

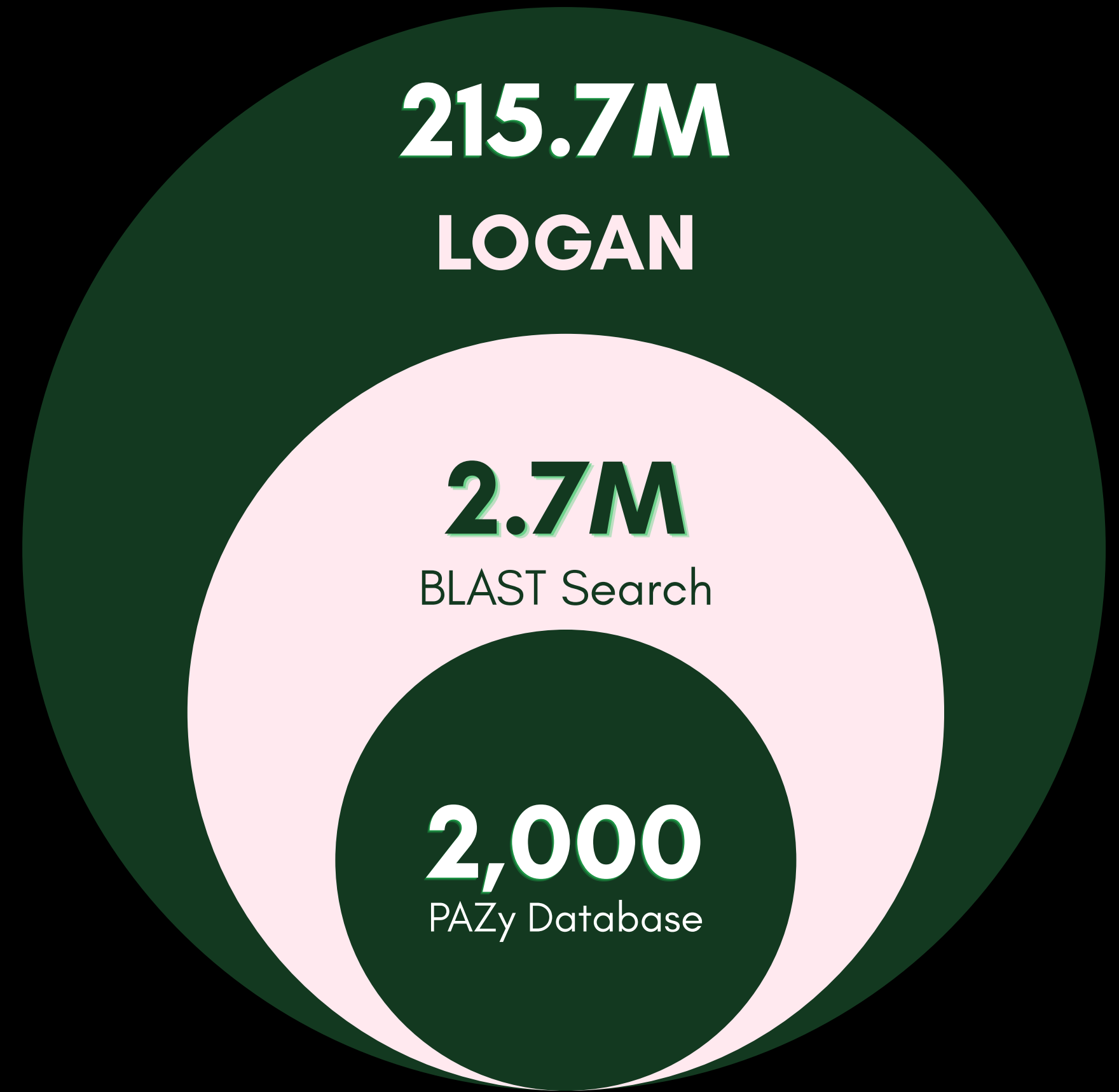


PETadex

World's Largest Plastic Degrading Enzyme Database

Background Img:
PETAdex Family Atlas of
plastic-degrading
enzyme families

**The PETadex
represents a
100,000x
INCREASE
of high quality
PETases**



► [bioRxiv](#) [Preprint]. 2025 Sep 1:2024.07.30.605881. [Version 2] doi: [10.1101/2024.07.30.605881](#) [↗](#)

Logan: Planetary-Scale Genome Assembly Surveys Life's Diversity

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The complete version history of this preprint is available at [bioRxiv](#) [↗](#).



