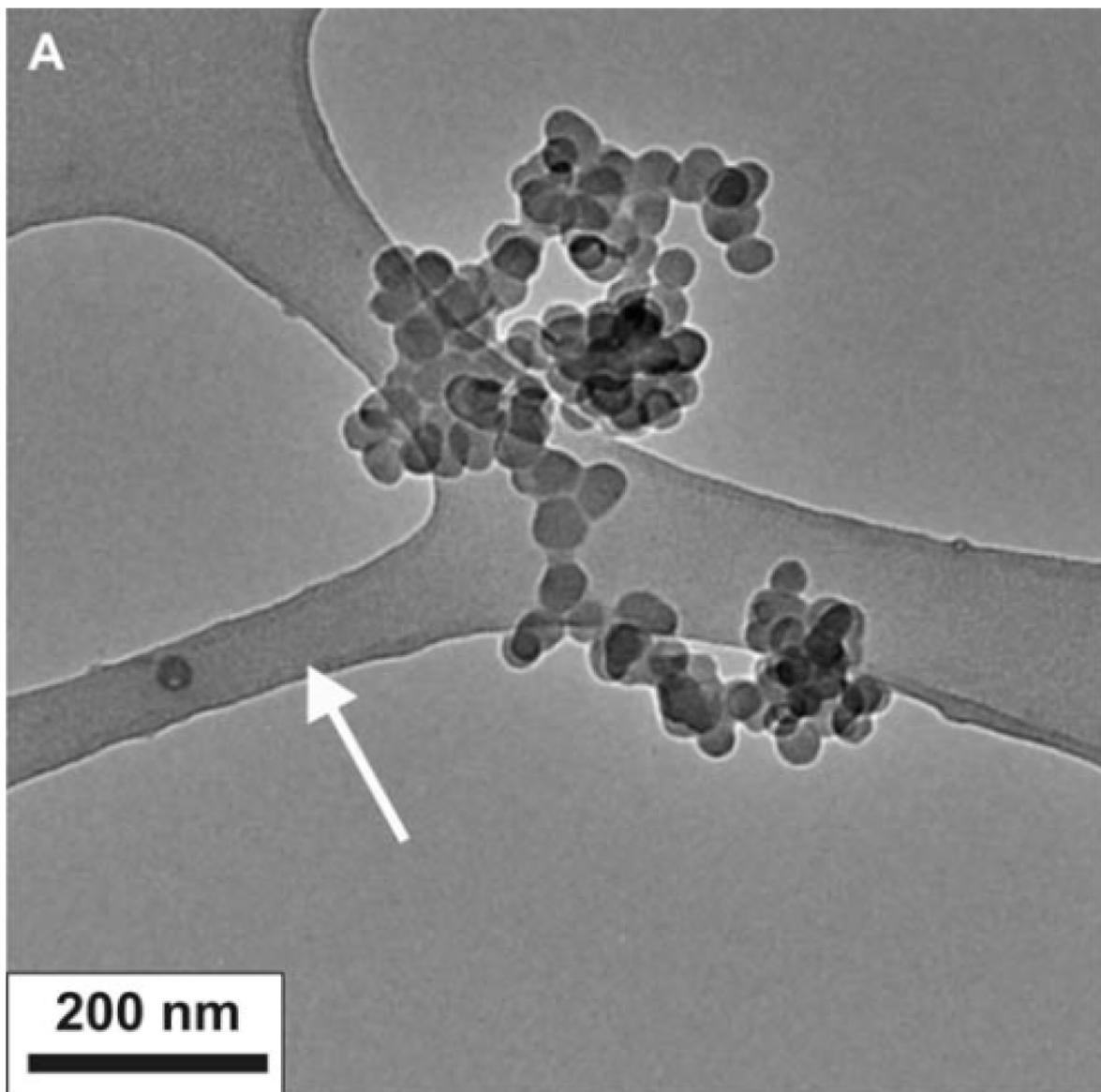


Internship prototype TEM/SEM image processor for nanoparticle aggregates

We are looking for a person with a knack for natural sciences and scientific software development to design and develop a proof-of-principle for an image processing tool to identify individual particles in aggregates on the nanoscale domain, similar to the image below.

