CEMAG CAPTURING SCIENCE CONTEST

FIRST EDITION

2021

Organized by

Y R
in M
2021

5th Young Researchers in Magnetism

In collaboration with

CEMAG
Club Español de Magnetismo

IEEE MAGNETICS

Universitat de Girona

President of CEMAG

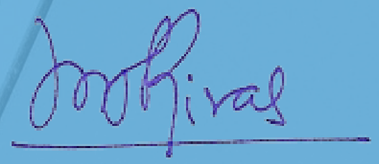
Club Español de Magnetismo

We already knew that science is beautiful and fun. Whether magnetism could be represented in beautiful, suggestive, or mysterious images was uncertain. The magic was achieved once again thanks to the science of the young researchers of the CEMAG and the Spanish chapter of the IEEE Magnetics Society. Thanks to their scientific work, creativity, and drive, today we have this delightful catalog that provides images and a thousand words for the 5th YRinM, the Young Researchers in Magnetism event.

Let me review our history a bit. It was in the year 2017, in Seville, when the YRinM event took place for the first time within the framework of our annual reunion. Others came later: Gijón, Pamplona, Bilbao... Bilbao? We will never forget why we were not in Bilbao in November 2020. The COVID-19 pandemic has marked our lives, underlined the importance of scientific research, and promoted new forms of virtual communication. The young CEMAG researchers were in charge of the entire organization of the event for the first time. The format was entirely virtual, surprisingly endearing, and a total success in terms of participation and quality. In 2021, the YRinM is already a fully established event, 59 participants and new activities. The catalog you have in your hands or on your screen illustrates the enthusiasm, talent, and professionalism of the young researchers who so well represent the present and the future of research and innovation in magnetism.

Now that we have strengthened the present, let's conquer the future.

Enjoy the voyage,



Montserrat Rivas Ardisana

Presidenta del CEMAG

Club Español de Magnetismo

Montserrat Rivas

Que la Ciencia es bonita y divertida ya lo sabíamos. Que el magnetismo pudiera verse en imágenes bellas, sugerentes o misteriosas era incierto. La magia se hizo una vez más gracias a la ciencia de los jóvenes investigadores del CEMAG y el capítulo español de la Sociedad Magnética de la IEEE. Gracias a su labor científica, su creatividad y su impulso tenemos hoy este precioso catálogo que dota de imágenes y mil palabras al 5º YRinM, Evento de Jóvenes Investigadores en Magnetismo.

Dejadme que revise un poco nuestra historia. Corría el año 2017 en Sevilla cuando, al calor de nuestra reunión anual, se celebró por primera vez la jornada de jóvenes investigadores en magnetismo. Vinieron otras: Gijón, Pamplona, Bilbao... ¿Bilbao? Nunca olvidaremos por qué no pudimos ir a Bilbao en noviembre de 2020. La pandemia covid-19 ha marcado nuestras vidas, ha subrayado la importancia de la investigación científica y ha impulsado las nuevas formas de comunicación virtual. Los jóvenes investigadores del CEMAG se encargaron por primera vez de la organización íntegra de la jornada, con un formato virtual que resultó gratamente entrañable, además de un éxito de participación y calidad. En el año 2021, el YRinM es ya un evento plenamente consolidado con 59 participantes y nuevas actividades. El catálogo que tenéis en vuestras manos o vuestra pantalla ilustra la ilusión, el talento y la profesionalidad de los jóvenes investigadores que tan bien representan el presente y el futuro de la investigación e innovación en magnetismo.

Ahora que hemos consolidado el presente, conquistemos el futuro.

