Lumi

UWE Bristol | University of the West of England

Case Study

How Lumi helped a PhD student save valuable time and money (and sanity)

Background

Stephanie Jay is a postgraduate researcher at the University of the West of England (UWE). Stephanie's specialist field is microbiology, with her PhD focusing on preventing incidence rates of periodontal disease globally.

She has finished the initial research stage of her PhD and is now conducting trials. Stephanie became aware of Lumi during her PhD and was recommended to use it for monitoring her biofilm experiment. There was also the opportunity for Stephanie to pilot Lumi for plate counting – an experimental feature being explored by Reach Industries.

Managing challenges inherent in microbiology research

Managing a living experiment…

One of Stephanie's challenges within her degree was monitoring and managing her biofilm experiment. Because Stephanie's PhD research was centred around periodontal disease, her biofilm replicated a human mouth and was set up to mimic the conditions within one.

This entails growing organisms in the biofilm, which is connected to a feed where media and air is pumped through to keep these organisms alive.

> "These organisms are very fussy. So, if there's any problems with the tubes, or not enough media comes through, they could die. I had a very hard time setting that up because ideally you set up on Friday, then you give it forty-eight hours to get to a state where it's settled. But, if you leave it on a Friday, you have to come in on Saturday and Sunday to make sure it's okay. The tubes could pop, or leak… everything could go wrong."

Stephanie lived on the other side of town to her university campus, and one of her colleagues lived in another city. As a result, making these journeys was time consuming and demanding, as well as taking up valuable free time in between their studies.

Manual, tedious processes

Another challenge that Stephanie had also come across during her research was the task of plate counting. Many microbiologists will know how laborious this process can be. Biologists typically have to manually count middle to low plate counts, which is the population of bacteria in a sample, however it's not possible to count high plate counts.

> "You can have tons of different bacteria on a plate, and you don't know what's what, or can't count the numbers,"
>
> Stephanie explains

"There's the big picture of a project which is exciting but when it comes to mundane things like plate counting, that's really boring. In my undergrad I had to count over 800 plates, which was not cool!"

Discovering Lumi for successful biofilm runs

Stephanie had heard about the creators of Lumi - Reach Industries - before using the solution, but it was only when her supervisor introduced founder Silas Adekunle, who was coming in to demonstrate a prototype, that she actually came into contact with the innovative computer-vision system.

> "My supervisor heard about Lumi and thought it would be useful for me. We set it up and it kicked off from there. I think we were destined to cross paths!"
>
> explains Stephanie.

There were some things that had to be fine-tuned for the project. Some of the features didn't exist before Stephanie used Lumi, however a week and a half later after their initial meeting, the tool was ready for Stephanie to use.

"The response time from the team was quick! Whenever I needed anything, they were always quick to respond, and always have a solution to my problem. It's great."

Once Lumi was set up, Stephanie was able to monitor her biofilm from home through the LabEye camera, logging in from her desktop or phone and seeing the experiment remotely.

"Having Lumi to monitor my biofilm saved me going to university all the time. It helped me see things like the levels, or the tubes, for example. If a tube was going to pop, Lumi could tell me before the tube actually popped.

If something goes wrong with a biofilm experiment, you've lost two weeks of set up - Lumi saved me those two weeks! It also costs money to set up a biofilm every time it fails, so having to not take things down and rebuild... that was very helpful."

Lumi for rapid and effective plate counting

Although Stephanie initially realised Lumi could be used to monitor her biofilm, Silas explained that there was potential for Lumi to do plate counts, and was happy to collaborate to test it as an experimental feature. Used for this, the LabEye ideally would be able to identify different organisms, as well as both the number and type. They then did a trial run for this use case.

"When I used Lumi for plate counting, I'd do my plates as normal and Lumi would capture them and then process that information, relaying the report back based on the corresponding image capture.

> Lumi is very clever. She was able to count the really highdensity plates with all kinds of different bacteria, and was able to specify and differentiate colony types,"
>
> Stephanie says.

"As time went by, Lumi started giving me access to other features like the alerts and that type of thing. It's really efficient and useful – everyone loves something useful!"

Excitement for the future of Lumi and science

"I'm excited about the possibilities and impact Lumi can make in my field of work," says Stephanie, discussing how many tasks "are tedious. And they are long, they are boring, and you can make mistakes as well. As Lumi can help with that, it makes everything faster, easier, more efficient."

"When you're doing a PhD, you don't have a lot of time, and it's something that you want to grasp onto desperately. If Lumi can save that time for researchers and for students, then that's just amazing."

Stephanie sees huge scope for Lumi, and believes it will deliver a lot of useful and measurable metrics. While she's not currently using Lumi – as she's in her trials, she's excited about the opportunities to work with Reach Industries on other projects in the future.

"It's not a closed door. It's very much open. I'm looking forward to helping to develop more stuff that could be useful for the research community."

She expresses her gratitude towards Reach Industries for introducing her to Lumi, and for developing Lumi to help with her project.

"Lumi was very useful and very significant. Big shout out to the Reach team, and thank you!"