

**IDRC Purpose:**  
To Defeat Global Health Threats  
*We Do the Difficult*

**IDRC Values:**  
Creativity, Knowledge,  
Achievement, Honesty,  
Competency

## ZINC (Zoetis Incubator) Begins 4<sup>th</sup> year at CSU

A little over 3 years ago CSU and Zoetis, the world's leading animal health company, initiated an innovative experiment and created a significant partnership. Zoetis discovers and develops innovative medicines, vaccines and diagnostics for pets and farm animals, and its investment in the Incubator established labs and hired scientists (most of them with CSU ties) here in Fort Collins. The IDRC checked in with Chad Ray, PhD, Executive Director and Head of Discovery Sciences and Technologies at Zoetis. This is a short update on how the partnership is going.

**Q: What were some of the primary goals when Zoetis decided to embed a group of R&D scientists here at the RIC in CSU's Foothills Campus?**

A: We established the Zoetis Incubator Lab at CSU to conduct early research to gain a deeper understanding of livestock immune systems and pave the way for new therapeutic solutions that could be alternatives to antibiotics in food-producing animals. We chose CSU because it is a vibrant research institution that draws upon highly skilled scientific talent in a strong biotech community. Our goal has been close collaboration to generate future innovations for healthy animals.

**Q: Would you describe your first 3 years here as successful? Any highlights you can share?**

A: Absolutely! In just three years we have built a fully functional research center within Zoetis that is married by the interests and resources at CSU. We have successfully established systems and pipelines on campus which allow us access to veterinary samples and computational power that we otherwise would not have been able to access. We have interrogated new disease mechanisms across animal species more effectively because of these resources and the scientists we've recruited, which may ultimately feed our therapeutic pipelines and fuel discovery in upcoming years.

## Zoetis, continued

**Q: You have various collaborations with CSU faculty members related to their research. Any comments on how your applied research efforts (to develop new animal medicines) is benefitting from being so close to CSU researchers engaged in their foundational science work?**

A: Our collaboration with CSU faculty members has had a significant contribution in accessing relevant sample types for assay development, informing our understanding of disease pathogenesis, and biomarker discovery for livestock and companion animals. Our collaboration has been mutually beneficial, in that, shared data has been showcased in posters, grants, and oral presentations by our collaborators. As one example, the Zoetis Incubator Lab has had a close partnership with Dr. Michael Kirby's group in Applied Mathematics, which has been very fruitful. Working closely with this group at CSU helped us to jump start our local data sciences program and understand how to apply the latest machine learning algorithms directly to biological organisms and disease mechanism of action. Since we have continued to push the boundaries by incorporating newly developed methods into our workflows, and we recruited a great postdoc from CSU to Zoetis, while providing real world experience to budding applied mathematicians.

**Q: Last summer you employed a small army of CSU students as interns. What kind of work did these students perform, and what type of feedback did you hear from them about their experiences?**

A: The CSU summer interns were energizing additions to our group. They worked on teams across functions and experienced what it was like to be a professional scientist. The interns took on their own projects in consultation with their mentors; these projects were inherently multi-disciplinary and helped the interns understand the importance of teamwork and collaboration in modern science. We've received a lot of positive feedback about the hands-on time of mentors with interns and the programming developed in house (e.g.: journal clubs) that challenged interns to engage with literature and develop their analytical and communication skills. Most of our former interns go on to scientific careers or further education having had an experience with us that propelled and prepared them. We're thankful to CSU for connecting us with these students and funding mutually beneficial learning and mentoring opportunities!

**Q: Do you expect some of the early-stage projects worked on by your teams here will eventually make it to the commercialization stage and be important products for Zoetis? Are you able disclose any of the key areas (animals / diseases) that could be impacted?**

A: Our research teams, including collaborations with faculty and student interns, have made great strides to accelerate the scientific understanding of multiple disease areas impacting both livestock species and companion animals. We do believe the work done in our Incubator on CSU's campus will help drive the next wave of veterinary therapeutics.