Que disfrutéis del viaje,

Montserrat Rivas Ardisana

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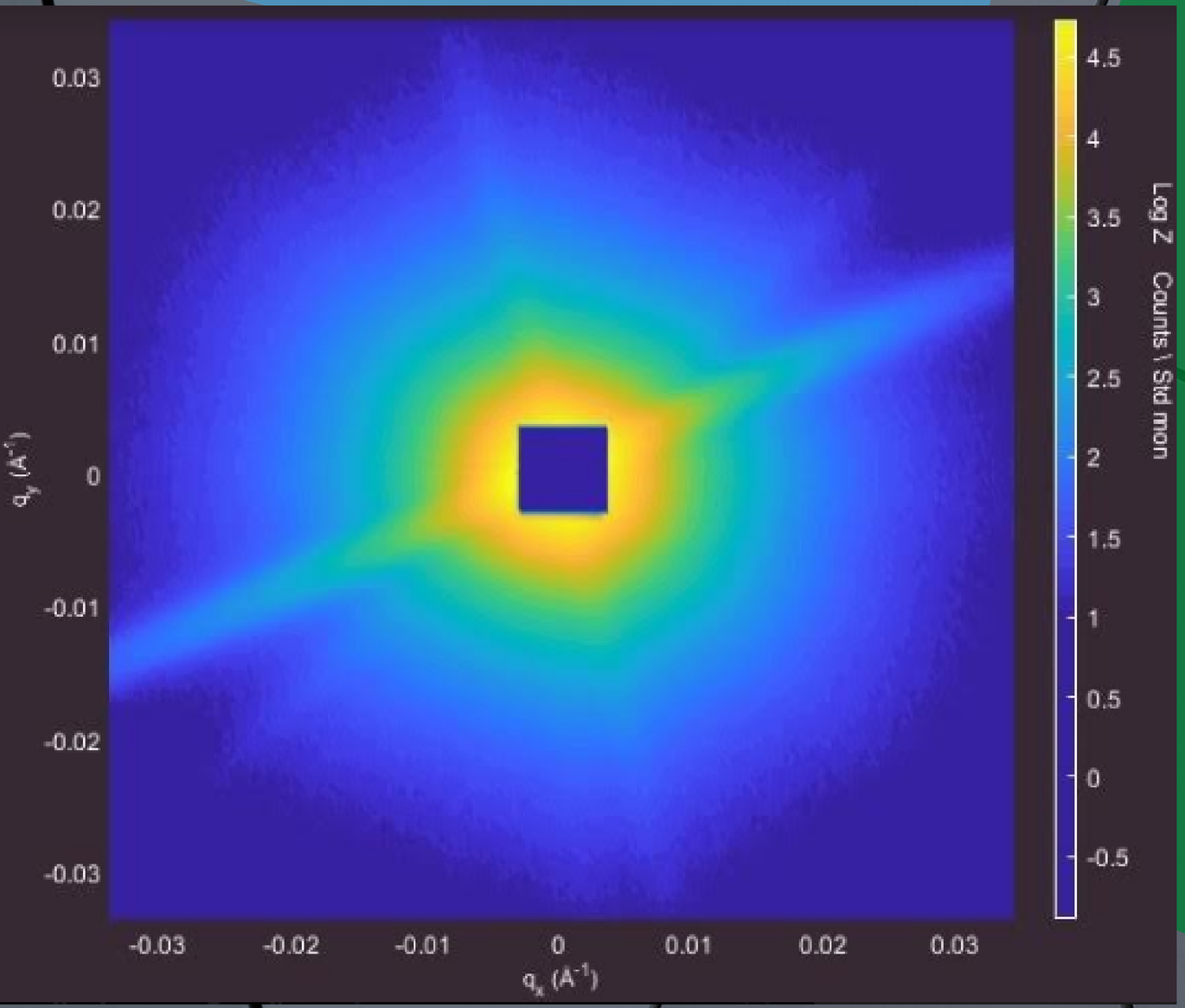
Sansturn

Elizabeth Martín Jefremovas



The image showcases the Small Angle Neutron Scattering intensity (2D plot) measured at T = 150 K for a Tb4.925La0.075Si2Ge2 sample. This temperature value corresponds to the Griffith's phase, which takes place between TC = 105 K and below the TG = 190 K.

Thanks to these technique, correlations among the clusters of magnetic moments can be unraveled.