THE DEFINITIVE ENZYME DATABASE

Cold ocean? In acidic landfill runoff?
industrial temperatures?
No problem.

PETadex can source **any**
enzyme for any **enviornment**

Live Demo

petadex.net





Family Atlas live

scroll · drag · click

OPEN · FREE · COMMUNITY-DRIVEN

Every plastic-degrading enzyme, in one atlas.

1.3 billion unique sequences. 64,730 enzyme families. 350+ characterized PETases. One interface to search, align, compare substrates, and trace evolution.

Start exploring →

How to cite

v0.4 · April 2026

α/β hydrolase

DD-peptidase

Amidase

Trypsin-like

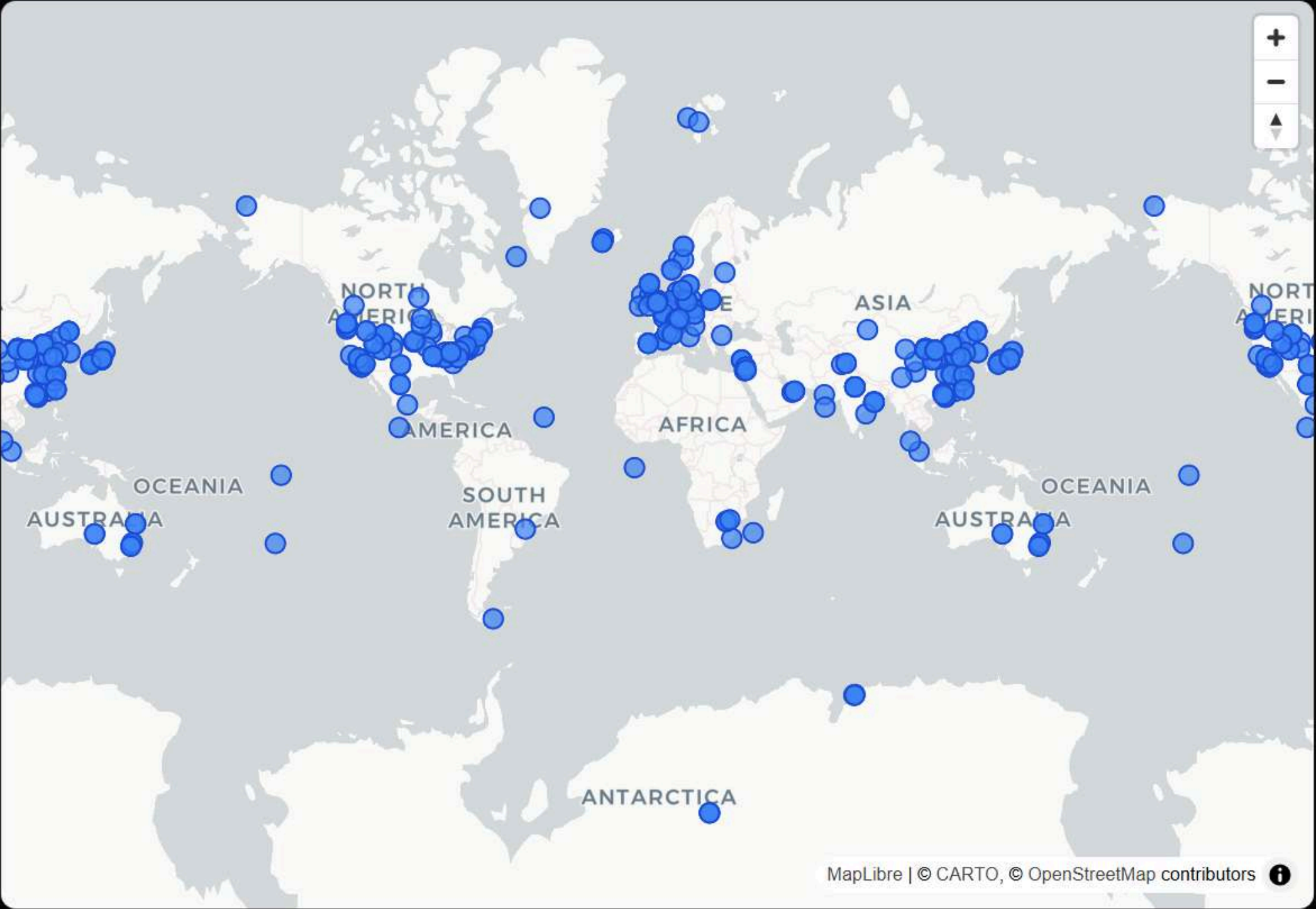
Arylesterase

Cupredoxin

L-aa peptidase

Geographic provenance of the environmental samples that contained PETase-encoding sequences.

Total Samples	Countries	Continents	Biomes
394	28	6	11



Amino acid sequences in the catalog. Those flagged as “synthesized” have been cloned into expression hosts and tested in the halo assay.

Catalog

PETase sequences in the database

Total sequences	602
Synthesized & tested	453
With geographic origin	161

Top Performers

See full activity data →

Highest peak-to-min activity recorded across BHET substrates

#1	GenuineReserve	BHET 12.5 mM	0.24
#2	VacantHalf	BHET 12.5 mM	0.16
#3	MoistCut	Fast-PETaseBHET 12.5 mM	0.13
#4	CelebratedReaction	BHET 25 mM	0.13
#5	AffectionateRule	BHET 25 mM	0.13
#6	GiddyReply	BHET 25 mM	0.13