**Q: Final question. You have now had more than 3 years' worth of experience interacting with the CSU community, and I am sure you understand that CSU is very proud of our Land Grant University heritage and mission around education, research, and service/extension. The Zoetis-CSU partnership seems to have really helped connect our students and faculty with real-world scientific problems that are of great importance, while also benefiting Zoetis. Do you think other companies or industries could benefit from developing closer relationships with land grant universities like CSU?**

A: We are proud of this unique collaboration model which bridges relevant academic research with pharmaceutical applicability not just through idea-sharing but through physical and geographical connectivity. Interacting directly with students and faculty helps keep our own scientists fresh and better aligned with new technologies and innovative solutions. It allows us to follow the science more fluidly and adapt. CSU has an abundance of resources and state-of-the-art core facilities directly in line with our mission to nurture the world and humankind by advancing care for animals. All have been invaluable to us in these three years.

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## Dr. Darragh Heaslip Named BioMARC Director

### Longtime Technical Leader Promoted After Wyckoff Retirement

Darragh Heaslip, PhD has been appointed to the role of Director of BioMARC and succeeds the former Director of BioMARC, John H. Wyckoff III, PhD who has retired. Darragh has over 20 years of experience in infectious disease research using high containment BSL-3 and CDC regulated biological agents, and over 11 years leadership experience in the Biopharmaceutical industry, including Process and Analytical Development, Technology Transfer, Quality Control and Biologics Manufacturing.



He received his bachelor's degree in Genetics from Trinity College Dublin and a Ph.D. from the School of Biological Sciences, University of Surrey, UK in conjunction with the Moredun Research Institute, Edinburgh, UK. He did postdoctoral studies in the laboratory of Prof. John Belisle at CSU focused on the role post-translational modifications play in *Mycobacterium tuberculosis* and *Mycobacterium leprae* disease.

In his prior role as the Associate Director of Technical Operations at BioMARC and an affiliate Assistant Professor in the MIP Department at CSU, he led the development and manufacture of several candidate vaccines at BioMARC including vaccines for Ebola, Western, Eastern and Venezuelan Equine Encephalitis viruses, HIV, typhoid fever, Rift Valley Fever, and SARS-CoV-2. He has also led the development team at BioMARC to produce material for inclusion in CDC diagnostic tests for Zika, West Nile and Chikungunya viruses, and the preparation and initial assessment of a CDC sponsored yellow fever (YF) MAC-HD diagnostic kit for field trial and validation in yellow fever-endemic countries.

Darragh's appointment to this role comes at a time of great growth in BioMARC's activities resulting from its engagement in pandemic response initiatives for new vaccine manufacturing processes in support of those initiatives. Darragh's engagement in those projects with funding from NIH/NIAID has been essential in driving technology development in pandemic response capabilities from Colorado State University.

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## NIH Invests Supplemental \$3.19M in CSU's IDRC Biosafety Infrastructure

### Funding Comes In Addition to Prior \$3.29M Grant from NIH

The IDRC is excited to announce that these incremental NIH funds are currently being deployed to replace more than 39 aging biosafety cabinets through the RBL, and to upgrade multiple sterilizing and washing systems used by our lab animal resources group. IDRC Executive Director Ray Goodrich commented, "The specialized high-containment laboratory facilities we have at CSU are among the best in the country and enable our researchers to make major contributions to pressing infectious disease threats while also training the next generation of biologists. However, this infrastructure requires significant ongoing investment. We are delighted that the NIH continues to see value in our unique capabilities, and we are very grateful for this investment which will so greatly benefit our faculty, students, and community." RBL Scientific Director, Dr. Karen Dobos, has led the efforts to secure the funds and get the much-needed upgraded equipment.

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# RIC (Research Innovation Center) Interns

## SiVEC Intern: Anthony Martinez



### Year of study, major:

Senior, biomedical science with a concentration in infectious disease and microbiology.

### What types of things are you doing in your internship?

Many of the things that I do are molecular biology oriented. SiVEC does a lot of molecular cloning in association with their bacterial delivery system technology. As such, PCR, traditional cloning techniques and newer HiFi assembly cloning techniques are used routinely, as is bacterial culturing and screening. The biggest skill I have learned though, is problem solving and troubleshooting.

