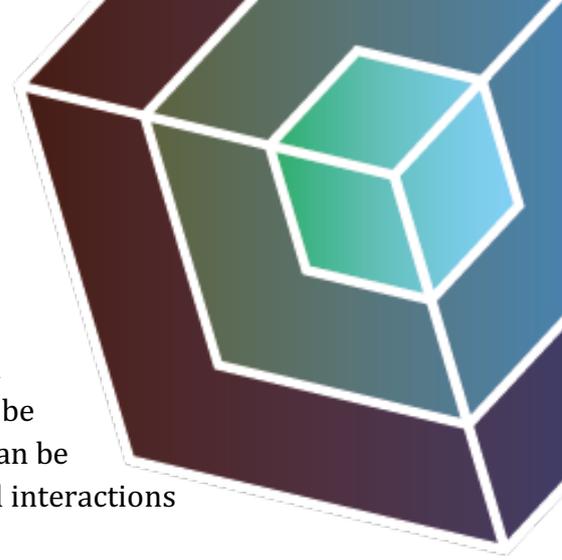


Project: Hydrodynamics and interaction of self-assembly in droplet confinement

“In hierarchical self-assembly (SA) atoms are arranged into nanoparticles, which can self-assemble and form micro- sized supraparticles. How the structure of these supraparticles can be optimized and the role of hydrodynamics in SA understood, can be obtained from numerical simulations by tuning the shape and interactions of the nanoparticles.”

Giulia Fiorucci (UU)

For a more detailed description, see below.



Can you do a short presentation about you?

I am Giulia Fiorucci, I got my master degree in Physics in Rome at La Sapienza University. I am currently doing my PhD in the Soft Condensed Matter group of the Physics department of Utrecht University.

How is living in another city like Utrecht?

Utrecht is a wonderful city, which offers a lot in different fields, from education to hobbies and activities.

Would you advice a friend to come to the Netherlands?

I would totally recommend to a friend to come to the Netherlands because it offers many opportunities both in education and jobs.

How/why did you finish in Utrecht?

I was looking for a PhD position in Europe and I was aiming for an important group as the one in which I am currently working.

How did you become interested in science?

In high school, we had great teachers who stimulated our interests by making simple experiments at the school lab. Since then, I was interested in knowing the explanation of some natural phenomena that occur around us in everyday life.

Did you know right away that you wanted to be a research scientist?

No, it was not clear at the beginning, but when you start your own studies in a scientific field it becomes quite natural to desire to get down to work on the frontier research.

Although being a scientist is not easy nowadays, because of the difficulties inherent to the subject itself and because it is a competitive world.

At the moment, it is unclear to me if I would like to continue with the academic carrier.

However, I believe the most valuable expertise we develop by making scientific studies

and by getting a PhD is the logical and critical attitude with which we face challenges, and this is applicable outside university as well.

What do you enjoy the most about your research?

I think the most exciting thing is to have the freedom to choose your own pathway to approach a topic. In fact, having the knowledge on what has been done in the past, enables you to come up with lots of ideas on what would be interesting to study next. I found this part the most enjoyable.

What is your biggest motivation?

My biggest motivation is to become a Doctor in Physics.

How do you see yourself fitting in the MCEC project?

I see the MCEC community as a great group of young scientists where you can share ideas and expertise to achieve important results in science. It gave me nice occasions to brainstorm in small groups and to attend very interesting lectures given by great Professors. I love it.

If you had a time machine and 2 beers, with which scientist would you like to meet (and why)?

I would love to go and talk to [Ettore Majorana](#) just to ask him “what happened to you?”.

Which scientific term/phenomena you think is the most misused by media?

I don't have an answer to the question, but I see the need to inform the general audience to the latest discoveries that might revolutionize our lifestyle in some years, and at the same time I see all the difficulties to convey the message in simple words. Therefore I sometimes understand how some argumentations are not entirely correct when spread by media.

What do you like to do in your spare time?

I like to read non-science related books and play board games with my friends!

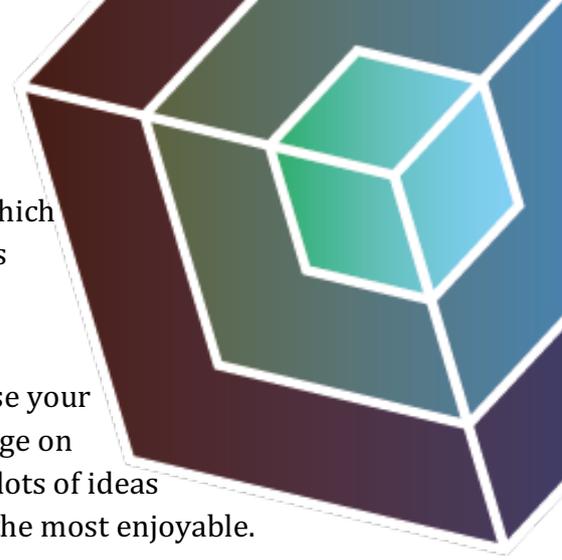
Is science the answer to everything?

It is the answer to everything can be probed by science itself. Science gives the answer to what can be probed nowadays with respect to our technical or energetic limitations, which might be overcome in the short or long future, when it would probably give the answer to new and deeper questions. So in short science cannot give the answer to something that cannot be investigated nowadays.

What do you want to do after finishing your PhD?

As I said before, it is still unclear, but doing a PhD prepares you to transit from being a student to becoming a worker, and therefore it opens up several possibilities in different fields.

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Project description:

Fine control over placement of materials on the nano- and meso-scale is a key element of designing new materials. In this project we aim to shed new light on one way to control the structure of these materials over multiple length scales: hierarchical self-assembly. In hierarchical self-assembly, we start by arranging atoms into clusters, which are often called nanoparticles. Then, the nanoparticles can be organized into larger clusters, and this process continues on different length scales with new properties and functionalities added at each self-assembly step. The structural properties of the resulting material are determined by the shape, size, and materials used in each assembly step. Recently the soft condensed matter group at UU investigated in experiments and simulations the self-assembly (SA) of nanoparticles inside the confinement of slowly drying emulsion droplets. They showed that the spherical confinement influences the SA process in an intriguing way, leading to crystalline clusters (supraparticles) with icosahedral symmetry. In this project, we will use computer simulations to provide support to optimize the structure of these supraparticles by tuning the shape and interactions of the nanoparticles, and to understand all aspects, including the effect of hydrodynamics, on the SA of particles in emulsions.

