

Morgan Hawker Q&A | RSP Newsletter | June 2020

From starting up her own lab to teaching through a pandemic, chemistry professor **Morgan Hawker**'s first year at Fresno State has certainly been eventful. Hawker recently received a **CSUPERB New Investigator Grant** to develop a plasma-based approach to fabricate two classes of silk films with opposing surface properties. She recently spoke about the grant and other topics, including her plans for this fall:

<http://www.fresnostate.edu/csm/chemistry/facstaff/facpages/hawker.html>

<https://www2.calstate.edu/impact-of-the-csu/research/csuperb>

How would you describe these last 12 months?

My first year at Fresno State has been a complete whirlwind! This year has been a non-stop learning experience, from the tenure track faculty networking orientation with other new faculty from across campus at the start of the year, to virtual instruction, to navigating the grant application process.

I have enjoyed getting to know the faculty, staff, and students in my department in both face to face and virtual contexts. I have come across numerous challenges during my first year and am thankful for the advice and support that I have received from everyone in my department and elsewhere on campus.

Much of my time this year has been dedicated to setting up my group's research space. This has truly been a collaborative effort between the undergraduate researchers in my group, as well as the talented chemistry department technicians Doug Kliwer, Alan Preston, and Ian Huh. I have really enjoyed working with everyone involved throughout this process all year long. My research students have generated some thought-provoking preliminary data in the lab so far, and I look forward to seeing where their projects go next (once we are able to get back to the lab safely, of course).

Over the last two semesters, I had the opportunity to teach general chemistry, biophysical chemistry, and a graduate course about the physical chemistry of polymeric biomaterials. I have enjoyed using these classes to try out new activities to engage my students, and am continuously inspired by their curiosity and creativity. For example, my biophysical chemistry students created podcasts the course topic of their choice. They integrated independent research using primary literature sources, and did a great job making their podcasts informative and enjoyable to listen to.

I have learned so much from my students throughout my first year at Fresno State and am looking forward to continuing to learn from them in the coming years.

Congratulations on your CSUPERB award! Can you explain how the award will enhance your lab? <https://www2.calstate.edu/impact-of-the-csu/research/csuperb>

Thank you! I am excited about this award because it will enable me to pay two undergraduate researchers for their work for one semester and the following summer. Participating in this project will provide students with an immersive research opportunity as they will be directly involved in all aspects of the research, from experimental design, to materials fabrication, to

data collection, to reporting their results at a future **Central California Research Symposium**.
<http://www.fresnostate.edu/academics/grants/students/ccrs2020.html>

My lab will be able to use the data generated from the CSUPERB project to expand our research capacity by applying for larger awards in the future. These future awards will provide my group with a strong foundation so that we can continue to grow, giving as many students the opportunity to get involved in our research as possible.

What steps did you take to write a successful proposal? Do you have any suggestions for first-time applicants?

I am one of those people who has to get writing tasks done ahead of time so that I have enough time to gather feedback from others. For the CSUPERB grant, it was really important to be able to reach an audience with diverse scientific backgrounds. For me, this meant sending the grant to as many people outside of my expertise as possible (my undergraduate research students, colleagues in my department whose research interests are very different than mine, and others from my PhD and postdoctoral research groups).

Additionally, faculty in my department who previously received CSUPERB awards, as well as our grants administrator **Gayle Sherwood**, were quite helpful throughout the application writing and submission process. Their input and assistance made the process less daunting.
<http://www.fresnostate.edu/academics/grants/staff/gsherwood-updated.html>

One of the highlights of this year was the installation of a **contact angle goniometer in the **Hawker Lab**. How has that impacted your research?**

<https://hawkerlab.weebly.com/what-we-do.html>
<https://csmfresno.com/contact-angle-goniometer-installed-in-the-hawker-lab/>

As the first large piece of equipment in our lab, we have really enjoyed using the contact angle goniometer. As with any new equipment, there has been a learning curve. I am really proud of my research students for taking responsibility to learn how to use the instrument and teaching each other what they have learned. I am sure they would tell you that this process can be frustrating at times, but I think this type of troubleshooting is essential to scientific research.

We have done a lot of work as a group to optimize the silk films we make so that we can collect reproducible data using the goniometer so that we can characterize how these materials interact with water. This insight is important when developing biomaterials as they are designed to interface with aqueous environments. We have had really productive conversations as a group about interpreting water contact angle data, data analysis, and reporting results.

The preliminary data my students have collected have generated many new questions about how plasma treatment changes the surface of the silk films we fabricate, and we are excited to pursue these questions in the coming months. We are also looking forward to collaborating with other researchers on campus who are interested in using the instrument as it has a wide range of functionalities in the context of surface science, including measuring static and dynamic contact angles, as well as measuring surface tension.

Undergraduate research has been a key part of the CSU's strategic plan. Can you talk about how students can benefit by joining a lab?

Undergraduate research is so important because it gives students the opportunity to join a community where they can be creative in a scientific context. I would encourage students to join a research group, even if they have no experience doing research and are not sure what to expect.

Research can take many forms (as just a few examples: computational work, collaborating with local companies, fabricating materials, chemical synthesis, educational technologies, working with living organisms), so do not get discouraged if your first research experience does not resonate with you. Try out a few different experiences and see what you like and what you find less interesting. I would also encourage students to consider research opportunities both in and out of their major.

My current research students are biology, biochemistry, animal science, and kinesiology majors. The perspectives everyone brings with different areas of focus is powerful and helps us develop research questions that combine our interests.

When it comes to advising research students for me personally, one of the most enjoyable aspects is to see them adapt to new ways of thinking and become excellent problem solvers. These skills will benefit you as a student no matter what your post-graduation plans are.

We noticed on your [Twitter feed](#) that you attended the [CSU Biotechnology Symposium](#), held in January in Santa Clara. What were your main takeaways from the experience?

https://twitter.com/m_hawker23

<https://www.csuperb.org/symposium/>

The Biotechnology Symposium was an excellent experience. As a new faculty member, it was especially useful as it exposed me to the diverse, high-impact biotechnology research occurring at the various CSU campuses. It was also a great networking opportunity as I met many great researchers from across the CSU system.

The meeting gave me a good perspective for the scientific ecosystem in which I am establishing my research group, and I am looking forward to taking my students to future Biotechnology Symposia to present their research.

While there are still plenty of unknowns for the fall semester, have you started thinking about how you'll need to modify your teaching and research efforts?

This topic has certainly been on my mind lately. My research group has been having weekly Zoom meetings where we alternate facilitating the discussion of different journal articles that are related to our research. We will likely continue doing this next semester (even when we are able to safely return to lab) because it has been useful to have a dedicated time for us to discuss the context of our research as a group.

Once we are able to return safely to the lab, it is likely that we will need to modify our research efforts to have a limited number of people in the lab at any given time. My department is

working hard to ensure that we have all necessary personal protective equipment (masks, gloves) as well as hand sanitizer so that we can be as safe as possible when we can return to the lab.

As for teaching, I am spending a lot of time this summer participating in professional development opportunities so that I can learn more about best practices in teaching online courses. I am looking forward to taking time to put what I learn into action when designing my general chemistry (CHEM 1A) and introductory physical chemistry (CHEM 108) classes for the fall.

I am especially excited about creating learning communities within my courses so that students can have a dedicated group of peers to bounce ideas off of and help each other to navigate the course. My goal is for students to experience a similar sense of community that they would experience in a face-to-face course despite that the course is online.