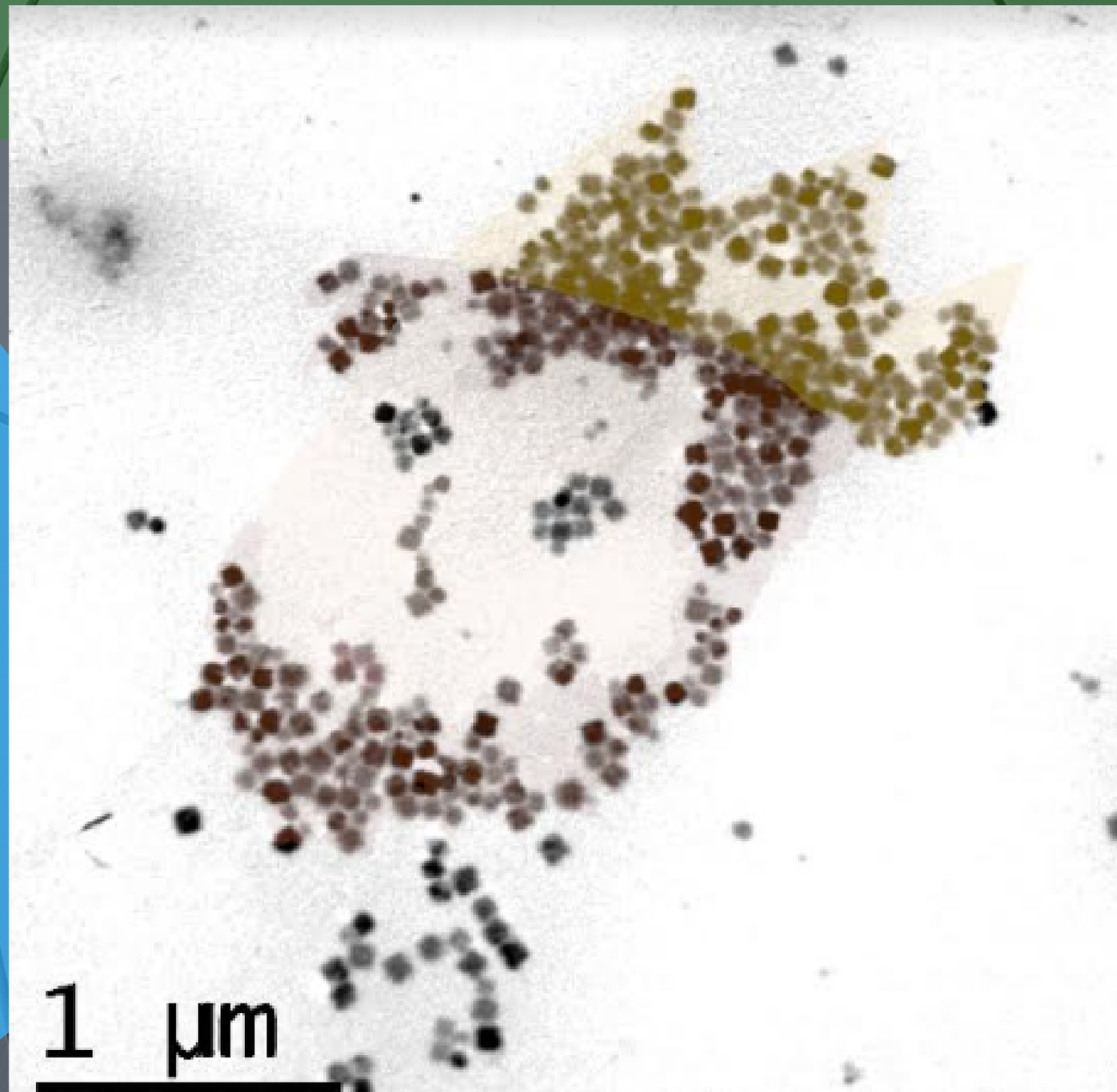
Technique: The image has been taken by means of Small Angle Neutron Scattering, using D33 instrument.

Long live the Nanoking

Mariona Escoda-Torroella

Polydispersed magnetic iron oxide nanoparticles randomly arranged in a king shape.

Technique: The image was collected using an MT80-Hitachi transmission electron microscope at the Serveis Cientificotèncnics from the Universitat de Barcelona. The nanoparticles were deposited on a carbon-coated copper grid. Finally, the image was slightly false-colored to highlight the shape.



Nanobloom

David Lago Cachón

The image shows highly-ordered anodized alumina in the shape of honeycomb. The side length of the hexagons is around 100 nm. These alumina templates are commonly used to fabricate magnetic nanowires using for example the protocol described in Patel NS et al. J Vis Exp. 2019;(152):1–5. Although most of the hexagons are nicely ordered, when some hexagons have only five neighbours, the picture authors claim to see flowers. **As the author's institution is located in the desert, any tiny bloom, even a nanometric one, is celebrated.**

