A1 in Appendix). This tilting capability will allow the proposed stream table to model varieties of river systems from flat sloped (mid-western rivers) to steep mountainous rivers. Because CE graduates work throughout the United States, it is important they learn how hydrologic process can vary between different types of river systems.

The stream table will also be equipped with a flow control and measurement device including digital display and data logger, which allow students to control and record flow in the experiments. The water depth in the stream will be measured with an Ultrasonic sensor. Water used in the stream table will be recycled and a sediment capture device will be installed such that students could quantify sediment transport or sediment load in the stream. It will be accompanied with 2, 20-gallon polyethylene reservoir tanks and a recirculating pump. Multiple grain size sands (will be used instead of the uniform sand in existing experiments. This change will allow stream table users to visualize size of sand particles that are in motion or transport in the stream. One of the new and advanced feature of the proposed stream table is that it will use mounted digital camera to take pictures of the experiments. Agisoft Metashape software

(https://www.agisoft.com/) will be used to quantify change in stream bathymetry analyzing photographs captured before and after the events. The software performs photogrammetric processing of digital images and generates 3D spatial data, which can be used in used in GIS applications. The software will be installed in one of the existing computers in the lab. The digital image processing requires control points (3 to 8) with known X, Y and Z (elevation reference to datum) coordinates, which will be permanently marked on the stream lab. The following tasks will be performed within one year of project period starting from July, 2024 (Table 1). Therefore, the proposed stream table is significantly different and advanced from existing stream table based on capability to perform experiments and multiple functionality (Table A1, in Appendix).

Table 1: Timeline for completing proposed project (July, 2024 to June, 2025)

Task	J	A	S	O	N	D	J	F	M	A	M	J
Task 1												
Task 2												
Task 3												
Task 4												
Task 5												

Task 1: The PI will consult with a structural engineering faculty member in the CE Department chair (Dr. Nader Panahshahi) for structural design. The PI also intends to visit different institutes where similar stream tables have been used. Based on web search, the flume has been used in CE department, Saint Louis University, MO (https://sites.google.com/slu.edu/cox/equipment-and-resources).

Task 2: Stream table will be constructed in the Fowler Student Design Center, School of Engineering, SIUE. PI will work closely with former School of Engineering Lab manager Mr. Brent Vaughn and a student worker to design and construct the table.

Task 3: The PI is responsible for the testing and verification of stream table and will work with Mr. Vaughn and a RA, before using in CE415L curriculum in Fall, 2025. Furthermore, RAs and teaching assistants (TAs) will be trained for operating the stream table for different experiments.

Task 4: PI will modify existing CE415L curriculum and experiment design. Specifically, stream and structural experiment will be modified focusing on quantified analyses.

Task 5: PI will prepare final report at the end of project period.

C. Evaluation and Dissemination:

Success of the project will be analyzed based on the number of undergraduate students benefiting from the project via course related experiments and other scholarly activities. Furthermore, undergraduate student and high school students, and professionals benefit from proposed project via teaching, demonstration and outreach. Beside for class experiments in CE415L, the stream table can also be used for fundamental and basic research on geomorphology, stream bank erosion and surface erosion in watershed. Additionally, it could be used to demonstrate riverine processes for professionals working in riverine biology and ecosystem, and geomorphologists as well as K-12 students for more advanced demonstrations, research, and teaching. PI's research interest focus on river systems and ecosystem, thus, this proposed project may also enhance hi research interests.

D. References:

Bertoldi, W., M.Welber, Gurnell, A.M., Mao, L., F.Comiti, M.Ta, 2015. Physical modelling of the combined effect of vegetation and wood on river morphology. Geomorphology 246, 178-187.

Cilliers, P., Biggs, H.C., Blignaut, S., Choles, A.G., Hofmeyr, J.-H.S., Jewitt, G.P.W., Roux, D.J., 2013. Complexity, Modeling, and Natural Resource Management. Ecology and Society 18(3), 1-12.

