Formulator Superpowers

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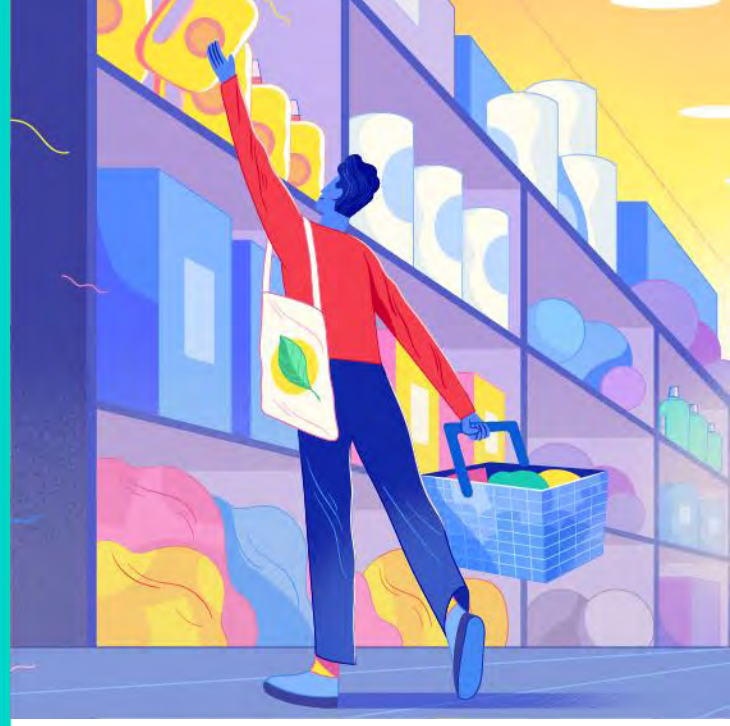
Formulation 4.1, 3rd Nov 2020



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HOME CARE

Unilever is a global company and we make many of the world's favourite brands

2019 TURNOVER €52BN

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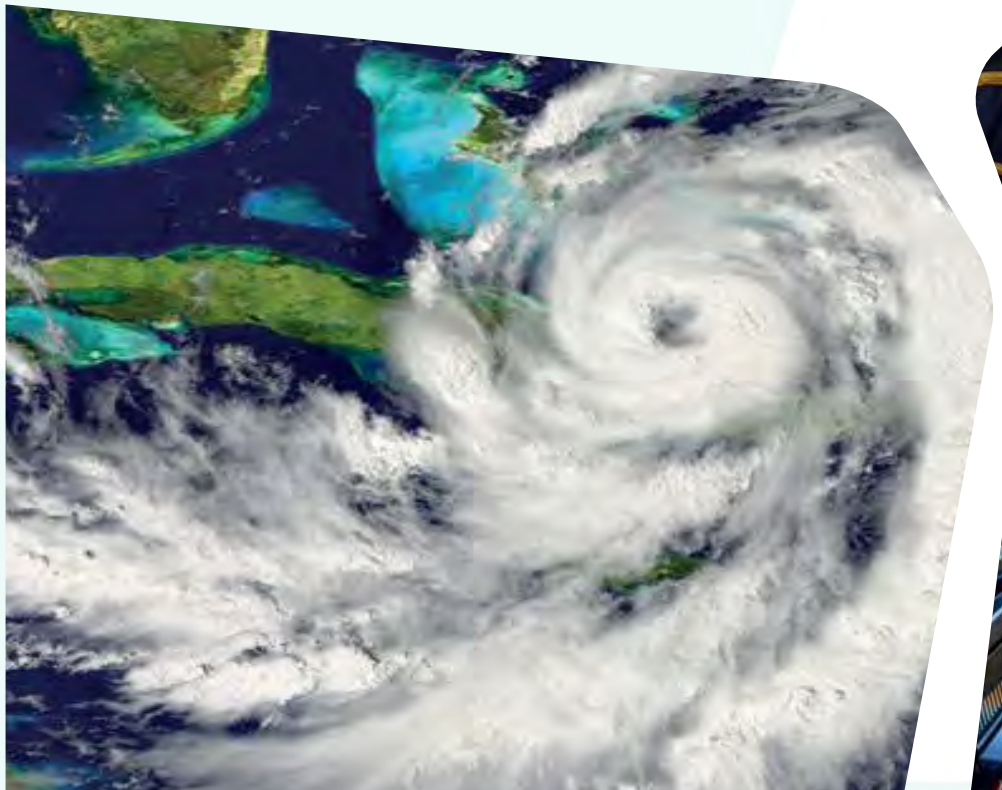
THE WORLD FACES NEW AND BIGGER CHALLENGES



