

Should I be thinking about AI in the Shower?

Robustness Automation and New Science in Innovation

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Senior Vice President Science & Technology
Unilever

A large global business

Over
400
brands

3.4bn

people use our products every day

>75%

of turnover from our 30 Power Brands

€8.6bn

spend on Brand and Marketing Investment

Making many of the world's favourite brands



NUTRAFOL

AXE



CLEAR

dermalogica

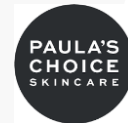
LUX



Horlicks



TRESemmé



closeup



Pepsodent



R&D in Brief



€949M investment
in Research & Development



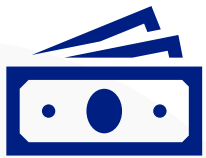
Six Global Innovation
Centres



~5,000 professionals inc.
500 PhDs across five
business groups and 4 key
capabilities



~60% of R&D colleagues are
female, and 55% of
managerial roles are held by
women



Multi €1.8bn sales from
innovation



>20,000 patents
>300 new applications



100 new patents on the
microbiome in 2022

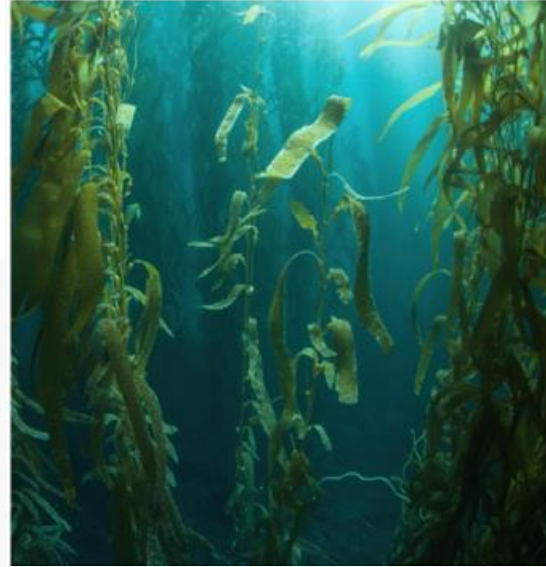


From 50% to 70% product
wins
Turnover tested vs
competition

Our Scientific Expertise



MICROBIOME



**ADVANCED
MATERIALS**



BIOTECHNOLOGY



SKIN+BRAIN



Transforming innovation
powered by AI



Unilever



Dynamic data-driven
consumer trend
prediction and holistic
concept validation



In-silico product
design through
molecular modelling
and optimisation



Virtual simulations &
digital twin for agile
manufacturing and
reduced carbon footprint



Unilever



Driving new breakthroughs
with **“in-silico”** science



Machine learning (e.g. QSAR) to identify the right molecules for our formulations



Understanding better the microbiome from 12 terabytes of data with advanced analytics



Computational models to ensure safety and biodegradability of our formulations, without animal testing



