

# Enzymes for a circular plastic economy

Making plastics truly recyclable

Investor Deck



[www.evoralis.com](http://www.evoralis.com)

March 2024

# Team



## Management



**Dr Daniel Kaute**  
CEO

- 30 years of high-tech commercialisation
- Track record in operations and international sales
- Started up business and exited



**Dr Mariana Rangel Pereira**  
CSO

- 11 years of expertise in molecular biology and functional metagenomics
- Research associate University of Cambridge, previously Newton Fellow of The Royal Society



**Dr Josephin Holstein**  
CTO

- 10 years of research expertise in synthetic chemistry and biocatalysis
- Research associate at the University of Cambridge



**Dr Juergen Eck Designated Chairman**

- Co-founder and former CEO of BRAIN AG

## Advisors



**Dr Tomasz Kaminski**  
Microfluidics | Biotechnology

- Group leader at the university of Warsaw, 12-years of expertise in microfluidics
- Forbes 30 under 30, 2 patents



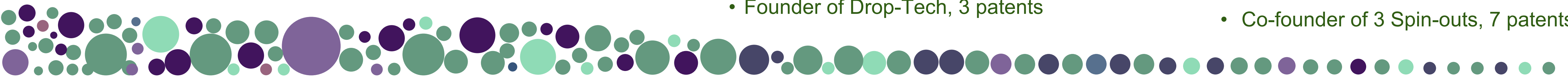
**Dr Liisa Van Vliet**  
Biotechnology | Entrepreneurship

- Biochemistry and Microfluidics
- Entrepreneurship mentor (Judge Business School)
- Founder of Drop-Tech, 3 patents

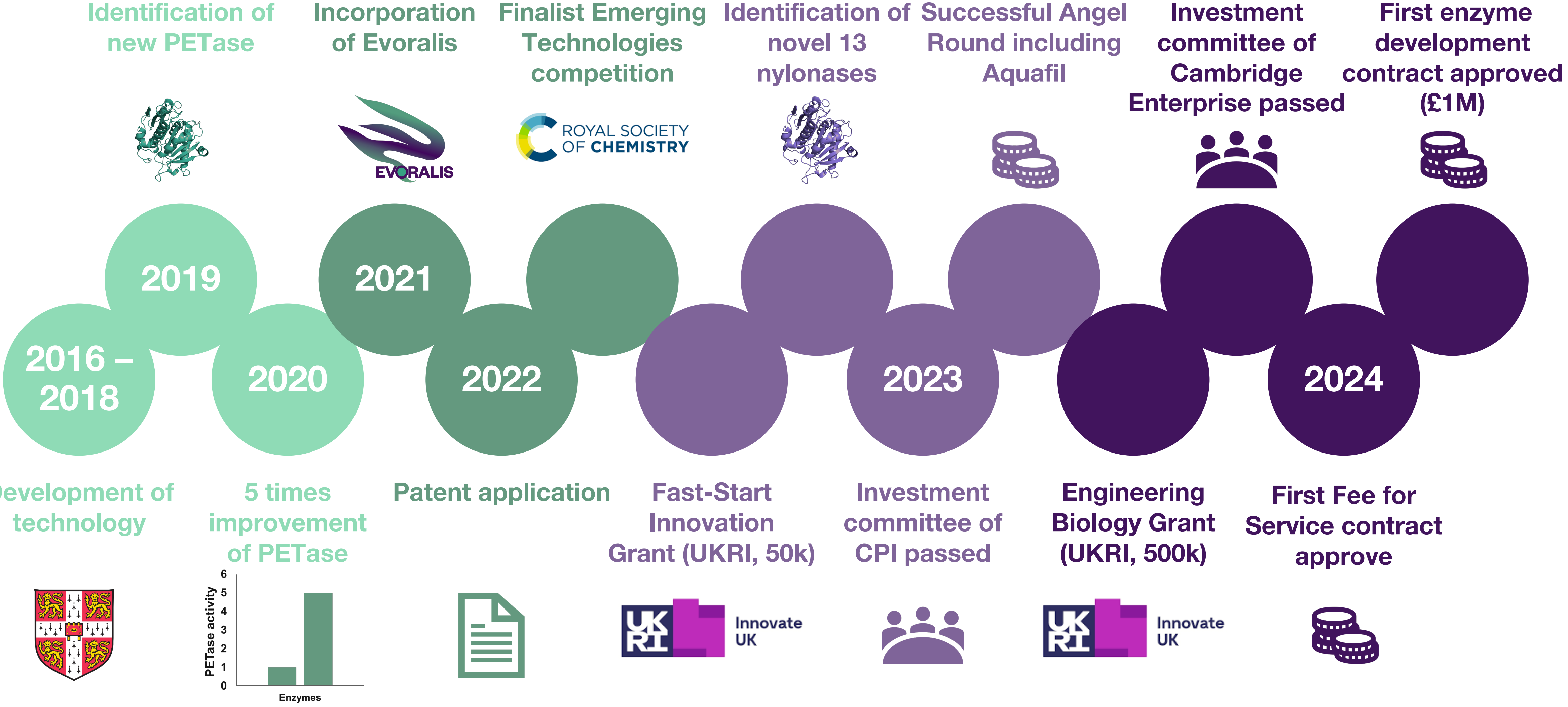


**Prof Florian Hollfelder**  
Synthetic Biology | Microfluidics

- 20 years group leader at University of Cambridge
- World class expertise in protein engineering and directed evolution
- Co-founder of 3 Spin-outs, 7 patents



