

RADFORD UNIVERSITY

Artis College of Science and Technology

REALISE

Realising Inclusive Science Excellence

We've had a wildly successful and eventful first semester, and there is much more on tap for Spring 2018, and beyond. Check out the highlights from the Fall, and what is coming up!



Coming events

Problem-Based Learning Workshop

January 10-11

hosted by

Worcester Polytechnic Institute

Finish the workshop with a tangible plan for implementing a single problem-based module in your course.

LUNCHES PROVIDED!!!!

[Sign up for the workshop](#)

- Learn PBL through hands-on activities and collaborative team exercises.
- Hear about proven examples and concrete advice for your classroom.
- Gain solutions to manage groups, pick appropriate problems, and avoid instructor overload.

Spring 2018 Faculty Learning Community

You can work with REALISE and the [Center for Innovative Teaching and Learning](#) to:

- discuss best practices for managing and grading groups, promoting your student's metacognition, and/or grading strategies that save time.
- consider what instructional approaches and course structures will help more students achieve success in our rigorous STEM curriculum.
- develop actionable plans for reforming one modest part of your course.
- work in small groups or one-on-one on the reforms you want to implement.

- build your portfolio of involvement and engagement with REALISE, earning credit towards a course reassignment.

Open to all faculty!

[Get more information about the FLC](#)

Peer Role-Modeling program to launch Spring 2018

Students who feel connected to a community of students, their departments, their faculty, and their disciplines are much more likely to finish a STEM degree. The REALISE peer role-modeling program is meant to provide students that intellectual home at Radford.

[Dr. Matt Close](#) from Biology has stepped up into a leadership role to help launch the REALISE peer role-modeling program, and has recruited a great first cohort of role models. Together they will be devising and implementing social and intellectual events to welcome new students to our programs, to engage students in a community of peers, and to help establish the norms of scientific scholarship and academic excellence.

Below are our new peer role-models:

Allen Greene - *Physics*

Natacha Rangel-Ribeiro - *Chemistry*

Jasmine Valentine - *Chemistry*

Daniel Harrison - *Biology*

Kelly Hodges - *Biology*

Marnesha Jones - *Biology*

...congratulate and thank them when you see them in the halls!

STEMed Reading Group

Through the fall, faculty gathered on a few Friday afternoons to talk about ["The Innovator's Mindset" by George Couros](#). Common challenges across our three disciplines were delineated, and faculty shared their best ideas for managing student group work, motivating students, and encouraging our students to face challenges with greater determination.



A Spring 2018 STEMed Reading Group is slated to begin soon. Stay tuned for that announcement. Reading groups are a low-stakes way to share great ideas about teaching and learning.

Reading groups are open to any interested faculty member.

Help is on the way! Postdoc searches begin.

All three REALISE departments have started searching for postdoctoral teaching faculty to bring new sparks of creativity to our classrooms, and to provide our full-time faculty with time away from the classroom to reimagine our instruction of entry-level STEM courses. The candidates look outstanding, many with significant experience and training in instruction and pedagogy. By July of 2018 we hope to have three new colleagues in place and ready to go!

Fall recap

Kickbox grants

This fall, seven faculty received small grants to pilot innovative making-themed class modules that challenge students to create solutions to solve real

problems. Then, the REALISE departments came together to hear about their colleagues' projects in-progress, and eat meatballs. Other faculty shared their pedagogical solutions to tough classroom issues. Below are just a couple of the projects:

Sarah Kennedy is asking her students to re-design a low-cost, versatile chemistry kit for distribution to communities in Sierra Leone. Designing a kit with the fewest pieces that can accommodate many experiments will force students to think critically about each process and reaction. Using clever pedagogy, in the service of an amazing cause, will inspire students with genuine motivation.



Sarah Redmond had students in her BIOL 160 class design independent research projects, and present their work via a poster session. Embedding open-inquiry, authentic research into introductory courses engages students in the process of science early, hooking them on what we know is the best part of science!

