



Incubation Fund Grant Proposal

For any teaching activity designed with a view to creating SoTL publications, conference presentations, or a larger pedagogy-related grant application. This might be a proof-of-concept project, or simply discrete research that adds to knowledge in the field of pedagogy. Funds can be used to pay individuals, including students and faculty, for their time; for materials; for guest presenters/speakers; or for fieldwork. Grants do not normally cover off-the-shelf software or equipment.

Required fields are marked *

Applicants are encouraged to meet with a member of the CTT team before submitting their application. Please email queries to ctt@unl.edu and submit completed applications to [NURamp](#).

*Name of lead applicant / co-applicant	*Department / School / College / Center / Other Teaching-focused Unit
Susan Vanderplas / Tyler Wiederich	Statistics
*Email address svanderplas2@unl.edu	*Telephone 402-472-7290
*Title of project	
Experiential Learning in Statistical Graphics, Experimental Design, and Science Communication	
*Total amount requested \$1000	
Names of others involved (if applicable)	
Name	Department / School / College / Center / Other Teaching-focused Unit
Name	Department / School / College / Center / Other Teaching-focused Unit
*Estimated start date 2023-05-14	*Estimated completion date 2024-05-13
*This project is focused on students from which departments and which levels?	
Discipline(s): Statistics	
Levels: Undergraduate	
Course / program title (if applicable): Stat 218	
*Overview of proposed project In this section provide a brief (500 words) overview of your proposal. We plan to develop and implement an experiential learning project for Stat 218, an ACE 3 course	

designed to prepare students to be critical consumers of statistical information. The project will require students to complete a series of written reflections, starting with an initial paragraph about how science happens and what the process of scientific investigation looks like from the perspective of researchers vs. the perspective of the general public. Then, students will participate in an experiment designed to determine how accurately people can read information from statistical graphics and/or detect data features when shown statistical graphics. This experiment will be completed in person and will require that students find the location where Stat 218 office hours are held. After participating in the experiment, students will be asked to critically reflect on the purpose of the experiment, what hypotheses may have been tested, what sources of error may be involved, what types of variables were used, and what elements of experimental design (randomization, controls) were present. These reflections will reinforce Stat 218 concepts while providing the student with the ability to see the project from the inside out as a participant. Once students have participated in the experiment, they will read and reflect on a 2-page abstract submitted to a conference peer-review process describing the experiment from the experimenter's perspective. Finally, students will watch a conference-style presentation of the results of the experiment and reflect on the differences in what information was provided in the presentation, the abstract, and to the participants of the experiment. This reflection will ask students to revisit the initial reflection and assess what they have learned about the scientific process by participating in the experiment.

This experiential learning project will provide students with the opportunity to learn about the scientific process from the perspective of a participant in research, an experimenter, and a consumer of research findings. In addition, because the research activities are specifically focused on statistical graphics and visualization, this will introduce students to new ideas: there are effective and ineffective ways to communicate scientific findings to the public and some visual design choices affect the way data are perceived. Finally, the scaffolding in this project is designed to reinforce material taught in Stat 218 over the course of the semester and to make the consequences of experimental design choices real to students through active participation in the process. This project supports the N2025 strategic plan goal to include experiential learning for all students, but also contributes to a much more general goal that all undergraduate students should be critical consumers of scientific research and statistical information.

***Experiential Learning**

The cycle of experiential learning focuses on the four elements of the experiential learning cycle: Concrete experience, Reflective observation, Abstract conceptualization, Active experimentation.

Explain how your proposal includes these four elements of the experiential learning cycle. Click <https://experientiallearninginstitute.org/resources/what-is-experiential-learning/> to learn more about the elements of the experiential learning cycle.

The proposed Stat 218 project will provide students with a concrete experience of the scientific process as a research participant. Students will then reflect on the experience and apply Stat 218 material to their reflection by identifying key elements of the experiment (variables, sources of error, experimental design, comparisons). During the remainder of the course, students will learn these concepts in more concrete detail in a traditional classroom setting (Stat 218 is already an activity-based course where concepts are introduced inductively), completing the thinking and acting stages of the cycle. As students develop more numerical sophistication and statistical literacy, students will be presented with two additional opportunities to experience the research cycle by evaluating research products related to the experiment they participated in; these products will be designed to reinforce key course concepts, but will also introduce students to the idea that the way concepts are presented is dependent on the intended audience. After each additional experience, students will produce written, guided reflections about the experience and its relationship to Stat 218 topics, before returning to learn additional statistical concepts. We hope that this experiential learning approach will provide students with additional motivation to learn statistical concepts that is sometimes missing in required gen-ed courses like Stat 218.

***Budget**

Please show how you intend to use the funds. Please give an itemized list of how you intend to use the funds. Funds can be used to pay individuals, including students and faculty, for their time; for materials; for guest presenters/speakers; or for fieldwork. Grants do not normally cover off-the-shelf software or equipment, or travel to conferences unless that travel is part of project dissemination.

\$500 – Stipend for Tyler Wiederich in Summer 2023 to assist with developing, implementing, and assessing the effectiveness of guided reflections and corresponding rubrics for Stat 218.

\$500 – Stipend for Tyler Wiederich in Fall 2023 to assist with revising and implementing the guided reflections and rubrics across additional sections of Stat 218.

***Signature of applicants**

Signature faculty: *Susan VanderPlas*

Name (please print): Susan VanderPlas

Date: 01/27/23 | 14:20 CST

***Approval by Department Chair / Dean.** Please ensure that you have consulted with your Head of Department / Dean before submitting your application.

Comments (optional):

I support this application and confirm that resource implications for the department/school have been discussed and agreed with the applicant(s).

Signature: *Bertrand Clarke*

Name (please print): Bertrand Clarke

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