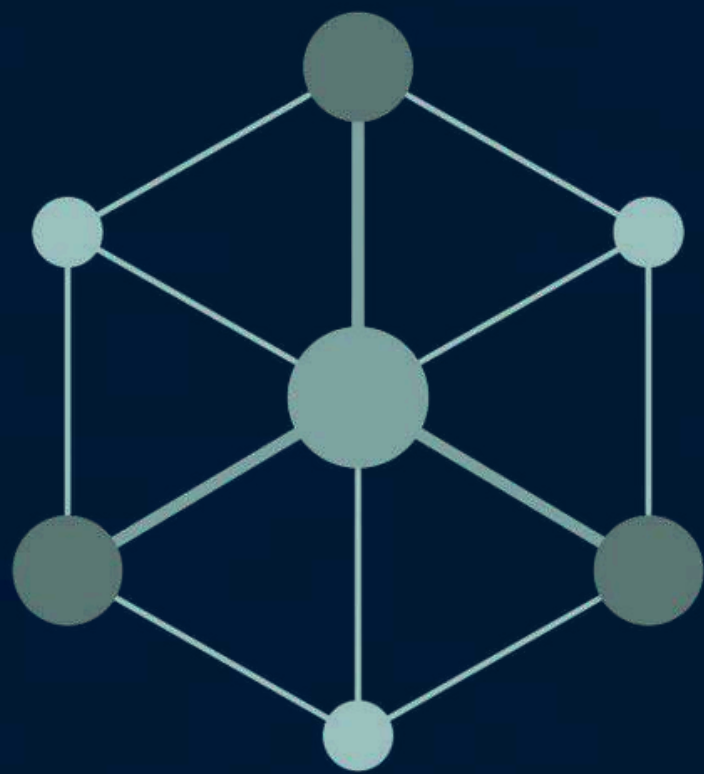




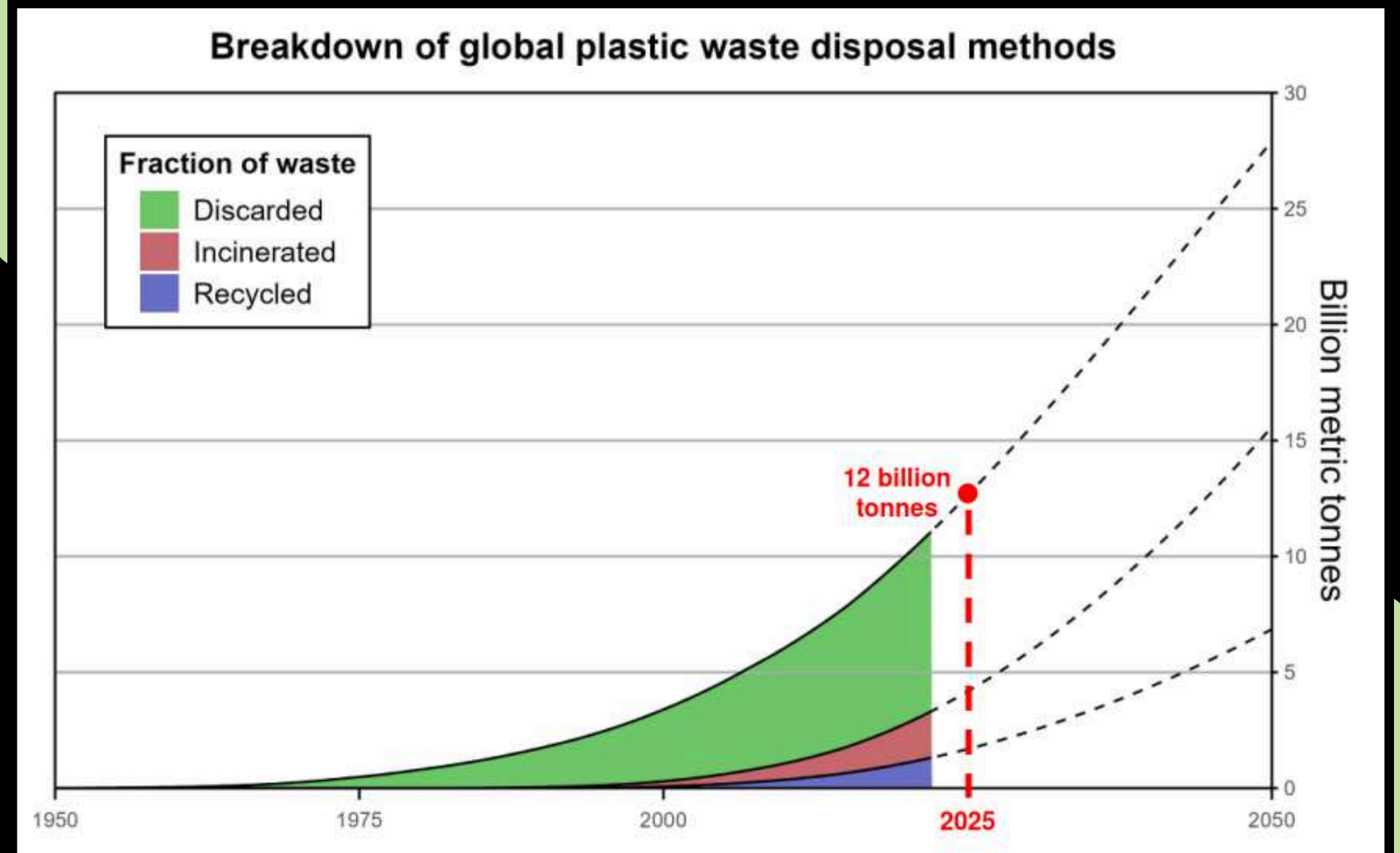
PetaBite

Delivering Tailored Microplastic
Degradation Solutions



Plastics are
everywhere.