# Evoralis timeline and achievements



# The plastic problem: recycling technologies insufficient



Only 9% of 350 Mt waste recycled per year



Only 9% recycled  
12% incinerated  
79% landfill or nature

## Mechanical and chemical recycling limitations:



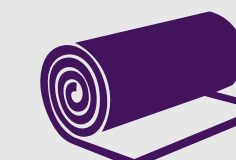
Require clean, pre-sorted feedstock



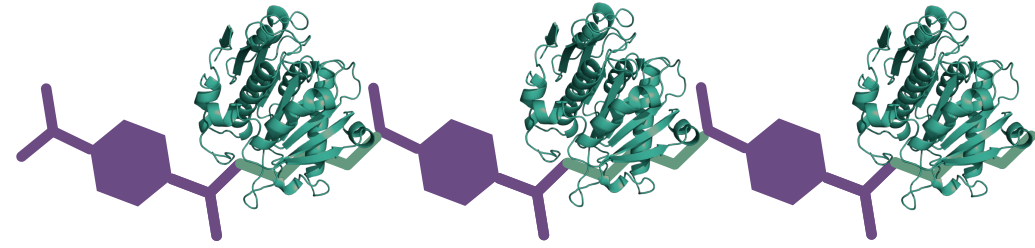
Cost



Requires high energy



Down-cycling: lower quality of recycled end-product



## Enzymatic recycling solves the current textile and plastic recycling issues

Enzymes are..

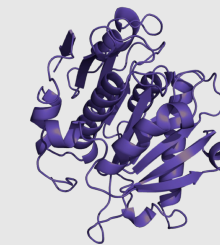
Specific

- can tackle blended fibres and mixed plastics
- enzymes for different plastics can be used together
- dyes and contaminants won't affect the efficacy

Efficient and Eco-friendly

- can work at lower temperatures
- do not need harsh chemicals or conditions for activity

### Enzymatic recycling limitations:



**Only one** enzyme available (for PET)



**In vitro** strategies: long development times for new enzymes



**In silico** strategies: AI lacks functional data

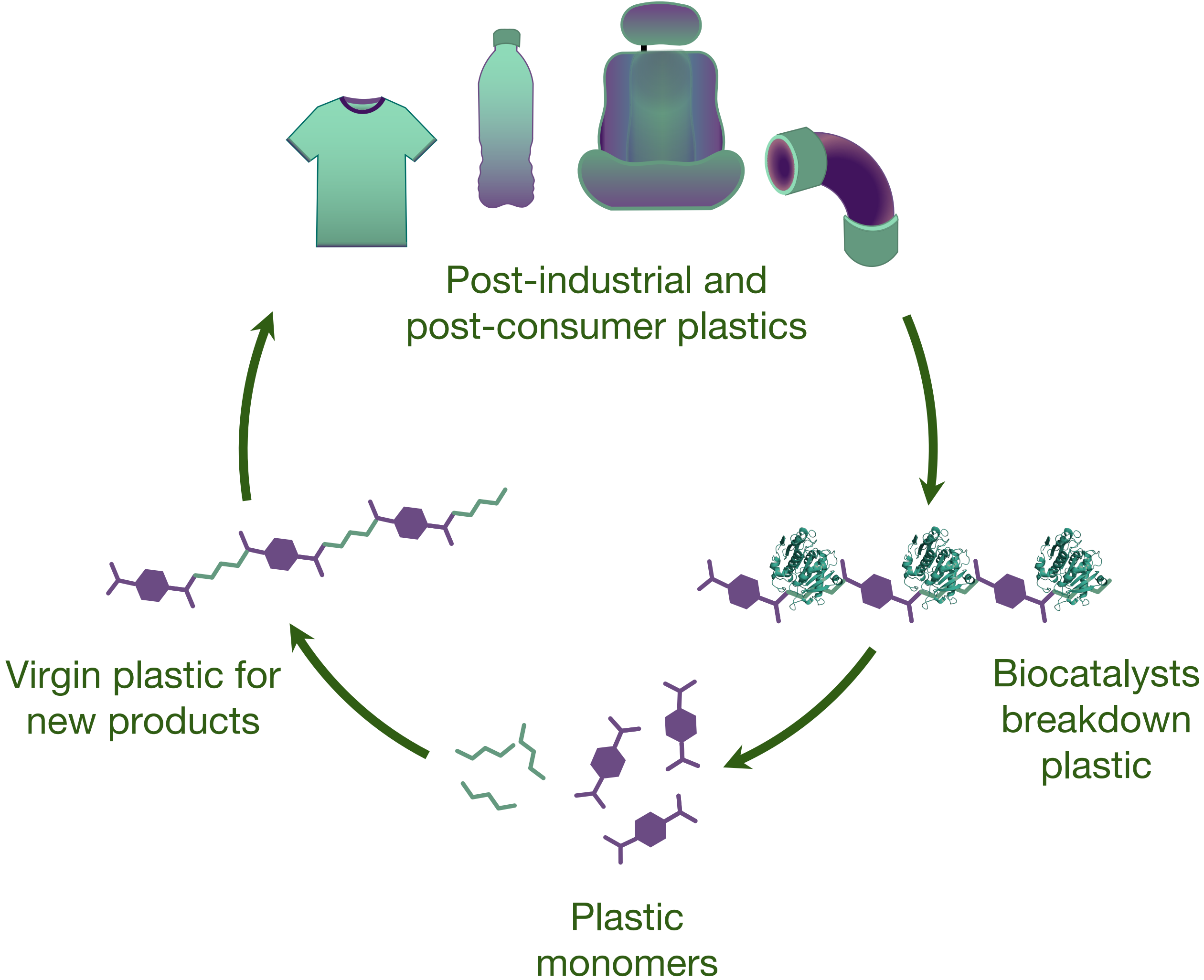


# Mission



Our mission is to enable large scale plastic recycling – making plastics truly circular