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DIGITAL ACCELERATES

DISCOVERY
SPEED
PRODUCTIVITY



Unilever



The future of R&D is hybrid

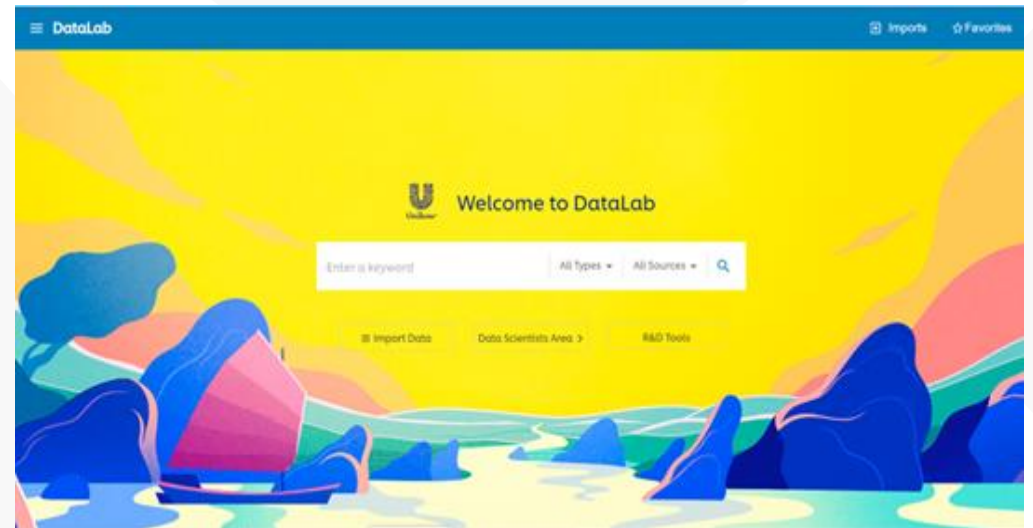
PHYSICAL



Data generation, testing, validation

+

DIGITAL



Discovery, design, optimisation

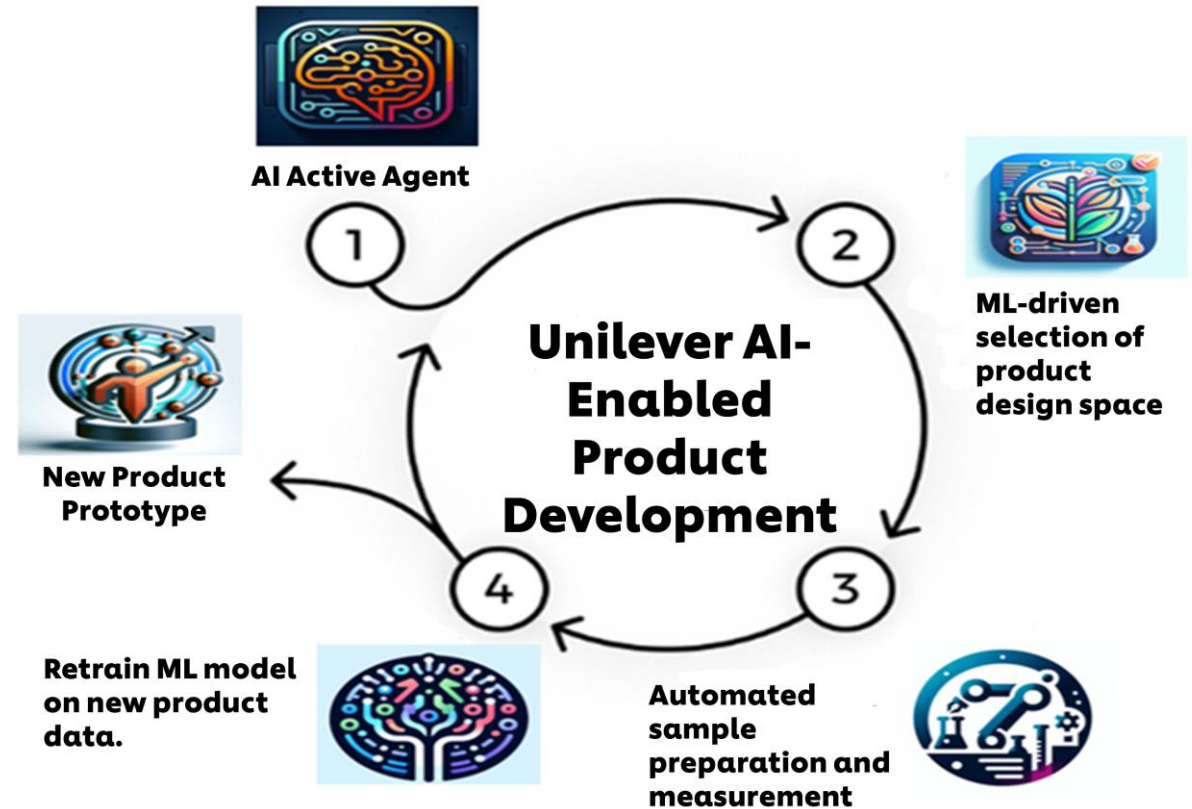
AI-Enabled Product Development

From...

- Iterative statistical experimental designs
- Batch-wise experimental campaigns
- Disconnected instruments/platforms
- Scientist decides what to test next

To...

- Scientist-led, hypothesis-driven experimentation
- Continuous data generation and analysis
- Connected instruments/platforms
- Algorithm suggests what to test next



AI in the Shower?

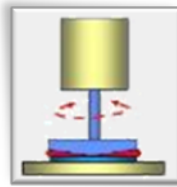
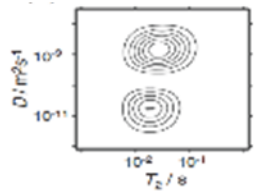
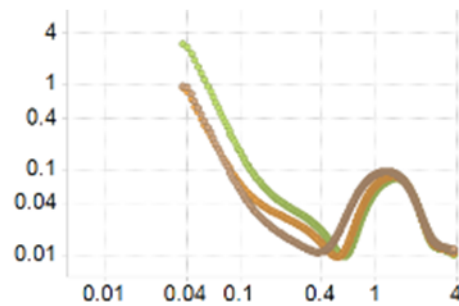


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Learning things, we could never learn before...

