ZEALAND
INTERNATIONAL

An umbrella for bioprocessing start-up companies

BIOPRO
Innovation Fund Denmark
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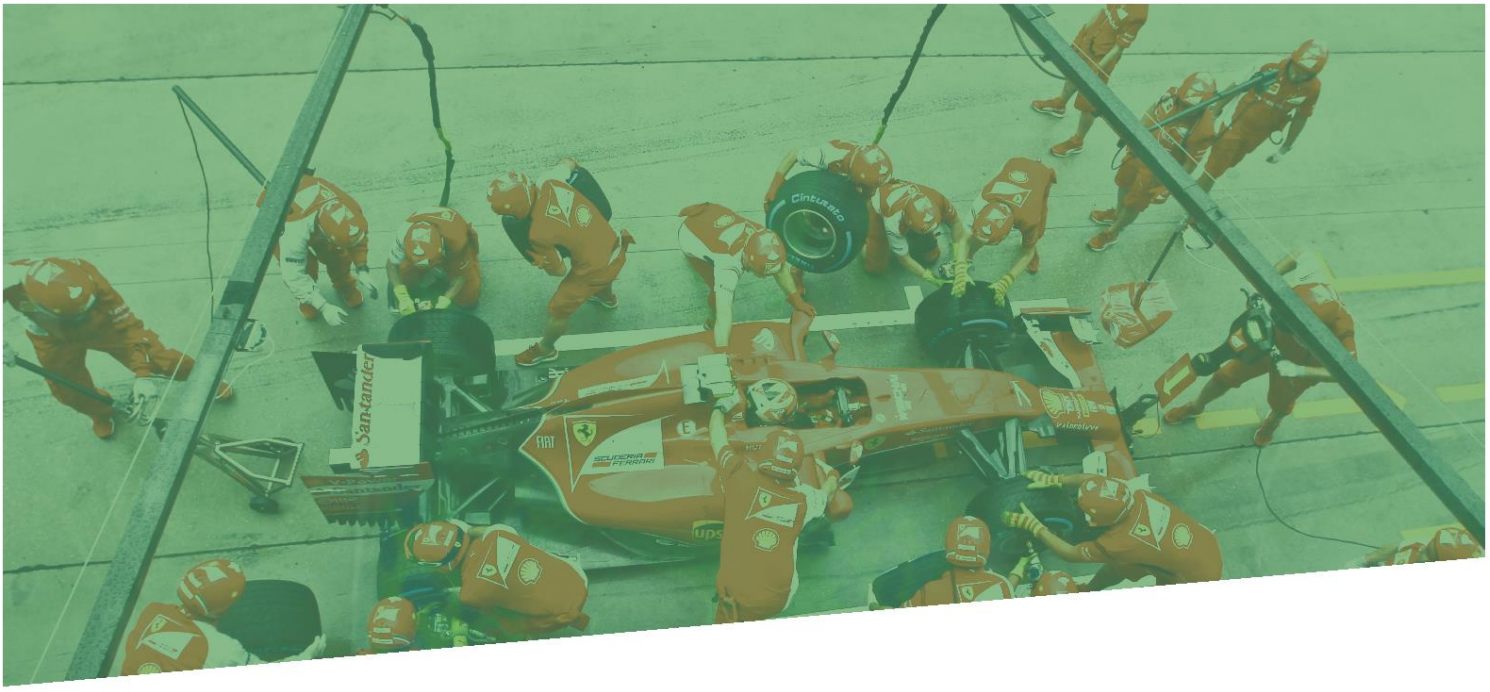
BIOPRO - an umbrella for bioprocessing start-up companies

- BIOPRO is a Danish consortium aimed at developing and commercialising novel technologies for the bioprocessing industry.
- The BIOPRO consortium is a triangular collaboration between universities, large industry players and start-up companies
- Two universities are participating in BIOPRO; Copenhagen University (UCPH) and Danish Technical University (DTU)
- Six leading Danish biotech industry players are participating in BIOPRO; Novo Nordisk, Novozymes, Chr. hansen, Xellia Pharma, CP Kelco and Ørsted.
- Nine start-ups operate today under the BIOPRO Umbrella - and more are being created based on ideas coming out of universities and industry. The start-up companies get access to discuss and test their technologies with the participating companies and universities, get financial support and guidance from BIOPRO and get in this way help to develop the companies towards addressing the global market needs.
- BIOPRO receives innovation support from CAPNOVA
- The BIOPRO companies are participating in Zealand International – an internationalisation project managed by Væksthus Sjælland and funded by the EU regional development fund and Vækstforum Sjælland
- This leaflet is an overview of the Start-Up companies currently under the BIOPRO umbrella



A Real-time visualisation platform for Operational Excellence

The timely and focused execution of often complicated and interconnected set of tasks holds the key in maximizing plant performance, just like a F1 Pit Stop.