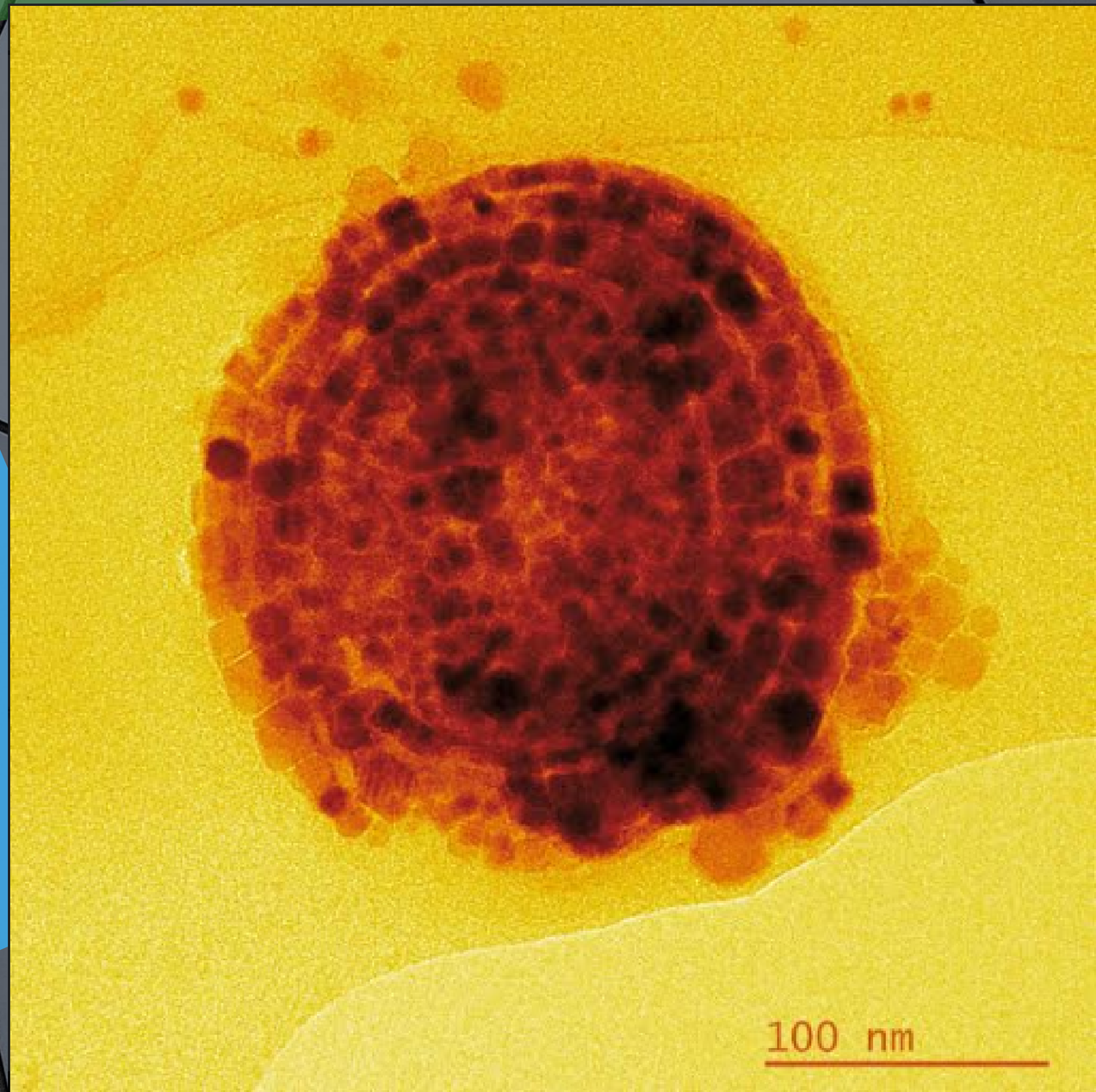
Technique: The picture was obtained using a FEI Teneo Surface Electron Microscopy from the Imaging and characterization core lab from KAUST. Colors were modified using GIMP.

