



## 2019 Year in Review for the Blunck Research Group

Dear Colleagues and Friends,

This is the fifth annual newsletter reviewing the past year for the Blunck research group at Oregon State University. This year was another great year full of accomplishments by the students of the group. We are very grateful to our many collaborators, funding agencies, and colleagues who make our progress possible.

### Overview

At the end of 2019 the research group had 9 graduate students, 1 post-doctoral scholar, and multiple undergraduate students. We continue to perform research related to detonations, wildfires, turbulent combustion, infrared thermography, and ignition. It is quite rewarding to see the students encourage, support, and push each other. Earlier in the year we had a discussion of the culture that they wanted from the group. After a thoughtful discussion they decided that they want to be known as impactful, rigorous, and collaborative. I like to think that these attributes are reflected by students and graduates of the group.



Figure 1. Members of research group in December of 2019.

### Successes of Students and the Group:

- One new PhD student and one post-doctoral scholar joined the research group. Nathan Gardner graduated with his bachelor's degree in the spring from Brigham Young University-Idaho. He is now leading efforts to identify physics controlling ignition of live fuels in wildfires. Sampath Adusumilli recently joined us after earning his PhD from Georgia Tech. He is conducting research quantifying the number and characteristics of embers released from burning large-scale trees.
- Daniel Cowan defended his M.S. thesis focused on smoldering of ponderosa pine duff. He is now working at Los Alamos National Laboratory and enjoying New Mexico.
- Our group is now leading a \$2M effort funded by SERDP studying burning of live fuels. We are collaborating with colleagues from OSU and from the U.S. Forest Service.
- We had a news interview with reporters from Japan who discussed wildfires. They visited our outdoor burn facility and watched a staged burn (ironically in December when everything is wet). You can view the interview at the link shown below. It is still not clear how they are describing our research (because it is in Japanese), but we (naively) assume that it is all positive.  
<http://www.news24.jp/articles/2019/12/20/10565112.html>
- Mick Carter, a PhD student, had a successful internship at National Energy and Technology Laboratory in Albany, OR. He is leading

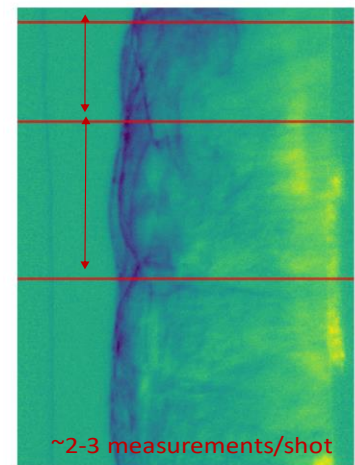


Figure 2. Focused schlieren image of a detonation front. The red lines note the location of triple points.



an effort to measure the sensitivity of detonation cell sizes to dilution with combustion products. An example image is shown in Figure 2.

- Tyler Hudson (MS graduate) has started working as the CEO for a small business, Rogue Approach, which is focused on making engines for small drones more efficient.
- Our research was featured on the front cover of a periodical magazine published by the College of Engineering (Figure 3).
- We commissioned a new experimental arrangement studying ignition characteristics of jet fuels when diluted with combustion products. This study has application to advanced engines.



**Figure 3. Front cover of College publication highlighting our research.**

### **Other Accomplishments:**

- I received tenure and am now an Associate Professor.
- I was interviewed by a radio show host based out of Los Angeles to discuss wildfires. It was overall a good experience. You can listen to the interview at <https://soundcloud.com/user-887857061/dr-blunck-interview-trimmed/s-rrwli?fbclid=IwAR2iEPdVC7TjB3RArpG4Qe5GDdBkK8uyFVI3FnZ217BKCSQTSmJET2KDsl0w>
- I accepted a position as the Associate Head for Undergraduate Studies in the School. I was drawn to the position because of the ability to have a positive impact on many students.
- We were 1 of just 2 groups in the College of Engineering at OSU to receive the 2019 Research Collaboration Award. We are very grateful to our many collaborators.
- My family's hobby farm was "bigger and better" this year. The fall season was particularly profitable and enjoyable as we sold pumpkins from our pumpkin patch. It continues to be a "love and hate" relationship among my sons, but a worthwhile (ad)venture.

### **Looking Forward:**

In 2020 I am looking forward to several graduate students graduating and applying their experience in industry or national laboratories. I believe that they are well prepared to have a positive impact in the world. I will recruit 3 new students to work on the live fuel project and to conduct research studying the influence of two-phase flows on detonations (funding by ONR). I look forward to multiple publications (5 are currently under review or revision) as we conclude several research projects. Finally, I am excited to serve as the Associate School Head and to positively influence the 1500 undergraduate students in our program. Please be sure to stop and visit the group when you are in the Pacific Northwest.

Best Wishes,

David

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