To achieve this Operators (like F1 pit crew) needs precise set of instructions taking into account the real time process variations

- → **3 pilot projects underway in Denmark**
- → **Non-invasive add-on to existing control infrastructure and ERP**
- → **Experienced and diverse team of developers and implementation specialist**
- → **"LEGO" solution with stage wise implementation**

BIOLEAN

- *One Stop Umbrella Solution*
- *Combines static scheduling and real-time data acquisition*
- *Computes optimal task start times in real-time*
- *"At a glance" visualisation platform for operators*

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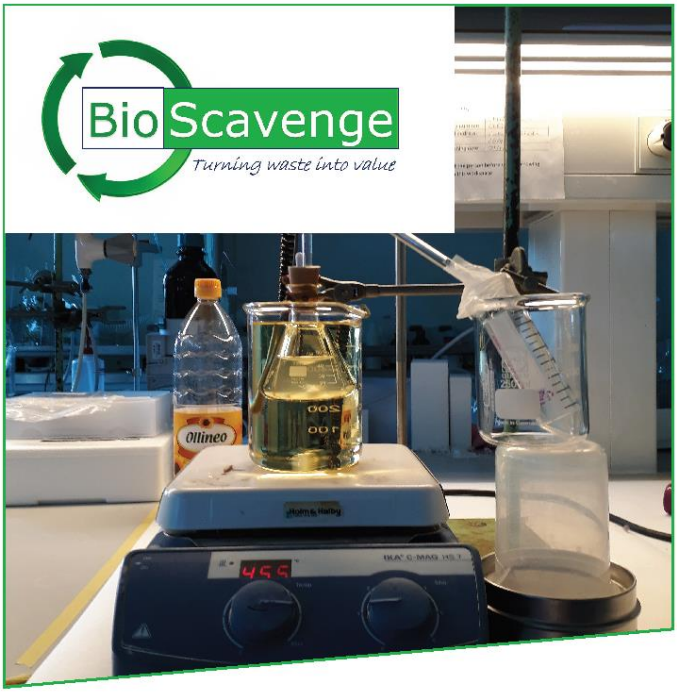
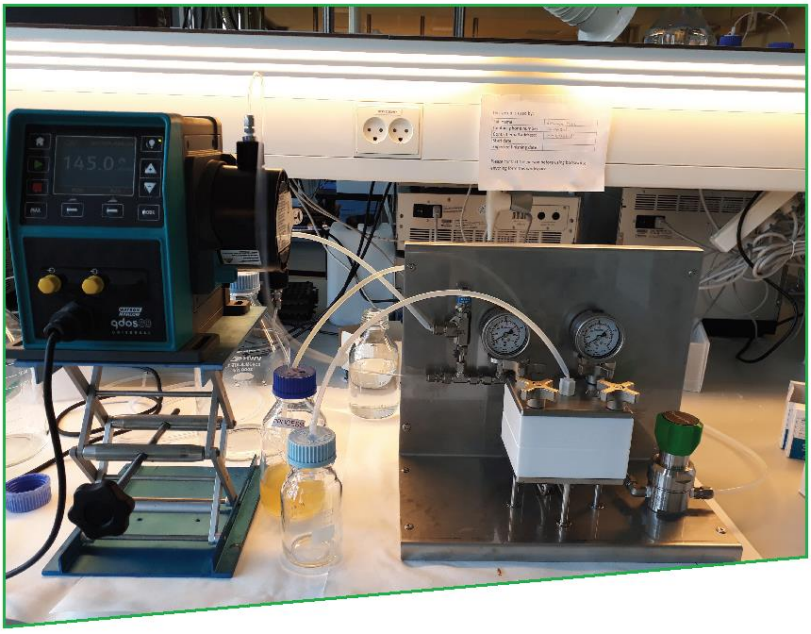
BioScavenge