Here comes the sun

Ana Carolina Moreno Maldonado

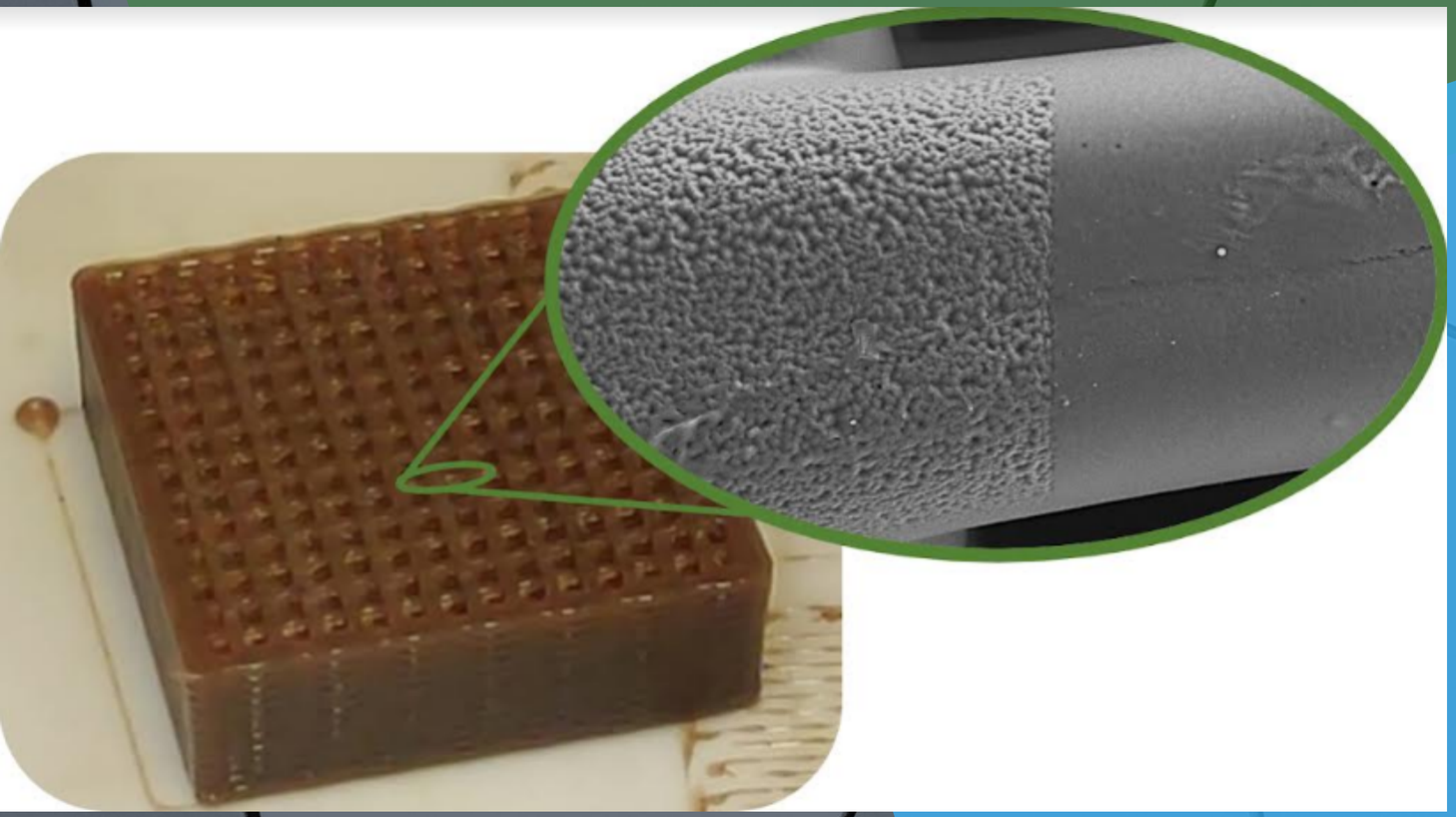
The image shows a magnetosome. An arrangement of magnetic nanoparticles covered by a double lipid layer.

Technique: Transmission Electron Microscopy (TEM) with staining.



Dr. Jekyll and Mr(Magnetic)Hyde

Juan José Moyano Subires



Selective texturing on the rods surface of a woodpile-like 3D structure made of iron oxide nanoparticles dispersed in a biopolymer matrix after been high-field exposure. The structure has been 3D printed using a direck ink writting additive manufacturing technique (robocasting).

Technique: Field Emision Scanning Electron Microscopy (FE-SEM S-4700 Hitachi, Japan)

Minecraft magnets

Florian Slanovc

The image shows a magnetic structure consisting of many cubic cells. It represents the result of a topology optimization algorithm in finite differences, where the magnet is optimized with respect to the desired field properties in a magnetic sensor system.

