

Particle Works



Unlock the
true power
of particles

Our engineering heritage is the key to our success



As part of Blacktrace, Particle Works draws on more than 20 years of experience in particle technology.

Particle Works combines a strong heritage of engineering, scientific knowledge, microfluidic expertise, and in-house chip fabrication. Dedicated to designing and building state-of-the-art particle engineering platforms, Particle Works paves the way to particle perfection. Our game-changing technology allows you to produce nanoparticles with unrivalled precision, quality, consistency and control, while reducing your development time and cost.

As part of Blacktrace, and under the Dolomite Microfluidics brand, we have been designing and making pumps, chips and tools for the manufacture of lipid and polymer-based nanoparticles for many years. We have been at the forefront of this rapidly changing science, listening and adapting as our customers' needs have evolved. With Particle Works, we bring you a focused brand where together we can unlock the true power of particles.

Revolutionize your workflow with high performance particles

Right time, right space

The demand for nanoparticle-based medicines and therapies has exploded in recent years. The COVID-19 pandemic has made us all realize that collaborative global efforts and unprecedented speed of treatment development can significantly influence the lifespan of diseases. Nanoparticles require only small amounts of precious materials for vaccine development, gene therapy, and drug development applications, and enable the rapid development and scale-up of lipid nanoparticles as the delivery vector for mRNA-based vaccines which contributed to the rapid roll out of the vaccine programme.

The pandemic catapulted mRNA-based therapeutics into the forefront of life science. However, this is just one application of many; our technology has numerous other uses in the drug delivery and life sciences markets.

Rooted in microfluidic technology

We've been at the forefront of microfluidics and have been selling particle systems for more than a decade. We have a strong heritage in particle engineering and built a fantastic team with expertise in developing a wide range of innovative microfluidic devices and chip fabrication. Our in-house designed and precisely manufactured chips, combined with our innovative platforms, revolutionize the formation of particles when working on the nanoscale; whether it be liposomes, lipid nanoparticles (LNPs), polymer-based nanoparticles, or microparticles, such as hydrogels.

Our strong understanding of customer needs through continued collaborations allows us to design and build platforms that pave the way to particle perfection. Our brand is dedicated entirely to offering end-to-end solutions for excellent particle production from start to finish, positioning us as a world leader in Productizing Science®. These pioneering technologies have global applications, and we have more exciting platforms in our product pipeline that will take you all the way from discovery, through development to manufacture and scale-up.

What do we offer?

Particle engineering platforms

Our platforms generate precisely-controlled particles for a wide range of applications, including encapsulation of both hydrophobic and hydrophilic cargoes, vaccine development and controlled active pharmaceutical ingredient (API) release.

Proof of principle studies

Our team of expert scientists will work closely with you to quickly test your materials on our platforms, demonstrating system performance and particle engineering capabilities. This helps you to choose the best system for your lab, suited to your needs, providing peace of mind.

Contract manufacturing

In some cases, our laboratory team can experiment with your materials using our standard platforms or a customized set-up to manufacture your required formulations in increasing quantities, to further accelerate your research.