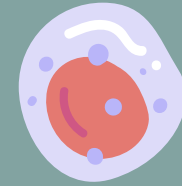
***≈ 400 Million
Tonnes
Produced
Each year.***



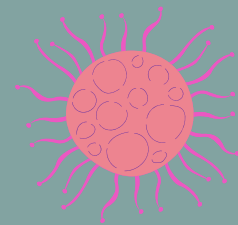
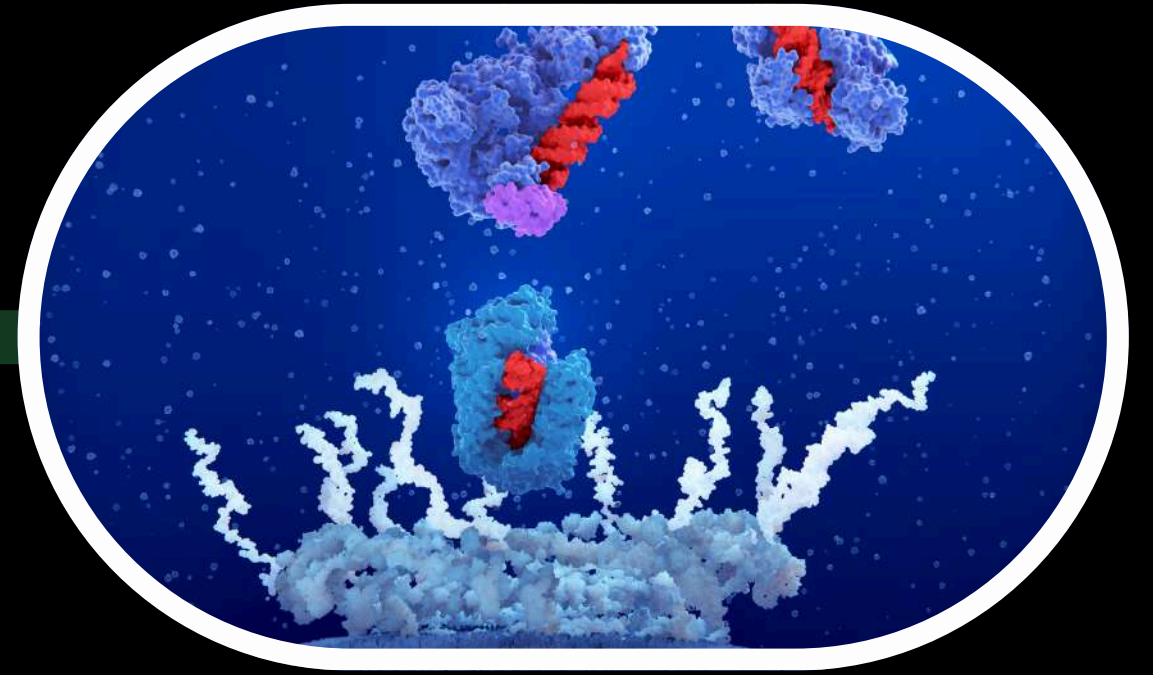
Microplastics