Timepoint: All (avg) 8h 24h 48h 72h 96h 120h

● **BHET 12.5 mM**

GENES TESTED

259

VS

● **BHET 25 mM**

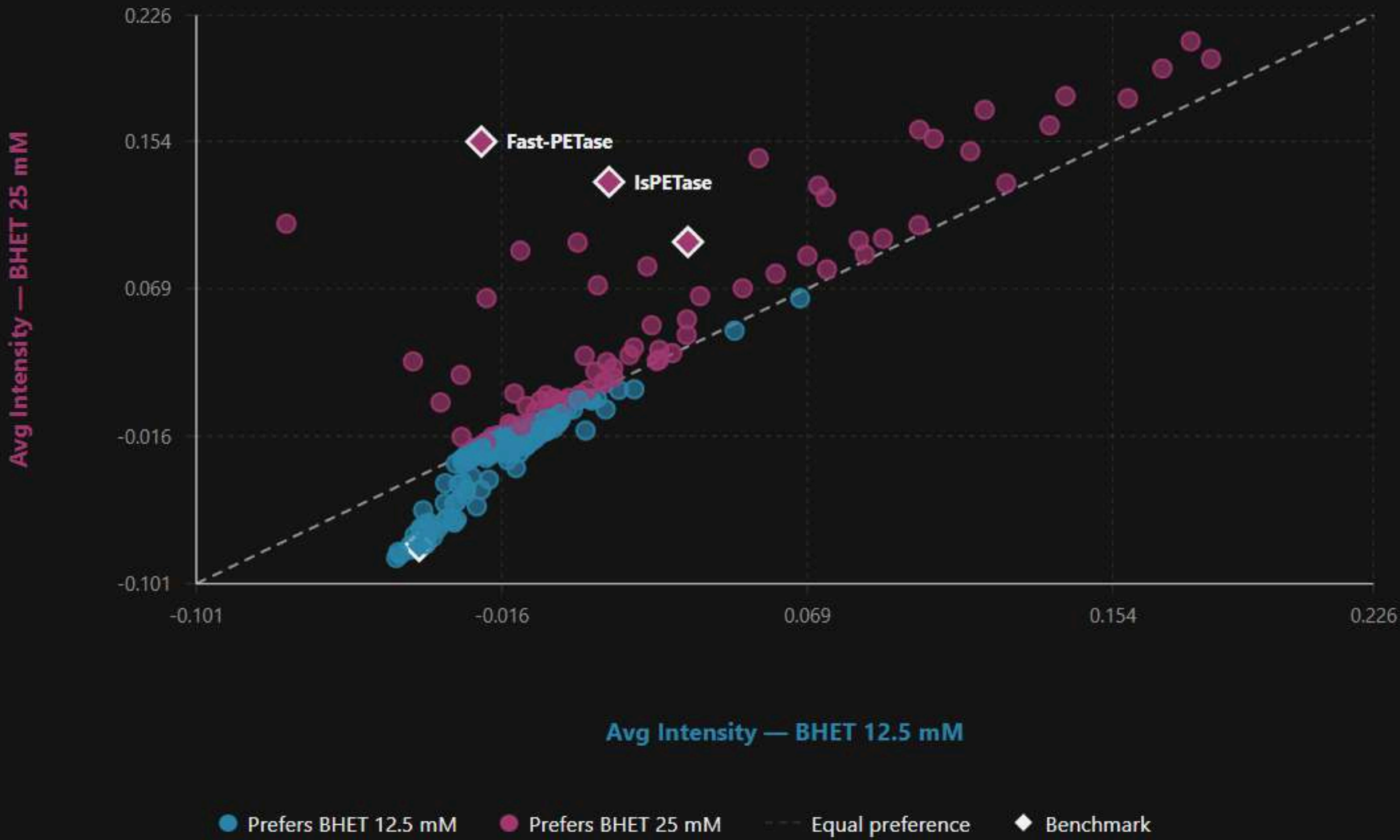
GENES TESTED

259

Substrate Preference

Each dot is one gene. Dots above the diagonal prefer the Y-axis substrate (averaged across all timepoints)

Drag a box on the chart to zoom in · click a dot to jump to its gene card



BLAST-NR Enzyme Database

Browse plastic-degrading enzyme families

TOTAL FAMILIES

64,730

TOTAL ENZYMES

1,048,585

COMPONENTS

42

VARIANTS

2,735,959

Search by accession, enzyme ID, family, or variant...

Sort by:

Variant Count



Showing 20 families

Family 68

RWM83426.1

11,814 variants

1 components

avg 54.4% identity

▼ Expand Variants

Sequence Search

Find similar plastic-degrading enzymes using MMseqs2 sequence similarity search

Try an example search:

IsPETase

Ideonella sakaiensis

Well-characterized PETase from
Ideonella sakaiensis

290 aa

FAST-PETase

Engineered

Engineered variant with enhanced
activity and thermostability

290 aa

SRR10663367

Metagenome

Logan-discovered enzyme with activity
exceeding FAST-PETase

290 aa

>IsPETase (WP_054022242.1)

```
MNFPRASRLMQAAVLGGLMAVSAAATAQTNPYARGPNPTAASLEASAGPF TVRSFTVSRPSGYGAGTVYYPTNAGGTVGAI AIVPGYTARQSSIKWWGPR  
LASHGFVVITIDTNSTLDQPSSRSSQQMAALRQVASLNGTSSSPIYGKVD TARMGVMGWSMGGGGLISAANNPSLKAAAPQAPWDSSTNFS SVTVPTLI  
FACENDSIAPVNSSALPIYDSMSRNAKQFLEINGGSHSCANS GNSNQALIGKKGVAWMKRFMDNDTRYSTFACENPNSTRVSDERTANCS
```

Load example: **IsPETase**

Max results:

50



Search

Family Atlas

🔍 Search family / organism...