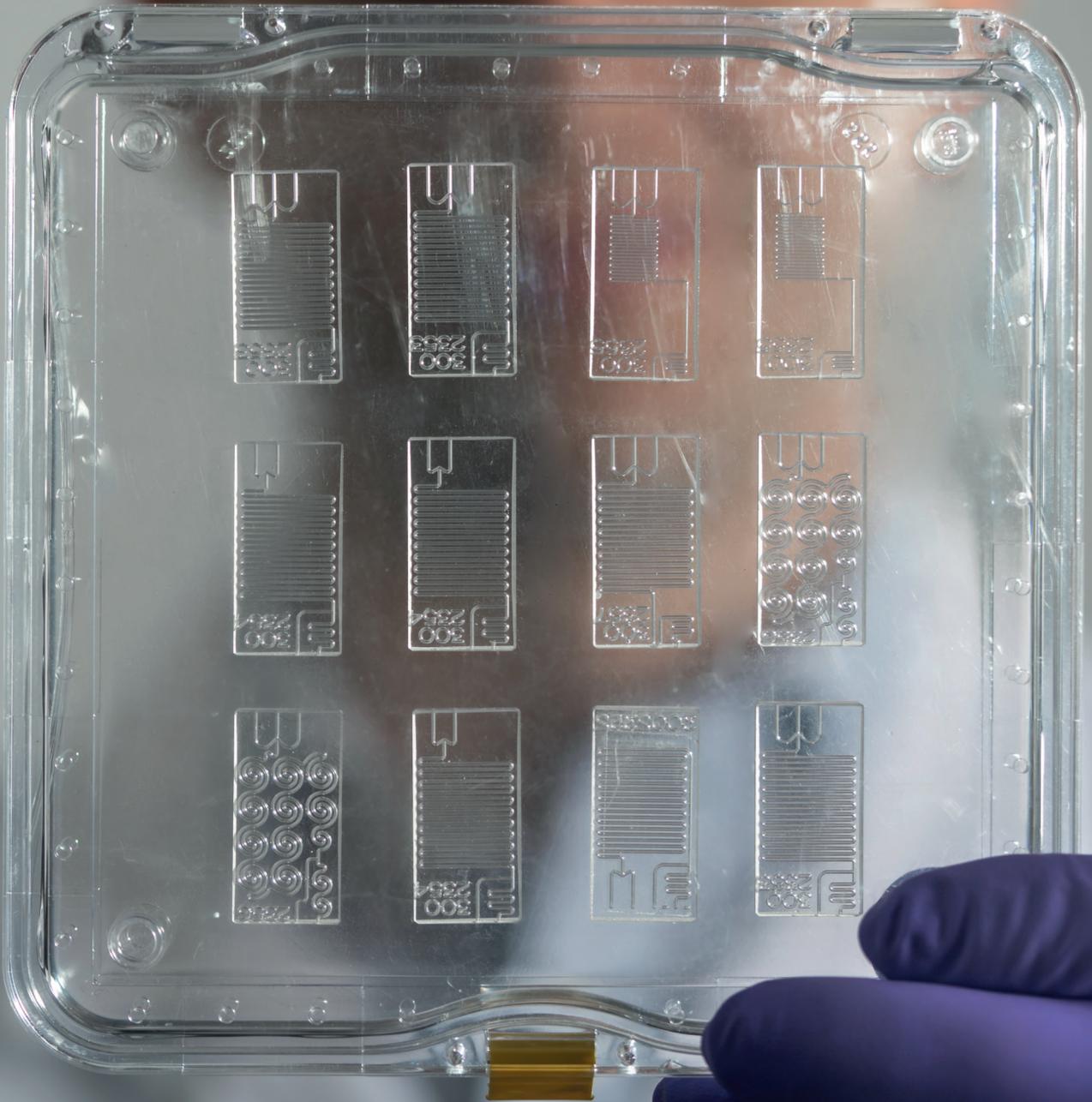




Did you know?



Since 2001, Blacktrace has had more than 100 engineers working on our products, and by 2016 around 50% of our employees were engineers. Since then, we have expanded our team to include more scientists, including experts in particle formation and biology. By doing so, we've added to our engineering heritage, applications knowledge and materials expertise. This has enabled us to create platforms specifically targeted for industry applications, providing the complete package to meet the ever-changing needs of our customers.



Quality in. Quality out.

Why choose Particle Works?

During drug development, we know how important it is for you to achieve both precise and reproducible results. Traditional batch methods provide inconsistent particle size, low monodispersity and poor scalability hindering your efforts and slowing you down. Fastest possible progress can only be made when you consistently generate the best possible particles for your application, and to do this you need to start by using the best tools and techniques. The precision, consistency and scalability you need can all be achieved using our microfluidics and particle technology.

Revolutionizing your science starts with precise control of the experimental parameters that dictate particle size, shape and structure. Reproducible generation of high quality particles with the desired properties can be achieved using microfluidic technology, which enables strict control of variables such as the flow rate of reactants. The fine details in our chips – geometry, diameter and length – all help you to optimally produce particles for your specific needs.

Advantages of microfluidics over traditional batch methods

- Unparalleled consistency of particle size and monodispersity.
- Higher encapsulation efficiency with controlled payload release.
- Higher reproducibility and linearly scalable processes.
- Lower sample volumes, reduced waste, ideal for screening and development.
- No mechanical mixing, helps avoid damaging particles.
- Faster, easier to optimize protocols.
- Scalability – produce μl to liters with the same chip.

Did you know?

Particle performance depends on:

Size

Targetable particle diameters, consistently achieved using our meticulously engineered systems, ensuring your highly monodisperse particles complement your application, from cell encapsulation (microparticles) to molecular entities such as nucleic acids (nanoparticles).