Damage

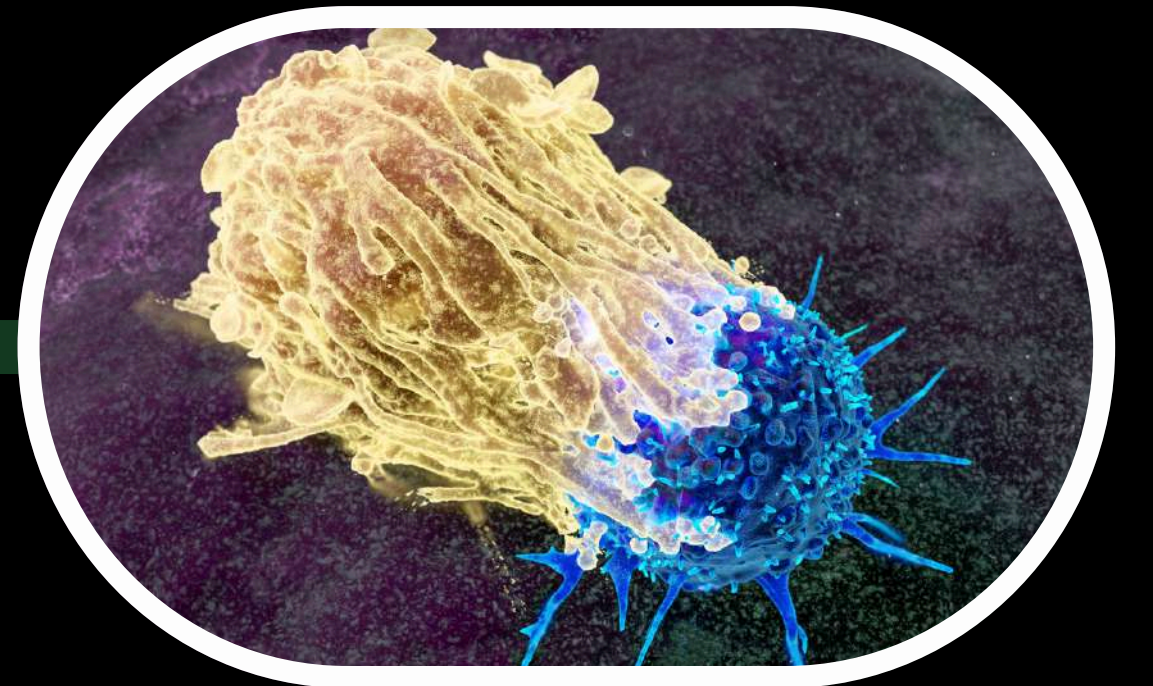
Human Health



Cell Damage



Cancer



The Economic **Burden**

≈\$19B

In Annual Losses



Food Security

Crop yield and supply chain disruption



Public Health

Toxin exposure and contamination



Environmental Cleanup

Remediation costs and ecosystem degradation

Plastic Production is Projected to Grow



Production Increase

Plastic production is expected to balloon from 435 Mt to 736 Mt by 2040