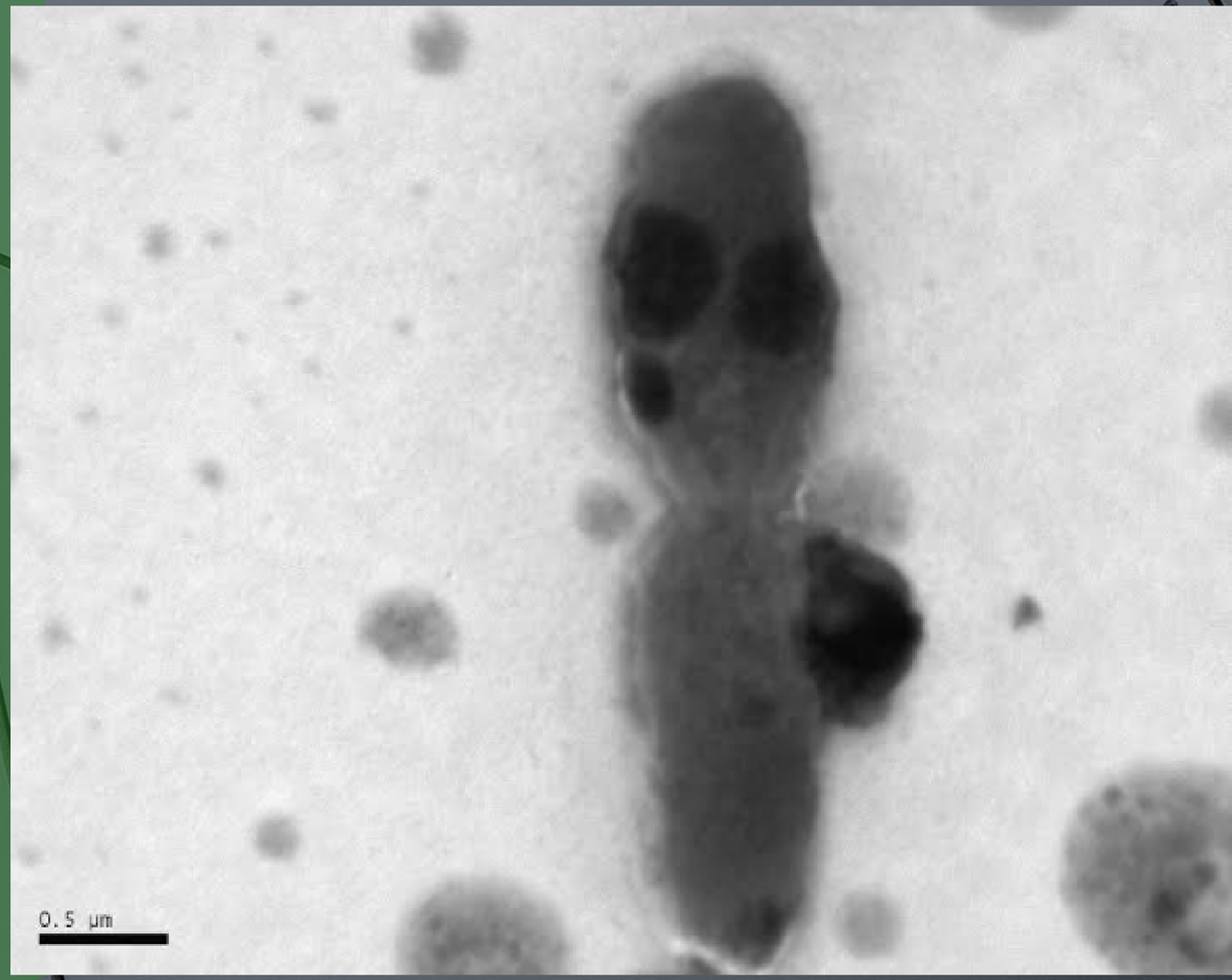
The algorithm decides for each cell whether to fill it with magnetic material or not, resulting in geometric patterns that remind us of the famous sandbox video game Minecraft.