Turning waste into value



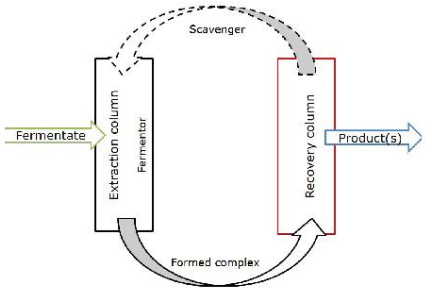


Turning Waste into Value

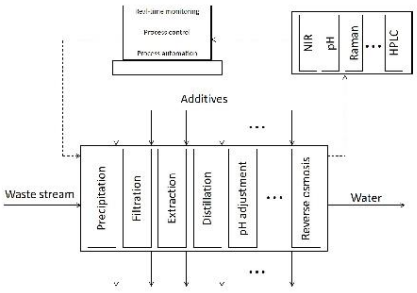
Bioscavenge ApS offers:

Cost effective, easy to use, safe and environmentally friendly technological solutions for resource recovery from waste flows.

Our technology is based on modular design ("lego-principle")



Our technology (1):
Selective removal of inhibitors in bioreactors



Our technology (2):
Recovery of valuable compounds from wastewater streams in the biotech industry

TECHNOLOGY POTENTIAL

Water re-use

App. 90% of industrial wastewater recovered for reuse

Chemical Recovery

Up to > 95% of chemicals recovered

Cimate change

Reduction of thousands of tons of yearly CO2 emissions

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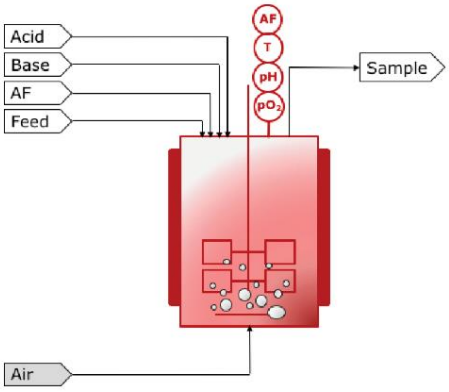
Real-time 360 ° monitoring of fermentation processes

→ **CellView is dedicated to enable real-time 360 ° monitoring of fermentation processes. Initial focus is on the pharmaceutical and industrial biotech industry sectors**

→ **CellView brings together the best technologies for real-time analysis of media components, cell kinetics and morphology, off-gas analysis and gradients.**

→ **CellView will in it's core be a data analysis & data integration company with strong competencies in fermentation. The company will take advantage of the best equipment providers available to provide the data collection.**

→ **CellView's aim is to reduce variability and increase yield through better insight into the fermentation processes.**



CELLVIEW OFFERING INCLUDE

• **Consolidated approach** *and focus on fermentation industry.*

• *Using* **OEM's to provide actual analytical equipment** *– with equipment and software optimized via CellView for fermentation industry.*

• **Data analytics & mgmt.** *Chemometric expertise. Converting data into insight.*