Munson, B.R., Young, D.F., Okiishi, T.H., Huebsch, W.W., 2010. A Brief Introduction To Fluid Mechanics, 5 edition ed. John Wiley & Sons, Hoboken, NJ.

Budget and Budget Justification:

Salaries - $5,435

- 0.25 month of summer salary is requested for the PI. He will be responsible for design stream table, preparing construction drawing, coordinate with former lab manager Mr. Brent Vaughn, verify stream table and train RA/TA for application of the stream table **($2485)**
- 3 month of salary (@40 hour/month with hourly rate of $16) is requested for graduate student during Summer and Fall 2025 (TA/RA). A graduate student hire and work with PI for Verification stream table, and experimental design and operation **($1,950)**.
- 20 hours service charge (@ $50 per hour) is requested for Mr. Brent Vaughn during construction and verification of stream table (Total **$1,000)**.

Student Wages for Summer and Fall 2025 ($600)

An undergraduate student will be hired (40 hours @ $15/hour) to work with Mr. Brent Vaughn, PI, and TA/RA during stream table construction, and verification.

Equipment ($4,958)

- 20 Gallon Molded Polyethylene Tank with Lid & 3/4" FNPT Fitting - 4" L x 12" W x 31" H,
- Construction materials: 1/2" marine and other plywood, metal and other structural members, piping and misc. components, waterproof paint, tilting mechanism (lump sum)
- Flowmeter with digital display and data logger, Variable speed flow pump, Digital camera, software, stream media, Ultrasonic sensor

TOTAL Budget - $10,993

Department Commitment, Cost Share - **$0**

EUE Funds Requested - $10,993

Budget Summary table

Description	Quantity	Unit	Price rate ($)	Total ($)
*Reservoirs	2	each	132	264
**Construction materials	1	set	413	375
Frame, steel	1	set	550	500
[Δ]Flowmeter, digital display, data logger	1	unit	1166	1060
Variable speed flow pump	1	unit	800	800
Tilt mechanism	1	parts	165	165
Digital camera	1	unit	220	200
Software	1	license	604	549
Stream media	100	lb	5.5	550
**** Ultrasonic sensor with display and software	1	set	495	495
Student worker (1 month @25%)	40	hours	15	600
***RA/TA	3	month	650	1950
[α]Brent Vaughn	20	hours	50	1000
PI	0.25	month	9938	2485

Total cost $10,993

*20 Gallon Blue Molded Polyethylene Tank with Lid & 3/4" FNPT Fitting - 14" L x 12" W x 31" H

**Construction materials: Wood, 1/2" marine plywood, piping and misc. components, waterproof paint, tilting mechanism (lump sum)

***RA/TA @ 40 hour/month, total 120 hours $ 16 per hour

****Water Depth Level Measurement Ultrasonic Sensor

[Δ]Model 9092-M3-DG-DAT 1" 2-272 m3/hr Digital Flowmeter with Data Logger without Drill

[α]Former SoE, SIUE lab manager Brent Vaughn will help to consrtruct and verify the stream table

Rohan Benjankar
Civil Engineering Department, EB Rm 3185, Southern Illinois University Edwardsville
Edwardsville, IL62026
Phone: 618-650-2814; Fax: 618-650-2555, rbenjan@siue.edu

EDUCATION:

Ph.D., Civil Engineering, Center for Ecohydraulics Research, University of Idaho, 2009

M.Sc., Water Resources Engineering and Management, Institute of Hydraulic Engineering - University of Stuttgart, Germany, 2003

ACADEMIC AND PROFESSIONAL POSITIONS:

Associate Professor, Southern Illinois University Edwardsville, Department of Civil Engineering, Edwardsville, IL, August 2022 – Present
Assistant Professor, Southern Illinois University Edwardsville, Department of Civil Engineering, Edwardsville, IL, January 2017 – August 2022
Research Assistant Professor, University of Idaho, Department of Civil Engineering, Moscow, ID February 2016 – December 2016
Adjunct Faculty, Boise State University, Department of Civil Engineering, Boise, ID, August 2015 – May 2016 (Two semesters)
Postdoctoral Researcher, University of Idaho, Boise, ID, August 2009 – January 2016