Shape

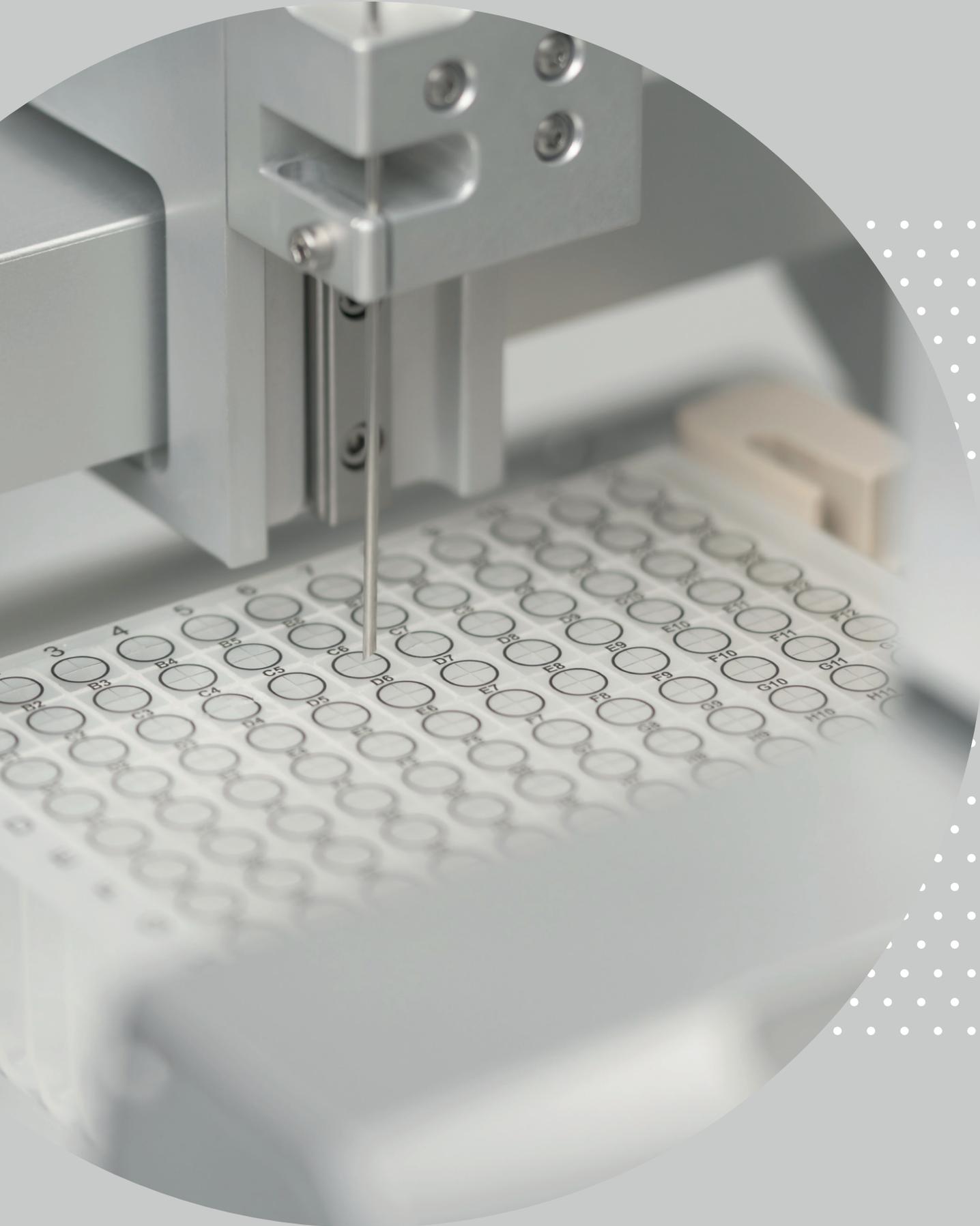
Continuous flow methodology provides accurate and reproducible self-assembly processes ensuring a homogeneous shape for any particle, including lipid nanoparticles (LNPs), polymer-based nanoparticles, or microparticles, such as hydrogels.

Structure

Consistent production of identical particles, with high encapsulation efficiency, allowing each particle to operate at its full potential.



Unlock the true power of particles



On a journey together

Particle Works carefully designs and builds innovative, pioneering technologies for the whole customer journey, from discovery and protocol development to manufacturing and scale-up.