• **Sample handling** *(goal is on-line real time analysis)*

CellView

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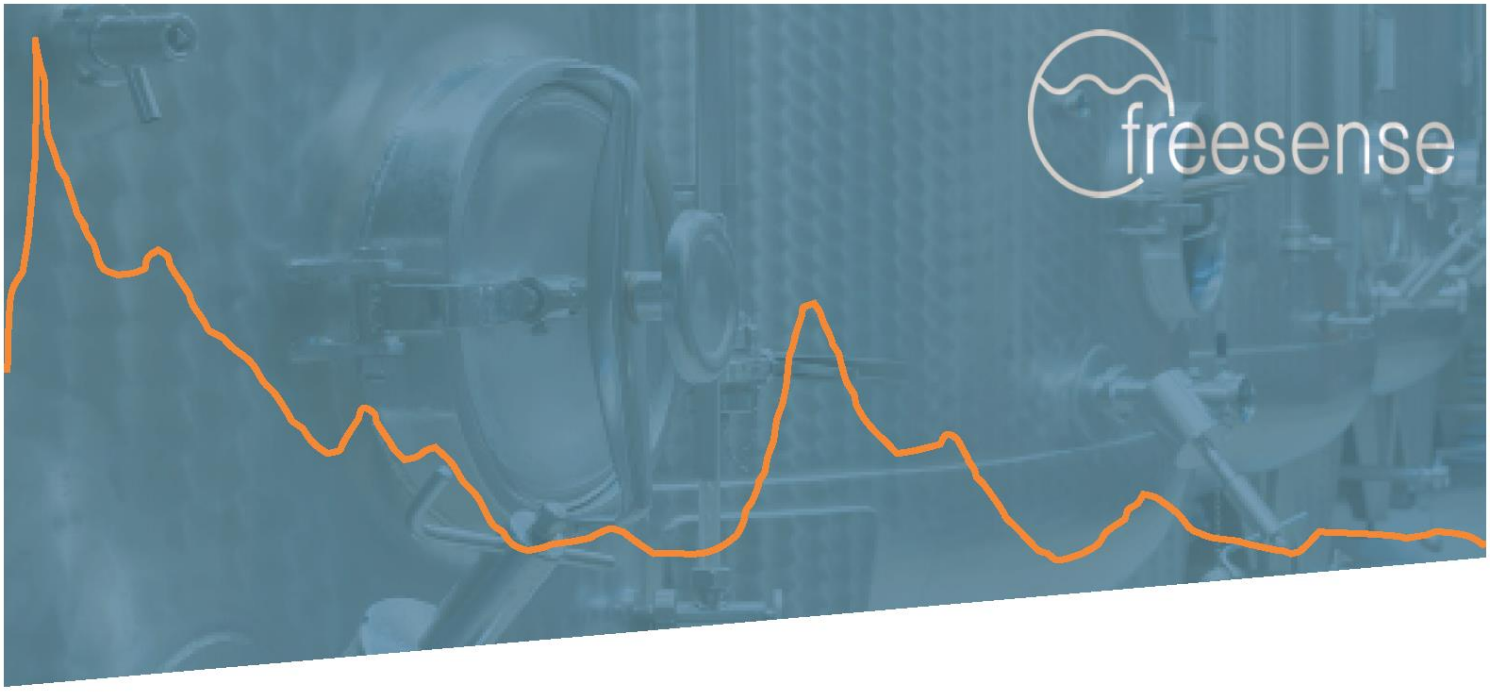


Optimize your fermentation with full reactor mapping

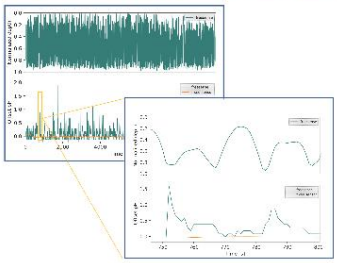
FREESENSE IS A COPENHAGEN-BASED SENSOR-TECH START-UP, ESTABLISHED IN 2016, BASED ON THE BIOPRO COLLABORATION BETWEEN THE BIOPROCESS INDUSTRY AND UNIVERSITIES.

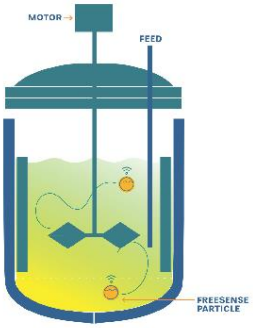
- CHALLENGE AND SOLUTION

With the current setup in industrial scale bioreactors it is not possible to measure gradients in fermentations. Simulations are complex and lack input data and validation.

Using Freesense's sensor particle, it is possible to connect measurements to a position, based on our patented technology, thereby enabling mapping of the fermentation.

The sensor particle (ø 45 mm) can be directly added in the fermentation. The shell is designed for high impact / temperature applications and can tolerate autoclavation.





FAST RESPONSE PACKAGE

- → pH
- → Temperature
- → Pressure
- → Accelerometer
- → Gyroscope

WHAT WE DELIVER

Onsite test support

A written report, detailing the findings

Access to data visualization software

Raw data file for input to modelling

For commercial enquires:
tr@freesense.dk, +45 61663151

For scientific enquires:
os@freesense.dk

For technical enquires:
lvp@freesense.dk, +45 61711101

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Measure pH with light

Contact-free pH measurement is possible using light. This gives a whole new range of advantages in the bioprocessing industry.

On-line, non-invasive monitoring of bioprocesses is made possible by miniaturized optical sensors based on fibre optics, allowing integration of sensors in large-scale production as well as in analytical lab-ware for R&D.