HONORS AND AWARDS

- Outstanding Researcher, School of Engineering, SIUE, 2022
- Outstanding Teacher Award, Civil Engineering Department, SIUE, 2019

PROFESSIONAL EXPERIENCE:

➢ **Course development and teaching**

- CE584: River Restoration
- CE583: Hydraulic Structure Design
- CE492: Application of GIS in Hydrologic Analyses
- CE460: Municipal Infrastructure Design
- CE416: Engineering Hydrology
- CE482: Water Resources Engineering and Management
- CE415L: Fluid Mechanics laboratory
- CE/ME315: Fluid Mechanics

PUBLICATIONS (Peer-Reviewed Journals, Selected 2021-2024):

1. Bhusal, A.; Thakur, B.; Kalra, A.; Benjankar, R.; Shrestha, A. (2024). Evaluating the Effectiveness of Best Management Practices in Adapting the Impacts of Climate Change Induced Urban Flooding. Atmosphere, 15, 281. https://doi.org/10.3390/atmos15030281
2. Rood, S. B., Hoffman, G. C., Merz, N., Anders, P., **Benjankar, R.**, Burke, M., Egger, G., Polzin, M. L., & Soults, S. (2024). Collateral benefits: River flow normalization for endangered fish enabled riparian rejuvenation. River Research and Applications, 1–12. Doi: https://doi.org/10.1002/rra.4255.
3. Chen, Q., Li, Q., Lin, Y., Zhang J., Xia J., Ni, J., Cooke, S. J., Best, J., He S., Feng T., Chen Y., Tonina, D., **Benjankar, R.**, Birk S., Fleischmann A. S., Yan H., Tang L., (**2023**). River Damming

Impacts on Fish Habitat and Associated Conservation Measures. Reviews of Geophysics, 61, 1-64. Doi: https://doi.org/10.1029/2023RG000819

4. **Benjankar, R.,** Vidergar, D., Tonina, D., Chen, Q., (**2023**). The role of water management and river morphology on stranding pool formation. Ecological Engineering, 213, 126-134. Doi: https://doi.org/10.1016/j.ecoleng.2023.107101
5. Ashitey. P., **Benjankar, R.,** Morgan, S., Retzlaff, W., Celik, S. (**2023**). Analyses of the Effectiveness of Different Media Depths and Plant Treatments on Green Roof Rainfall Retention Capability under Various Rainfall Patterns. Hydrology, volume 10 (149), 1-13; Doi: https://doi.org/10.3390/hydrology10070149
6. Duffin, J., Yager, E., Buffington, J. M., **Benjankar, R.,** Borden, C., Tonina, D., (**2023**). Impact of flow regulation on stream morphology and habitat quality distribution. Science of the Total Environment, volume, 878, 1-14. Doi: http://dx.doi.org/10.1016/j.scitotenv.2023.163016
7. Tranmer, A.W., **Benjankar, R.**, Vidergar, D., Tonina, D. (**2023**). Identifying failure mechanisms of native riparian forest regeneration in a variable-width floodplain using a spatially-distributed riparian forest recruitment model, 187, 1-11. Doi: https://doi.org/10.1016/j.ecoleng.2022.106865
8. Tonina, D., McKean, J., Isaak, D., **Benjankar, R.**, Tang, C., Chen, Q. (**2022**). Climate Change Shrinks and Fragments Salmon Habitats in a Snow-Dependent Region. Geophysical Research Letters, 49 (12), 1-10. Doi: https://doi.org/10.1029/2022GL098552.
9. Paudel. S., **Benjankar, R.** (**2022**). Integrated Hydrological Modeling to Study the Effect of Different Precipitation Sources on Surface Water and Groundwater Hydrology in a Small Watershed. Hydrology, volume 9, 1-18; https://doi.org/10.3390/hydrology9020037
10. **Benjankar, R.**, Kafle, R., Satyal, S., Adhikari, N. (**2021**). Analyses of Spatial and Temporal Variations of Salt Concentration in Waterbodies Based on High Resolution Measurements Using Sensors. Hydrology, volume, 8, 1-20. Doi: https://doi.org/10.3390/hydrology8020064