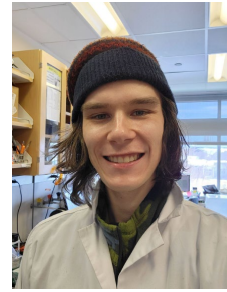
### Do you think this experience has complimented your class and lab work at CSU?

It absolutely has, working at SiVEC has allowed me to take what I am learning in the classroom and apply it to real world research and bioengineering. It highlights what knowledge is key and what knowledge is useful, but not used often in applied scientific settings. I have also been able to take the knowledge that I have gleaned in the lab and applied that in the classroom which has greatly augmented my learning journey.

### Any thoughts on what you hope to do after graduating?

I see both my degree and the experience I have gained as a ticket to be able to live nearly wherever I wish too. I have recently found an interest in plant pathology and may pursue a masters degree in that in upcoming years. For now, I plan to stay in industry for a few more years working in Denver, I hope to eventually move to the United Kingdom hopefully in the next five or so years.

## E-Flux Intern: Anatoly Rapport



### Year of study, major:

Junior, Computer Science and software engineering

### What types of things are you doing in your internship?

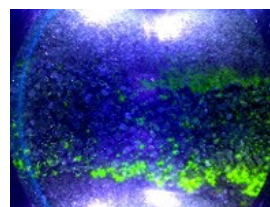
During this internship I have worked on a few different projects. The first project I worked on was the UV-light probe. I managed to make the software more stable for the equipment in order to conduct testing with the device. Most recently, I have been working on a project that is more web development focused. I have been working on developing a tool that graphs pollution levels during oil spill remediation.

### Do you think this experience has complimented your class and lab work at CSU?

I think my time at this internship has helped me a lot. The environment / OS that the software I have been building is run in is Linux (Ubuntu). Before this internship, all I had used was Windows. Additionally, at the beginning of the internship I also learned some Bash scripting / programming. Both Bash and Linux have been used in one of my classes I am currently taking (CS253 Software Development with C++). This internship has helped me complete the assignments in this class.

### Any thoughts on what you hope to do after graduating?

After graduation I would like to be a software engineer at a tech company. I personally wouldn't want to work at a social media company but would be interested in doing more research-sided development. The work that I do is important to me, so having a job that has meaning (besides just building a multimedia platform) is something I want to do after graduation.



The UV-light probe Anatoly worked on took the left image. The probe optically surveys a dry well in the ground of petroleum contaminated locations. It detects the presence and distribution of contaminants in the ground based on their fluorescence (contaminant fluoresces green.)

# RIC (Research Innovation Center) Interns

## Vivaldi Intern: Charlotte Anderson



**Year of study, major:** Junior, Biochemistry (ASBMB Concentration)

**What types of things are you doing in your internship?**

Molecular virology, reverse genetics, PCR and sequencing, assays

**Do you think this experience has complimented your class and lab work at CSU?**

Absolutely, there's a significant amount of content crossover between my microbiology and biochemistry classes and my lab work. Some of the assays I do in the lab today are ones I first learned about in Life 212.

**Any thoughts on what you hope to do after graduating?**

Hopefully continue researching! I would also like to explore the world of biochemical research beyond virology, though I am enjoying virology very much.

## PhotonPharma Intern: Sara Sellers



**Year of study, major:** Senior in Biomedical Science: Microbiology

**What types of things are you doing in your internship?**

In my internship with PhotonPharma I am working with multiple cell lines to maintain cell culture, learning how to run flow cytometry, doing lots of IFA stains, and learning about cancer biology and cancer treatment technology.

**Do you think this experience has complimented your class and lab work at CSU?**

Absolutely! I've been able to apply all the skills I've picked up in lab courses to an actual work environment. I also better understand the work I do thanks to the classes I've completed throughout my degree.

**Any thoughts on what you hope to do after graduating?**

After graduation I plan to continue working in oncology or pathology research and sharpen my lab skills before continuing my education with a graduate degree in microbiology or epidemiology. My goal is to eventually bring my focus to global health care accessibility, infectious disease research, and public outreach.

IDRC

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