We target to enable recycling of over 80% of textiles within two years



# Our technology

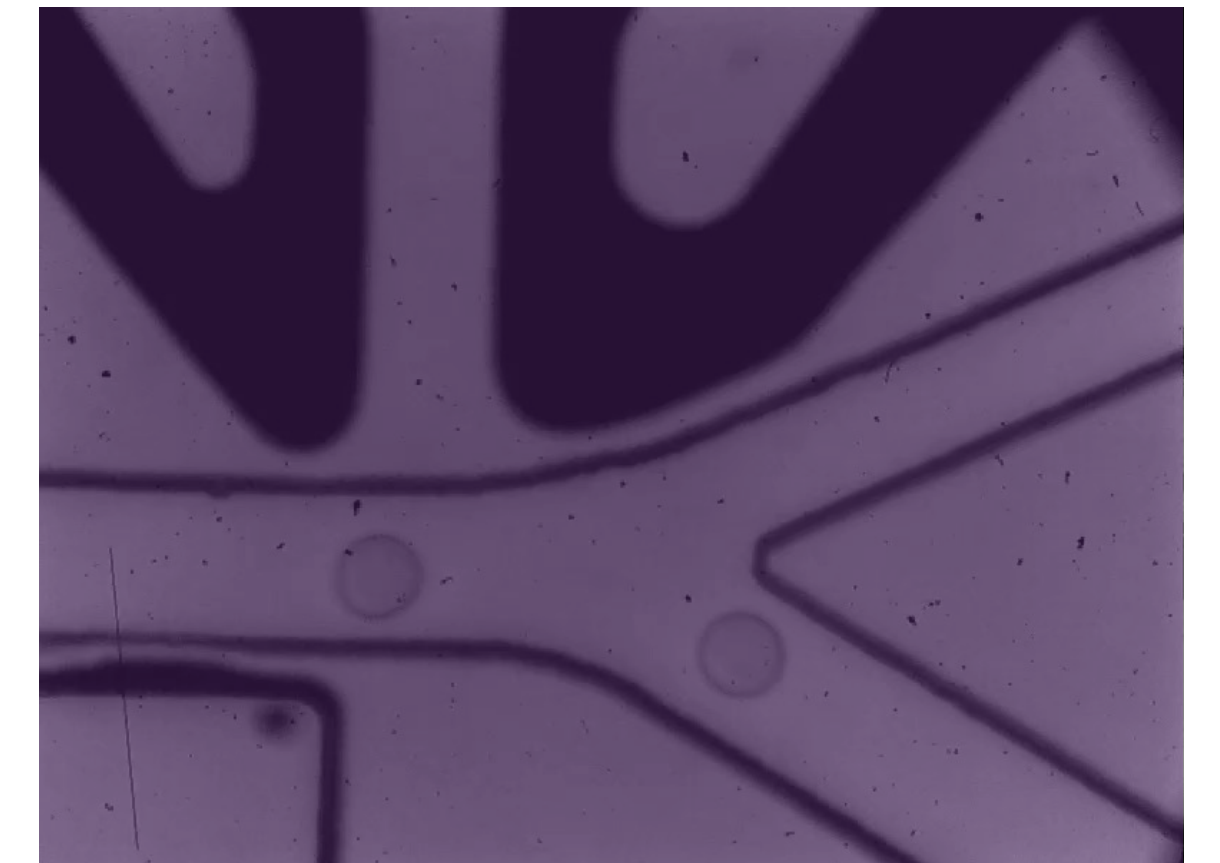
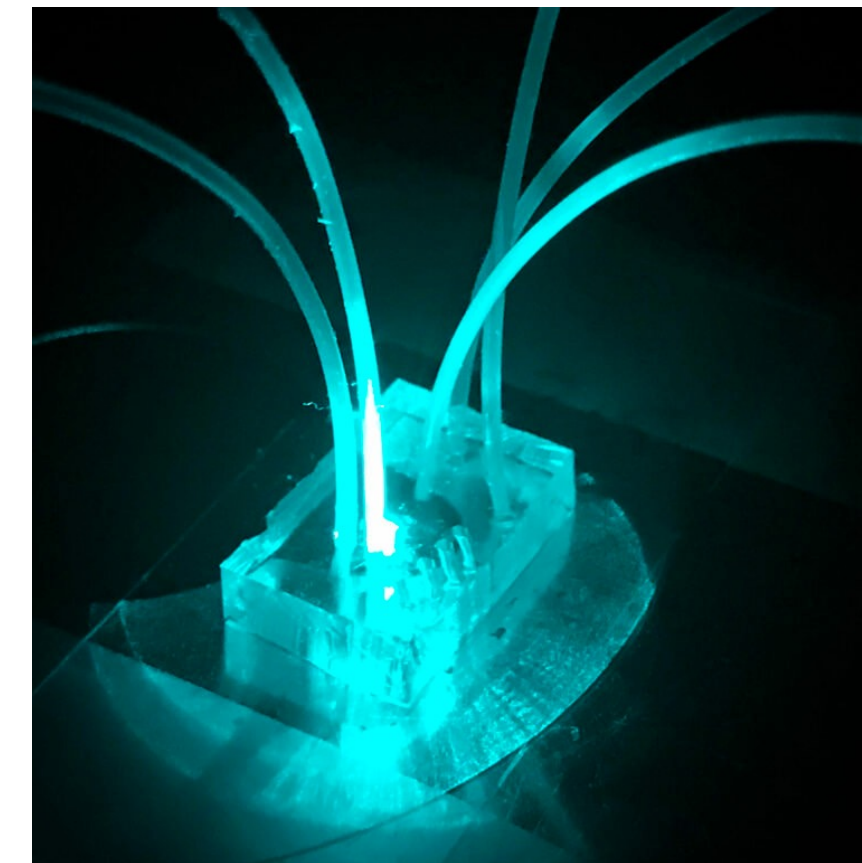
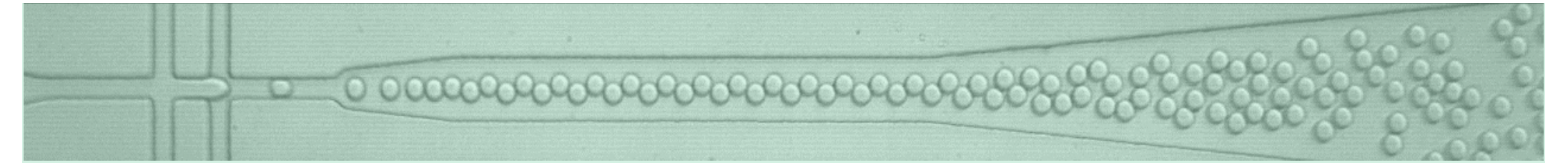


Our technology enables the discovery and improvement of enzymatic plastic depolymerisation, with a screening platform that is 1,000x faster than conventional methods

→ find new enzymes

→ improve activity of existing enzymes for specific conditions (pH, temperature, additives..)