GRANTS AND FELLOWSHIPS (Selected 2021-2023):

1. SIUE RET, High Performance Computer to simulate computationally Intensive River and Watershed processes, 2023, **$5,290**, **Benjankar, R.**, SIUE Graduate School
2. "Internship Agreement"**, $4,830** (Fall, 2022); **$4,140** (Spring, 2023), **Rohan M**. **Benjankar** (PI), Sponsored by city of Collinsville, Illinois.
3. At the Confluence: Supporting Critical Transitions for Graduate Students in Sustainable Watersheds Research, August 2022-July, 2027, **$1,500,000.** Martinez, Adriana (PI), Locke, Sharon, **Benjankar, Rohan M**. (Co-PI), Black, Alan, Colaninno-Meeks, Carol, (Funded by NSF), Federal
4. Watershed Hydrology and one-dimensional hydraulic modeling development to analyze flood hazard, May, 2021 – April, 2023, **$77,448**, **Benjankar, R.**, Environmental Protection Agency (EPA) (Funded through **IEPA** and partnership with **Heartlands Conservancy)**
5. SIUE RET, Monitoring scour and deposition at river bed and around bridge piers using low-cost temperature measuring sensors, 2021, **$7,775**, **Benjankar, R.**, SIUE Graduate School
6. SIUE Competitive STEP funding, Study of the role of the lake, wetland, and pond on changing salt concentration downstream, July, 2021 – June, 2022, **$15,212**, **Benjankar, R.**,
7. SIUEInnovation & Excellence in Graduate Education, January, 2021 – June, 2021, **$6,375**, Colaninno, C. (PI), Martinez, A. (Co-PI), **Benjankar, R.**, **(Co-PI)**, Black, A. (Co-PI), Locke, S. (Co-PI), Southern Illinois University Edwardsville (SIUE)