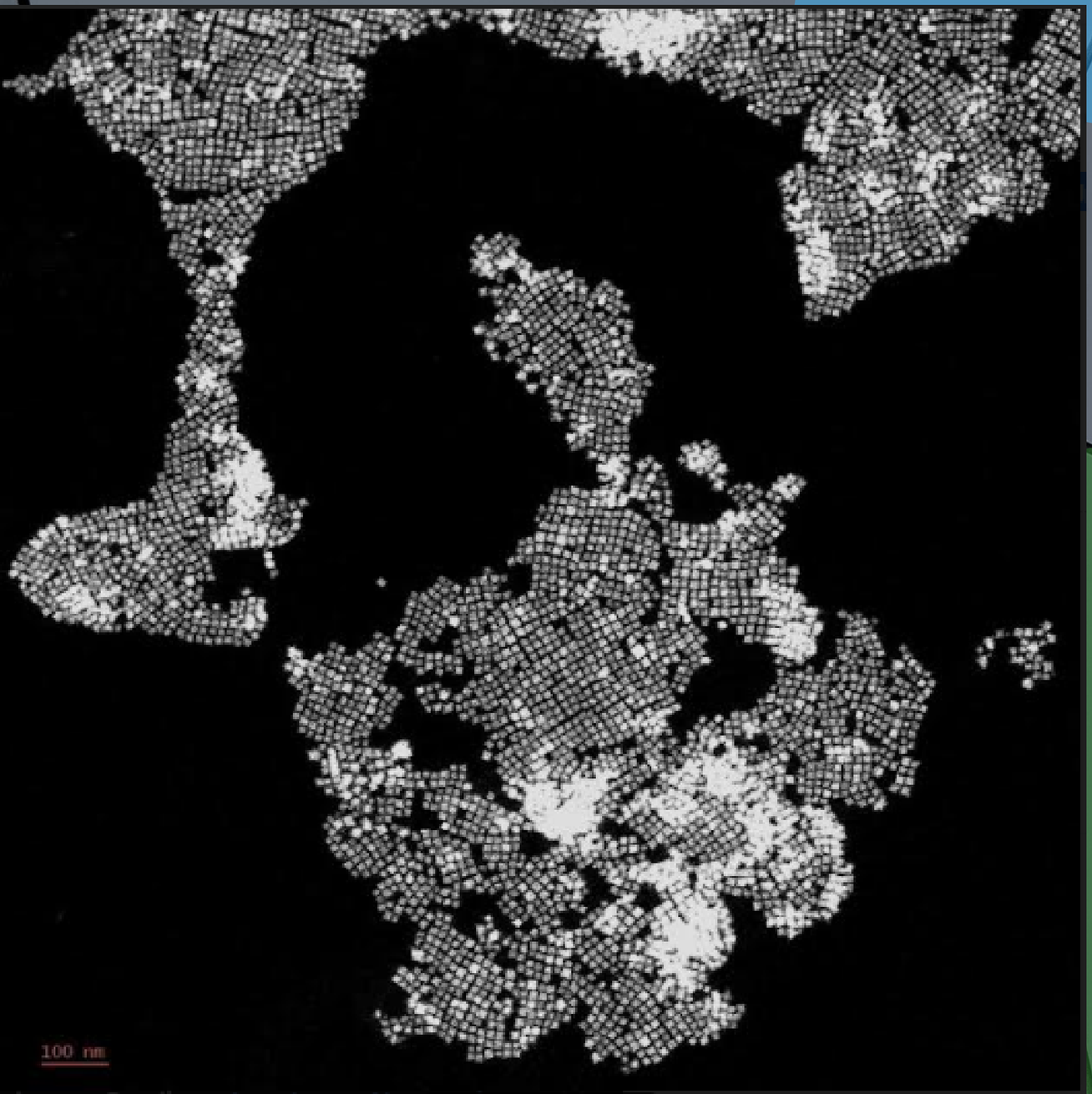
"Where's the coffee break?" Lost Bacteria.

María Salvador

Escherichia coli bacteria can be a dangerous microorganism responsible for food borne outbreaks. Magnetic nanoparticles (MNPs) can be used to detect them by attaching in their surface specific proteins against the bacterial membrane. In this image, taken by TEM, you can see a lost bacteria staring at you and asking for coffee just after the plenary of the congress first day. Or maybe, what you can see is two Escherichia coli that have been tagged by various MNPs.

The image has been edited only in terms of saturation and brightness.





NanoPangea Breakdown

Jorge Martín Nuñez

The image shows an arrangement of magnetic core/shell Fe3O4@CoFe2O4 nanoparticles.

