



# REALISE

Realising Inclusive Science Excellence

November 2018

## What is REALISE?

**The challenge:** From 2013-2015, Biology, Chemistry, and Physics retained ~50% of new majors. Another subset persisted, but didn't thrive academically or engage in the experiences we know are most impactful for our students.

**The goal:** To improve student success through strategic, evidence-based reforms targeting freshman, sophomore and transfer students.

**The rationale:** We know close student-faculty relationships, mentored research, student STEM clubs, and the like are amazing for our students. But we lose ~1/2 of our students before they can participate in our most valuable experiences. More students will succeed if we can provide those experiences earlier, and critically, provide them within courses where they are available to everyone.

### What REALISE offers faculty:

- Support to pursue impactful and inclusive educational practices, such as project-based learning and course-embedded research projects.
- Opportunities to just talk with your colleagues about what works for them, in their classrooms.
- Time – time to reflect, think, plan, and implement the kind of lessons you wish you had the time to do.

### What REALISE offers students:

It may be surprising, but most students drop out of STEM not from disinterest or inability to meet the academic challenges, but because they don't feel like they belong, or don't feel welcome. Thus, REALISE is trying to generate stronger social and academic support networks among student peers and between students and faculty.

## Highlights:



Ask your students to take our [survey](#) about their experiences as science majors.



[Course Spotlight:](#) Making organic chemistry more student-ready and inclusive.



"Panters" and "sweaters" face off in a [Make-a-thon](#) exploring animal thermoregulation.



If you only read [one pedagogy paper](#) this semester, make it this one!

**Ask your students to take our survey!**

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To help enhance student retention, the REALISE team is gathering information about our students' sense of belonging, identities as scientists, and self-efficacy. We have created an IRB-approved survey with literature validated questions to ask our students about their experiences at Radford University and within their major. In order to obtain meaningful results, it is imperative that we get a large number of student responses. We are asking all ACSAT faculty to please send our survey out to all students enrolled in their courses each semester. We expect that by having you send this survey out to your students they will be more likely to respond.

**Here is some sample text that you can use to email the survey to your students:**

*The Artis College faculty are working collectively to enhance the student experience at Radford University and you can help! We have a survey that will take you about 5-10 minutes to complete that will ask you about your perceptions of science, your major, and Radford University. Please click the link below to take the survey.*

[http://radford.qualtrics.com/jfe/form/SV\\_9F5Gx36qcJW643r](http://radford.qualtrics.com/jfe/form/SV_9F5Gx36qcJW643r)

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## Course Spotlight: CHEM 301

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*Dr. Amy Baliija and biology major Sarah Stevenson check the progress of a reaction in CHEM 301 lab. Madison Murray (Biology) looks on.*

“What haven’t I changed?” Dr. Amy Baliija (Chemistry) laughs. Amy is constantly striving to make her organic chemistry class more student-ready and inclusive. Here are a few of the changes Amy has implemented:

- Honing **module learning objectives** with help from teaching specialists at CITL.
- Deploying **real-time assessment tools**. Each class begins with a warm-up problem focusing on material discussed in the previous class. Students answer via Plickers, and their responses help Amy decide whether to spend 2 or 10 minutes reviewing material.
- Creating **hands-on activities** to explain abstract concepts. Students explore chirality by building 3D models from gumdrops and toothpicks, and learn the science behind liquid-liquid extraction using strips of paper and

glue before before working with chemicals.

- Introducing students to new software. To increase students' **digital literacy** in preparation for the workforce, Amy created digital lab notebooks from editable PDFs.

Students spent the first lab mastering the software they would use throughout the semester to take notes and draw chemical structures.

- Forging **personal connections with students** in an informal setting. Amy invites students to Starbucks (her treat!) to chat about the course, their career ambitions, and life as a science major at Radford.

Amy thinks these strategic changes are already starting to pay off: exam averages are higher this semester than last.

