

IOH Profiler



A modular benchmarking platform



**Universiteit
Leiden**
The Netherlands



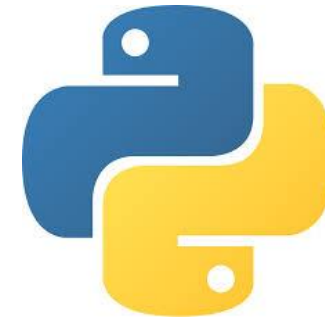
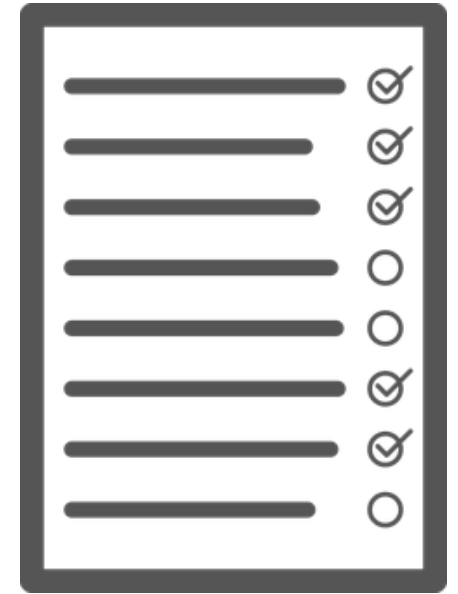
**SORBONNE
UNIVERSITÉ**



**Tel-Hai
College**

Benchmarking: IOHExperimenter

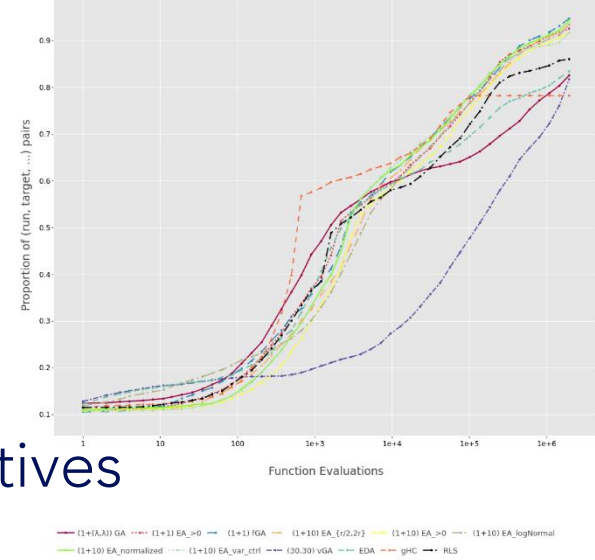
- Easily **extendable** problem suites (currently PBO and BBOB)
- Flexible **logging** system
- Tracking of **adaptive** parameters
- Available in C++, R and Python
- Many algorithms already available



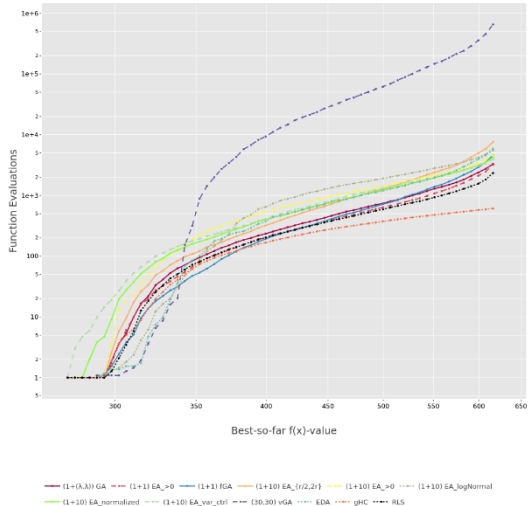
Visualization: IOHAnalyzer

- GUI available **online**, without login (<https://iohprofiler.liacs.nl/>)
- Highly **interactive** plots
- Performance analysis in fixed-target and fixed-budget perspectives
- Also available as R-package

