

Team Third Report

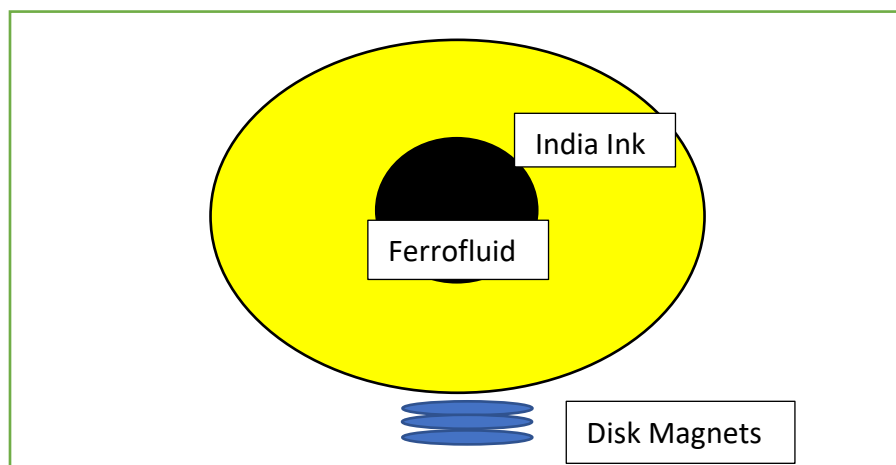
By: Lucas Garcia

*Team Members: Abby Rinerson, Brian Gomez,
Brooke Shade, Nick Scott*

Cine 4200-001

For this photo me and my group set out to capture the how a ferrofluid will react when being influenced by a magnet. A ferrofluid is a fluid that is magnetic by nature so when it is influenced by a magnet it will form spikes which is caused by the magnetic field. I loved how the spikes were very prominent in my photo and really stood out with all the colors. I also like because we dropped ink over the spikes you can see how they formed in hexagonal grid.

The ferrofluid we used in this image was of a type EFH1 that is used in light mineral oil to carry it and we also used very strong disk magnets to create the field. In the case of my photo we first placed in the ferrofluid surrounded it with yellow India ink, then placed the Petri dish over 3 disk magnets (Figure 1.). The India ink is water soluble which was important because it didn't mix with the ferrofluid and allowed us to see how the spikes formed. We tried this set up several times by mixing different India Inks to get different colors but also with a different amount of magnets which caused the strength of the field to be different which is clearly exhibited.



Ferrofluids act the same as magnets they're just in the liquid phase and not the solid phase. To do this you need to suspend ferromagnetic particles inside of a fluid which in our case was a light mineral oil. What happens is that due to Rosenweig Instabilities forming we get to see the spikes forming. What causes these instabilities is surface tension and gravity being stored in the fluid. When the spikes are formed due to the disk magnets it is minimizing the magnetic field that is why the spikes are different sizes across the fluid. It is important to note that the spikes are coming out in the direction of magnetic field lines that is why they protrude at angles and not straight into the air. Also due to this instability they are packed in a hexagonal pattern which is very interesting because I expected them to be circles. It was very important that we dropped the ink over the ink so we could fully see this instability.

I used a plethora of flow visualization techniques to get this photo. First I needed to make sure that I was getting the proper light on the experiment to truly show everything it had to offer. Second, I had to make sure that when I zoomed the correct things were in focus and that nothing was too distracting. Finally, I had to make sure my camera settings were the best as I really loved this image. I took many photos on different settings attempting to get the best one

Overall I was very pleased with how these pictures came out and they were my favorite that I took this semester. I was amazed at how big the spikes were and how they were able to just be suspended in air like that. I also loved how the India Ink really made the whole entire picture pop. If I were to do this again I'd use different India ink colors and try and the set up in more a of a horizontal set up.