

## QTAG Report 2017-2018 Ogden College of Science and Engineering

### OCSE QTAG Committee:

Ali Er – Physics and Astronomy  
Natasha Gerstenschlager – Mathematics  
Philip Lienesch – Biology  
Diane Lickenbrock – Psychological Sciences  
Bangbo Yan - Chemistry

In 2017-2018 OCSE 18 QTAG projects were approved for funding. The total recommended funds totaled \$41,267. Every department (Agriculture, Biology, Chemistry, Geography and Geology, Mathematics, Physics and Astronomy, Psychological Sciences and the School of Engineering and Applied Sciences (SEAS) in Ogden College) received at least one QTAG. Common threads run through these greatly diverse projects include student engagement, development of collaborations (local, regional, national, and global), outcomes in terms of publications with student co-authors, and use of results of the QTAG project to springboard to additional funding.

**Fourteen** of the faculty (>80%) who received QTAG funding submitted a combined **36** external proposals during this fiscal year. **Eight** faculty who received QTAG funding received **external** research awards during this fiscal year. These are very productive results and Ogden recommends that the QTAG program continue.

The most common issues observed by the committee that potentially resulted in a decline were:

- A request for travel funds for the faculty member or for students to present work rather than conduct research, and/or
- A request to hire a student worker with no clear immediate need
- A timeline that did not fit the prescribed 3-month QTAG timeframe.

In the first case, faculty members were advised to seek travel funds through the normal channels (department and college) and to resubmit the QTAG application to focus on research activities. In the latter cases, faculty were asked to resubmit or to either make minor adjustments or to modify the timeline (without a resubmission) to meet the requirements provided. The committee felt an adjustment of the project requirements and description, from an Ogden perspective, would serve to address these issues.

The committee members (Ali Er, Natasha Gerstenschlager, Diane Lickenbrock, Philip Lienesch and Bangbo Yan) worked diligently to thoughtfully review the QTAG applications each month. It was inspiring to me to view the full impact and benefits for the faculty members and students of Ogden College resulting from the QTAG program.

Submitted by:  
Cathleen Webb, Associate Dean for Research, OCSE

Although no formal final report is required, the recipients of the OCSE QTAGs were encouraged to submit photos, videos, brief summaries, etc. A few summaries are provided.

**From Gordon Smith (SEAS):**

The QTAG grant has facilitated the fabrication and instrumentation of a lab-scale furnace exhaust system, comparable in temperature and composition to industry references. Current analysis of data collected over the summer will determine if a quantitative analytic model or a numerical approach is more appropriate for determining the resources of the resulting thermal resources. Plans are already afoot (and potential funding opportunities identified) to begin developing extreme-temperature heat exchangers suitable capturing the waste heat for thermoacoustic processes.

**From Mikhail Khenner (Mathematics):**

The QTAG funded a collaborative project (with Prof. Dimitrios Maroudas, UMass Amherst) titled “Kinetics of Nanoring Formation on Surfaces of Stressed Thin Films”. The paper by the same title is in press in Physical Review Materials. Also published the paper titled “Modeling solid-state dewetting of a single-crystal binary alloy thin films” (*Journal of Applied Physics* **123**, 034302 (2018), <https://doi.org/10.1063/1.5011676>)

**From Jennifer Gill (Agriculture):**

QTAG funding covered the purchase of Fuji Rescale Film (from Sensor Products Inc.) and was used to reveal the pressure map created by the contacting area of a horse’s hoof in motion over 3 different riding terrains. The force applied by the hoof was measured over three different riding surface while the horse was barefoot and while wearing a Cavallo hoof boot. This data is of practical importance to trail riders with barefoot horses (horses without metal horse shoes). The study created a relationship between WKU and Cavallo Horse and Rider Inc. for a complementary supply of hoof boots and future product testing. The data from this study was presented at the International Hoof Care Summit in Cincinnati, Ohio in January 2018, where the PI was an invited speaker. This data was published in the *American Farriers Journal* July/August issue pg. 62-69.

**From Paul Woosley (Agriculture)**

This past spring, a trellis system was constructed and four varieties of hops root stock were acquired and planted. The hops study has been a stop on several industry and community tours at AREC. The trellis system will also be utilized as a classroom tool this fall semester in plant science courses. As the hops plants mature over the next two

years and begin to produce, future research studies will be facilitated. Current data being collected will establish which cultivars are best in a KY climate.

The Q-tag funds were used to build the trellis structure built and establish hop plants. This part of the study is already completed. Data collection on the performance of these cultivars is ongoing.

**From Bruce Schulte (Biology):**

This project was originally designed to be conducted in the Mosi-oa-Tunya National Park Zambia but the Zambian government held up the permits through our collaborators at ALERT (African Lion and Research Trust) so we had to move it across the Zambezi River to Zimbabwe where ALERT had permits. My graduate student, Brigit Rooney, scheduled to be in Zambia from late July through the end of October 2018, is now working in Zimbabwe. I arrived a few days before Brigit and had meetings with the field personnel. Brigit and I went into the field every day we were together and observed elephants each day. We made very good progress in her training and in re-aligning the project to the new landscape.

A photo of a male African elephant by Brigit Rooney is attached to this email.

**From Ajay Srivastava (Biology):**

The QTAG funded the generation of a polyclonal antibody against a Basement Membrane Associated Protein which will aid in understanding the contributions of Basement Membranes to tumor metastasis and developmental invasive behavior.

**From Keith Philips (Biology)**

I and a graduate student, Olivia Gearner, travelled to South Africa to collect needed genera of spider beetles from May 30-July 5. We concentrated in the northwest and western part of the country which are areas of winter rainfall. The hypothesis that adults are active all year was supported. Adults of several needed genera were collected (including those of a genus she is revising) as well as larvae that are currently being reared. Molecular sequence data is being acquired and will be analyzed soon and the resulting phylogeny published as part of the student's MS research.

Overall a successful trip and the student can carry on studies long after I am gone as she received a thorough training and is now competent in conducting field work on these beetles anywhere in the world. Many thanks for the support.