Keep a lookout for the Spring 2018 call for Kickbox proposals!



Fall 2017 Faculty Learning Community

Several faculty from each REALISE department bravely stepped up and plunged into the deep end to redesign their entry-level courses. With help from Radford's [Center for Innovative Teaching and Learning](#), faculty met to learn the principles of backward course design, starting from what we want our students to be know or be able to do after our course, and designing the assessments and course activities from there. After some really hard work these folks are poised to implement their plans for course redesign in Spring 2018.

Interested in joining the next cohort? Ask Jamie Lau or Joel Hagen (Biology), Rhett Herman or Shawn Huston (Physics), or Amy Baliya or Sarah Kennedy (Chemistry) about their experiences, or ask the [REALISE team](#).

Reading list

By working to ensure our departments' curricula, cultures, expectations, and instructional practices provide equal opportunities for success for all students, we are working at the cutting edge of STEM education. Need evidence? How about a trio of (short!) articles in *Science* that provide rationales and recommendations for achieving true inclusion:

Purrrity et al. 2017. [Without inclusion, diversity initiatives may not be enough](#).

Science 357 (6356): 1101-2.

Sessoms. 2017. [Helping less-prepared students excel](#). *Science* 357 (6352): 654-5.

Zellmer and Sherman. 2017. [Culturally inclusive STEM education](#). *Science* 358 (6361) :312-3.

Ok, one more, just for fun...

Bumpus. 2015. [Moving towards inclusion](#). *Science Careers*
doi:10.1126/science.caredit.a1500273

Beyond Radford...

We are tackling big problems, but the good news is that we don't have to invent every solution *de novo*. We can instead adopt and adapt tenable solutions others have worked out, and benefit from their hard work! Here is one example that is worth examining:

[Towson University](#) is a large, public, comprehensive university in Maryland that faces many of the challenges we face at Radford. Neither can provide all our students the blue-chip experience of a university science degree - faculty-mentored undergraduate research in the one-on-one apprenticeship model. Like many other institutions, including Radford, Towson is turning to Course-Based Undergraduate Research Experiences (CURE's) to allow all their students to participate in authentic scientific research.

In particular, Towson's Biology Department has instituted a common project in introductory courses where students isolate, amplify, and sequence DNA from fecal samples from pets, farms, vet offices, and more. The DNA isolates represent the host's genome but also those of the members of the microbiome living in the host's gut. Because host demographic information (e.g., age, sex, species, diet, disease state) is curated, students can ask their own unique, meaningful scientific questions about gut microbiota using the accumulated

data. Scalability is achievable by selecting a research context where individual analyses are cheap and similar across organisms, but data are rich and reusable.

Many faculty valiantly try individual or group research projects in their courses, but don't persist with that course reform because of the burden it places on the faculty's time - to find materials to support divergent projects and experimental designs, and teach a swath of analytical techniques to deal with disparate data. Thinking a bit about the long-term sustainability of any CURE project, especially in terms of faculty time commitments, could be an enduring lesson from Towson's example.

At Radford, the Physics and Biology Departments were chosen to be part of the [*Council for Undergraduate Research's Transformations Project: Integrating and Scaffolding Research into Undergraduate STEM Curricula*](#). The synergies between the REALISE and CUR Transformations initiatives are clear and will re-emerge frequently, and our peer institutions in these initiatives (including Towson) will no doubt continue to provide examples for us to consider.

An invitation...

We understand that this initiative is a bit amorphous, and hard to wrap one's head around. Whether you are interested, excited, nervous, or skeptical, we'd love to meet with you one-on-one for an informal chat about how we can:

- help you share your own expertise and experience with others that could benefit.
- 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 or 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.
- define what the hell "Inclusive Excellence" is, anyways...

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



Question, comments, concerns?

Email [Tara Phelps-Durr](#) or [Jeremy Wojdak](#).