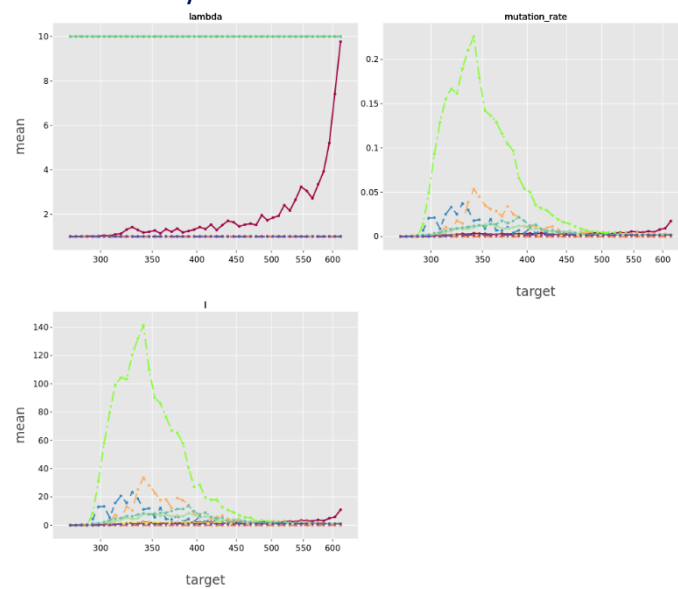
Aggregated ECDF Curves



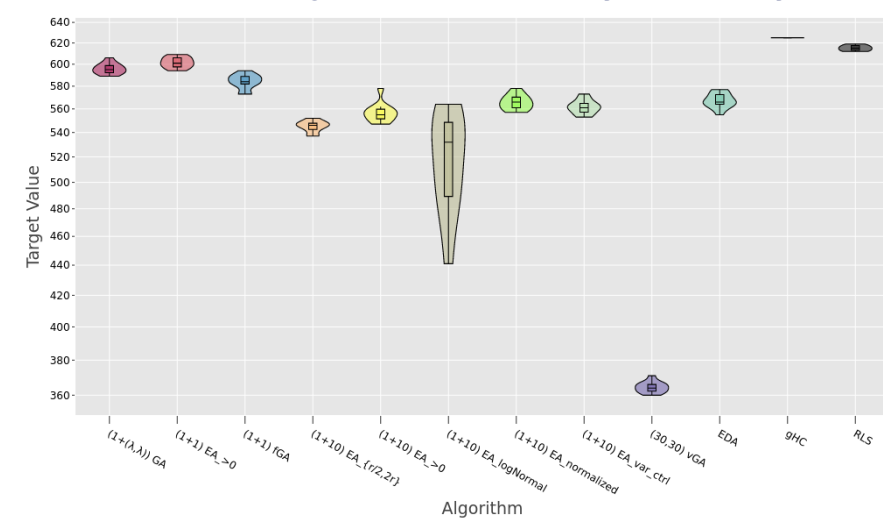
Expected Runtime (ERT)



Adaptive Parameters



Fixed-Budget Probability Density



Data: IOHData

- Support data in many formats:

- IOHprofiler itself
- BBOB
- Nevergrad
- SOS
- Additional support in development



- Many pre-processed datasets available on IOHanalyzer directly

COMPARING CONTINUOUS OPTIMISERS: COCO



Load Data from Repository

Load the data from the available repositories. There are currently three available sources:

- Data generated with the PBO-suite, implemented in the IOHexperimenter
- All data generated by the nevergrad benchmarking framework
- The majority of the publicly available benchmark data on the single-objective BBOB framework