→ gain massive functional data for use in exploration of sequence space and AI/ML (Series A)



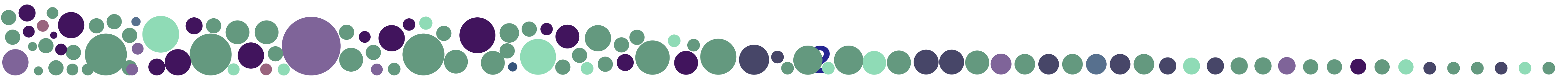
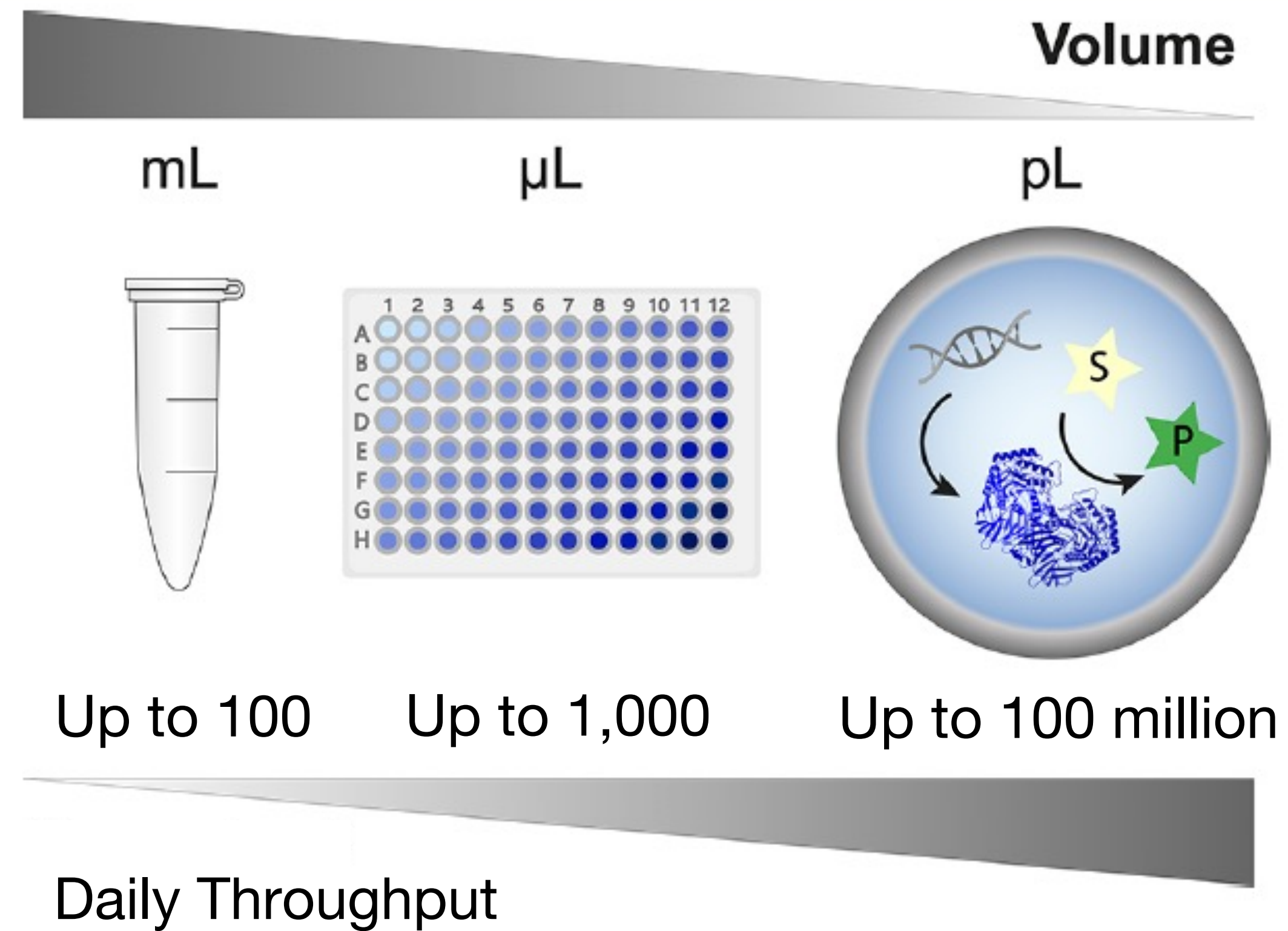
- **10 million** different enzymes tested/day
- **1,000x** faster than other *in vitro* methods
- Testing **directly on plastics, not on mimicking substrates**



# Microfluidic screening platform



Ultrahigh throughput methods are needed to find the “needle in a haystack”