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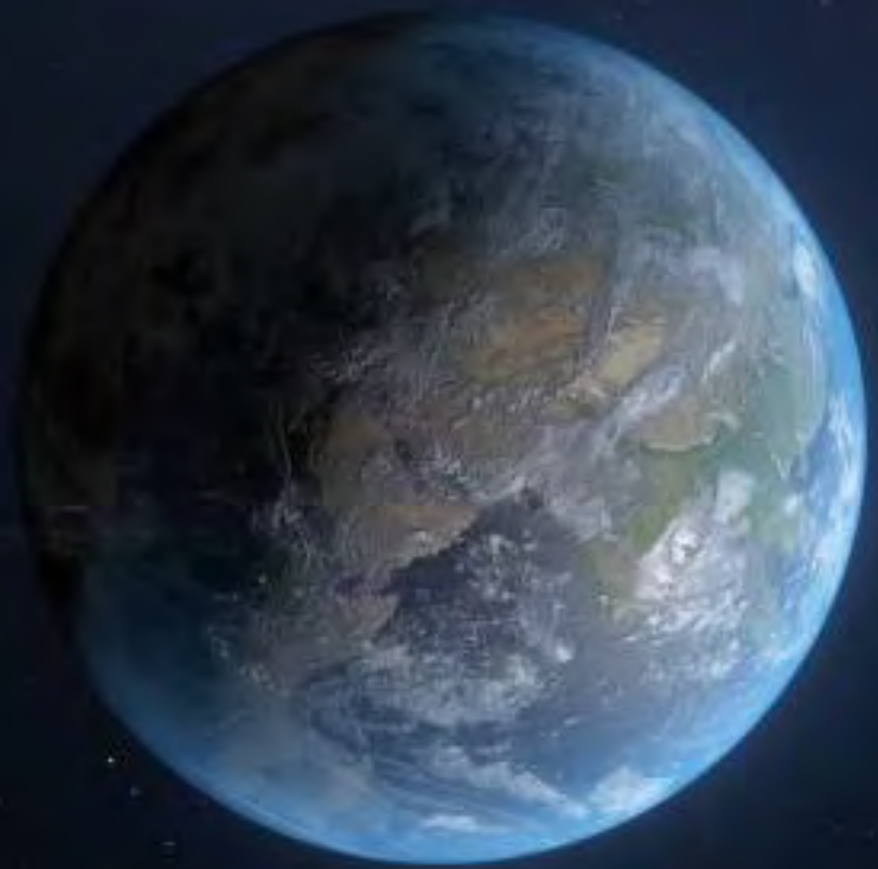
OUR VISION

"To innovate boldly for people and the planet"

Unilever RESEARCH & DEVELOPMENT

VIDEO SLIDE



More important than ever

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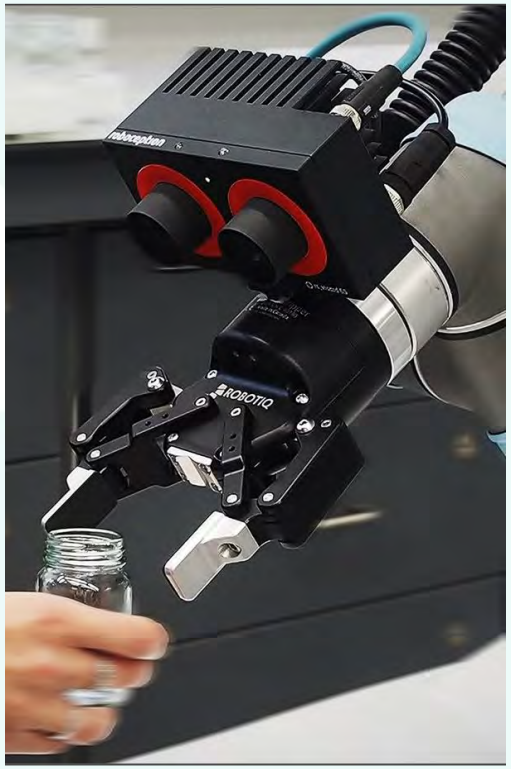
Bigger better faster innovation

- To meet our Clean Future's ambition, we must radically reformulate our entire Home Care and Beauty & Personal Care portfolio.
- This is not achievable with traditional bench science alone.
- Instead we use a mix of automation and computation to explore wider formulation spaces.



