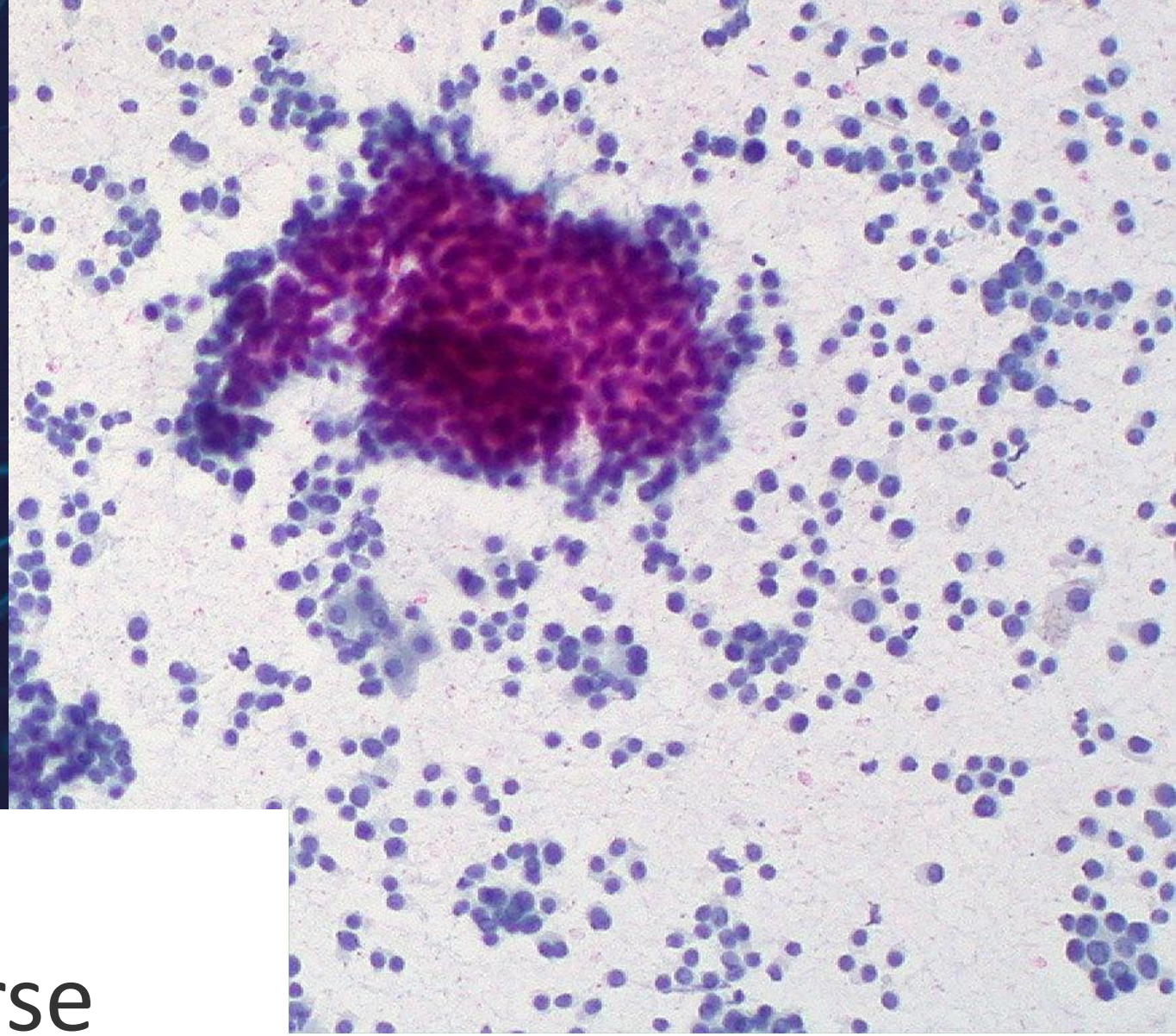


15-16 February 2021

COMETH Training course

From omics data

to tumor heterogeneity quantification

EIT Health is supported by the EIT, a body of the European Union

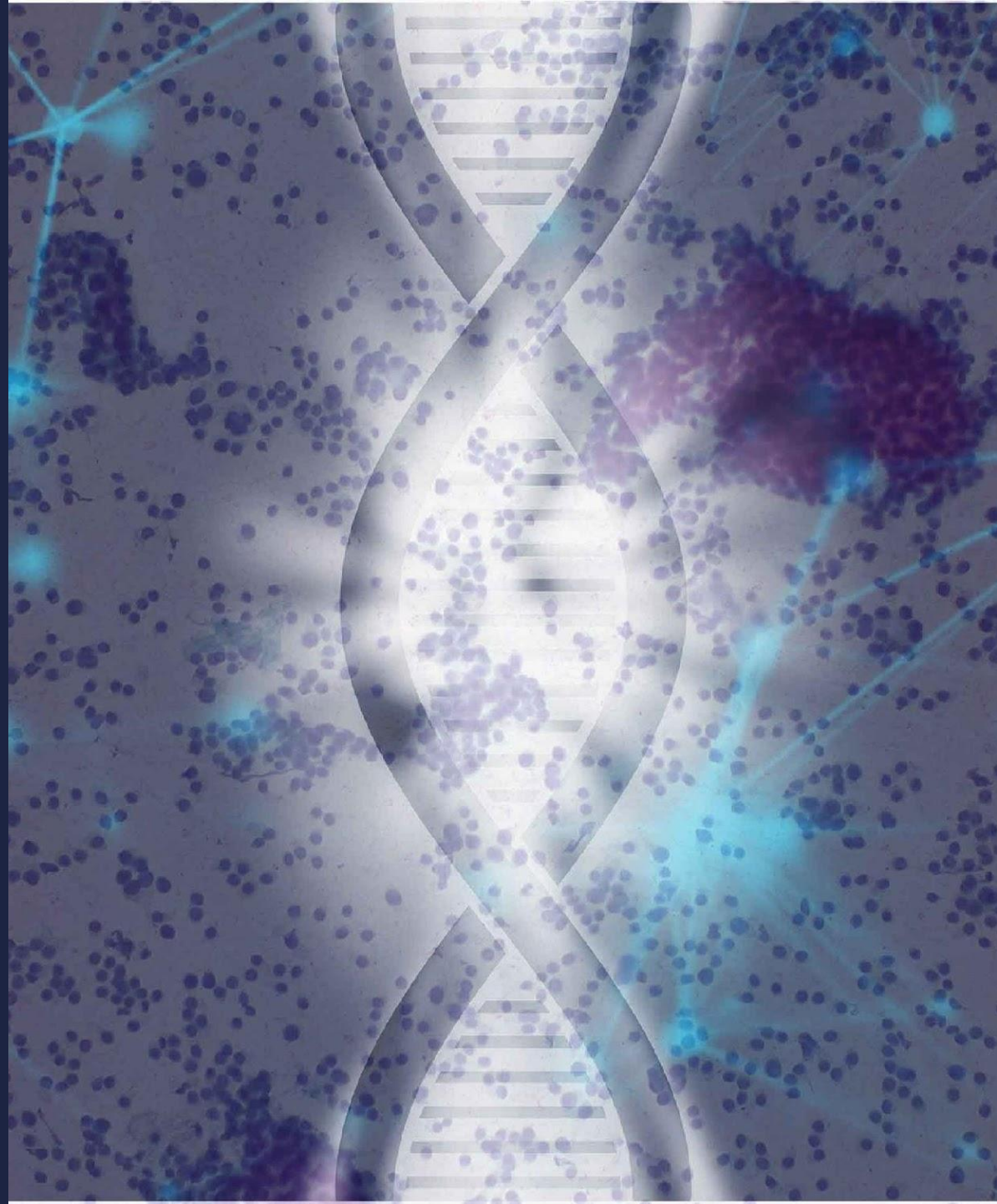
15 February 2021

Introduction to the course

Yuna Blum and Magali Richard