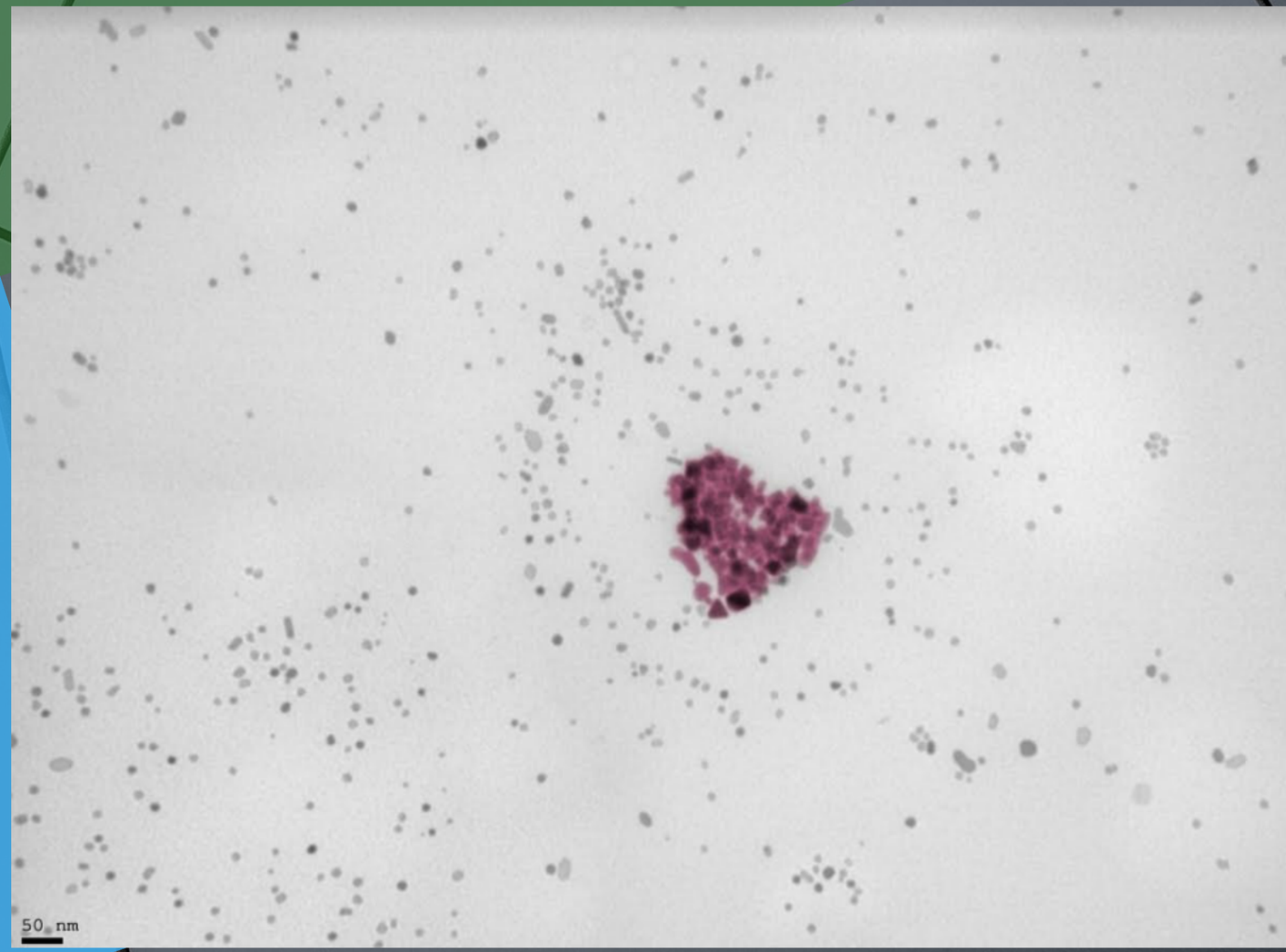
Technique: High angular annular dark field scanning transmission electron microscopy (HAADF STEM).

Nanoheart

José Luis Marqués Fernández

The picture shows magnetic nano particles (MNPs) synthesized by thermal decomposition to obtain a narrow size distribution. The image was obtained by TEM. The MNPs distribution is heart-shaped. Colourized.

Technique: Transmission Electron Microscopy



1st CEMAG Capturing Science Contest

What is your favourite magnetic photo?
Vote for it!

Contact information:

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Request your attendance certificate

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