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FRS SYSTEMS

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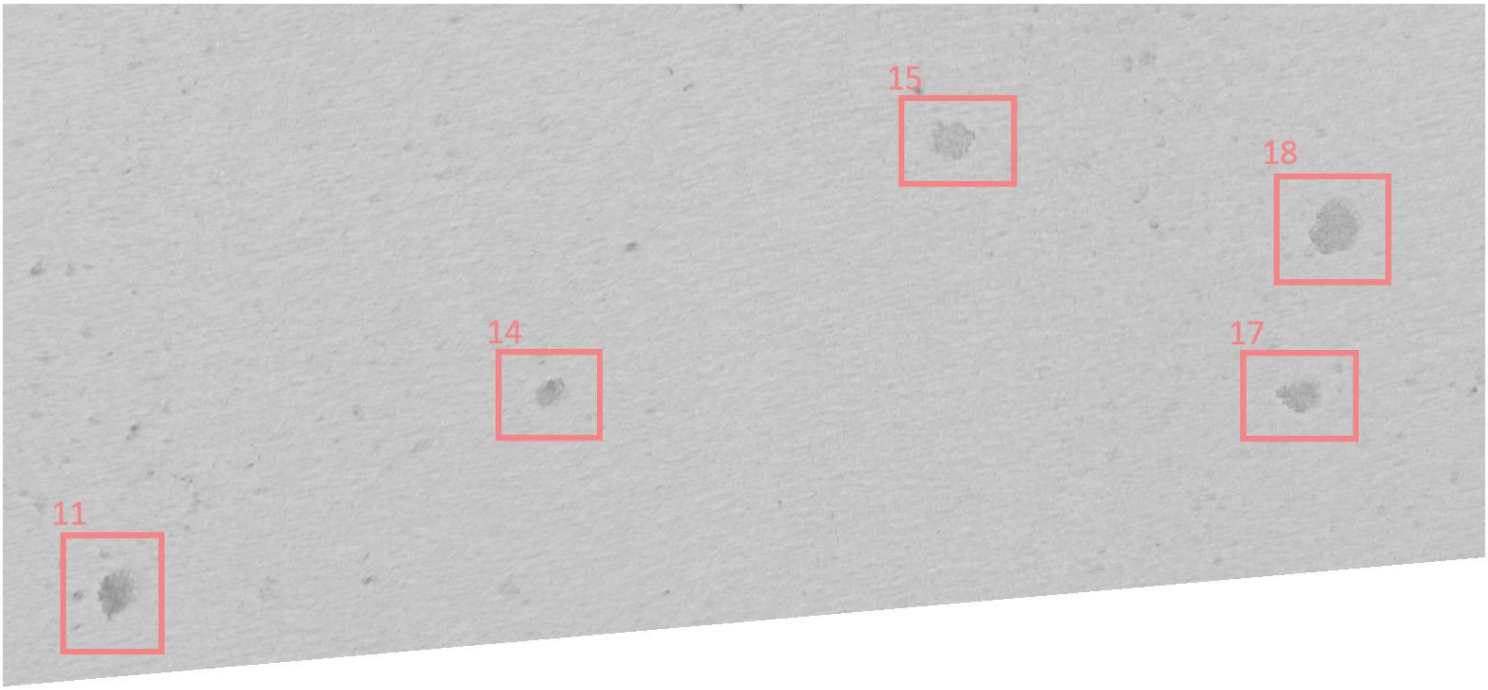

Stop waiting days for microbial analysis results!

The IntuBio Platform currently provides 2 new analysis methods:

1. Fast Bacteria Indication in 20 min.
2. Fast Growth Detection in 1-3 hours

The benefits from todays compendial methods are:

- → **Reduced lead time**
- → **Rapid response to potential deviations**
- → **Decreased inventory and storage capacity**
- → **Increased production capacity**

INTUBIO ApS

IntuBio's mission is to provide the World's best solution for microbial detection, by offering a fast, sensitive, simple and cost-effective solution.

IntuBio is a Danish start-up company, based in Farum, with key competencies in optical scanning, image analysis and sterile consumables.