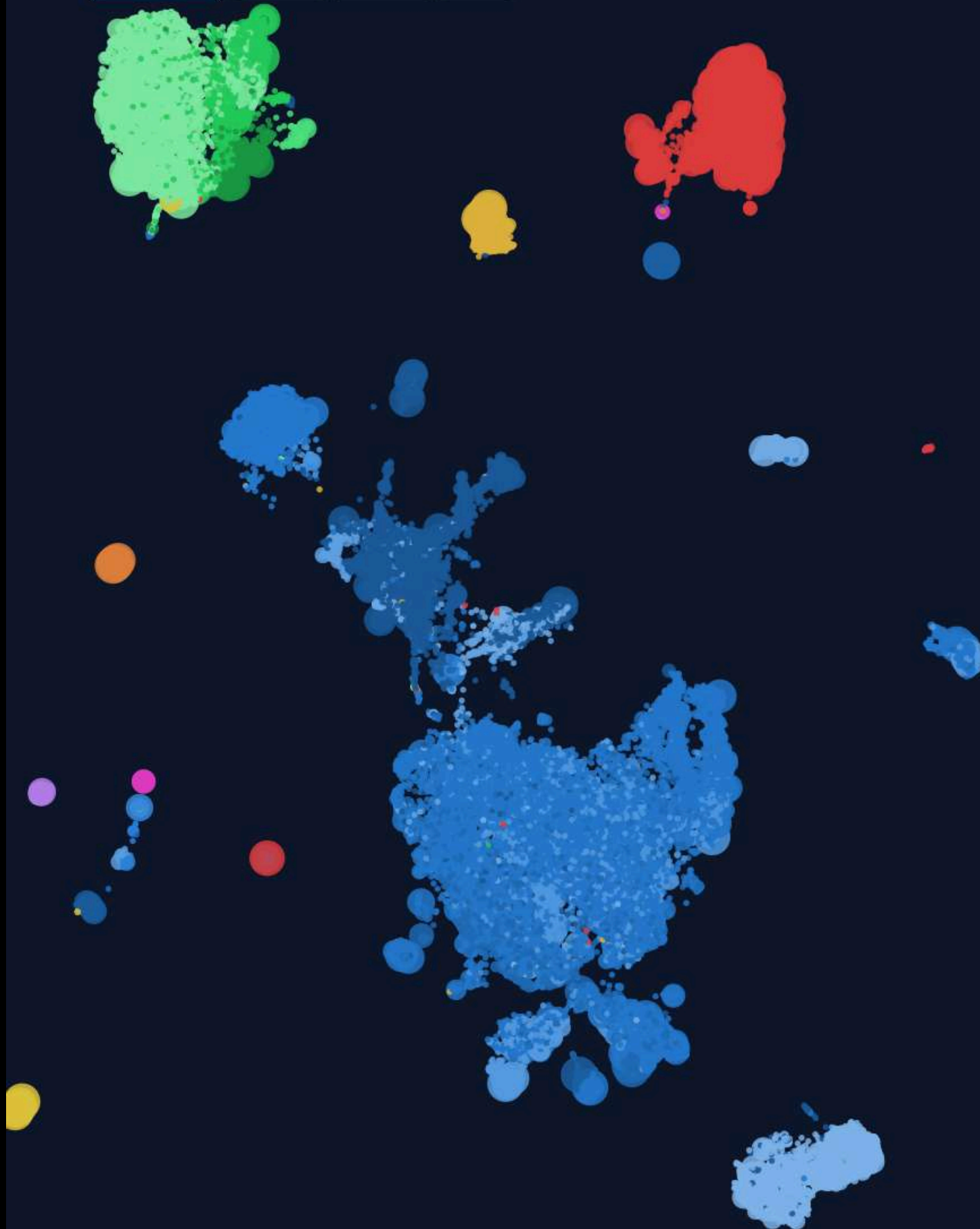
Color by

Component

Domain

Phylum

None





Validation at

Any Temperature

Any PH

Any salinity



May – June
BioReactor
Able to Simulate
Temp. + pH.