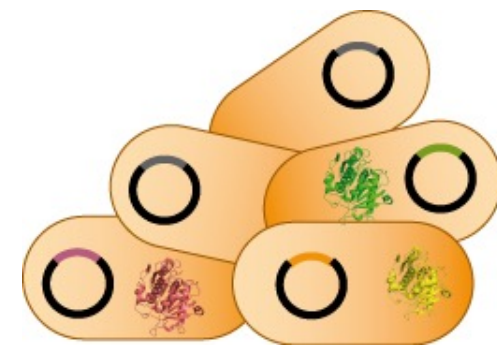
# Evoralis screening technology



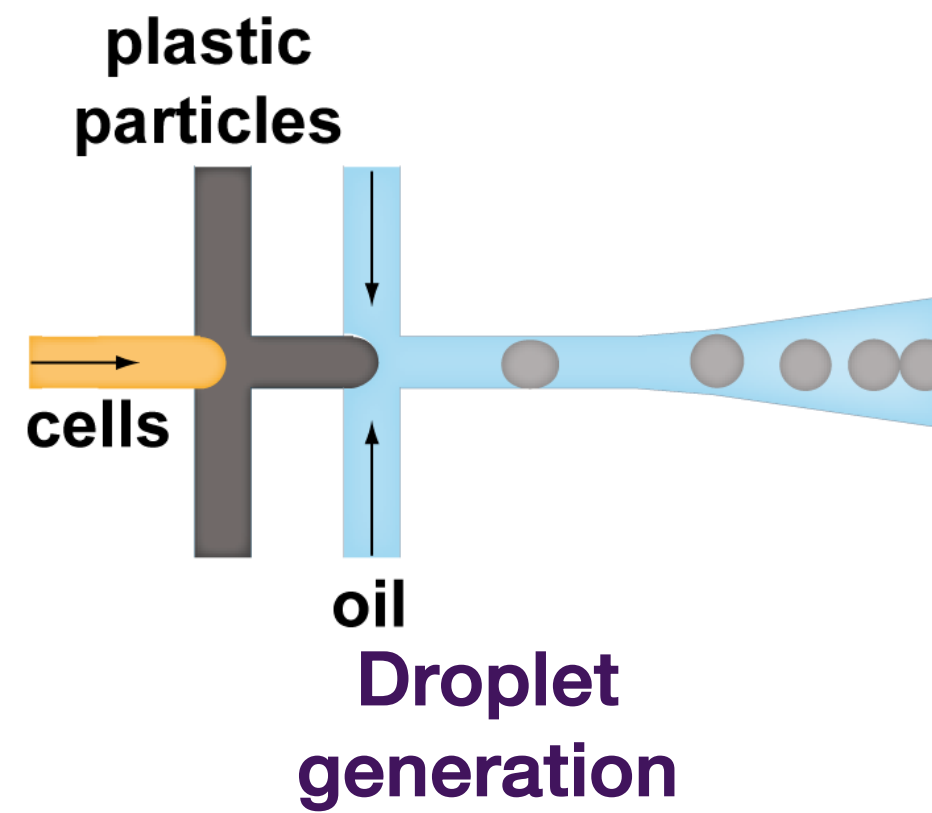
## Finding enzymes:



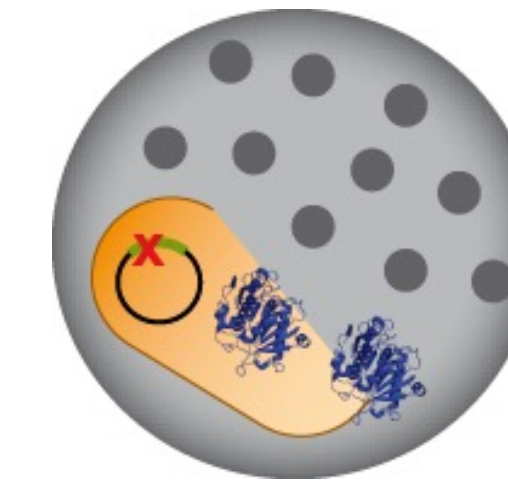
Nature



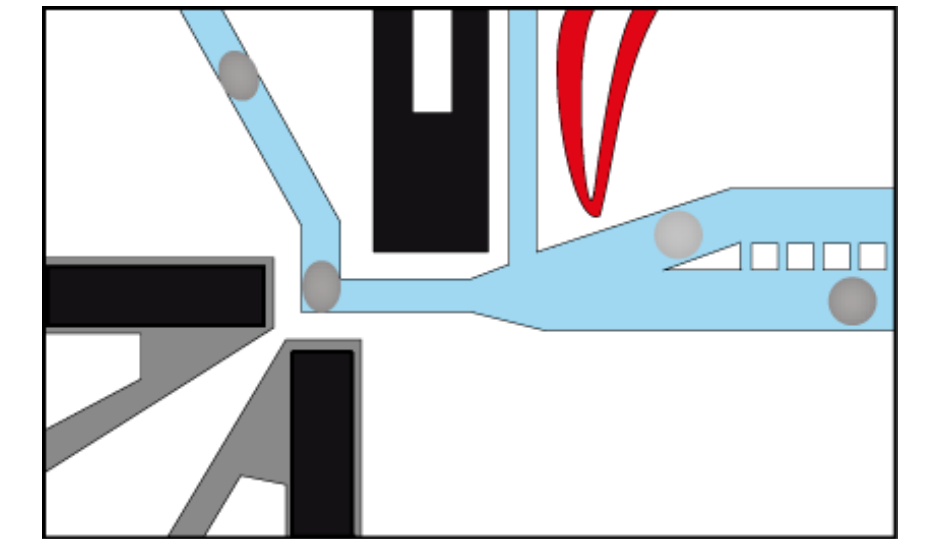
Library generation



Droplet generation

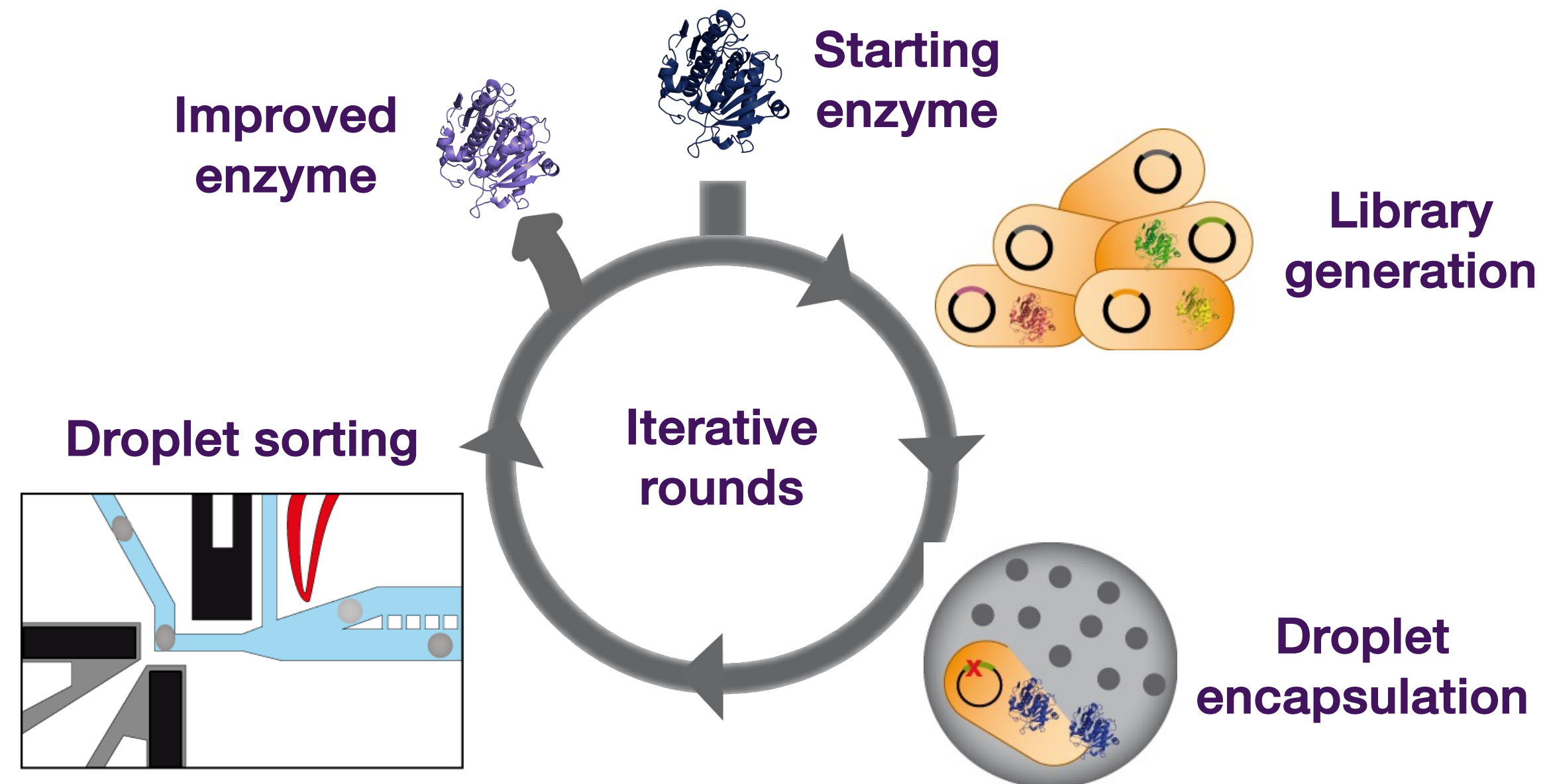


Lysis/reaction



Droplet sorting

## Improving enzymes:



Improved enzyme

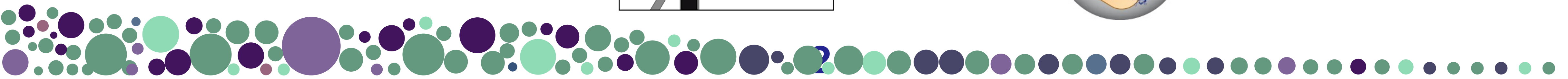
Starting enzyme

Library generation

Droplet encapsulation