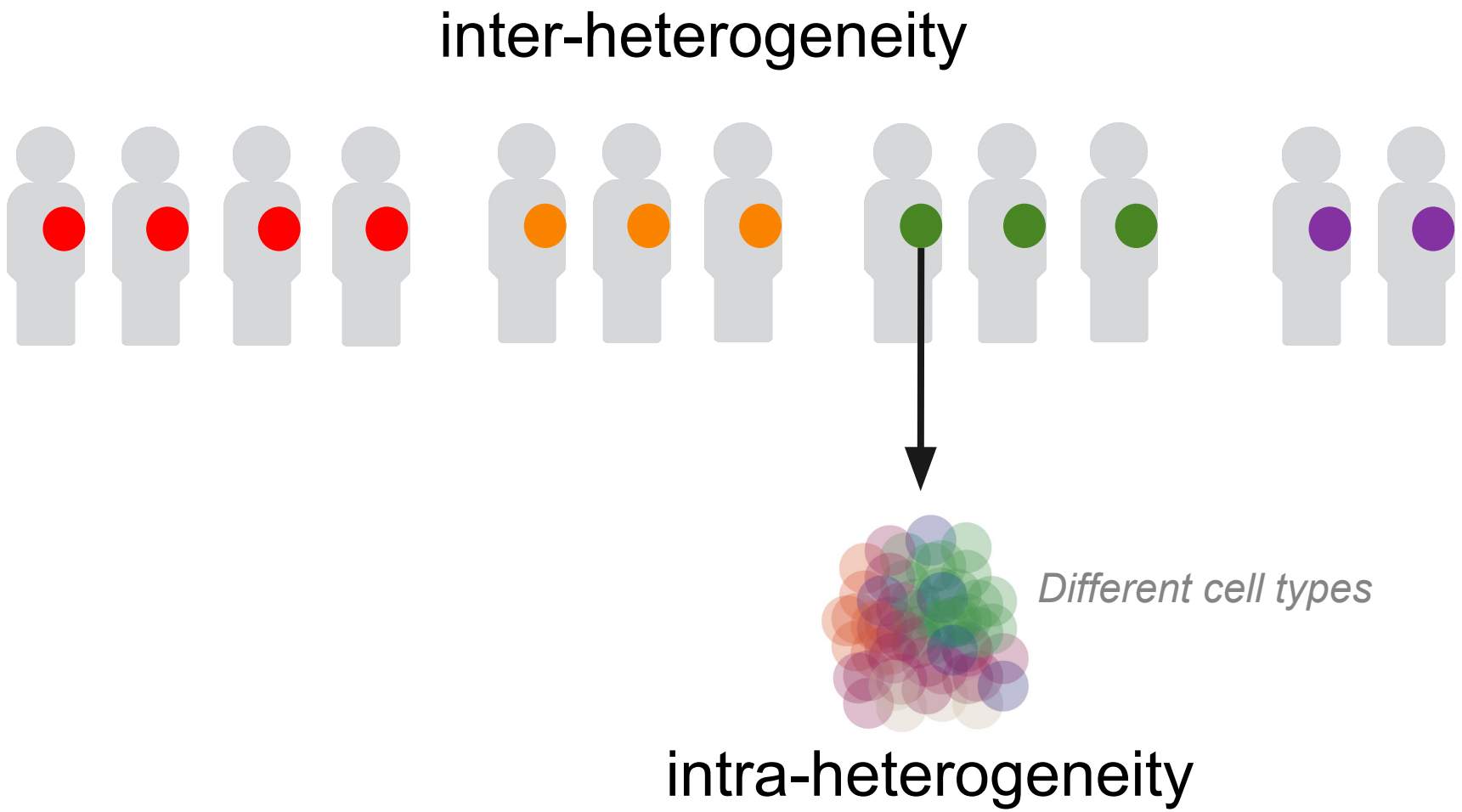
EIT Health is supported by the EIT, a body of the European Union

What is tumor heterogeneity?



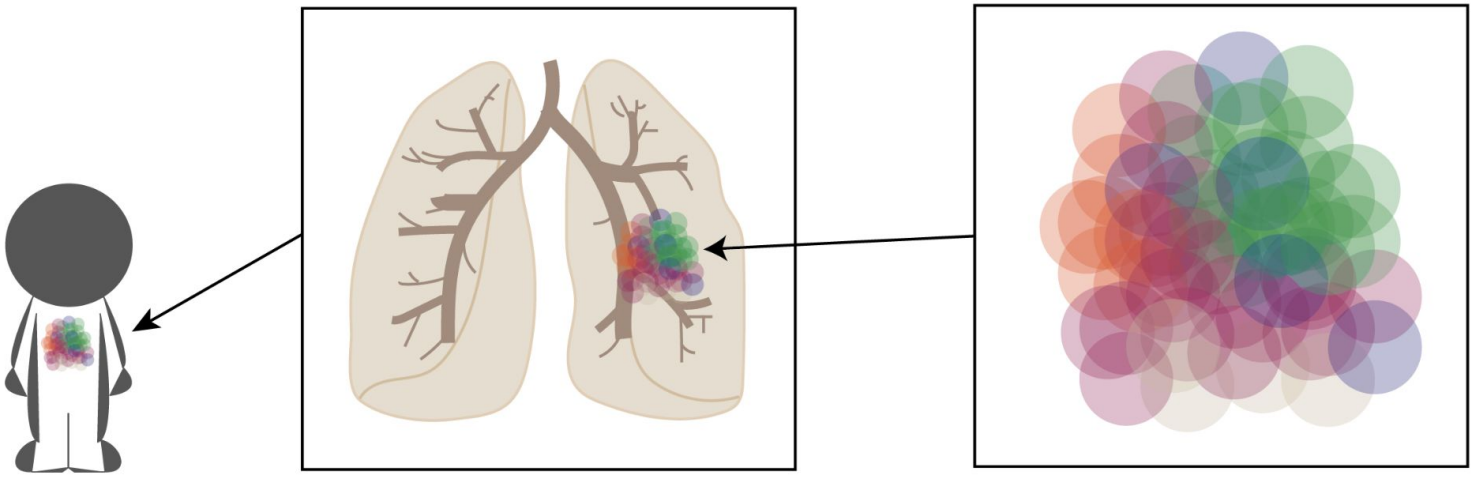
From omics data

to **tumor heterogeneity** quantification



From omics data

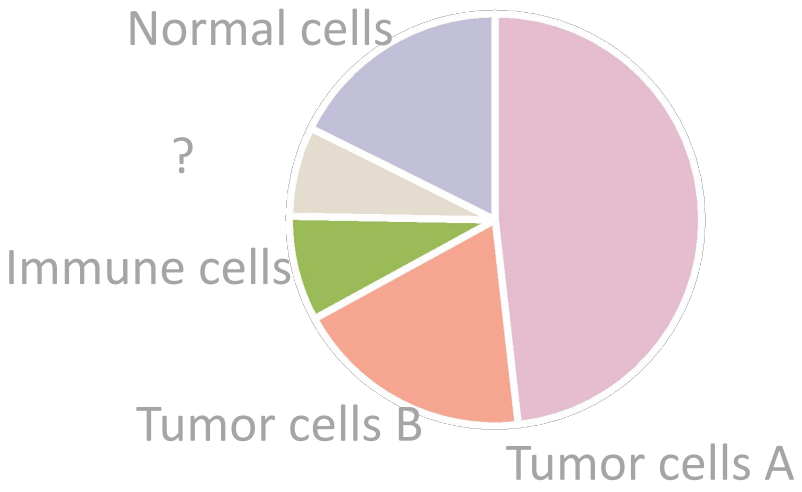
to **tumor heterogeneity** quantification