Appendix

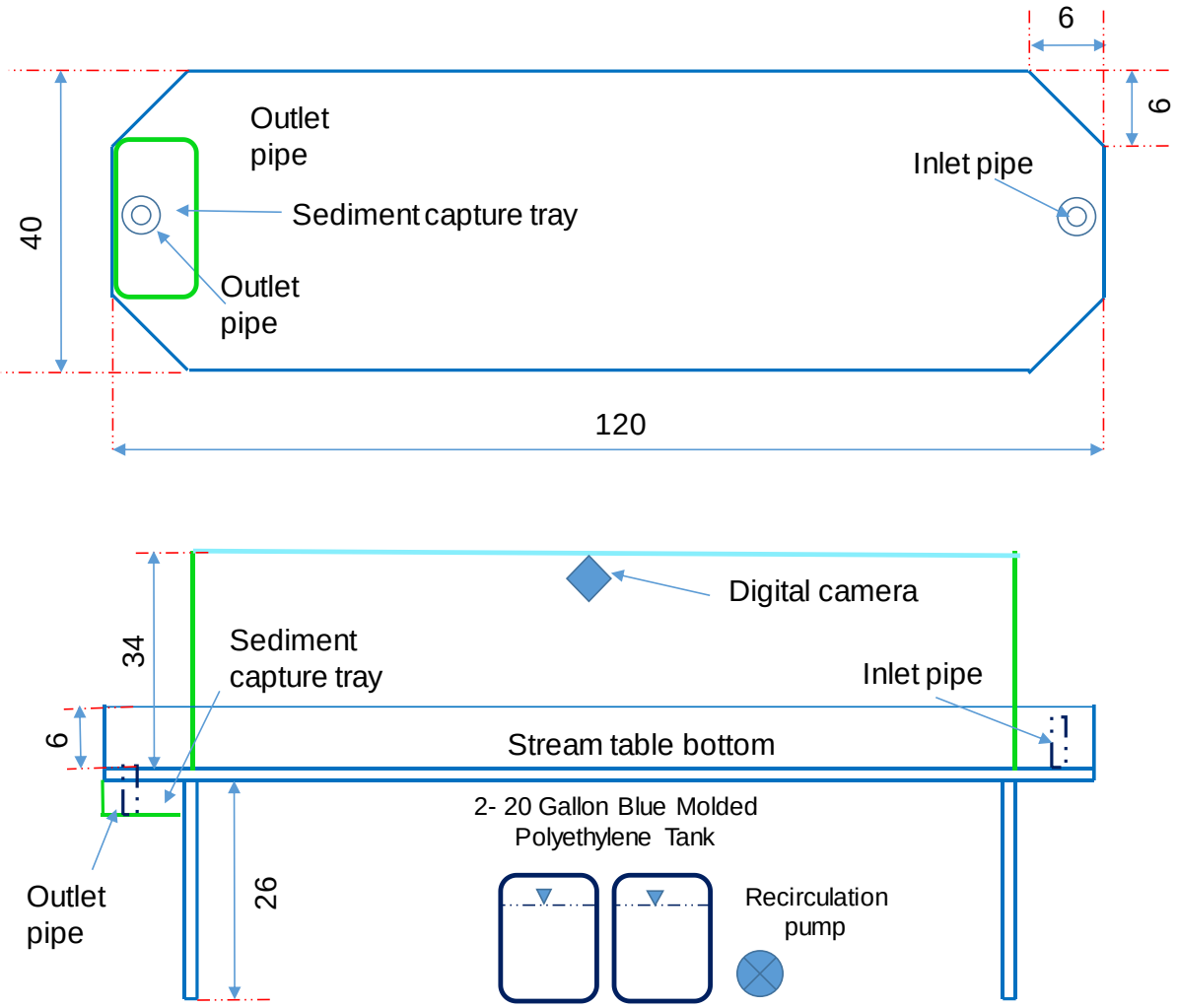

Figure A1: Plan (top) and sectional (below) view of and proposed stream table. The dimensions are in inches.

Table A1: Difference between existing and proposed stream table based on capability and functionality.

SN	Item	Existing	Proposed
1	Interaction between structure and stream processes	Yes	Yes
2	Discharge measurement	No	Yes
3	Sediment capture and transport quantification	No	Yes
4	Color coded grain size	Yes*	Yes*
5	Slope of stream adjustment	No	Yes
6	Quantification of change in stream topography	No	Yes
7	Recirculation tank	No	Yes
8	Sediment capture tray	No	Yes
9	Recirculation pump	No	Yes
10	Stream mounted camera	No**	Yes

*It is possible to use in existing experiment but uniform white sand has been used. Due to cost, we decided to use verities of grain sizes but uniform color

** Photographs are taken by personnel smart phones in existing experiment

Memo to: Excellence in Undergraduate Education, Proposal Review Committee
From: Dr. Cem Karacal, Dean, School of Engineering, SIUE
Date: February 29, 2024
Subject: EUE Proposal, Rohan Benjankar

The School of Engineering (SoE) strongly supports Dr. Rohan Benjankar's proposal for a EUE grant to design and develop a "Multi-use stream table to quantify and demonstrate the interaction between a stream and in-channel structures". The proposed advanced and multi-use stream table is important for the undergraduate Civil Engineering curriculum CE415L: Fluid Mechanics lab. The proposed project helps to ensure students are prepared professionally to apply the knowledge on the interaction between hydraulic structures and riverine physical processes in their future professional careers. The proposed project will improve the CE415L lab and students benefit from the hands-on learning experience. Specifically, students will be able to visualize and quantify the impacts of in-channel structures (e.g., bridges, culverts, etc.) on river dynamics. The proposed project provides benefits to CE Undergraduate students significantly as well as it can be used to demonstrate riverine processes for high school students and professionals working in river management fields.