### Thoughts from Amy:

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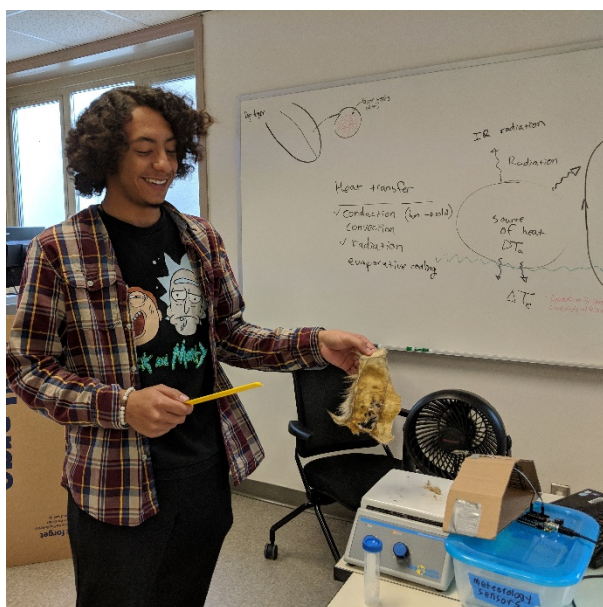
**What would success look like for you in this class?:** "Every student should feel success within themselves as a result of their hard work in my class."

**What has been your biggest challenge so far?:** "My biggest challenge is having more ideas to improve inclusivity within the classroom than time to implement them."

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## Students investigate animal thermoregulation in Make-a-thon

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Physics major Sam Williams (*pictured above*) grinned as he scraped burnt fur from a hot plate. "No one said it had to look good."

"Or smell good," added REALISE physics postdoc Todd Rutkowski.

Unconstrained by the "rules" of a typical lab environment, curiosity and ingenuity thrived in a Make-a-thon held Saturday, October 27th in Peery Hall.

Over the course of the six-hour event, nine Radford science majors and five faculty members explored why some animals sweat and others pant to cool off. Participants built infrared and ambient temperature sensor platforms using Arduino microcontrollers, then rummaged through piles of materials to construct original experiments.

The students' experiments yielded biologically-relevant data on animal thermoregulation. Sam and his team showed that heat dissipated more quickly from wet ("sweaty") filter paper "skin" than from wet fur. Another team found that salty water cooled more quickly than regular water. In combination, these findings offered insights into why humans—relatively hairless animals—excrete a saline solution to cool off.

Additional Make-a-thons on a range topics are planned for Spring 2019.

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## Teaching checklist: If you only read one pedagogy paper this semester, make it this one!

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How many times have you found yourself in a pedagogy workshop, or reading a teaching book or article, thinking **“Ok, this theory is great, but what should I actually do in my class?”** If you are nodding, you are not alone!

We don't think you'll find many better translations of learning theory into classroom practice than [this paper](#) by Kimberly Tanner. She outlines 21 simple, practical approaches we can consider for our own courses. You are probably already doing some of them, but you'll likely find some new ideas too. The context is biology education, but there is nothing discipline specific about her recommendations. Her strategies all focus on ways we can encourage more of our students to engage and succeed in their studies—the definition of inclusive pedagogy. One of our favorites:

**“Multiple Hands, Multiple Voices:** *After asking a question, some instructors call on just a single student to answer. However, this is problematic in many ways. The same students can often end up sharing repeatedly during a class... One simple strategy for broadening participation... is to generally ask for multiple hands and multiple voices to respond to any question posed during class time (Allen and Tanner, 2002). Instructors can set the stage for this by asserting, “I’m going to pose a question, and I’d like to see at least three hands of colleagues here who would share their ideas. I won’t hear from anyone until I’ve got those three volunteers.” Additionally, this particular use of hand raising allows instructors to selectively call on those students who may generally participate less frequently or who may have never previously shared aloud in class.”*

A recent guest lecturer at RU used this strategy, and had nearly every student in a class of ~40 participating by the end. It was genuinely amazing to see how a simple technique, that requires very little change on the part of the instructor, could so effectively engage so many more students in the lesson.