July – Aug.

Collaboration: Ontario Experimental Lakes Area (OELA)

→ Testing at scale in lake conditions



Prof. Chelsea Rochman
(University of Toronto)



Degradation rate

% of plastic broken down per unit time

1.



2.

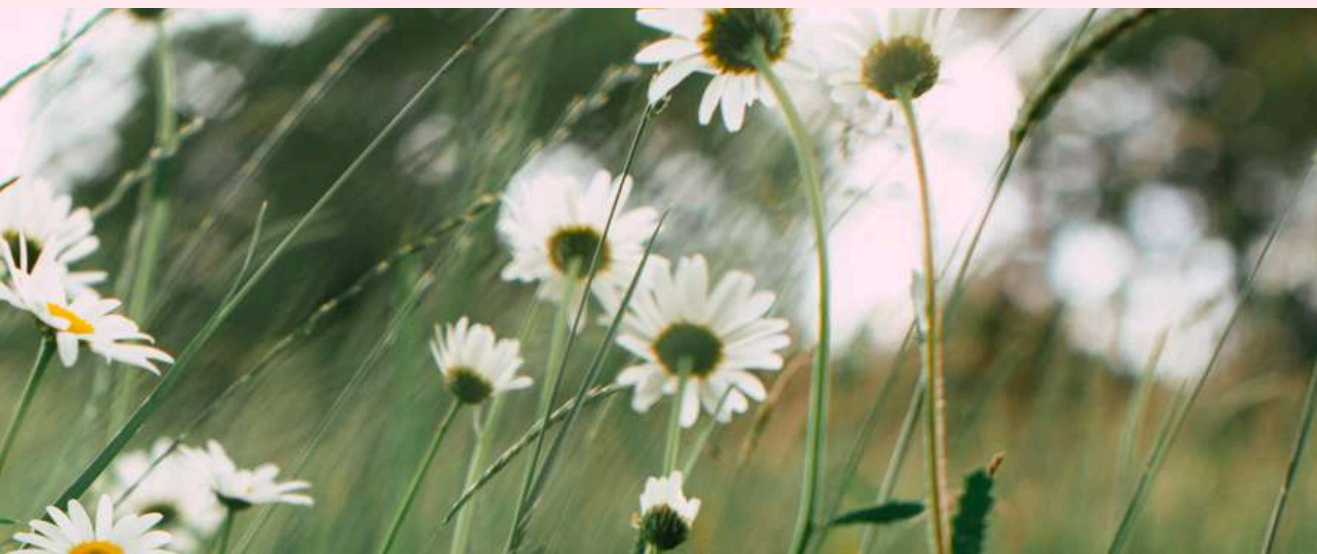
Enzyme Stability

Across temperature, pH ranges and salinity

Environmental Safety

No off target effects on native lake species

3.