Credits M. Richard

Tumor
intra-heterogeneity

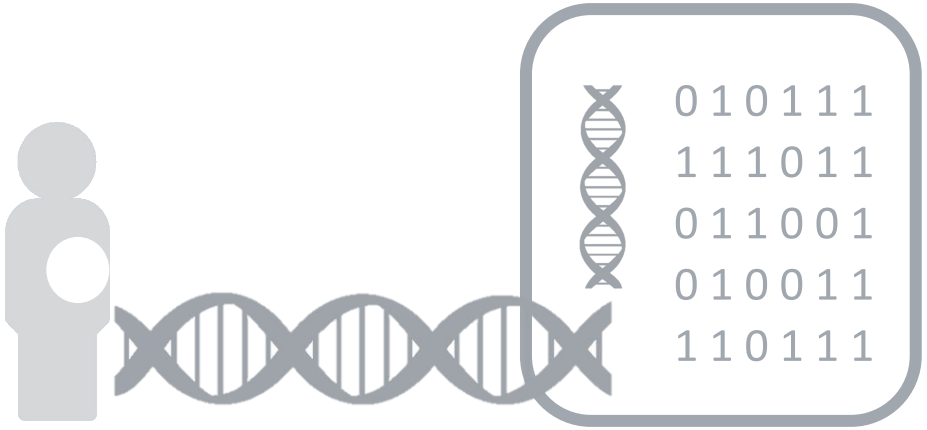
Cell populations



From **omics data**

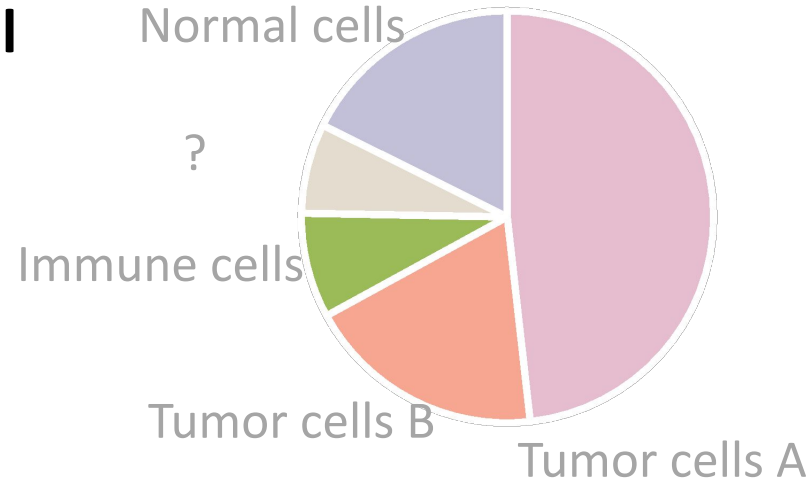
to tumor heterogeneity quantification

Omics data
from bulk samples



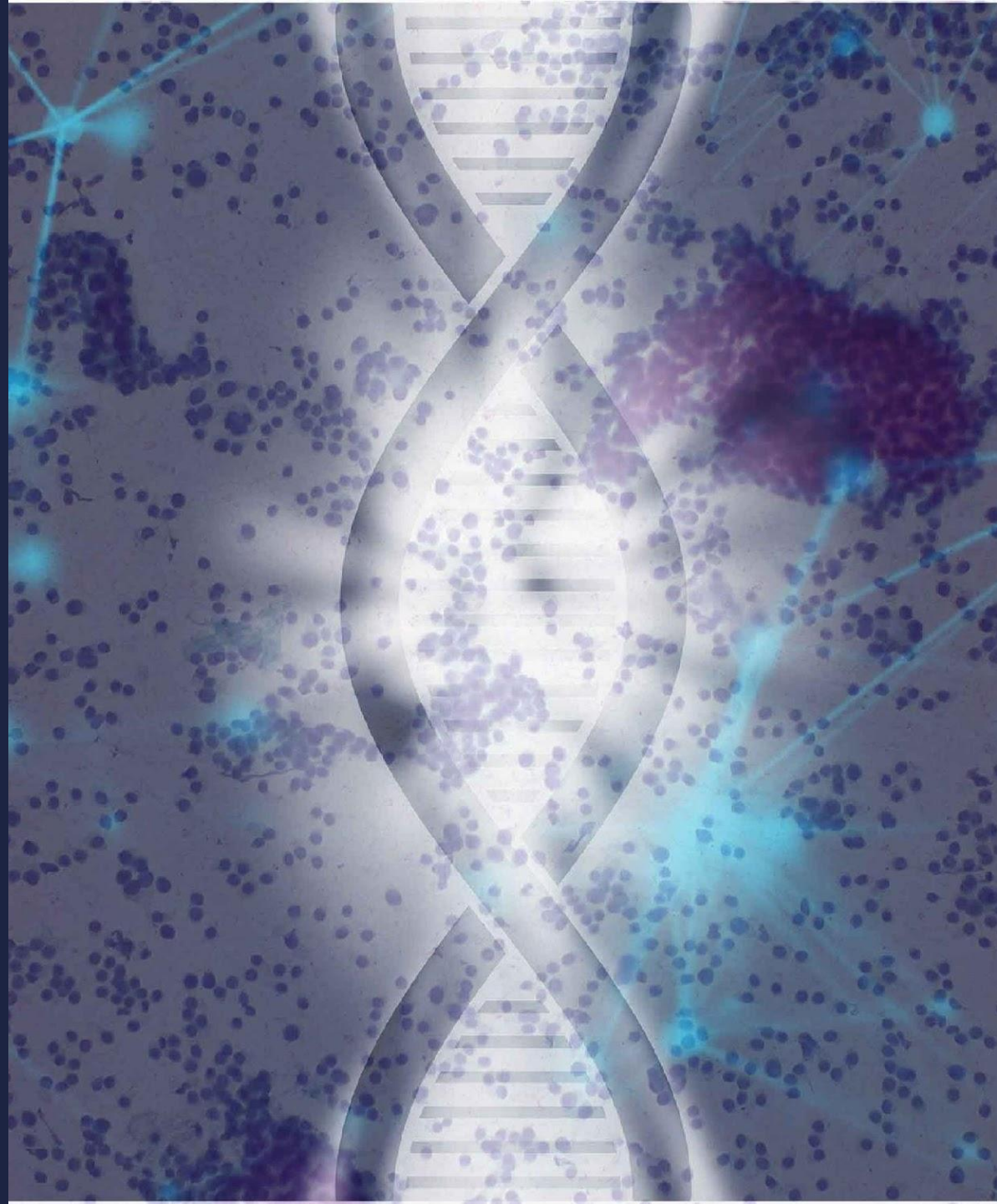
In silico quantification
using **computational methods**