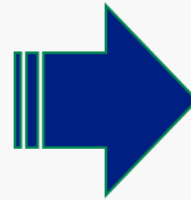
Structure



Determine the structural features

- Simulated properties
- Scattering Diffusion NMR
- Rheology

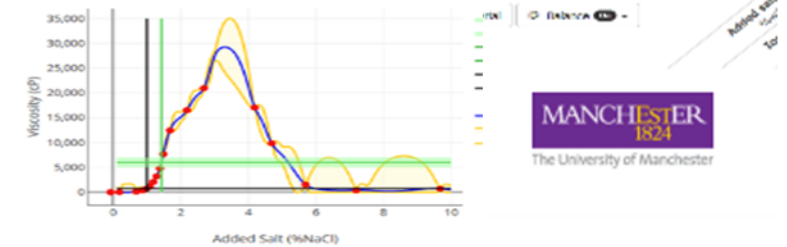
Machine learning/group contribution models



Rheology

ID	Material name	Quantity
1	SLES 180 (DPA)	1.73428
2	DTV L190 & FATTEN AJ COLLOX	1.61
3	CAPB with Sodium Boronate sodium boronate	5.3222
4	PPG 7	0
5	ca 11 H100 (NATROX)	1
6	Carbopol 960	0.4
7	HM - SILICONE EMULSION Co. 151 PDE	1.111
8	CF 1700 POT/ SIN. G30-M5	0
9	EDTA	0
10	PAN 1 (2% KG HNA)	1
11	NaCl Salt 50% w/w salt	0
12	Water	11
		05.0009

Shampoo Viscosity model v2



Viscosity prediction available for R&D and SC

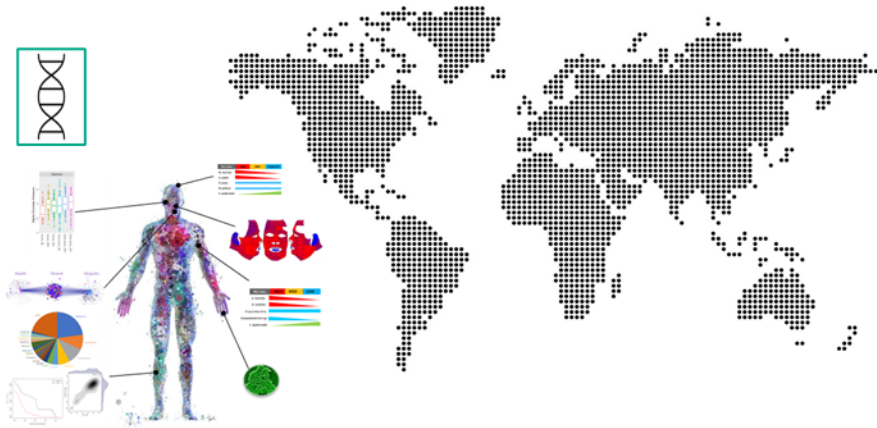
- Viscosity response to salt
- Viscosity response to shear

Enabled with Partnerships

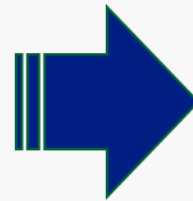


Learning things, we could never learn before...

Multomics

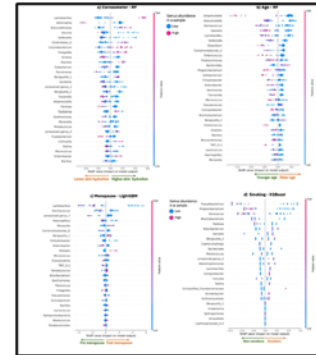


- One of the largest collections of skin microbiome data on the planet
- Skin, Oral, Scalp, Face, under arms
- Multiple geographies
- Over 18,000 microbiome samples

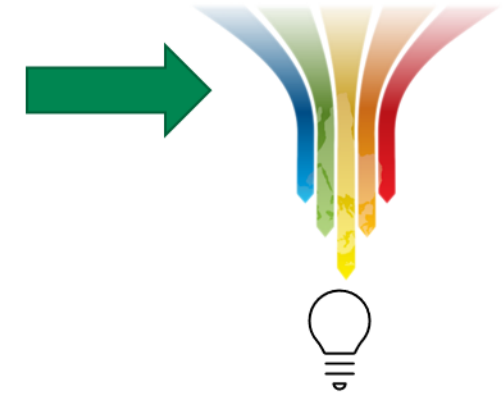


Unlocking Insights

16 s sequencing
Microbiome data



Explainable
AI workflow



- Prediction of Skin quality measures
- Accurate prediction of age, skin hydration, Lifestyle (smoking etc)
- Validated by Clinical results



Enabled with Partnerships



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