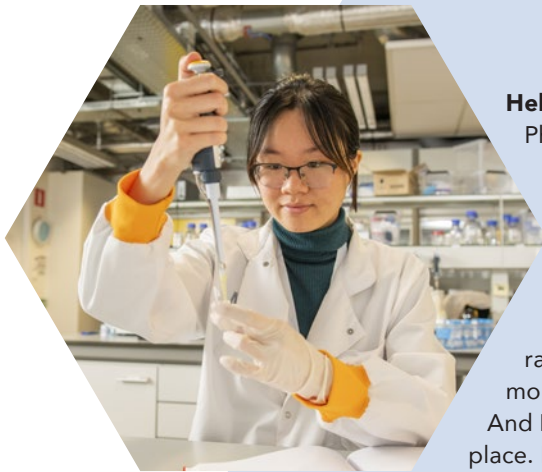




Training PhD students in the ICMS spirit

Marie Curie Innovative Training Networks (ITNs) are European collaborations linking PhD research projects across Europe. With their focus on complementarity and interdisciplinarity, the ITN concept fits quite well with the mission of ICMS. It may come as no surprise then that many ICMS members are involved in one or more ITNs. As principal investigator - supervising PhD students - or even as initiators and coordinators of an entire ITN. We asked Lorenzo Albertazzi, Menno Prins and Peter Zijlstra, who coordinate the ongoing ITNs Theracat, Consense and SuperCol, about their experiences. And we asked PhD students of these ITNs how they feel about doing their PhD in the ICMS environment.

From left to right:
Lorenzo Albertazzi,
Menno Prins and
Peter Zijlstra



Helen Tan

Helen Tan is in the second year of her Consense PhD research in the Molecular Biosensing group, guided by Menno Prins and Arthur de Jong. She works on continuous biosensors based on the diffusional motion of particles at a sensor surface. "I applied for this Consense PhD position because I was attracted by the interdisciplinary context. And well, it's a Marie Curie ITN, which is rather exclusive and it promotes a lot of international mobility. In fact, I discovered ICMS not until I started. And I have to say I'm really happy that I chose this place. I visited talks and workshops and that was a great experience for me. ICMS is really beneficial for early career researchers. It provides an interesting interdisciplinary network and it provides access to a lot of advanced equipment which really benefits your research. Furthermore, meeting other researchers is also important from a personal perspective, to share experiences. It's not just about the research. It's also about personal growth."

The Innovative Training Networks were established as part of the Marie Skłodowska-Curie Actions scheme within the European Union research funding program. They are among Europe's most competitive and prestigious research and innovation instruments. The Innovative Training Networks involve up to 15 PhD students (called Early Stage Researchers or ESRs) in a partnership between universities, research institutions and companies across Europe. A key aspect of these networks is that they facilitate the sharing of knowledge through collaborations, networking activities, workshops and conferences. In addition, the PhD students are trained through secondments to other partners in the network. To Menno Prins, coordinating the Consense ITN, the concept and popularity of the training networks in fact confirms how visionary it was to establish ICMS back in 2008. "What we now see across Europe has been acknowledged here right from the start: how important it is to build bridges between disciplines. We are

in full swing with that approach – and indeed quite successful." Peter Zijlstra adds that being an ICMS member has helped him to establish the SuperCol ITN, because of the experience in connecting, discussing, and collaborating with colleagues from very different fields. "Adding to that, the combined ICMS expertise and infrastructure significantly strengthens a proposal. It underpins that we have the right environment to troubleshoot issues that might be outside our comfort zone."

"IT IS THIS SCIENCE-BASED APPROACH COMBINED WITH CREATIVITY THAT FORCES UNEXPECTED BREAKTHROUGHS"

UNDERSTAND THE COMPLEX SYSTEM AT HAND

All three ITNs fit nicely within the scope of ICMS research, as they rely on biochemically functionalized particles for biomedical applications. At the same time, they differ from each other: Theracat focuses on catalytically active particles for drug delivery applications, Consense on the development of continuous biosensors, and SuperCol is about methods to synthesize the particles and characterize them using correlative super-resolution microscopy. Theracat coordinator Lorenzo Albertazzi underpins that all three ITNs are about connecting the chain of particle synthesis, functionalization, characterization, and application. "The common approach here is to understand the complex system at hand and go beyond trial-and-error."

Of course that is also an important aspect at ICMS, says Prins: "We try hard to make molecular systems work, but we also want to know how they work. We take the time to do analysis,

reveal underlying mechanisms, develop models and perform calculations." To facilitate that, ICMS has state-of-the-art infrastructure in microscopy, spectroscopy and computing. "It is this science-based approach combined with creativity that forces unexpected breakthroughs," says Prins. Zijlstra adds: "To synthesize and functionalize colloidal particles, characterize them using microscopy, and to apply them in biosensing and drug delivery applications requires knowledge in chemistry, physics, and biology. There is no researcher that possesses all this knowledge individually, so it is very much in the spirit of ICMS that you achieve this through interdisciplinary collaborations. What's more, the broad and diverse consortia we work in naturally stimulate out-of-the-box thinking. And the intense collaborations create ideas that may otherwise not be thought of."

Bárbara Malheiros



Bárbara Malheiros is in the third year of her SuperCol PhD research in the Self-Organizing Soft Matter group of Ilja Voets. She synthesizes and characterizes DNA coated colloids in different sizes and studies their assembly behaviour.

"I really like the idea of working together with all SuperCol PhDs at universities across Europe and collaborating a lot. And through my fellow ICMS PhDs of Consense and Theracat I have access to a huge European network! It's a really nice idea that I am, in an indirect way, in touch with all these other researchers. And of course even in a direct manner, when ESRs of other ITNs visit Eindhoven for their secondments. When I started working, I found out that ICMS was a big community and that was a great surprise. I feel like I have an ITN within the university; it's easy to be in touch with all these other ICMS groups. I can just knock on their doors and have a chat or ask for assistance. That really helps me in my research."



Emmanouil Archontak

Emmanouil Archontak is in the last year of his Theracat PhD project and is currently writing his thesis. In his research he employed optical super-resolution microscopy, in particular single-molecule microscopy, to characterize nanomaterials developed by other Theracat ESRs. "It was a very multidisciplinary effort with many different people. I really wanted to work in a Marie Curie ITN because of the collaborations and the connection to companies. What ICMS added to that was the infrastructure. I was very impressed with the state-of-the-art-microscopes, its modalities and functionalities. To have that all at your fingertips is truly amazing. What I also like very much in ICMS is that it sort of feels like home. It doesn't look like academia here in Ceres. It's a very professional but at the same time very open environment. You can easily walk into someone's office, ask a question or have a coffee break and speak science. I experienced this daily connection with people as really helpful and made me comfortable with things that were initially outside my comfort zone."