Cell populations

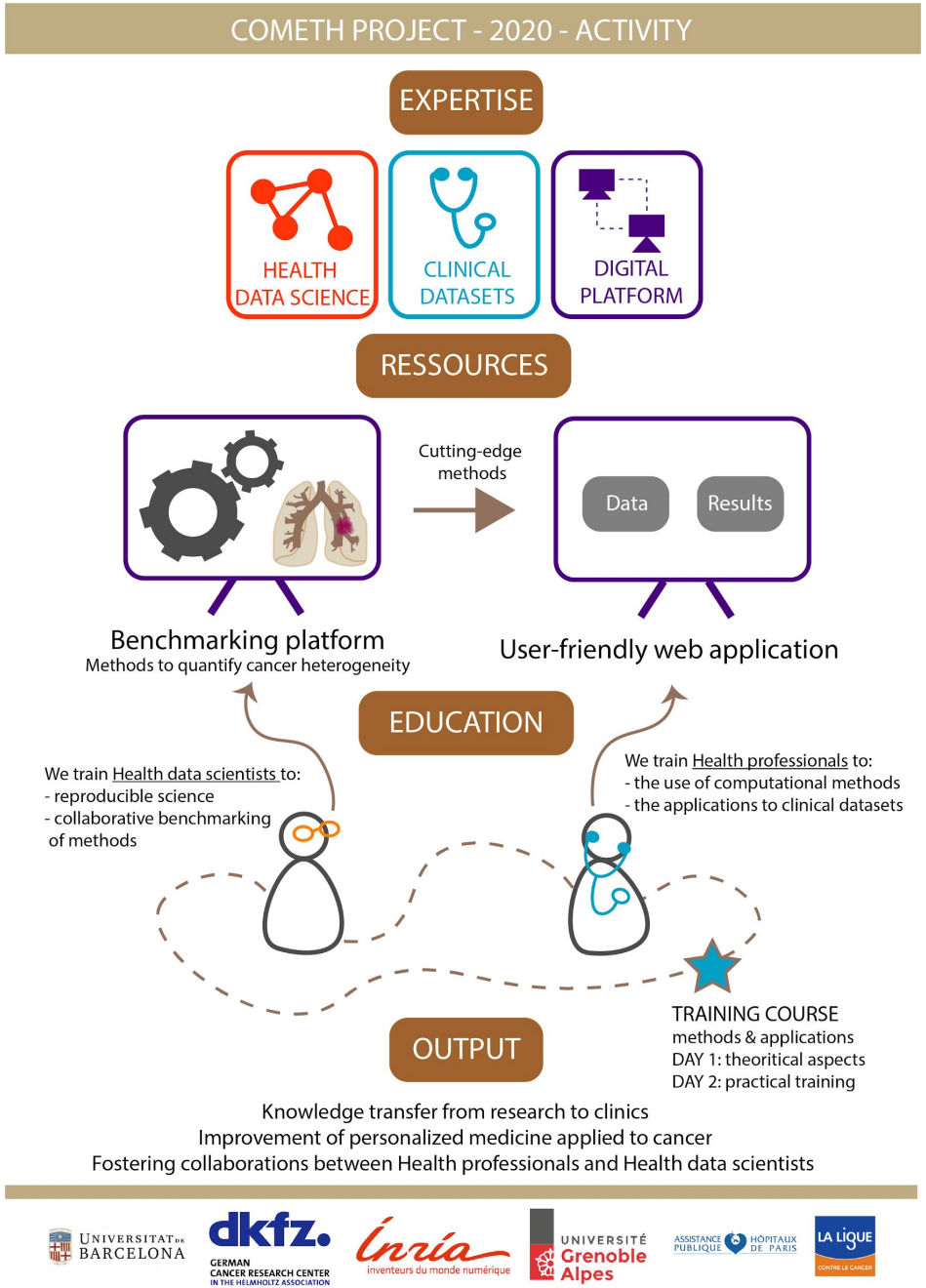


Project in Brief

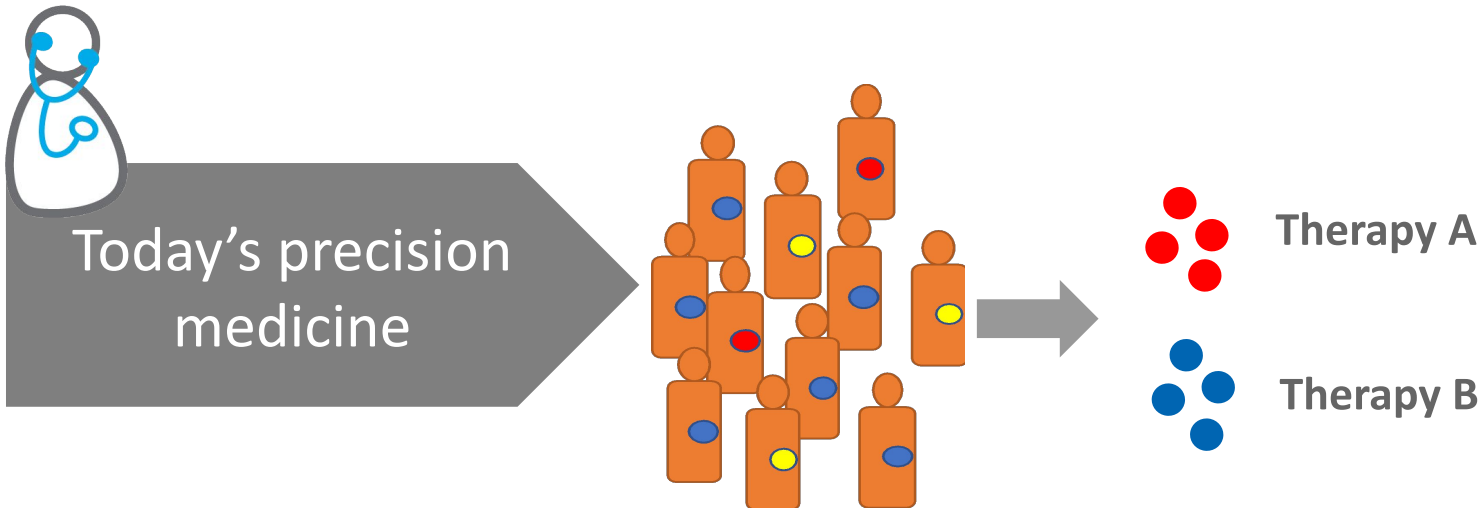
What is COMETH program?
Aim of the training



COMETH - COmputational METhods in Health



Genomic Big Data & clinics : UNMET NEEDS



500.000 patients/year treated by targeted therapy in Europe

Per-patient lifetime costs for Chronic Lymphoid Leukemia treatment:
$147,000 to $604,000 (2006-16)

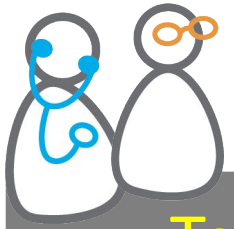
Genomic Big Data & clinics : UNMET NEEDS

Today's precision medicine

25 GENES PANEL

Crude tumor characterization → Poor patient selection → Low drug efficacy Important side effects → Heavy economic burden Dismissal of potential effective drugs → Crude tumor characterization

Genomic Big Data & clinics : UNMET NEEDS



Tomorrow's precision medicine

GENOMIC BIG DATA

Find the drop of apple juice…

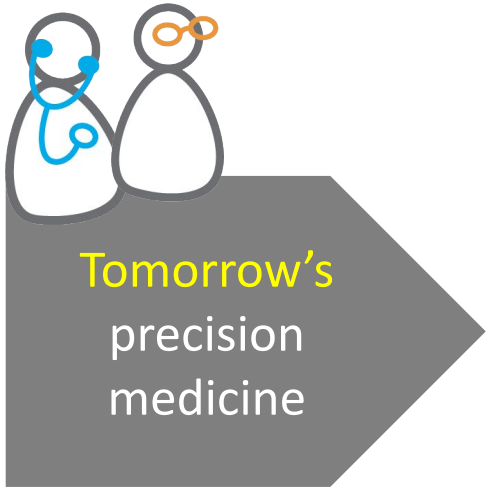
Fine tumor characterization

Efficient patient selection

Improved drug efficacy
Less side effects

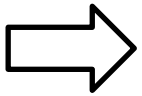
Decreased economic burden
Transcancer drug development