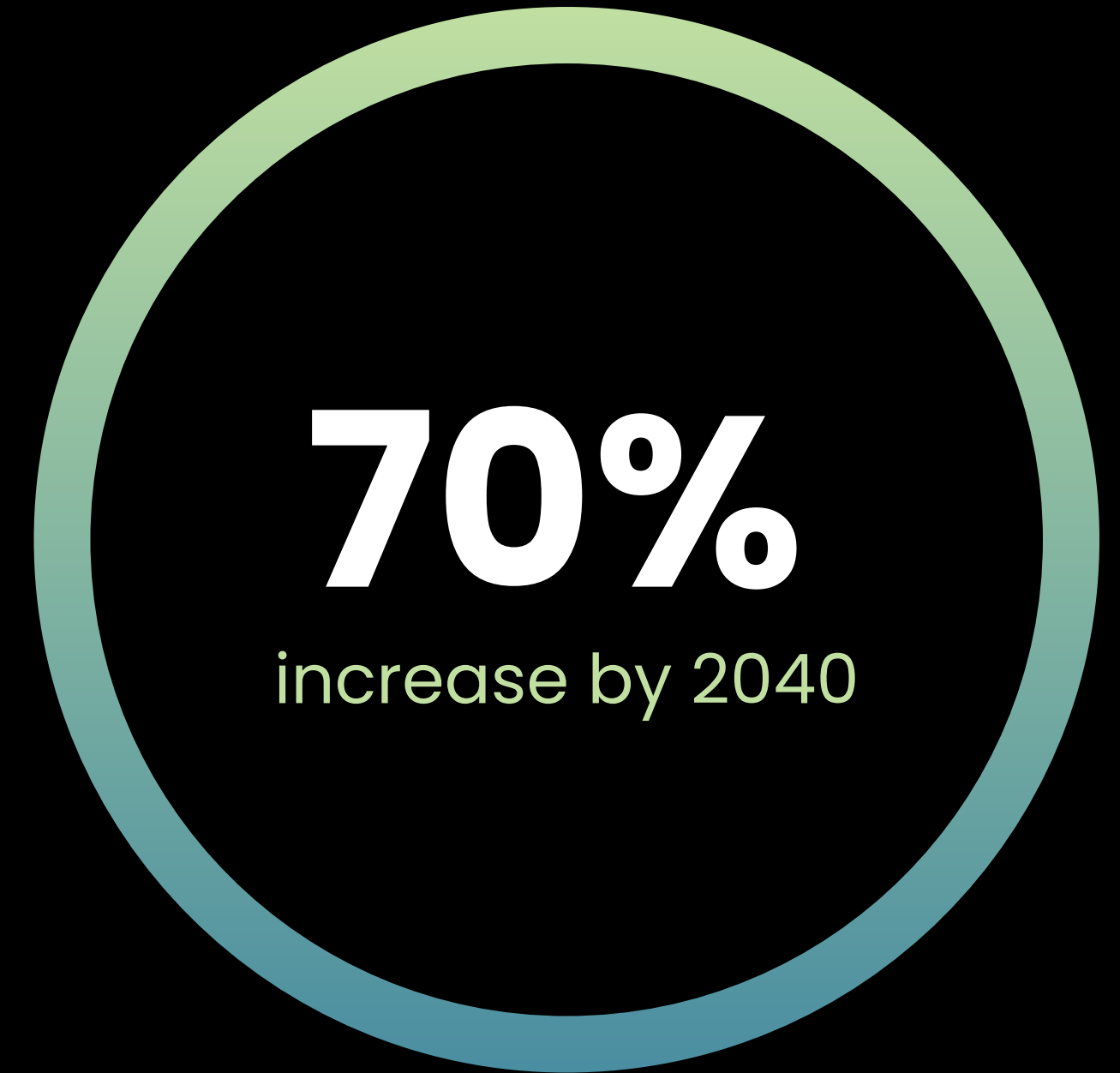
Mismanaged Plastic Waste

Expected to increase nearly 70% by 2040

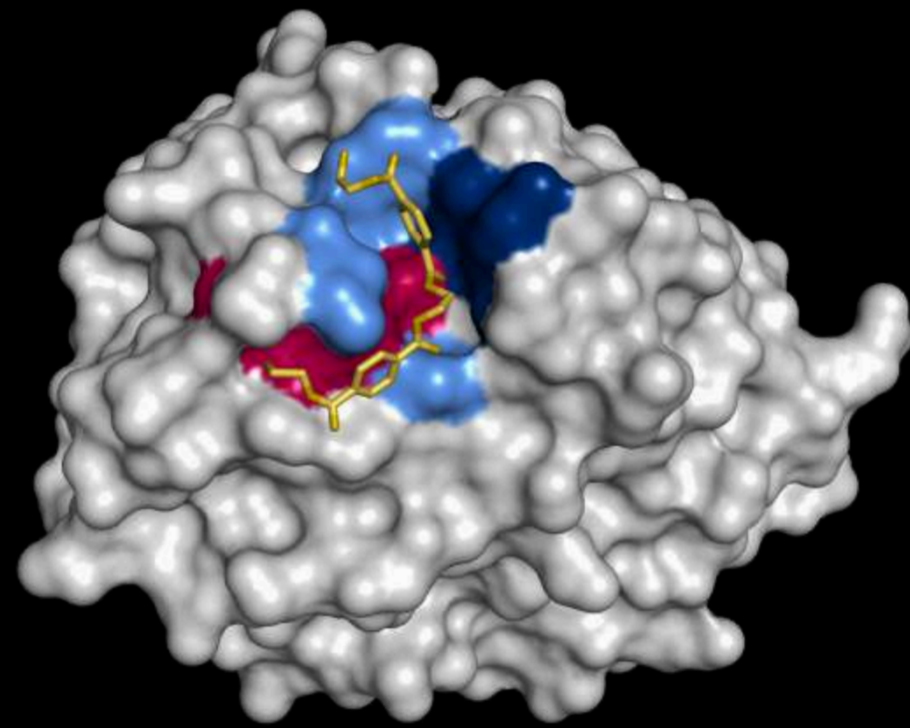


Rising Government Pressure

Ex. Canada's 2030 sustainability targets are driving urgent action on microplastic pollution.



Organisation for Economic Cooperation (OECD).

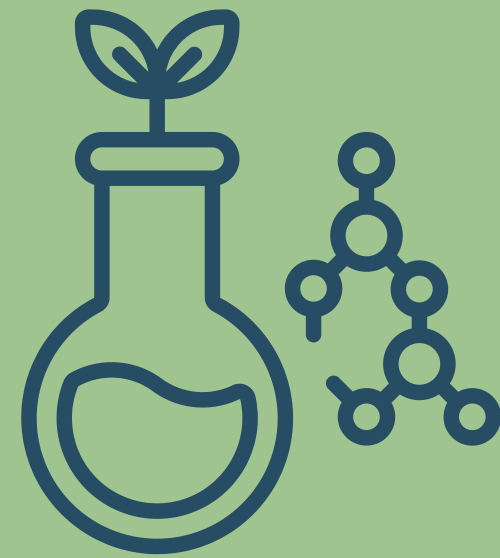


3D PETase Model

Solution:
Engineered
Plastic-Degrading
Enzymes (PETases)