Discovery phase

A key part of the discovery workflow is the high throughput screening of different potential drug candidates (e.g. mRNA or drug molecules) and delivery formulations (e.g. lipids and polymers) to establish the ideal properties and responses. The **Automated Library Synthesis (ALiS) System** is designed for exactly for this purpose, and is ideal for research and development facilities looking for the next novel drug formulation or vaccine. The high throughput ALiS System is equipped with fluid handlers that can automate aspiration from 96 well plates, and advanced pumps to push those through the system before mixing at the junction in our carefully designed chips, so you can speed up and automate your discoveries.

Research and development

The **Automated Nanoparticle (ANP) System** is ideal for researchers who have discovered the most effective particle size, shape and structure for their encapsulated material and application, and now need to optimize the process for reliable, reproducible and higher throughput production. It is perfectly suited for protocol development, enabling a series of automated experiments to be performed from a single pair of reagents. Numerous experiments – each individual one using the same reagent – can be conducted in just one injection.

Scale-up & GMP manufacturing

You may already have a formulation selected, but what about further down the road? We also have platforms in our pipeline for scale-up and GMP production of particles.

ANP Pilot is the version of the ANP System that will be suitable for GMP environments. It is designed for final process development in a manufacturing environment, and for initial scale-up of particles for low volume applications such as clinical trials. It allows continuous sample manufacturing, with a 57 liters throughput in 24 hours (15 grams of LNPs, 1.5 million vaccine doses), and has a direct translation from discovery to development and is scalable by running systems in parallel.

Titan is the final step in your particle production journey. This makes high volume manufacture in GMP facilities a breeze, enabling continuous manufacturing of 1,440 liters in 24 hours (~400 grams of LNPs, 40 million vaccine doses). Its modular structure provides process flexibility and is scalable by running systems in parallel.