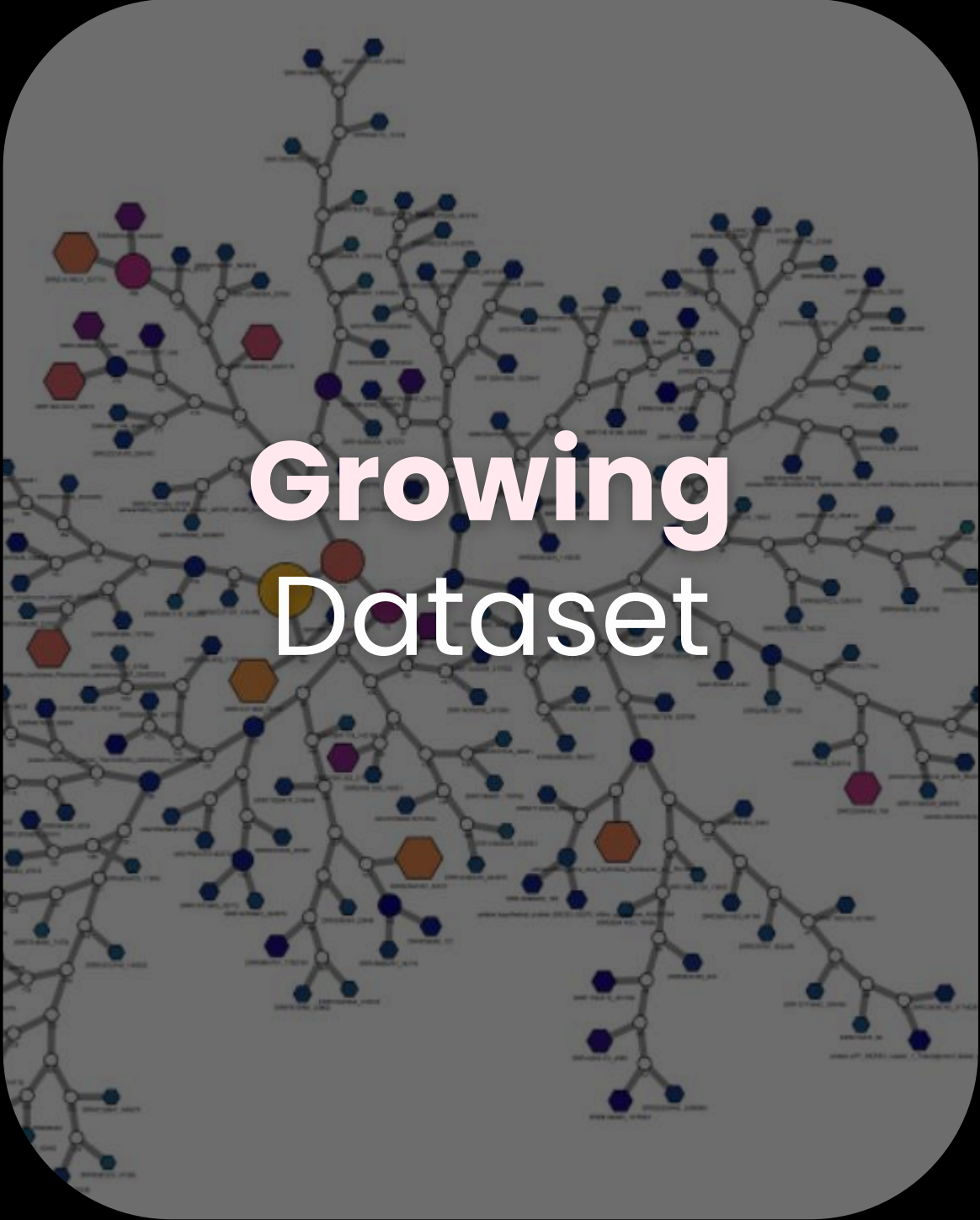


4.

