SQUIRREL-NET: IMPROVING **RESEARCH SKILLS BY INVOLVING** STUDENTS IN A NATIONAL STUDY OF SQUIRREL **BEHAVIOR**

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Employers were asked which skills - beyond strong GPA - they most want to see on a student's resume. I include the most current NACE top 10 skills list on all of my course syllabi. While the list does not change much from year to year, Leadership dropped from number one in 2017 to number eight in 2019, and Written Communication increased from number three to number one in 2019.

Undergraduate Research

Research experiences are critical elements of undergraduate science education. They provide an opportunity for students to learn about inquiry, gain confidence in overcoming obstacles, and self-identify as scientists¹⁻³. However, gaining extracurricular research experience is not often feasible for many students either as a result of financial or time limitations⁴, lack of awareness of opportunities, or institutional structure and resource limitations. This is particularly the case for STEM students from under-represented groups⁵. Furthermore, university culture and/or current STEM pedagogy can make these students feel they do not belong in academia, leading to higher dropout rates⁶.

CUREs (Course-based Undergraduate Research Experiences)

Course-based undergraduate research experiences (CUREs) are a strategic way to introduce more students to authentic research⁴; however, many barriers limit their widespread adoption^{7,8}. Development of a CURE can be time consuming⁹ and may seem daunting to faculty that lack pedagogical training. Additionally, it is difficult to collect sufficient data for meaningful analyses in a semester, particularly at smaller institutions or in field-based courses⁸. This restricts student opportunities to engage in research, master data analysis¹⁰, and prepare for graduate school or data-driven careers¹¹. Finally, most CUREs target large-enrollment introductory courses⁹, limiting exposure to mentoring opportunities. Rarely do students return to the same topic within their undergraduate program, even though repeated exposure promotes deeper engagement and longterm gains in skills and content knowledge¹².

Squirrel-Net

Exploring biology through the squirrely lives of squirrels

Review Teaching Materials

Join our Research!

CourseSource Publications

Visit our YouTube Channel

WHAT IS SOUIRREL-NET?

We received NSF funding to study how our CURE network affects student gains, and we are looking for collaborators! <u>Learn more by</u> <u>clicking here!</u>

SQUIRRELNET GUD DATASHEET

Please fill in each white field completely! This sheet will serve as a template for entering your observation at (https://goo.gl/forms/lwaNaAzKTbCqxfGy2)

Name of observer								
Name of partner or team-mates								
Institutional affiliation								
Email address							0r32985*	Data Entry QR Co
II. EXPERIMENTAL CONDITIONS								
	Date	Time		What kind	of species did		Did it rain d	uring your
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Site Name					Location (de 5 decimal pla	cimal degrees, ces)	Latitude	Longitude
Habitat Type (where trays were deployed: circle one)	Desert Gras	sland Coastal Shrubland	Coniferous forest	Deciduous forest	Riparian	Agricultural	College campus	Other urban (within city)
Proximity of tray to human structures (circle all that apply)	Next to sidewalk	3m from sidewalk	>3m from sidewalk			ζ.	*	
Microhabitat features at tray (circle all that apply)	Under or next to "cover"	3m from "cover"	>3m from "cover"	There is no "cover" here	Next to ground squirrel burrow	3m from ground squirrel burrow	>3m from ground squirrel burrow	
	No	Scent added	Artificial light	Sound	Predator decoy	Temperature		

Student datasheet for the Giving Up Density Module. The QR code links to a Google Sheet where students enter this into a national dataset.

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Space Autom University 32,9997 -55,4885 Core college campus 10m Om Natural area, of trian, Multin 15 meters of sidewalks, Within 15 meters of sidewalks,	53 Auburn University 54 Auburn University	32.59497 -85.48292 Deciduous forest (not riparian) 32.59501 -85.48307 Core college campus	0 - 3m > 10m	< 3m < 3m	Natural area, off trail, Natural area, on trail Natural area, on trail, Within 15 meters of dirt/gravel road	9/22/20	3:43:00 AM Mostly cloudy No 9:17:00 AM None No	Light breeze	Eastern gray squirrel (Sciurus carolinensis)
	55 Auburn University	32.59507 -85.4885 Core college campus	> 10m	Om	Natural area, off trail, Within 15 meters of sidewalks, Within 15 meters	10/15/20	7:55:00 AM Partly cloudy No	Light breeze	Eastern gray squirrel (Sciurus carolinensis)

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free and open statistical software to bridge the gap between researcher and statistician