Business Development

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IntuBio

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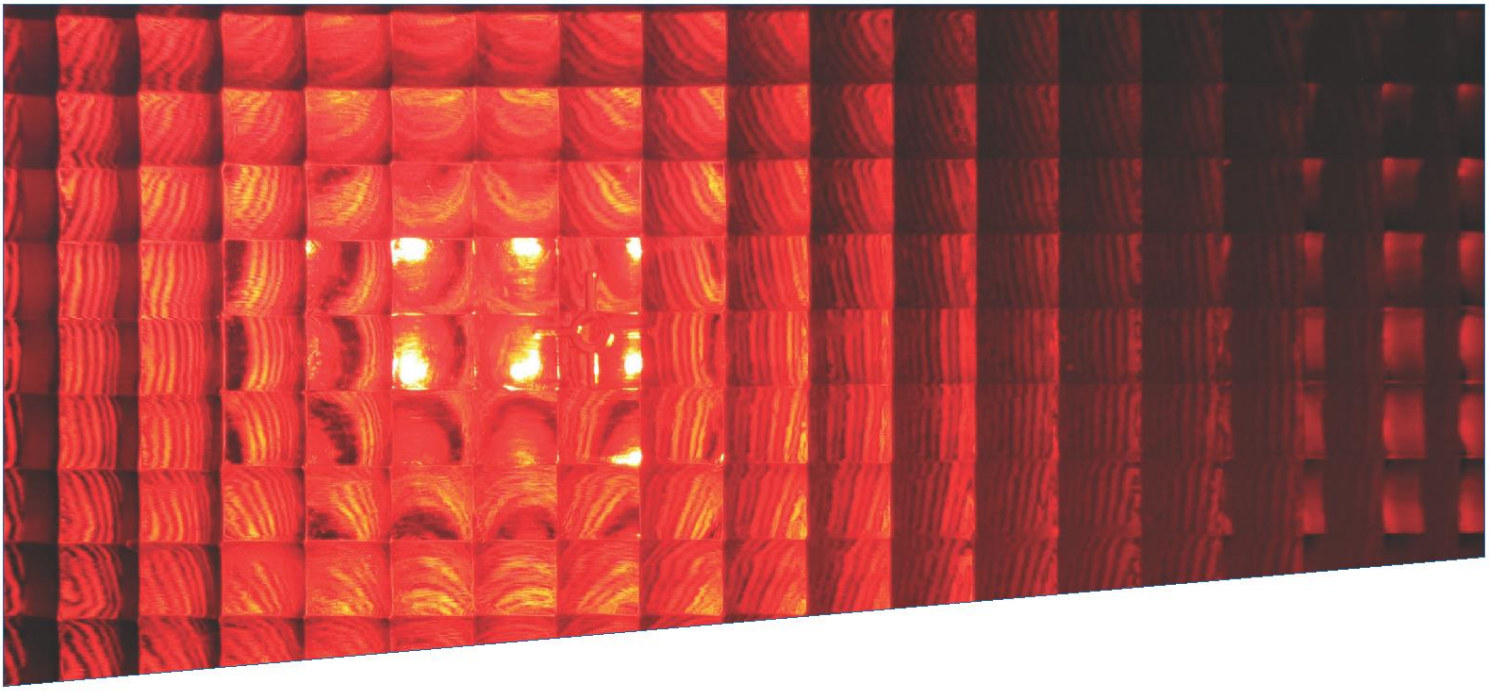

Mid-Infrared Spectrometers - In-Line & On-Line measurements

Fast and uncooled Mid Infrared spectrometers.

Measures the spectra of gasses (transmission), liquids (ATR) or materials (reflection) in milliseconds with high SNR and < 10 cm-1 in spectral resolution.

Our spectrometers are superior alternatives to traditional FTIR technologies in applications that require fast operation, high SNR and tolerance to vibrations. Hence covering the requirements for In-Line industrial measurements.