The specific case of tumor heterogeneity quantification

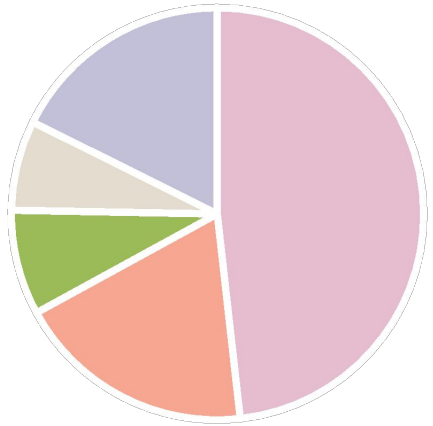


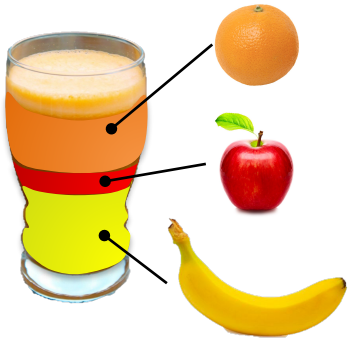
GENOMIC
BIG DATA

Bioinformatic methods
Quantify cancer heterogeneity

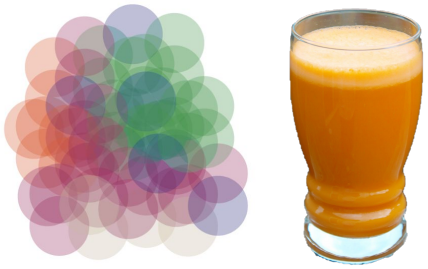


Standardized
Fine description





State of the art: Robust analysis tools

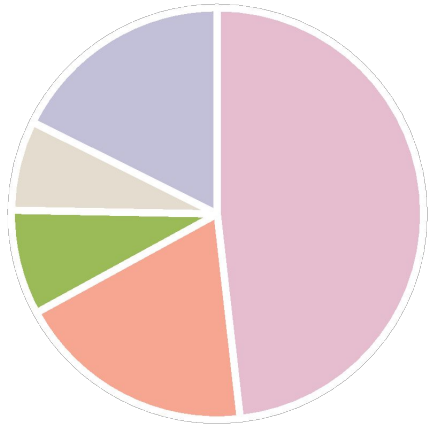


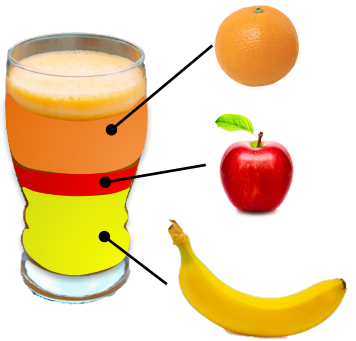
GENOMIC
BIG DATA

Bioinformatic methods
Quantify cancer heterogeneity

Standardized
Fine description

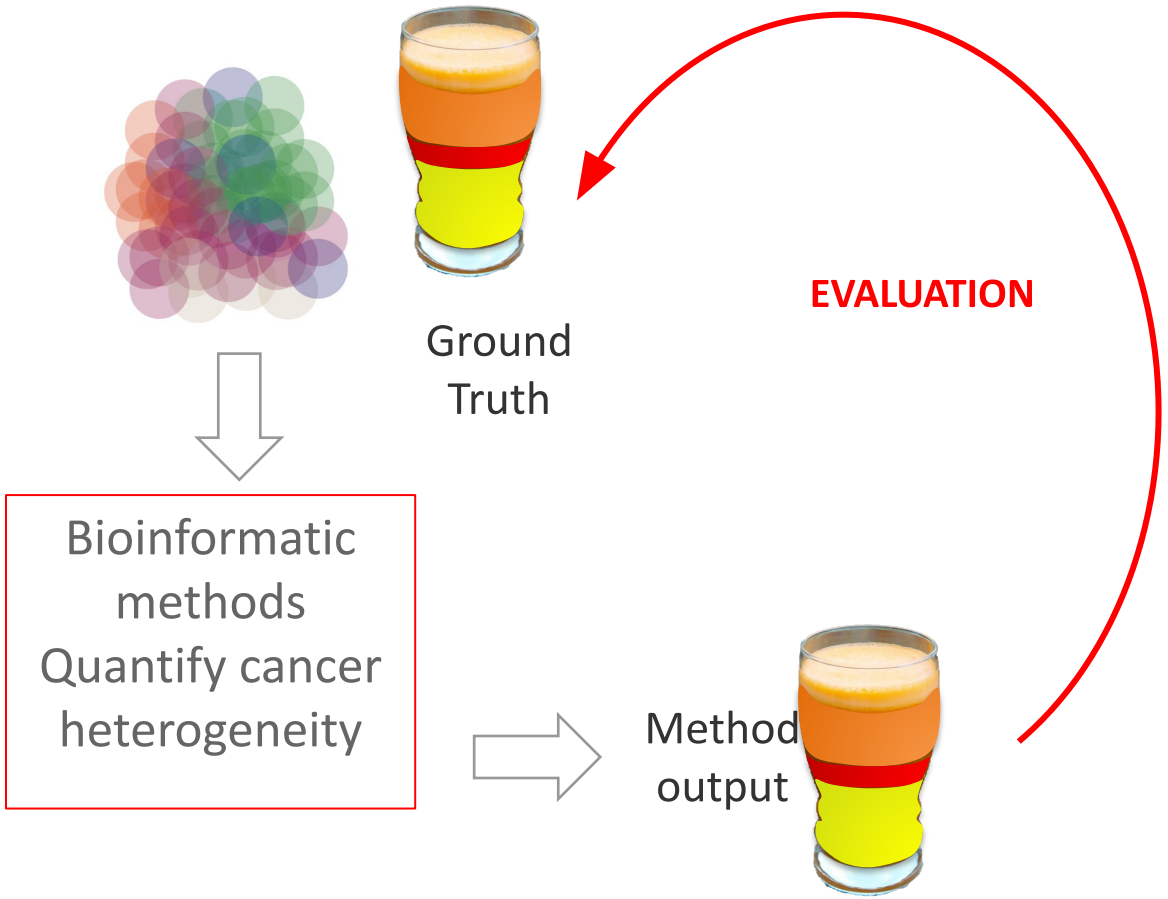
More than **50 methods** in the literature
For research-use only // **0 clinical grade**
0 objective comparison



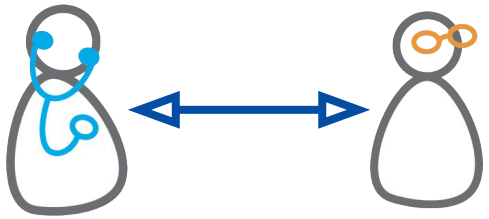


What do we need ?

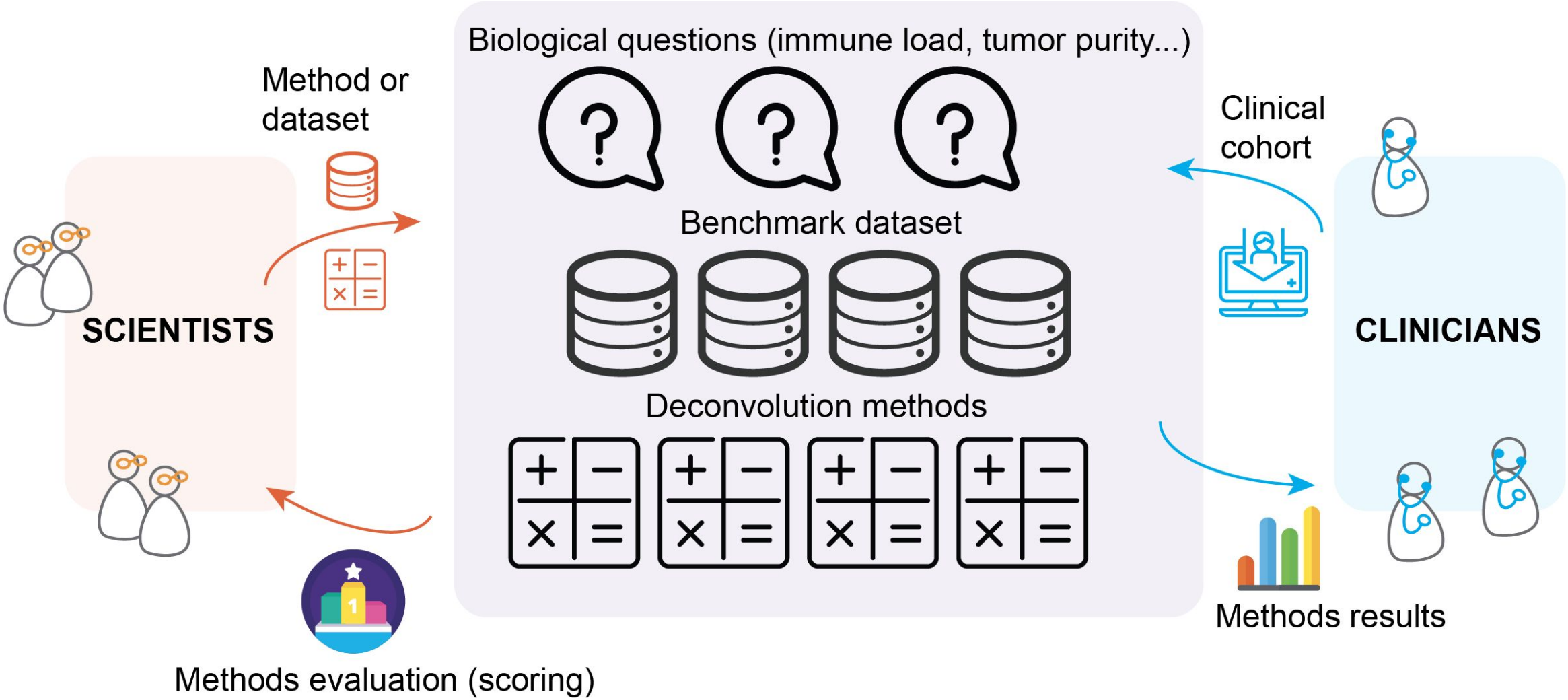
Robust benchmark tools to evaluate methods