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Automation and digital tools gives formulators super powers!

Perfect Memory

Being in lots of places at the same time

Super levels of attention

Fast decision making

Share data with anyone, anywhere

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Bigger better faster innovation

Super levels of attention

Errors are normal in manual data recording especially on repetitive task. Not knowing if a data set contains errors is a worst-case scenario

- Multiple measurements can be taken continuously: temperature, pH, stir speed
- Data is uploaded into lab information systems automatically

Perfect memory

Innovating new formulations means adjusting the formulation as it is made on the bench, which may be different to how it was planned

- Automation can record exactly what happened and when
- A formulation can be made exactly the same as before

Fast decision making

Making fast decisions on optimal formulations and materials needs clear, readily available and trustworthy data

- Automation standardises data and accelerates experiments
- In-silico models enable informed decisions to reduce the number of experiments

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Bigger better faster innovation

Share data with anyone, anywhere

Turning innovative formulations into products means the information has to be shared

- Laboratory information management systems hold the data in a format that anyone on the team can access from anywhere

Being in lots of places at the same time

Traditional bench formulation means each formulator can only do one task at a time.

- Automation can conduct analysis in a lab elsewhere in the world while a formulator works at the bench, it make the next formulation overnight ready for the formulator the next day

Imagine carrying out live scientific experiments virtually!

- MIF Hub team - specifically assist from a distance.
- Smart Video Glasses so partners can view online the experiment taking place.

Imagine having a robot to do the drudge work for you!

- Robots are great at high throughput, repetitive tasks
- Data collected is detailed, timestamped and accurate, perfect for creating predictive models

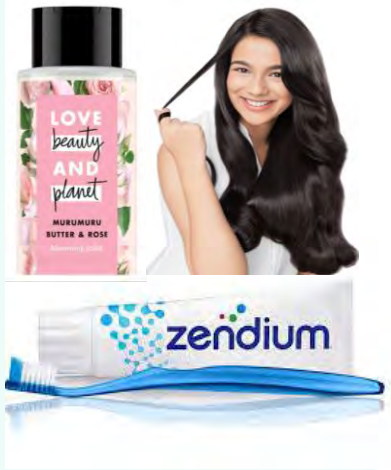
Bigger better faster innovation

Home care innovations through MIF

- Rapidly reformulated and tested OMO to respond to a competitor launch in Myanmar in a matter of days and weeks instead of months.
- Detailed forensic analysis that proved a competitor was infringing our patents.

Beauty and Personal care innovations through MIF

- Tested how hair fibre quality is affected by daily life. Recent launch of Love Beauty & Planet.
- Work on the human microbiome helped accelerate first-to-market innovations such as Zendium toothpaste, which actively creates a positive oral microbiome.



Disrupting through Digital

- Physical tests→ only explore a limited number of options. They are slow and costly.
- Through digital using an in silico first approach→ replace physical tests with robust simulation tools that provide results in minutes or hours rather than days or months.
- New digital modelling tools tap into a mine of information to look at critical aspects of a product (performance, cost and stability), allowing us to fine tune our designs to develop the best formulations faster than ever, and reduce costs

Formulation Challenge: **fabric conditioner unstable** → shipped to very cold or hot countries.

- Traditional stability tests in the lab are very time consuming (8 to 12 weeks).
- Comparable test on a supercomputer takes 45 minutes, accelerating product discovery.

Laundry Formulation Modelling: 70 formulations were made in the lab, 5 million modelled in silico and their performance predicted. After filtering to meet our requirements, 6 lead candidates were identified for validation. Leading to a saving of 1.5 million Euros.

Thank you!

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