Your pathway to particle perfection

Screening



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Protocol development



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Initial scale-up

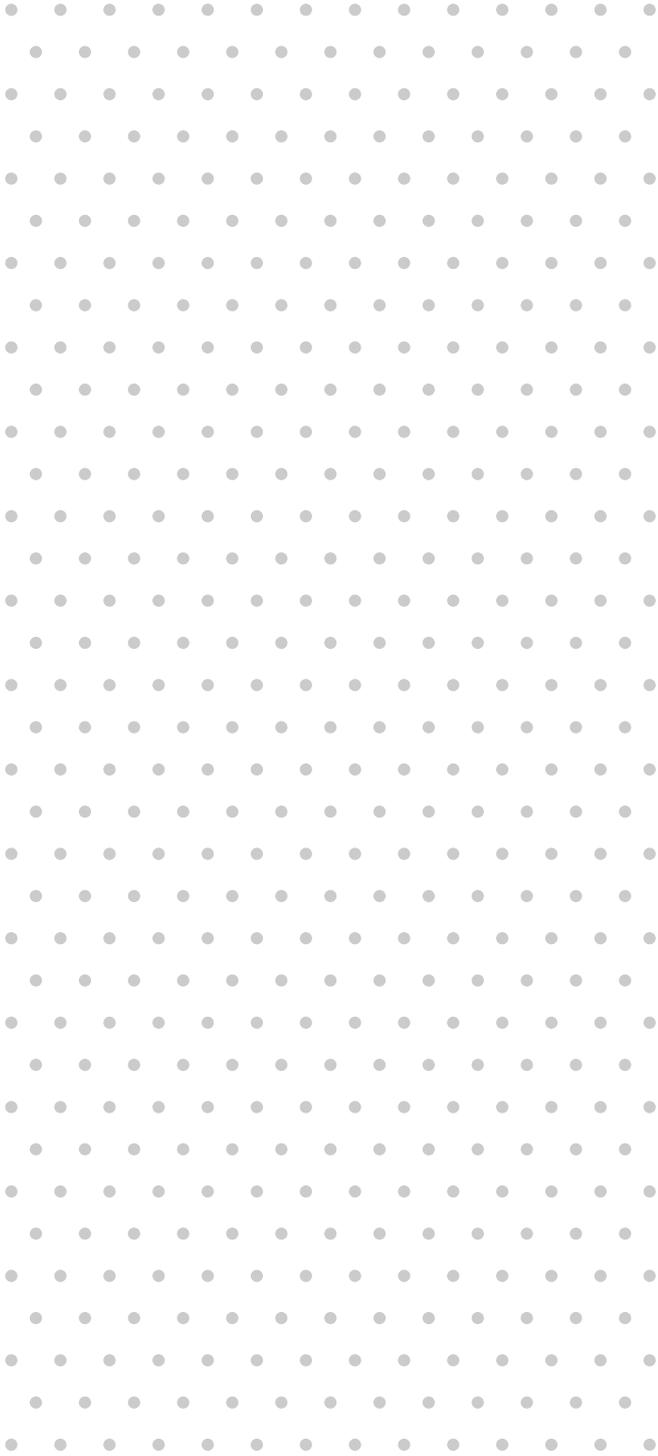


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Production



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Collaboration



If there's anything that the COVID-19 pandemic has taught us, it's that we can overcome challenges by working together. The development of COVID-19 vaccines, for example, has clearly shown us that particles have a positive impact in science and are important in our future. Over the last 20 years, we have worked extremely closely with our customers around the world to understand what we can do to meet their individual needs.

At Particle Works, we strongly believe partnership is an important aspect of achieving our mutual goals, and this is why we are keen to collaborate with new and existing customers.

Shaping the big picture, one particle at a time



Particle Works is proud of its journey, heritage and in-house expertise and now, with a brand entirely dedicated to excellent particle production, we bring quality products, service, training and support for the whole customer journey.

We empower every scientist, using automation to help them screen and optimize the production of high performance particles, shortening optimization times and accelerating their scale-up pipelines.

We like to collaborate and build partnerships with customers and distributors who share the same passion, so that together, we can envision and engineer a bright future for everyone.

What drives us?

Discovery

We're passionate about pushing boundaries. Our experienced and explorative approach lets us expand horizons, innovate freely and help others experiment without hesitation.

Partnership

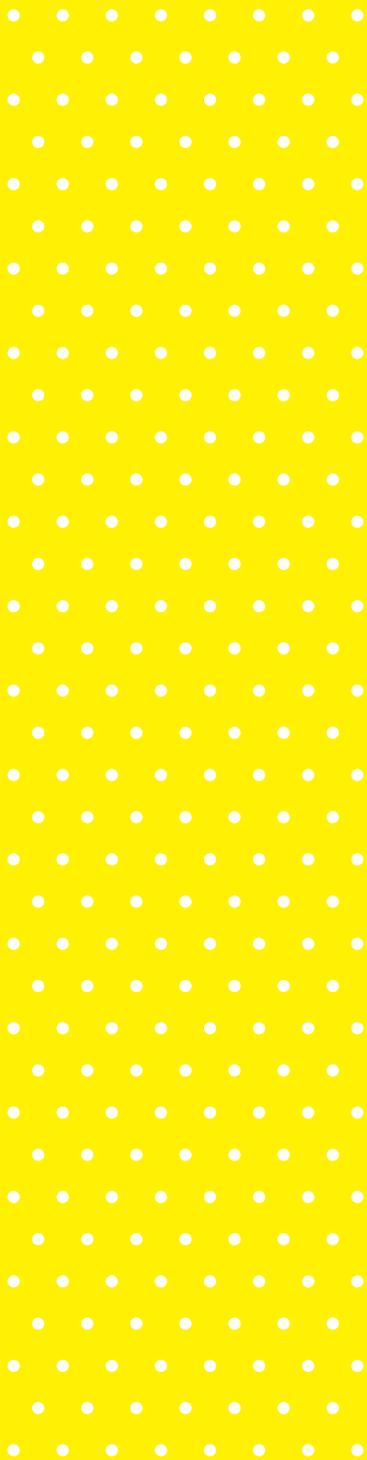
We know that two or more minds get more done. We're passionate to discover, develop and deliver with our strategic and scientific partners.

Excellence

We sweat the small stuff. That's why we're global players, paving the way for particle perfection. We deliver unrivaled accuracy, quality, consistency and efficiency, from our solutions and studies to our customer support.

Innovation

We're excited about the possibilities and ready to make a difference. We care deeply about the revolutionary change our technologies can bring and the powerful impact they will have.



“Having evaluated all available options for nanoparticle screening and optimization, the ANP System offers the best solution for us. We use it daily for nanoparticle formulation and process optimization as it provides robust and reproducible results – enabling us to deliver complex projects on time against aggressive deadlines.

Having worked with the (now Particle Works) team for a few years, we have complete faith in their capabilities. We appreciate their willingness to work with customers to improve results, and their customer service is excellent.”

Dr Julia Rashba-Step
VP, R&D and Alliance Management
Phosphorex

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