As part of an analysis toolbox, VSPARTICLE has developed an image processing tool using modern Python libraries and machine learning to analyse micrographs of individual nanoparticles created using electron microscopes. Recent findings have suggested that this tool could be extended to analyse nanoparticle aggregates which currently cannot be processed by computers, even with state-of-the-art professional image processing software. Extending the developed framework to be able to process aggregates would open up an additional direction for our company to grow in. Your feasibility study on this will hopefully result in a proof-of-principle, based on which the company will decide if it continues down this path.



From: Pawlyta, Mirosława & Hercman, Helena. (2016). *Transmission electron microscopy (TEM) as a tool for identification of combustion products: Application to black layers in speleothems*. *Annales Societatis Geologorum Poloniae*. 86. 10.14241/asgp.2016.004.

Company

Born out of the research labs of TU Delft with over 20 years of experience in the synthesis of aerosols, VSPARTICLE believes there is a whole new world of possibilities at the nanoscale. As we all start to understand these possibilities, nanotechnology will enable research and industry to rethink production processes and develop new materials to create innovative applications. At VSPARTICLE we support this process by making nanoparticle-based manufacturing as easy as pushing a button and providing research and industry with the tools to rapidly advance the field of nanotechnology.

We are a start-up at YES!Delft (just next to the TU Delft campus and a 5 minute bike ride from Delft Zuid train station) with a young, diverse team of enthusiastic people from various disciplines of academia and industry. You will join the Data team, which analyses and uses data through modern data science principles and numerical modelling to better understand our products and nanotechnology as a whole.

Responsibilities

You will figure out if and how the TEM/SEM image processor tool could be extended to successfully analyse aggregates of nanoparticles. For this, you will make yourself familiar with the existing tools, study scientific papers, as well as discuss your ideas with your colleagues and supervisors. You will then implement your plans on top of the existing code base and use your developed solution on images of aggregates to verify your work.

Because the product you develop will become part of the existing tool, emphasis will be put on writing well-structured, good quality code that can be used long after your work has been finalised. You will develop skills essential for scientific software engineering, such as writing well-structured high-level code and incorporating version control.

Required profile

We are looking for the type of person that attempts to solve an issue, fails, and along the way has come up with two new possible solutions to try. Someone who is independent, creative and persistent. While a lot of software engineering and mathematics is involved, we are looking at EWI students as well as from other faculties; know-how of the natural sciences will help you understand the problem and find possible solutions.

Required skills and experience:

- Background in applied scientific R&D, e.g. applied physics, molecular science & technology (MST), computer science or applied mathematics
- Strong mathematical background (linear algebra, transforms, statistics)
- Basic programming skills in high-level languages (e.g., Python, MATLAB)
- Perseverant, investigative mindset
- Optional: Microscopy (e.g., TEM, SEM, AFM, optical)
- Optional: Material science (e.g., crystal structures)
- Optional: Nanotechnology
- Optional: Version control (Git)
- Optional: Basic experience with image graphics (e.g., Photoshop, GIMP)

The project most likely provides sufficient freedom to incorporate internship requirements from your faculty. We will figure this out together.

The work you will be doing is strictly confidential and you will be required to sign a non-disclosure agreement (NDA). Your internship report will be placed under an embargo. Because of this, the project is only suitable as an industry internship, not as a thesis project.

Salary, duration and application

The salary is 450 EUR/month, for three months. The position is available right now, until a suitable candidate has been found.

For additional questions about the vacancy, feel free to contact Tomas Storck via email (t.storck@vsparticle.com) or LinkedIn (www.linkedin.com/in/tomasstorck). To apply, use the form where you found this vacancy, or send an email with your CV plus a short text explaining your motivation.