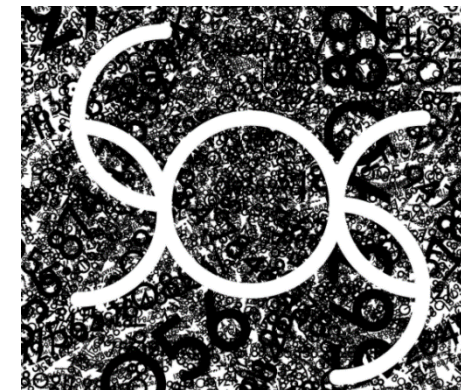
Select the dataset source

- bbob
- nevergrad
- PBO
- sample_data

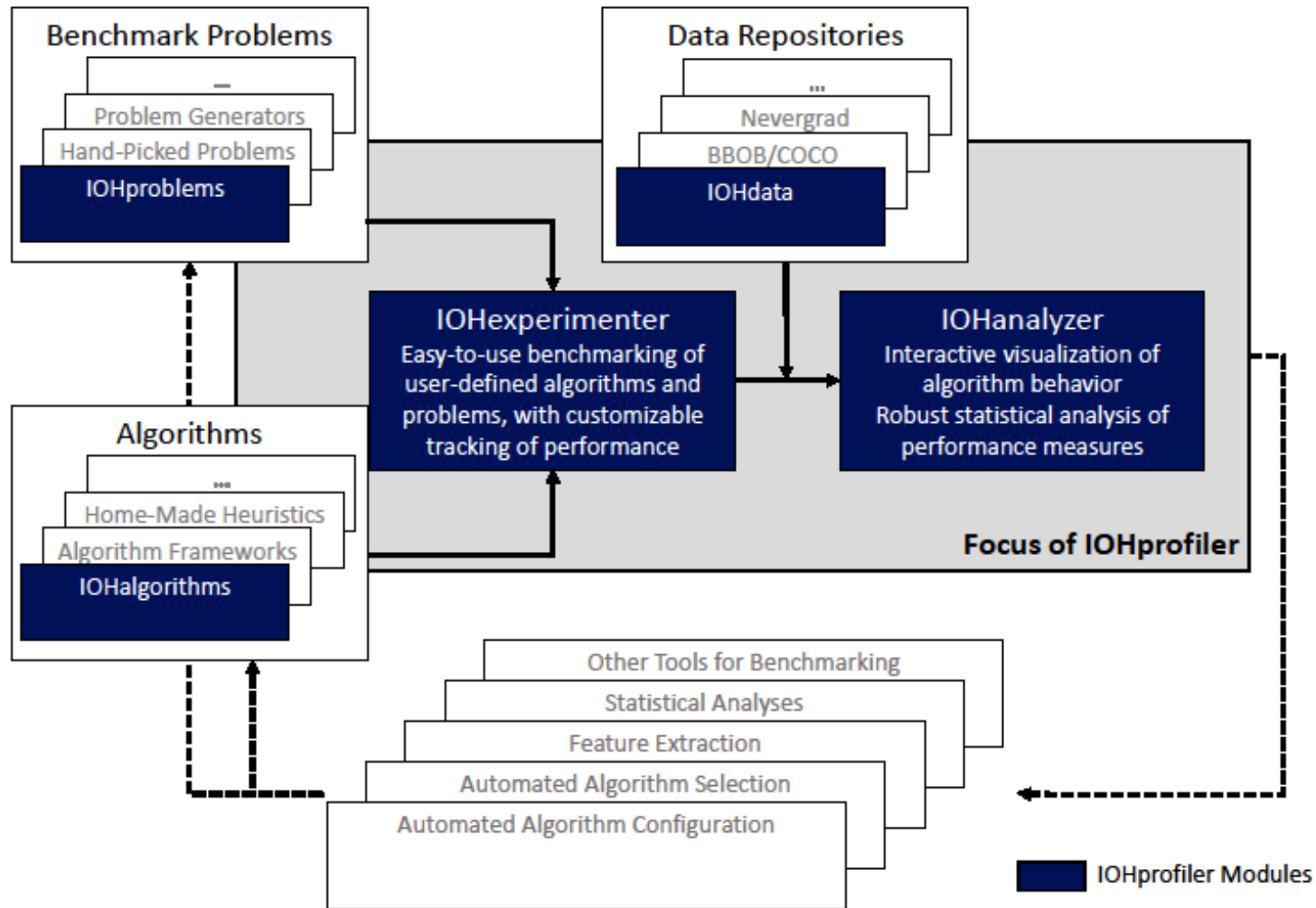
Please choose the function

Please choose the dimension

Please choose the algorithm



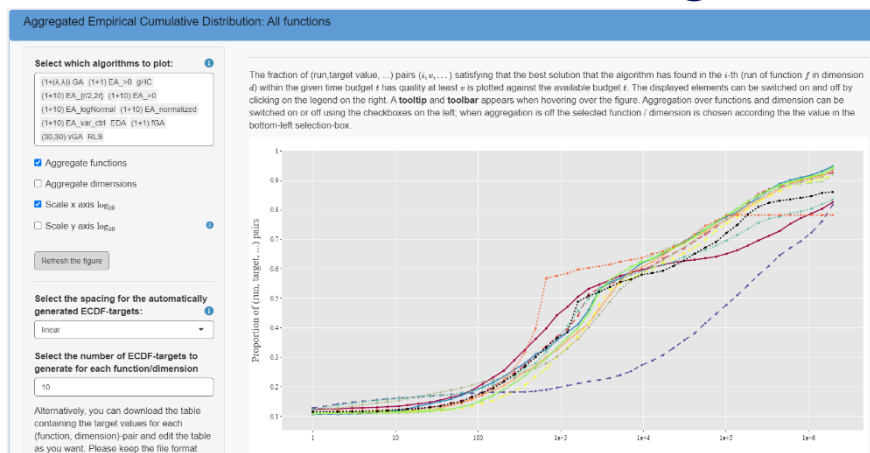
IOHprofiler Architecture Overview



Benefits of IOHprofiler



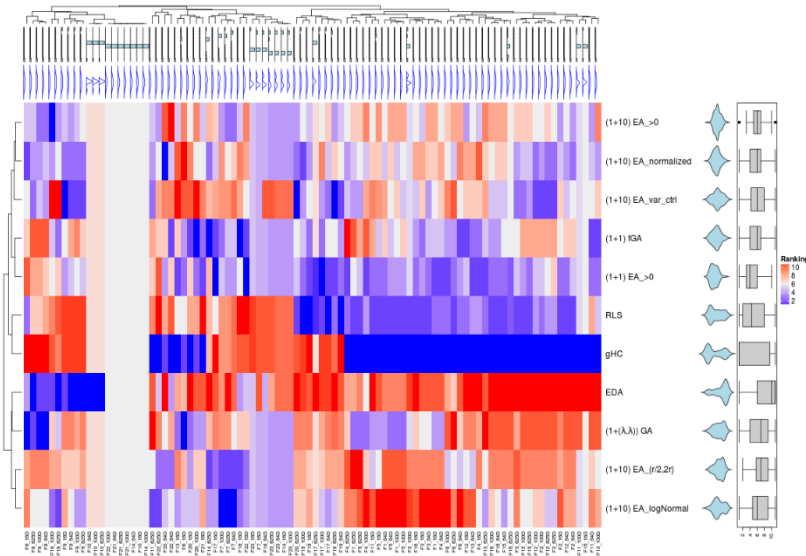
- Effortless integration into your experimental pipeline
- Significantly easier **exploration** of performance data
- Easy access to robust **visualizations** and statistical comparisons
- Interactive data analysis, allowing for **dynamic changes**, e.g. to ECDF targets
- Many common tables and figures for easy integration into **publications**
- Useful tool for **teaching** benchmarking concepts to students



Collaborations



- Integration IOHexperimenter with ParadisEO (Johann Dréo)
- GUI for DSCtool in IOHanalyzer (Tome Eftimov)
- Implementation of **W-model** in IOHexperimenter (Thomas Weise)