Droplet sorting

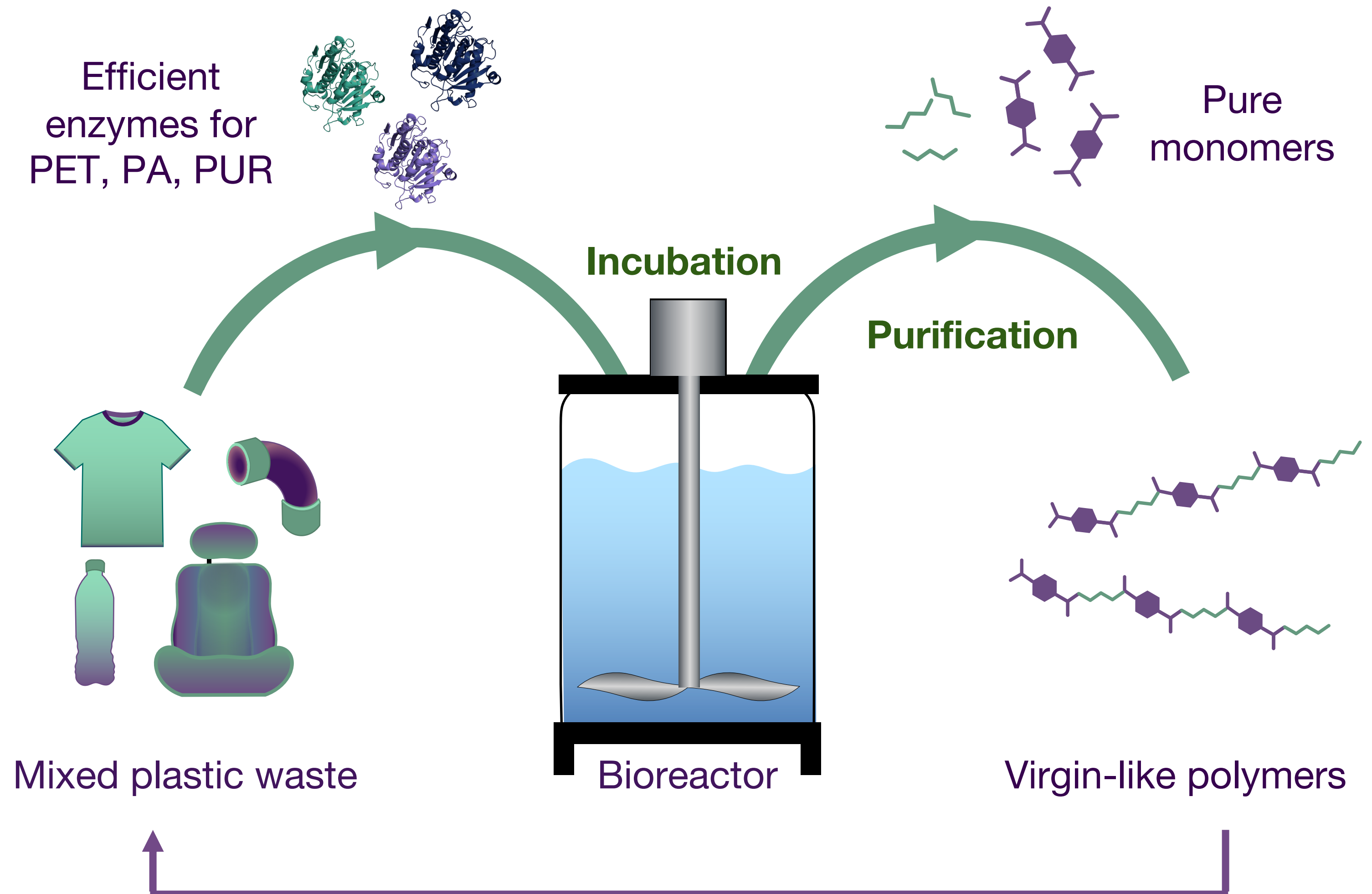
Iterative rounds



# Enzymatic recycling – the overall process

With CPI, Evoralis will develop a simplified recycling process whilst identifying:

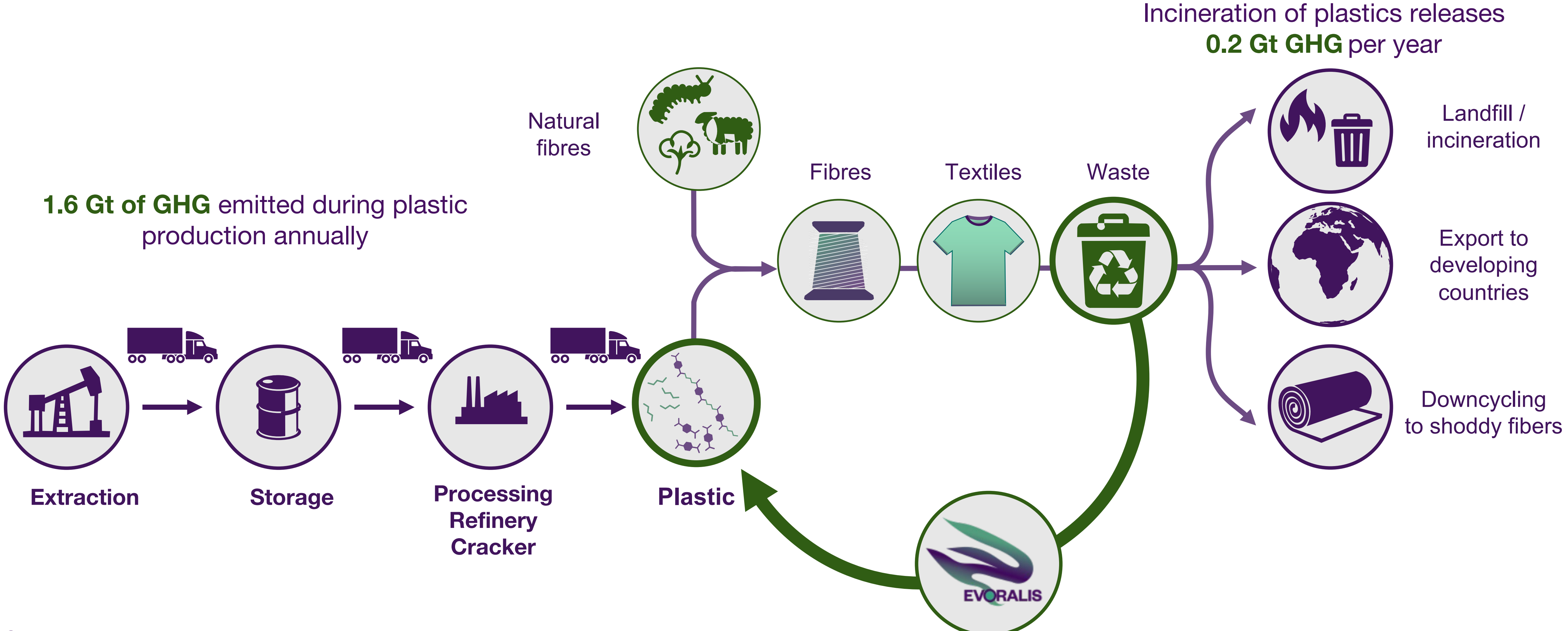
- Optimal incubation conditions
- Extraction and purification techniques for different plastic monomers