Efficient knowledge transfer between scientists and clinicians



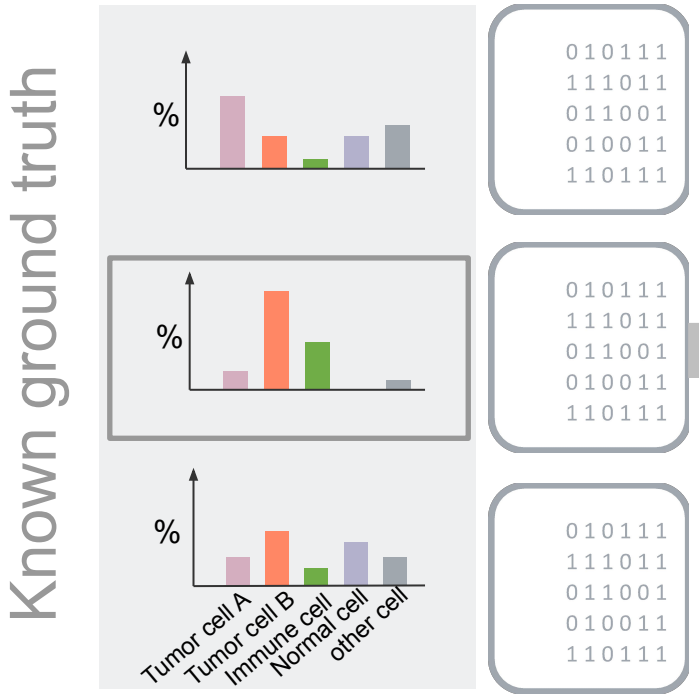
The COMETH program



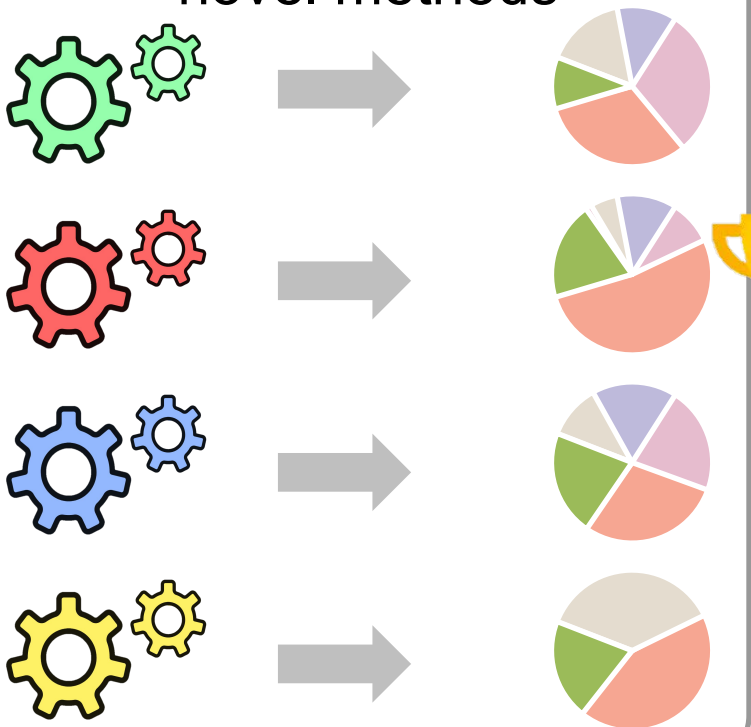
The COMETH program

Codabench Benchmark bioinformatic platform

Benchmark omic datasets



Application of existing and novel methods



Selection of the best methods

Cometh web app

The COMETH interfaces

COMETH Data Challenge interface (for data scientists)

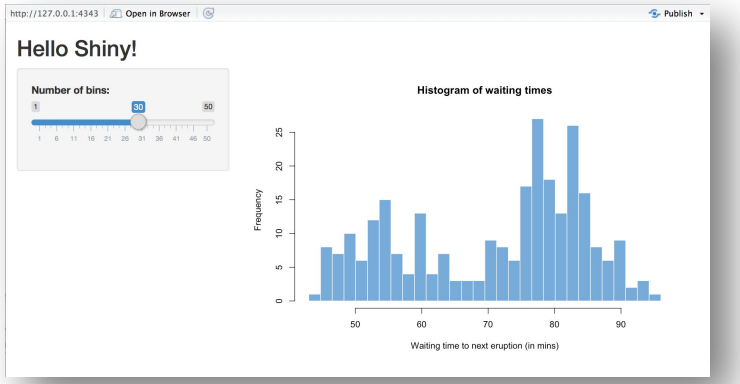
Aim: Benchmark new computational methods