NLIR Nonlinear Infrared Sensors

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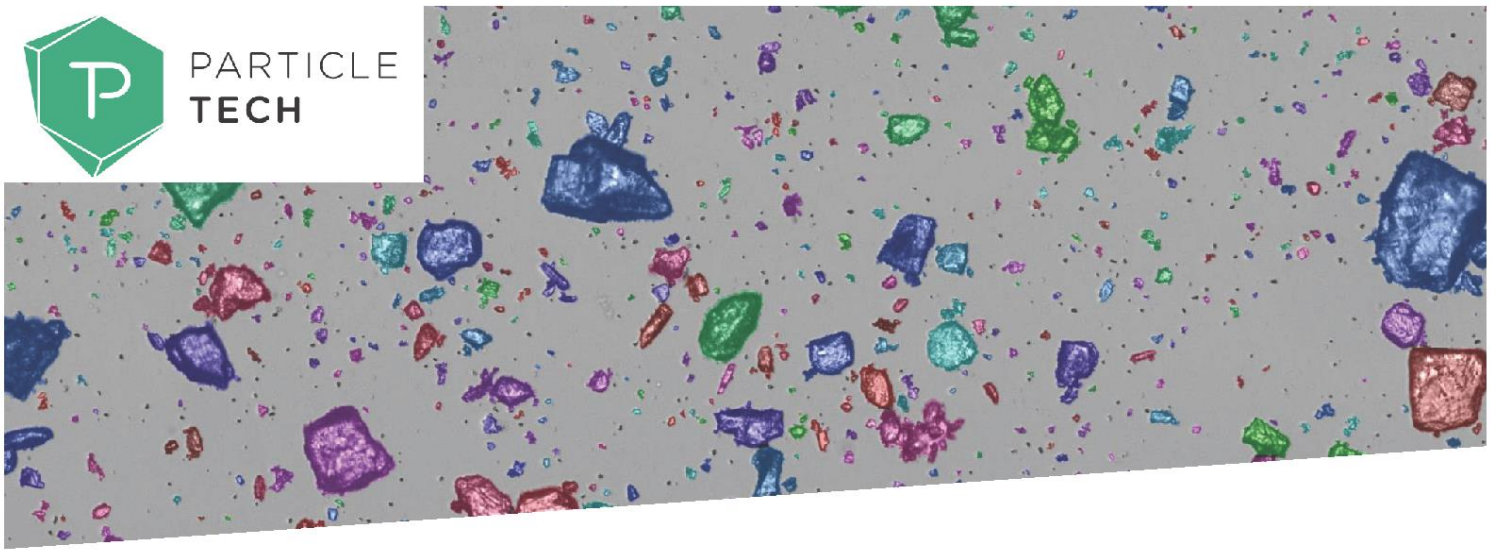
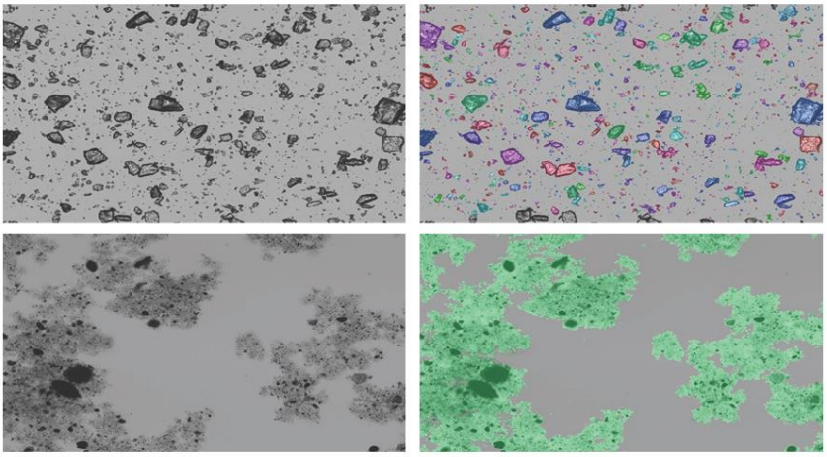
PARTICLE TECH



The smallest things make a big difference



→ Continuous monitoring of particles with image analysis

→ Measurement in production

→ Size, size distribution and shape

→ Fast analysis

→ Time and cost saving

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Enabling clients to optimize their production output

PREDICTit provides insight with predictive analytics and machine learning that enables clients involved with biological and chemical production to optimize their production output.

Based on your existing and real-time production data our solution provides you with a visual overview of your production key performance indicators and predict the future output for your production process in real time. At any instant during you can compare a running production with the best performing historical output, which enables you to make adjustments and improve your output.

Based on self-learning principles the solution will learn and improve the prediction and production output over time.

PREDICTit

WE EXTRACT THE POTENTIAL IN YOUR PRODUCTION DATA IN THREE STEPS

AI

Continuously improving manufacturing performance based on machine learning and self-learning principles

Real time

Real time suggestions for manufacturing output improvements through on-line machine learning

Advanced Analytics

Identification of optimisation areas for improving manufacturing performance and determination of best possible output for a process based on your existing production data

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