The PI has demonstrated his dedication to improving undergraduate education in the CE Department, SIUE adopting a teacher-scholar model and integrating hands-on learning experiences. The proposed project will help to advance hands-on and practical learning experiences for students in the water resources management and environment fields of the Civil Engineering curriculum.

SOUTHERN ILLINOIS UNIVERSITY
EDWARDSVILLE

Memo to: EUE Proposal Review Committee Members
From: Nader Panahshahi**,** Chair, Department of Civil Engineering
Date: February 29, 2024
Subject: Dr. Rohan Benjankar EUE Proposal

This memo confirms the strong support of the Civil Engineering Department for Dr. Rohan Benjankar's 2024 EUE proposal entitled, "multi-use stream table to quantify and demonstrate the interaction between stream and in-channel structures."

The proposed project will significantly improve the fluids laboratory for students in our department. The requested equipment, when constructed, will greatly enhance the hands-on learning experience of the CE 415L (Applied Fluids Lab) students. CE 415L is an important required laboratory course in our ABET accredited undergraduate Civil Engineering program. Using the new CE 415L students will be able to quantify their observations, analyze a larger variety of river systems, and the stream table will conserve water by recycling. None of these features are available with our current stream table.

Dr. Benjankar has demonstrated his dedication to continued improvement of undergraduate education, has added new courses to our curriculum, and was selected as the 2019 outstanding teacher in our department. This proposed project is feasible and will have a very positive impact on the Civil Engineering undergraduate curriculum, especially in the water resources area.

Lastly, the proposed stream table can also be used for demonstration purpose during School of Engineering Open Houses, and outreach events such as the future SIUE Engineering Scholars Field Trip and the SIUE Summer Camps.

MEMORANDUM

Date: February 27, 2024

To: Nicole Klein
EUE Coordinator

From: Brent Vaughn
Retired, SIUE Dept of Civil Engineering

Subject: Support for 2024 EUE Project Proposal by Dr. Rohan Benjankar

I am writing in support of the Excellence in Undergraduate Education (EUE) proposal by Dr. Rohan Benjankar to design and build a multi-use stream table for students in our CE program.

I researched, designed and built the original stream table about twenty years ago for the CE415L Applied Fluid Mechanics Laboratory course that I taught for sixteen years. The basic concept that this early stream table version borrowed from, known as micro-modeling, was developed by the U.S Army Corps of Engineers (USACE) Applied River Engineering Center in St. Louis. We incorporated the realistic stream bed materials and the basic model scale used by the USACE into a very simple stream table version. We did not bring in the more sophisticated flow-control and geomorphic surface measurements employed by USACE mostly because of the cost of those technologies.

This stream table lab experiment module was very popular with the students and they seemed to appreciate it because it was a very interactive, hands-on modeling activity. In my observations of the students in the lab and reviewing their lab reports, that experiment module contributed to developing deeper qualitative and intuitive insights. The basic marine-grade plywood construction proved to be very durable, and still does not leak.

The proposal by Dr. Benjankar will provide a far better educational experience for the students because of the increased control of the water flow, angle of tilt range, and longer flow length runs of the streams. Another innovation is the proposed method to do 3D imaging and analysis of the moveable sediment materials to be further visualized and could be quantified in a geographic information system (GIS). In addition, Dr. Benjankar possesses the requisite theoretical and practical experience to make the most of this proposed enhancement to our Applied Fluid Mechanics lab facilities.

As the former CE Lab Specialist and Manager of the Fowler Student Design Center, I have the experience needed to help design, fabricate, assemble and maintain the proposed hardware and related control and analysis systems. Indeed, this will help to fulfill a need that I wanted to bring to our students for many years. Commercially available stream tables with comparable features would typically cost at least twice as much as the proposed project budget.

I am confident that this request for funding the multi-use stream table and materials to provide this greatly enhanced stream modeling will further enhance our students' fundamental understanding of water resources engineering.