Current PETases

Have **MAJOR** Industry Limitations



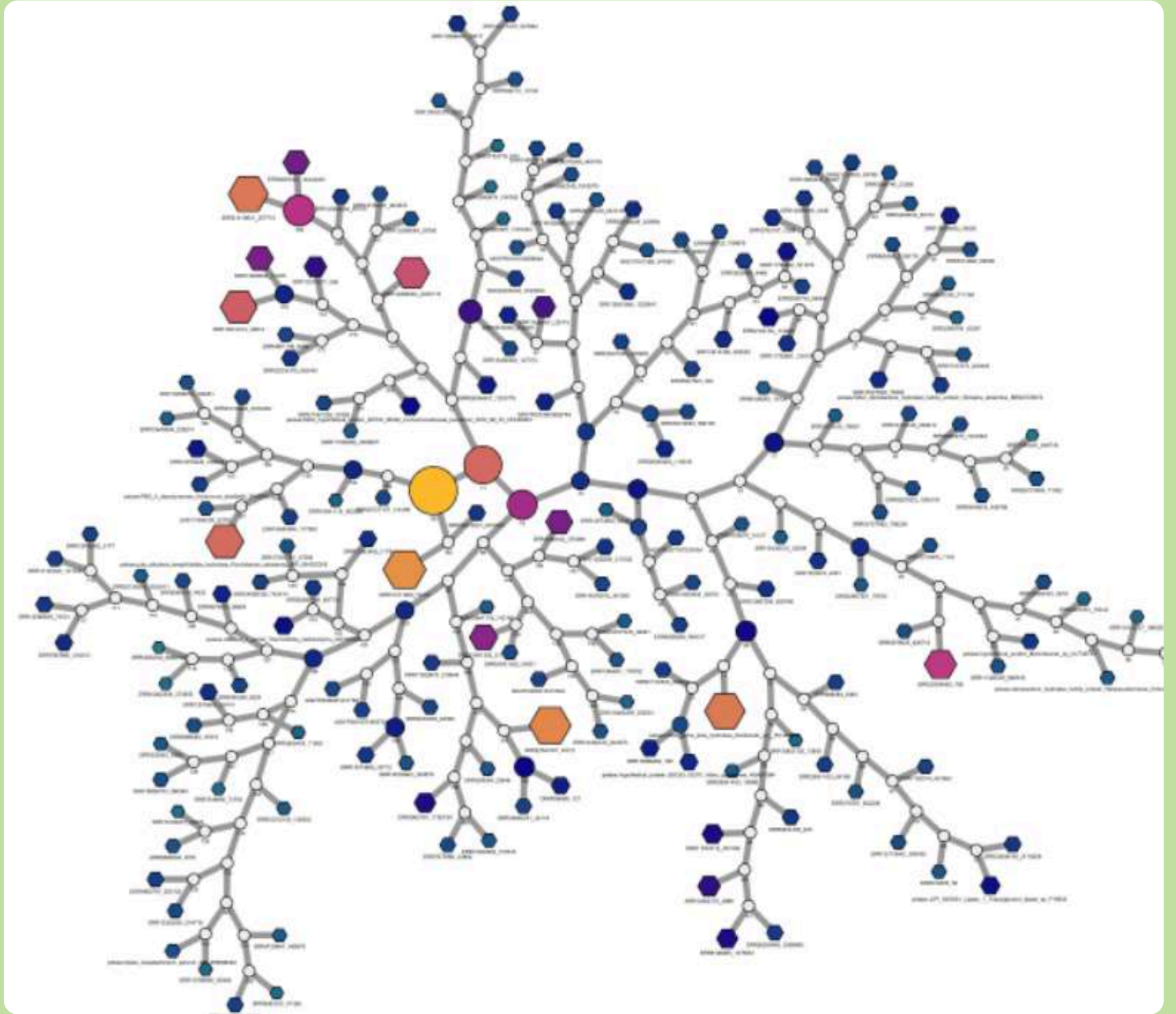
**Operate at very specific
temperatures, pH,
controlled conditions**