The critical feature seemed to be getting three volunteers before the first person answered. Students find it so socially awkward to disagree with another student- if we ask for responses sequentially, many students will not correct or even add to a previous response. Others will just wait for the most vocal student(s) to speak up. This

simple structure promotes scholarly discussion and acknowledges that different explanations can aid everyone's understanding. The subtle implication in asking for three responses is that there isn't a single "correct" answer to any but the most rote questions.

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## STEMed Reading Group

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**Every other Friday @ 2:00 PM in CS 286**

*Hosted by the Center for Innovative  
Teaching and Learning and the REALISE Program*

The Fall 2018 STEMed Reading Group text is [\*\*\*Breakthrough Strategies: Classroom-Based Practices to Support New Majority College Students\*\*\*](#) by Kathleen A Ross (Harvard Education Press, 2017).

By meeting regularly throughout the semester to discuss *Breakthrough Strategies*, we hope to create a community of scholarly dialogue around teaching, blending the best ideas of experts with the local wisdom and experience of our faculty.

Come when you can! The readings are modular, such that discussing any topic in isolation will still be valuable. **Faculty are welcome to attend any/all session(s).**

[Email us](#) for a free copy of the book!

### Date

### Topic

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November 2	Chapters 9-10 Reframing the Classroom as Community Creating Confidence: A Professor's Role
November 16	Chapters 11-12 Journaling for Confidence and Deeper Thinking Developing Student's Own Academic Ideas
November 30	Chapters 13-14 Envisioning and Academic Identity: How Professors Can Help Building Professional Identities to Counter Stereotypes

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## Request for Proposals: **Kickbox Minigrants**

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Want to learn more?  
**Check Out D2L!**

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[Kickbox Minigrants](#) are a virtual "**box**" of resources that **kickstart** faculty-student making-themed or project-based learning pilot projects.

Proposals are accepted throughout the year and are reviewed on a rolling basis.

Awards are up to **\$500**.

### **Reach out before you write:**

[Tara Phelps-Durr](#) or [Jeremy Wojdak](#) can work with you to clarify grant guidelines and make suggestions that might sharpen your proposal.

## **HIPs Grants**

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The [HIPs Teaching and Learning Grant](#) initiative is designed to enhance teaching and learning through the purchase of instructional supplies/materials and travel associated with high-impact teaching pedagogies.

Awards are up to **\$1,000**.

Proposals are due **Thursday, December 20<sup>th</sup>, 2018**.

We are compiling a growing library of shared resources on the REALISE program's [D2L page](#). On tap:

- Writing welcoming syllabi
- Group work
- Project-based learning
- Microaggressions
- The Kickbox Minigrant RFP
- REALISE project details
- ... and more!

Contact [Tara](#) to be added to the REALISE D2L page.

As a result of the Faculty Learning Communities, book groups, departmental reform efforts, and plain old hard work, our faculty are busy crafting great new classroom modules. We are developing an easy way to share educational resources across instructors, that tracks contributions and usage, providing a mechanism for you to earn credit for your teaching scholarship. Stay tuned!

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## An open invitation...

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Whether you are interested, excited, nervous, or skeptical, we'd love to meet with you on-on-one to chat about how we can:

- Help you share your own expertise and experience with others.
- Use your concerns to improve the project as we go.
- Help you find what you need to try something new in your course (e.g., materials, time, technical/instructional expertise).
- Help you identify a part of the initiative that resonates with what you already do and value.
- Plan for how you can get involved.
- Figure out what the heck "Inclusive Excellence" means.

Contact [Sarah](#), [Tara](#), or [Jeremy](#) and we can share ideas over coffee.

Contact [Ariel Firebaugh](#) to be added to or removed from the newsletter subscriber list.

**RADFORD UNIVERSITY**

Artis College of Science and Technology