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1	2020	2020-04-24 1	1	California Sta	36.656	-121.768	Core college	> 10m 🔺	Resu
2	2020	2020-04-25 1	1	California Sta	36.658	-121.769	Grassland	0 - 3m	
	2020	2020-04-25 1	1	California Sta	36.657	-121.769	Grassland	0 - 3m	
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5	2020	2020-04-26 1	1	California Sta	36.653	121.794	Core college	3 - 10m	
	2020	2020-04-26 1	1	California Sta	36.653	121.794	Core college	3 - 10m	Descrip
	2020	2020-04-26 2	1	California Sta	36.652	-121.790	Core college	> 10m	-
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)	2020	2020-04-27 2	1	California Sta	36.657	-121.770	Desert	3 - 10m	Missi
1	2020	2020-05-04 1	1	California Sta	36.654	121.795	Core college	0 - 3m	Modi
2	2018	2018-10-24 2	1	Colorado Me	39.180	-108.831	Desert	3 - 10m	Stand
3	2019	2019-10-24 1	1	Colorado Me	39.550	-107.983	Deciduous fo	3 - 10m	Minir
ŀ	2019	2019-07-10 1	1	Colorado Me	39.255	-119.970	Coniferous fo	3 - 10m	Maxi
	2020	2020-10-18 1	1	Auburn Unive	32.726	85.946	Riparian	0 - 3m	
5	2020	2020-10-18 1	1	Auburn Unive	32.361	-88.013	Riparian	0 - 3m	
1	2019	2019-03-27 1	1	University of	44.537	-89.562	Deciduous fo	> 10m	
C.	2019	2019-05-11 1	1	University of	44.982	89.618	Deciduous fo	3 - 10m	
i.	2019	2019-07-28 1	1	University of	45.841	-89.678	Coniferous fo	> 10m	
Ê,	2020	2020-08-08 1	1	University of	44.324	-89.797	Deciduous fo	3 - 10m	Des
	2020	2020-10-21 1	1	University of	44.491	-89.507	Other urban (0 - 3m	
2	2020	2020-10-08 1	1	University of	35.208	-97.447	Core college	0 - 3m	
3	2020	2020-10-08 1	1	University of	35.208	-97.447	Core college	0 - 3m	Descrip
1	2020	2020-04-30 1	1	University of	44.533	-88,156	Riparian	3 - 10m	
5	2020	2020-05-06 1	1	University of	42.924	-88.065	Other urban (3 - 10m	N
5	2020	2020-10-13 1	1	University of	44.414	-89.263	Deciduous fo	0 - 3m	Missi
7	2020	2020-09-10 1	1	Agnes Scott	37.256	-121.942	Other urban (> 10m	Mear
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variables (Independent variables)

		W	р
2018	2019	-4.85	0.002
2018	2020	-1.49	0.544
2019	2020	5.47	< .001

Intro C GUD and Behavior modules C/B Jamovi and data analysis/handling B Tangible learning outcomes/ artifacts B/C Recruiting other institutions C Thank You

Research gains

How much did you GAIN in the following areas as a result of your most recent research experience? In other words, how much easier is it for you to perform the tasks described below since participating in your most recent research experience?

Research gains

Also some-to-strong gains reported in >80% of students for these questions related to conduct of research and persistence.

How much did you GAIN in the following areas as a result of your most recent research experience:

Significance assessed with a Chi-Sq test of independence

CURE activities and perceptions

Students seemed to report a feeling of ownership and that their ideas and contributions mattered. However, most did not report interacting outside their institution (not too surprising given who responded to the survey).

Students who reported greater connectivity (Q7.2_7; see slide 11) also reported greater feelings that their ideas and data contributed to the scientific community.

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- o- biginterview

Question 4 of 10 What are you most passionate about?

Answers the question well ⑦ Conveys relevant qualifications ⑦ Communicates enthusiasm ⑦

Your review for this question

Wisconsin Teaching Fellows and Scholars Project

Can an intervention using a Squirrel-Net Cure improve student responses on job interview questions?

- Used Big Interview and had first semester Biology students answer ten mock interview questions.
- Pre and Post interviews were conducted using the same 10 questions, one given at the beginning of the semester and one towrds the end.
- All students participated in the Squirrel-Net GUD CURE during the semester.
- Student interviews were transcribed and coded using QDA Miner.

Freshman Pre-Interview: Competencies

Freshman Post Interview: Competencies

Initiative and Leadership were the two competencies that were highlighted most in first year student responses. After the Squirrel-Net CURE activity more students included examples of quantitative literacy and oral communication in their interview responses.

First year students quickly incorporated examples from college courses and college research into their interview responses. There were still many examples from extramural activities, particularly relating to questions about working on teams. Extramural examples declined dramatically in the senior responses. Student mock interviews using Big Interview were transcribed and coded using QDA Miner.

Below are some of the benefits to participating in this research for you and your students!

Benefits to Instructors	Benefits to Students
Participation in a national science community!	Participation in a national science community!
Evidence of service outreach and teaching development for merit and retention decisions.	Field and/or behavioral observation experience with small mammals to use on a resume or job interview.
Participation in Squirrel-Net's equipment loan program for running modules.	Experience with data analysis and interpretation.
Access to a national database of student- collected data, allowing students to test broader hypotheses compared to data collected in one place or at one time.	Access to a national database of student- generated data, enabling the testing of creative and interesting student-driven hypotheses.
New teaching lab(s) to add to your curriculum that is fully developed and vetted at numerous institutions.	Through exposure to data from local/regional/national squirrels, an increased awareness of species and ecosystem diversity.
Connection to a national community of instructors, including authors of the modules, who can provide additional support.	Connection to a national community of other students working on the same research project.
Access to four labs, readily adaptable to online teaching.	A hands-on scientific lab experience, even when learning remotely.
Course-based Undergraduate Research Experiences (CUREs) involve more students in authentic research, advancing STEM pedagogy.	An authentic research experience, not a "cookie-cutter" lab activity.

SQUIRREL-NET

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Join our Research Team!

Squirrel-Net has received NSF funding and is looking for collaborators! We need your help in assessing the value of our teaching modules and, more generally, Course-based Undergraduate Research Experiences (CUREs). All you need to do is use one of our modules, ask your students to complete the 10-minute pre- and post-assessment surveys, and take a 15-minute instructor survey. By participating, you will gain access to: an extensive set of teaching materials, assistance from the Squirrel-Net tearn, a national network of students and student-collected data, and our equipment loan program.

Please click here for more information or to sign-up!

Below are some of the benefits to participating in this research for you and your students!

Benefits to Instructors	Benefits to Students
Participation in a national science	Participation in a national science
community!	community!

HOW DO WE RECRUIT INSTRUCTORS?

- Society list-servs (Mammal-L, Ecolog, SABER)
- Professional meetings (ASM, SICB, TWS, ESA)
- Website and CourseSource Publications
- Word of Mouth