**Unable to function in real-
world environments and
industry applications**



LOGAN Index

***A planetary sequence
search that discovers novel
PETases***



Phylogenetic tree of the **plastic
degrading enzyme** candidates

Methods

➤ **Dry Lab** • Searchable atlas of plastic-degrading enzymes

LOGAN Sequence Mining

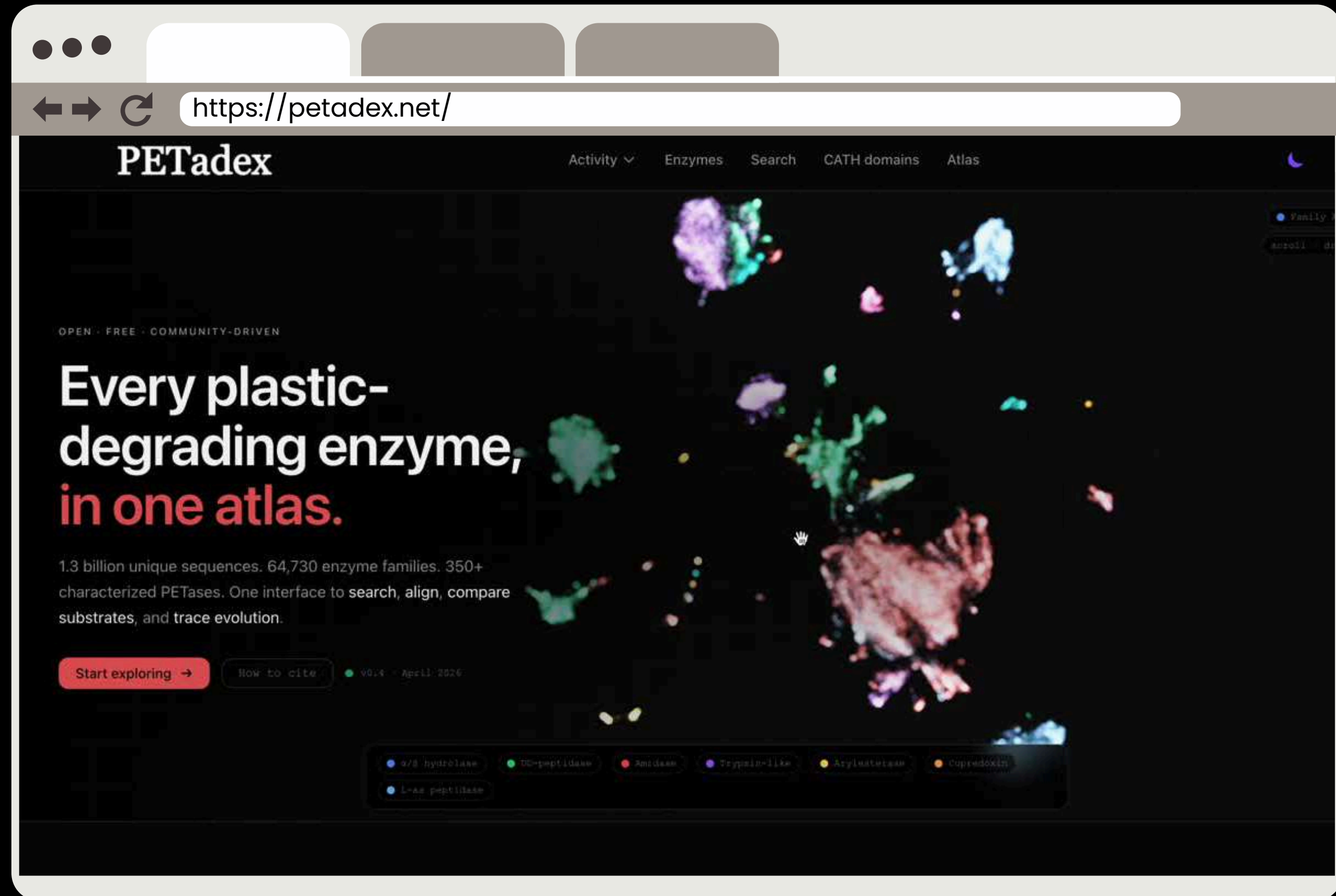
27.3M public sequencing datasets

PETadex Analysis

Sequence, structure, and environmental metadata

Candidate Selection

Curated fragment library for wet lab testing



Wetlab and Hardware

EVALUATING EFFECTIVENESS AND SCALABILITY OF OUR ENZYME DISCOVERY PLATFORM

300 million sequences



Random screen of **161**
enzymes



Discovered **2** enzymes that
outperform the current lab
standard "FAST-PETase"!

DESIGNING AND PLANNING NOVEL WET LAB ASSAYS

Plasmid designs finalized with
plasmid assembly underway
Design of novel **copper-based**
PETase activity assay



Successful infusion of **copper**
phthalate into **PET mesh**

BUILDING AND TESTING BIOREACTOR SYSTEMS

Hardware team built and
tested **bioreactor** components
with optimization underway



Performed system and code
integration testing indicating
inter-system compatibility

PetaBite PETase Verticals of Deployment

01

Waste-water Treatment Plants

PETase deployed in clarifiers to break down concentrated PET in biosolid sludge. *Use-case validated with WWTP operators and research specialists.*

02

Textile Pellet Bioremediation

Targets PET pellets released in textile processing before they enter waterways.

03

Filtration

Breaks down PET microfibers shed during washing to reduce household discharge.

04

Landfill Leachate Bioremediation

Degrades PET in leachate streams, reducing climate pollution from landfills. *Use-case validated with research specialists.*

05

Degreasers

Breaks down PET trapped in oily industrial waste streams.

Next Steps

Each phase unlocks a distinct market

PHASE 1



PET Degradation

Enzymatic PET degradation across wastewater and bioremediation systems.

TAM: 63.4B

PHASE 2



Multi-Polymer Degradation

Enzymes capable of degrading every major plastic polymer in the listed use-cases.

TAM: ≈145B

PHASE 3



Upcycling

Convert degraded plastic monomers into new biodegradable materials.

TAM: ≈22B

Competitive Landscape

- **No commercial-scale enzyme-based microplastic solutions for WWTP yet**
- **Existing enzyme tech:** research & pilot stage only
- **Current WWTP standard:** physical removal methods

Regulatory Landscape

- **Federal (CEPA):** full notification + lab-generated enzyme characterization data
- **Provincial:** permit amendment to existing facility approval (not a new application)

HUMAN PRACTICES

STAKEHOLDER INTERVIEWS

OVER 30 COMPLETED INTERVIEWS!



DR. TEMITOPE O. SOGBANMU
ENVIRONMENTAL TOXICOLOGIST
AT THE UNIVERSITY OF LAGOS

Emphasized testing enzyme specificity, byproducts, and performance under realistic conditions.