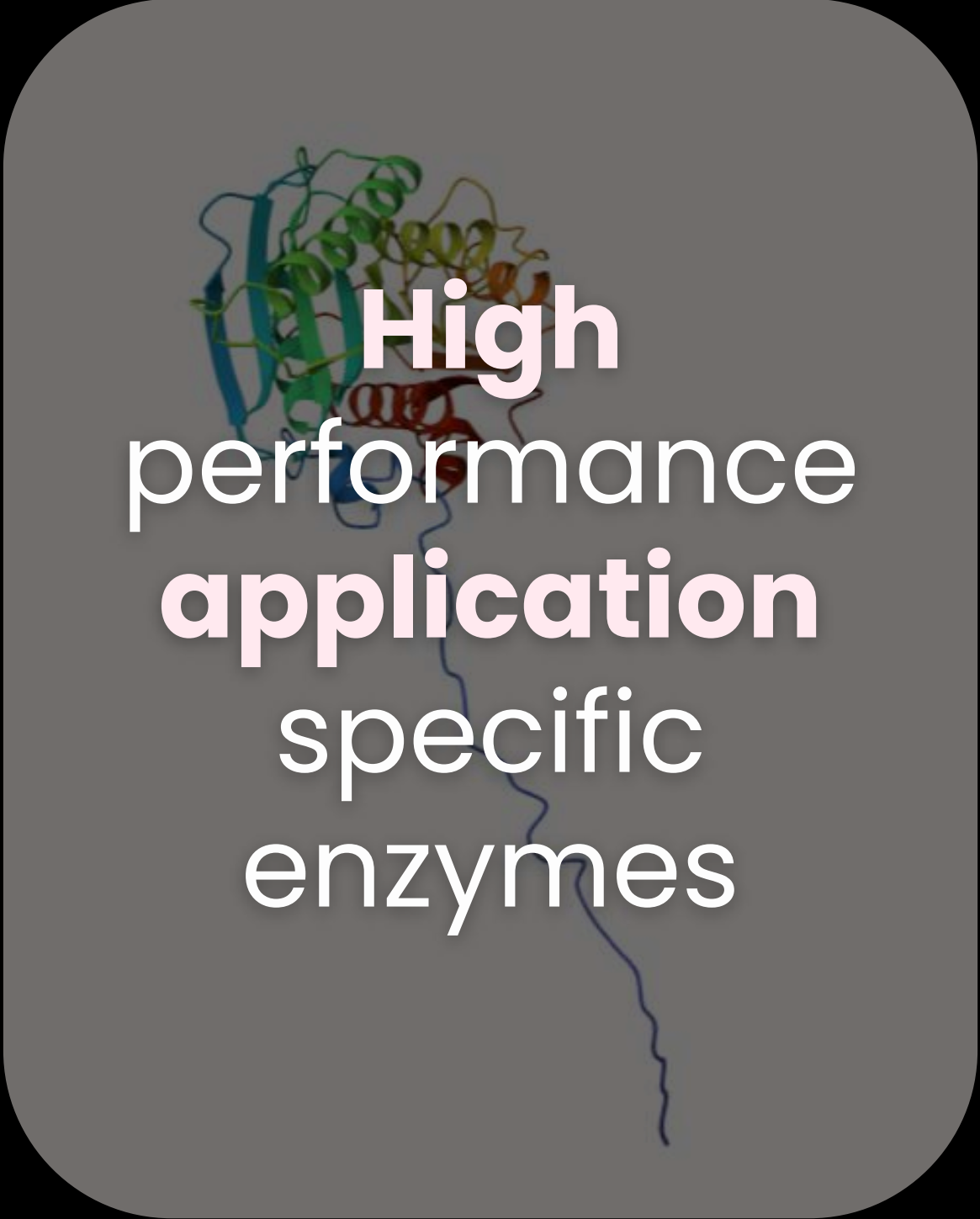
Enzyme Families

Number of new enzyme families added to PETadex

All in One Enzyme **Platform**



**Growing
Dataset**



**High
performance
application
specific
enzymes**



**Full Stack
enzyme
provider**

iGEM TORONTO

Advisors from:



서울대학교
SEOUL NATIONAL UNIVERSITY



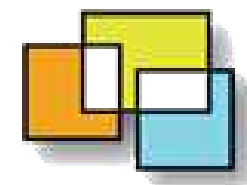
The Laboratory for

**RNA-Based
Lifeforms**

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



Supporting Labs and Institutions:



Donnelly Centre
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THE AWESOME FOUNDATION



Institute of Biomedical Engineering
UNIVERSITY OF TORONTO



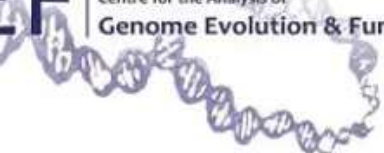
SnapGene



UNIVERSITY OF TORONTO
FACULTY OF APPLIED SCIENCE & ENGINEERING

CAGEF

University of Toronto
Centre for the Analysis of
Genome Evolution & Function



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