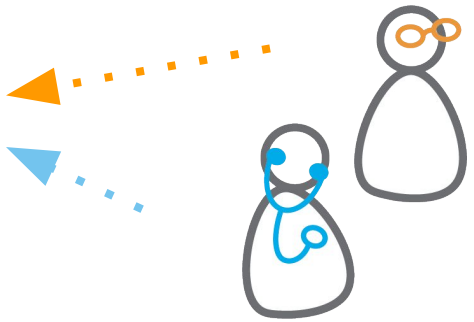
COMETH user friendly web interface

Aim: Choose and apply computational methods

COMETH shiny app

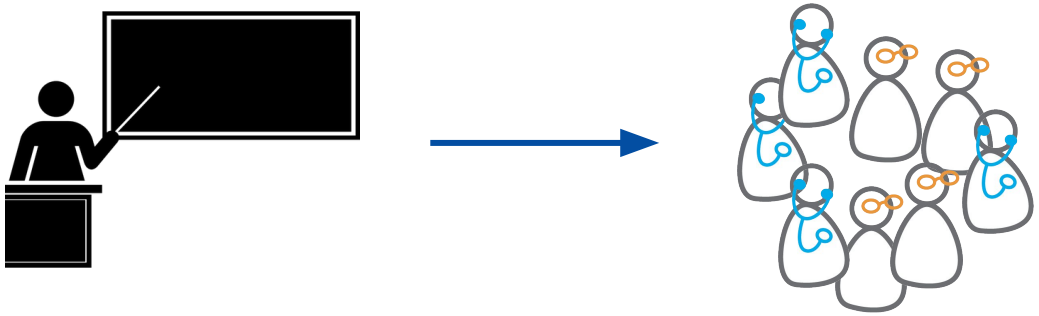
Aim: Visualise the results



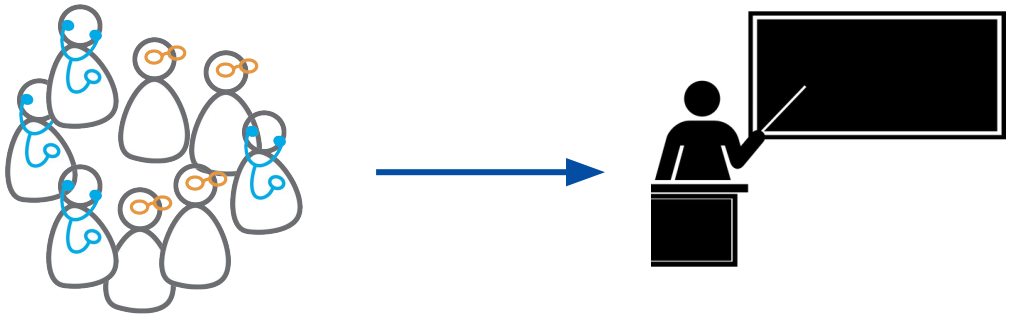


Mutual and interactive learnings

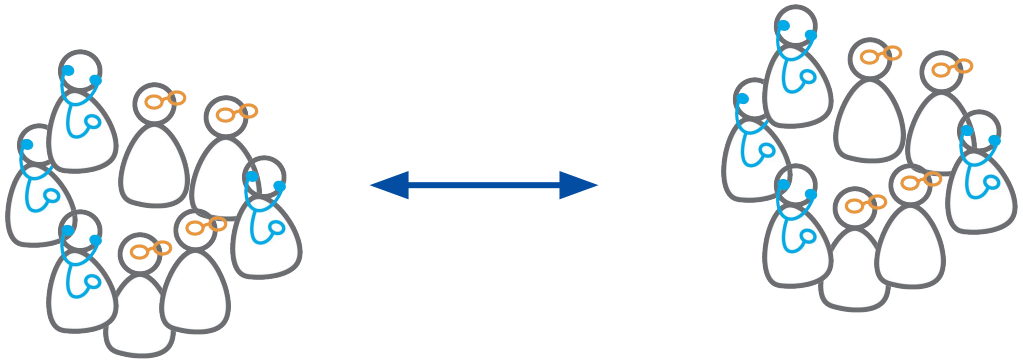
LEARN



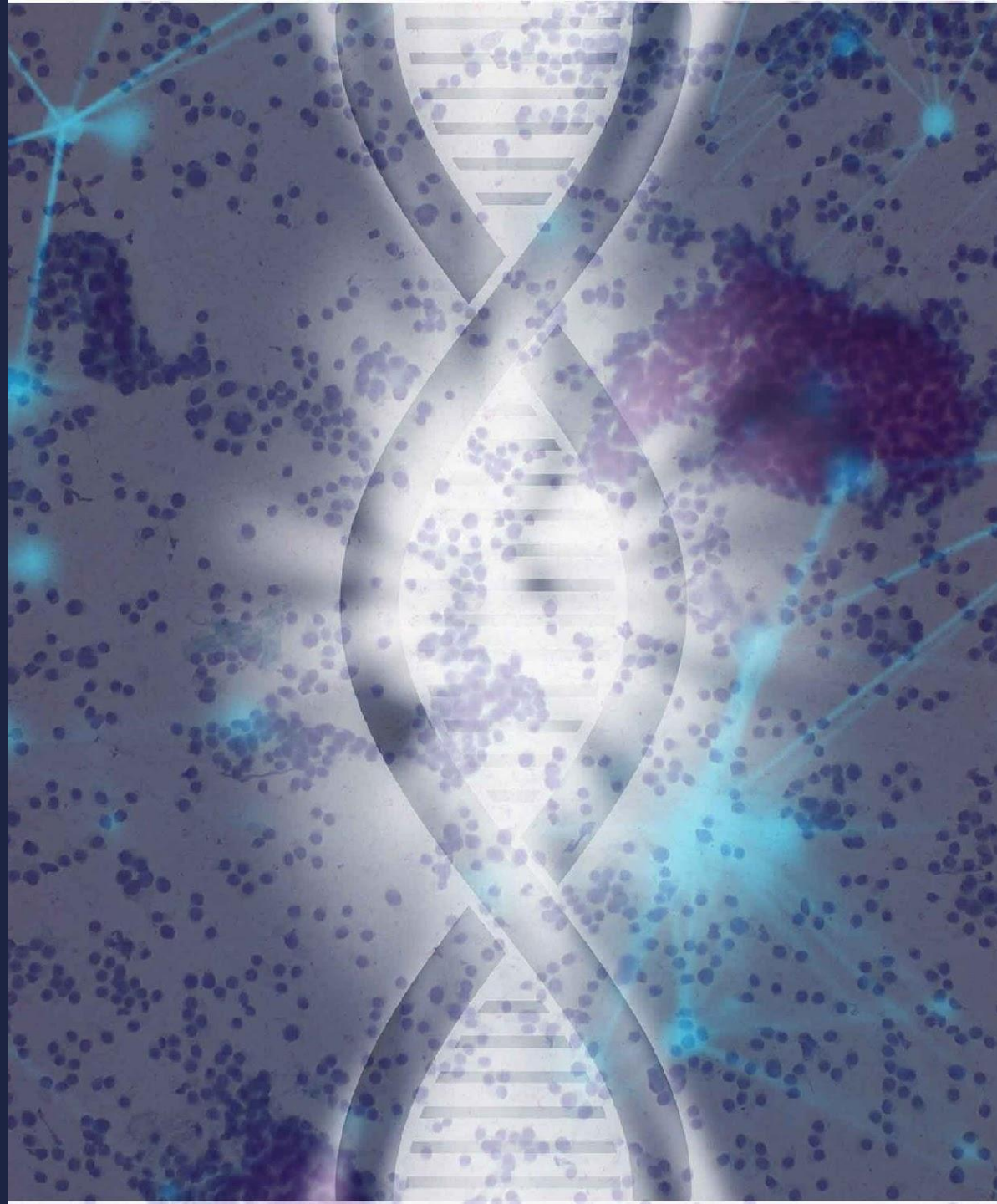
IMPROVE



SHARE



Presentation of the trainers



Instructors

Yuna Blum
Research scientist,
IGDR CNRS Uni. Rennes,
France

Jérôme Cros
Clinician
APHP Paris, France

Carl Herrmann,
Assistant-professor,
Medical Faculty
University Heidelberg,
Germany

Sim Karkar
Researcher, Postdoc
Uni. Grenoble Alpes, France

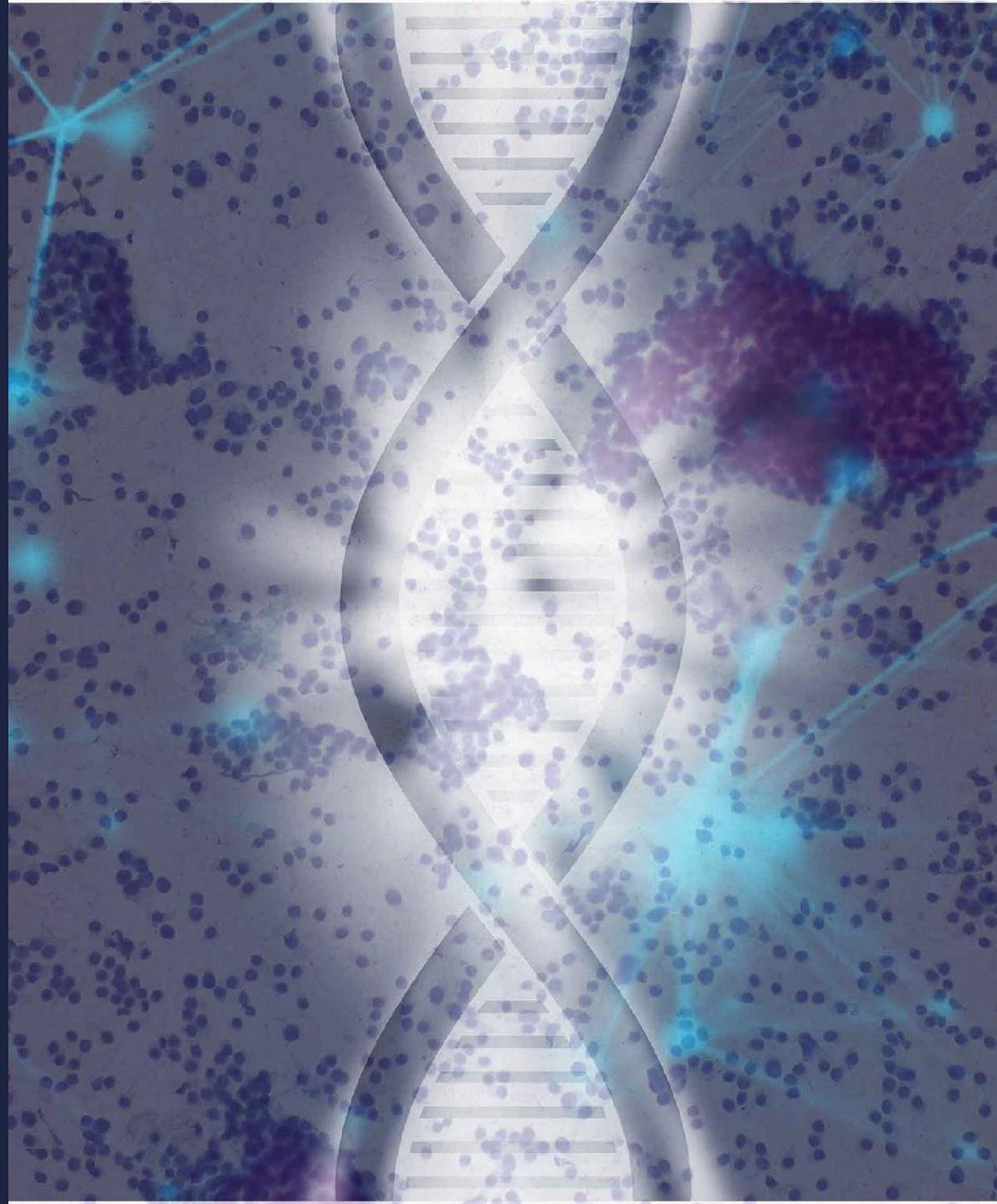
Magali Richard
Research scientist,
Uni. Grenoble Alpes, France