DR. NATASHA ANWAR
MOLECULAR PATHOLOGIST
AND BIOETHICS
RESEARCHER IN PAKISTAN
Emphasized that responsible deployment must account for affordability, local infrastructure, and clear ethical oversight.

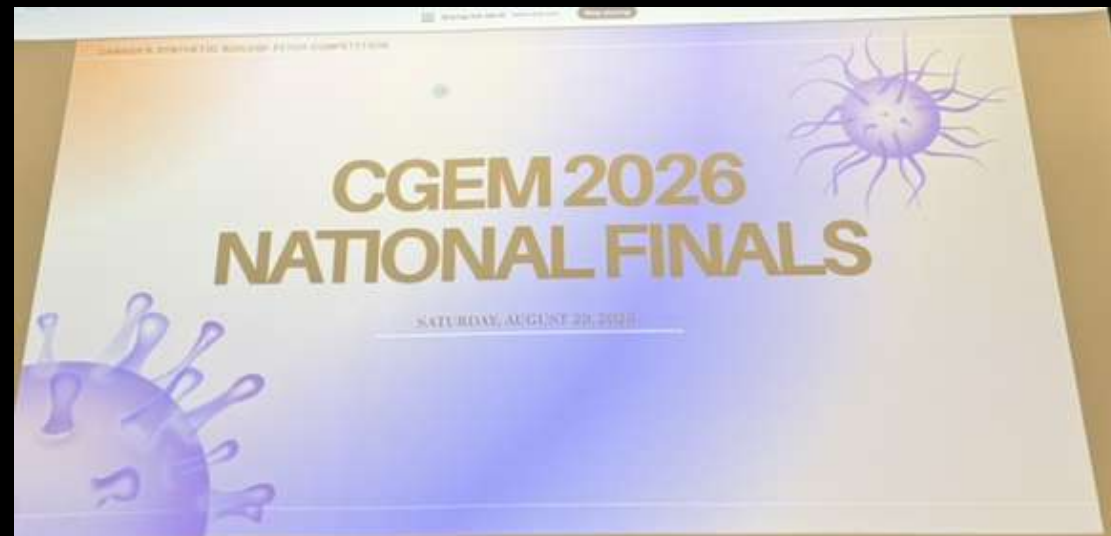


DR. LEROY LITTLE BEAR
BLACKFOOT SCHOLAR AND
INDIGENOUS RIGHTS LEADER
Highlighted plastic pollution's disruption of ecological relationships and the need for technology that restores long-term balance without reinforcing extraction.

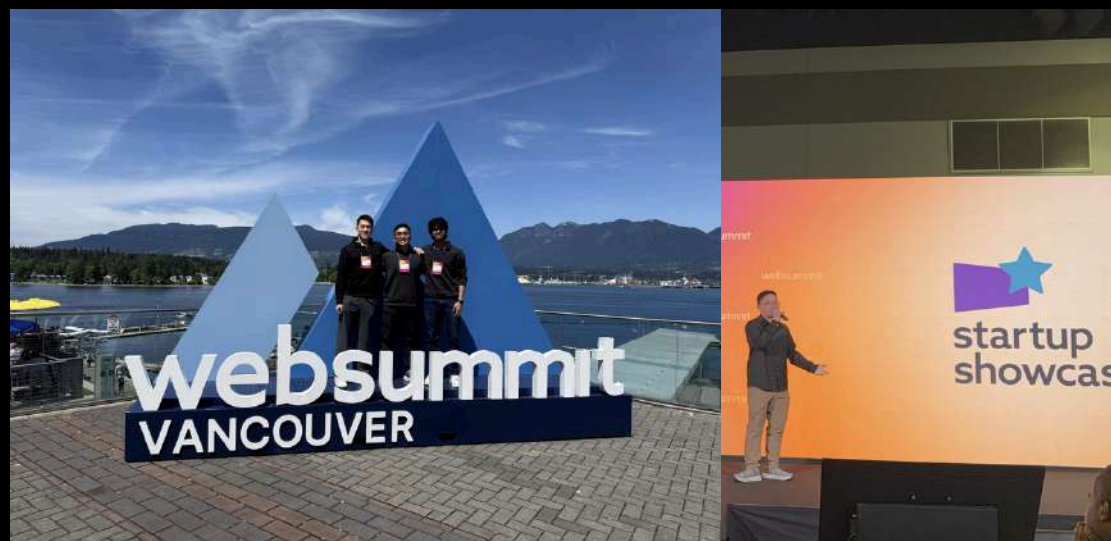
HUMAN PRACTICES - EDUCATION AND CONFERENCES



- 150+ ATTENDEES
- 15 RESEARCH POSTER PRESENTATIONS
- 5 KEYNOTE SPEAKERS ON MICROPLASTIC AND SUSTAINABILITY



- 5+ TEAMS
- IGEM TORONTO X IGEM ONTARIO HS TEAM COLLAB



- PRESENTED AT ONE OF THE WORLD'S LARGEST TECH CONFERENCES
- PITCHED TO OVER 50+ INVESTORS, 20+ COMPANY EXECUTIVES, AND 100+ ATTENDEES
- SELECTED TOP 8% OF 1,200 STARTUPS
- (WE ARE FEATURED AT 44 MIN!)