- Integration of IOHexperimenter problems into **Nevergrad**
- We are **always** open to new collaborations!



- 1 original bit string (here: variable-length)
 x 0101 0110 0000 1110 1000 0
- 2 Introduction of Neutrality
 $\mu=2$ 01 01 01 10 00 00 11 10 10 00 0
 $u_i(g)$ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓
 1 1 1 1 0 0 1 1 1 0 x
- 3 Introduction of Epistasis
 $v=4$ 1111 0011 10 insufficient bits,
 e_i ↓ ↓ ↓ ↘ at the end, use
 1110 0110 11 $\eta=2$ instead of
 $\eta=4$
- 4 Multi-Objectivity
 $m=2, n=6$ 1 1 1 0 0 1 1 0 1 1 padding:
 (x_1, x_2) 110110 101010 $x^*[5]=0$
 x_1 x_2
- 5 Objective Values
 $n=6$ 110110 101010
 $f(x_1)=3$ $f(x_2)=6$
- 6 Introduction of Ruggedness
 $\gamma=12, n=6$ $f(x_1)=3$ $f(x_2)=6$
 $\gamma'=9$ $r_{12}[f(x_1)]=3$ $r_{12}[f(x_2)]=5$

IOH profiler team



Universiteit
Leiden
The Netherlands



Dr. Hao Wang



Prof. Dr. Thomas Bäck



Furong Ye



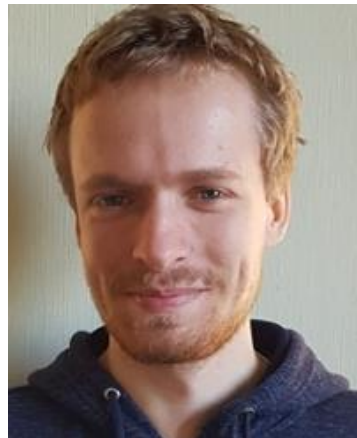
Dr. Carola Doerr



Dr. Ofer Shir



Jacob de Nobel



Diederick Vermetten