# Impact on the environment



Enzymatic recycling could save 17-43% GHG emissions representing 0.3-0.7 Gt



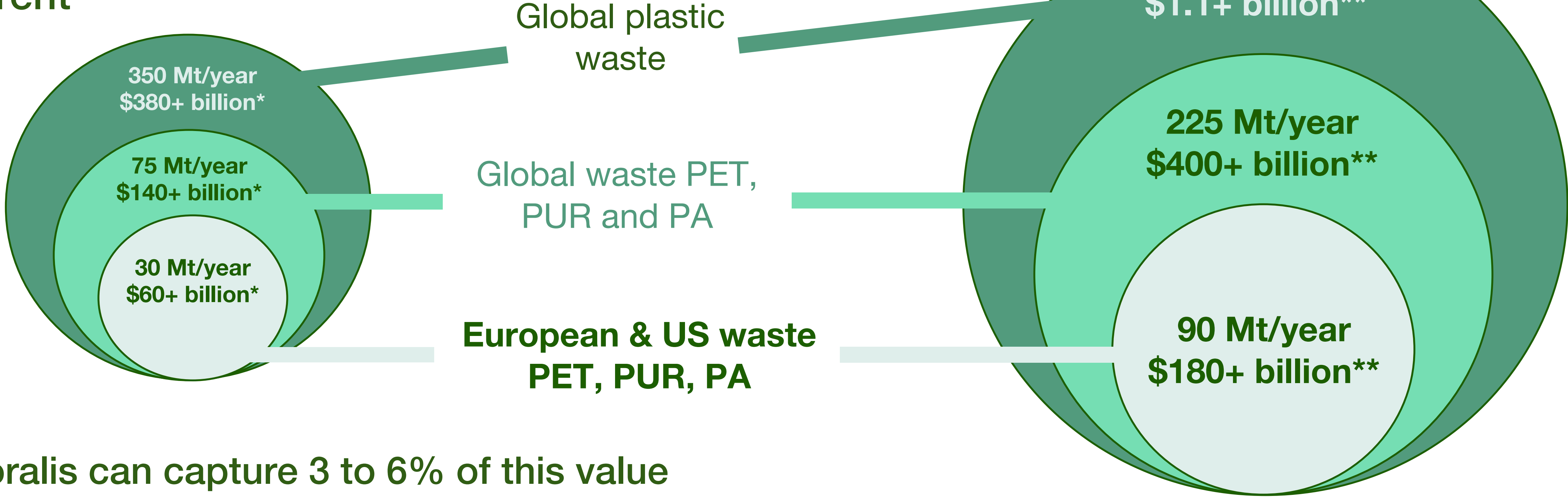
# Market opportunity plastic waste - today \$140 billion



Targeted plastics: polyester/PET, nylon/PA, elastane/PUR  
 CAGR 4%

2060 Projection

Current



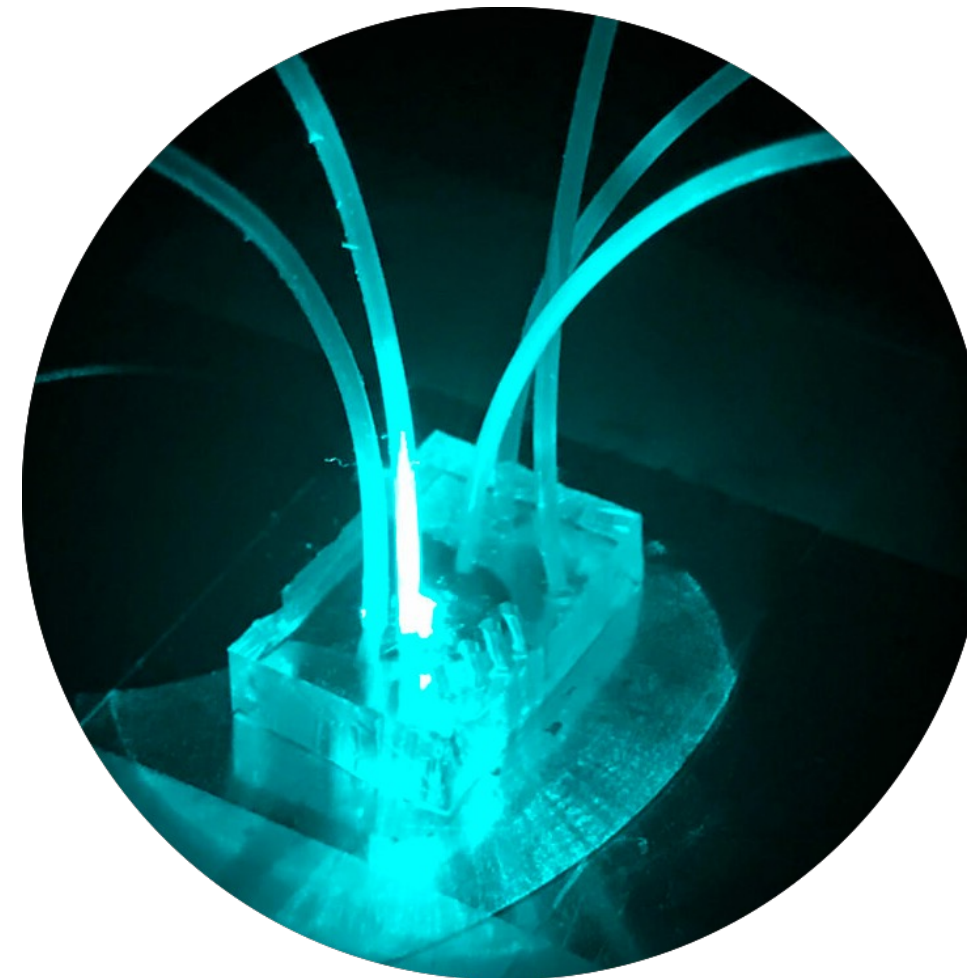
Evoralis can capture 3 to 6% of this value

OECD, Environment Statistics, 2022

\*Counting the value of the polymers that can be obtained from the waste at pre-Ukraine war market values, not counting possible recycling premium  
 \*\*Constant dollars



# Enzymes for a circular plastic economy



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