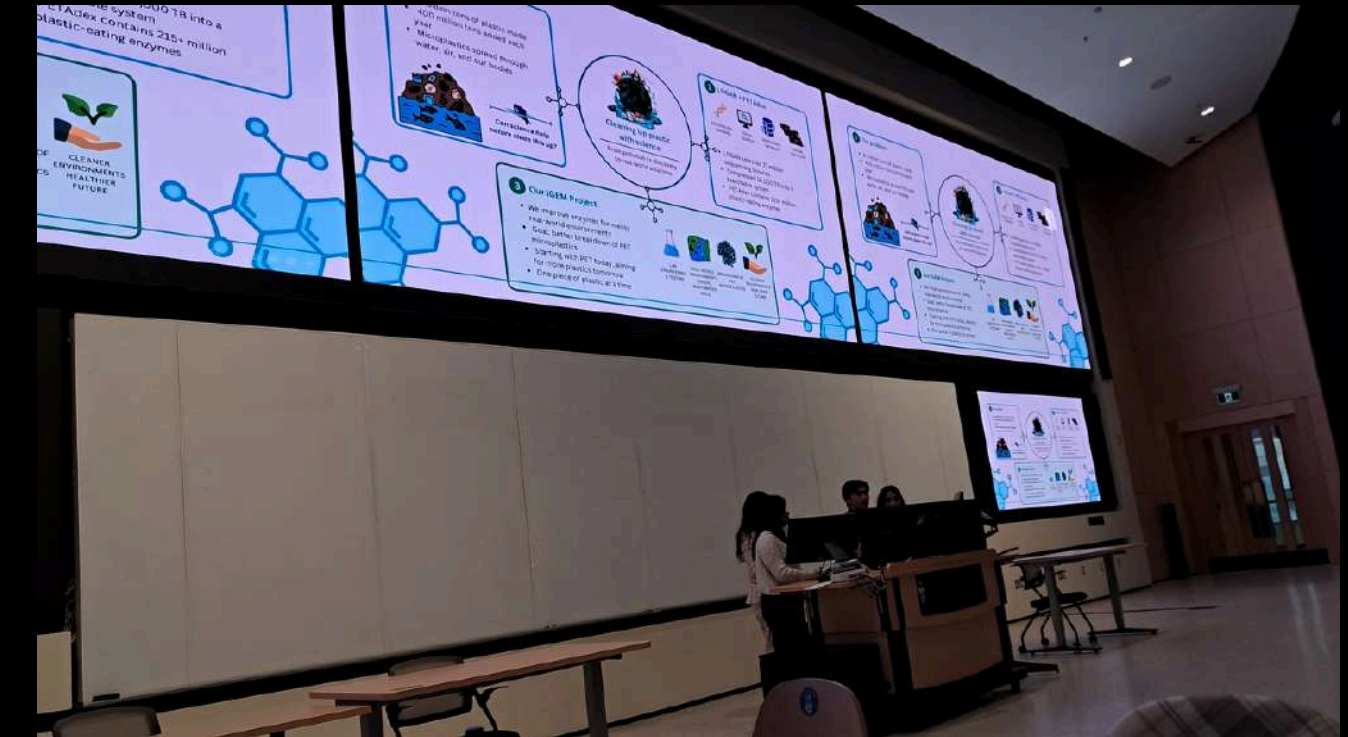
HUMAN PRACTICES - CROSS COLLABORATION



CONVERSATION WITH PATRAS
UNIVERSITY ABOUT OUR
RESPECTIVE PROJECTS



FACULTY ORIENTATION ABOUT IGEM AND OUR PROJECT AT
THE UNIVERSITY OF TORONTO, TO OVER 10+ FACULTY AND
50+ UNIVERSITY STUDENTS



RENDEZVOUS SCIENCE PITCH
FAIR, TEACHING OVER 100+
STUDENTS ABOUT PLASTIC
DEGRADING ENZYMES

Team

iGEMTO

Advisors from:



**INSTITUT
PASTEUR**

Drinking Water Research Group

University of Toronto, Toronto, Ontario



VECTOR INSTITUTE



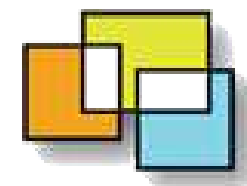
The Laboratory for

**RNA-Based
Lifeforms**

<https://RNAlab.ca> | @RNA_Life



Supporting Labs and Institutions:



Donnelly Centre

for **Cellular** + **Biomolecular** Research

UNIVERSITY OF TORONTO



Institute of Biomedical Engineering

UNIVERSITY OF TORONTO



UNIVERSITY OF TORONTO

FACULTY OF APPLIED SCIENCE & ENGINEERING

BioZone



UNIVERSITY OF TORONTO
FACULTY OF ARTS & SCIENCE

***AI-powered, PET microplastic
degradation to scale to industry.***