Ashwini Sharma
Research scientist
Medical Faculty University
Heidelberg, Germany

Yasmina Kermezli
Researcher, Postdoc
Uni. Grenoble Alpes,
France

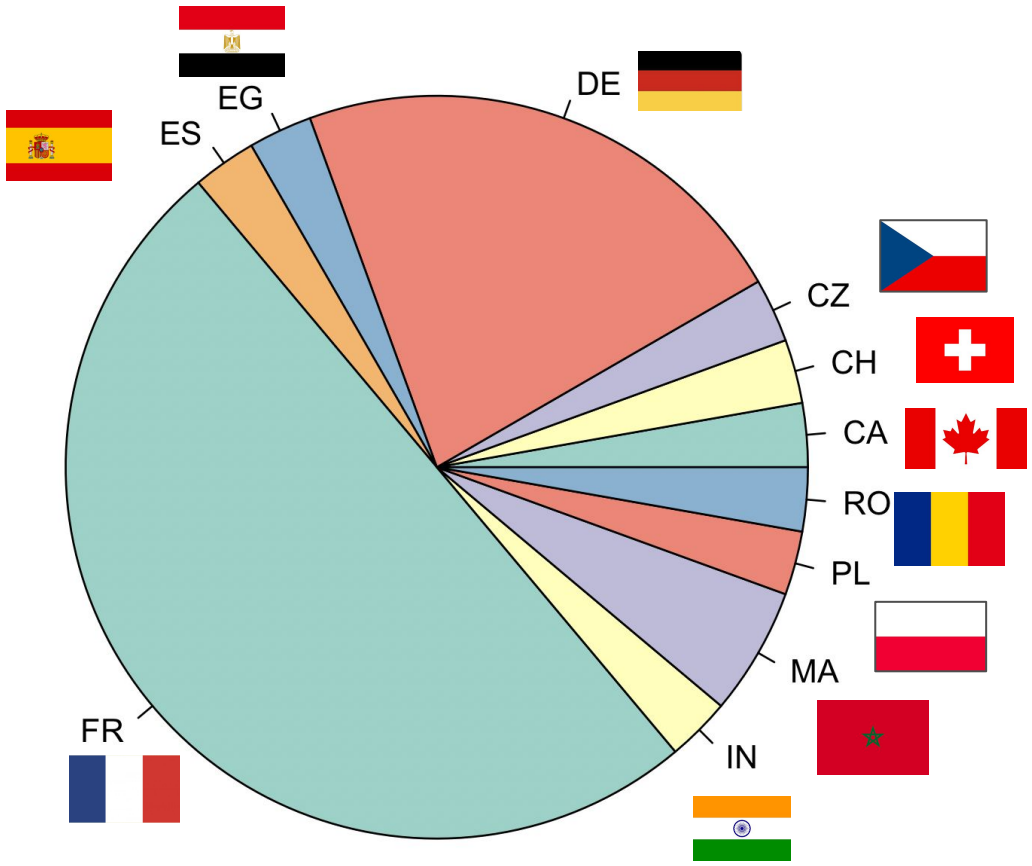
Clémentine Decamps
Researcher, PhD student
Uni. Grenoble Alpes,
France

Participants and groups

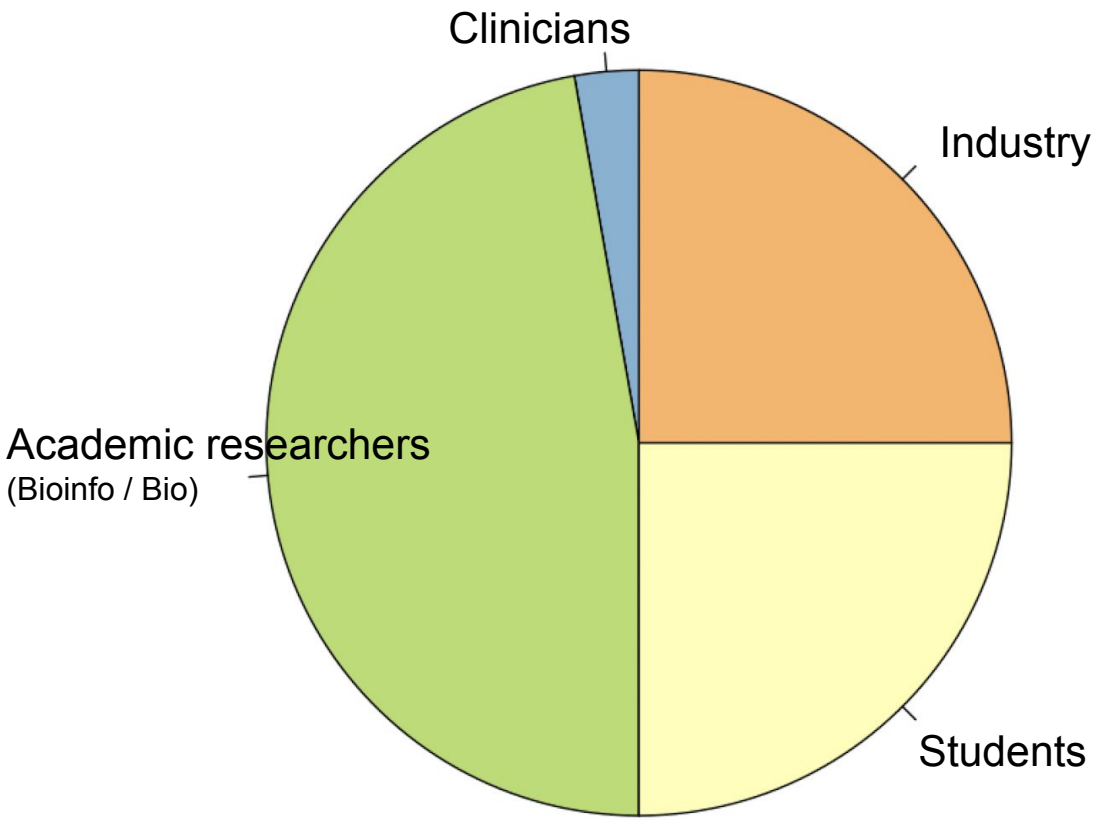


Participants n>30

11 countries



Professional category



Groups and small teams

First Name	Last Name	Medical Group	Teams
Agata	Nosowicz	Medical contributors	G1-M
Lena	Voithenberg	Medical contributors	G1-M
Ferdaous	Idlahcen	Medical contributors	G1-M
Saravanakumar	Selvaraj	Medical contributors	G1-M
Fatima	Berro	Medical contributors	G2-M
Lilija	Wehling	Medical contributors	G2-M
Sebastien	Corre	Medical contributors	G2-M
Bhavana	Rahangdale	Medical contributors	G2-M
Linda	LARBI CHERIF	Medical contributors	G3-M
Lucie	Laplane	Medical contributors	G3-M
Naoual	Menssouri	Medical contributors	G3-M
Fatima Zahra	EL BARCHE	Medical contributors	G3-M
Ibrahim	Bouakka	Medical contributors	
LAMIA	MADACI	Medical contributors	
aakanksha	bansal	Medical contributors	
rousseaux	sophie	Medical contributors	
NIDHI	PATEL	Medical contributors	

Trainers



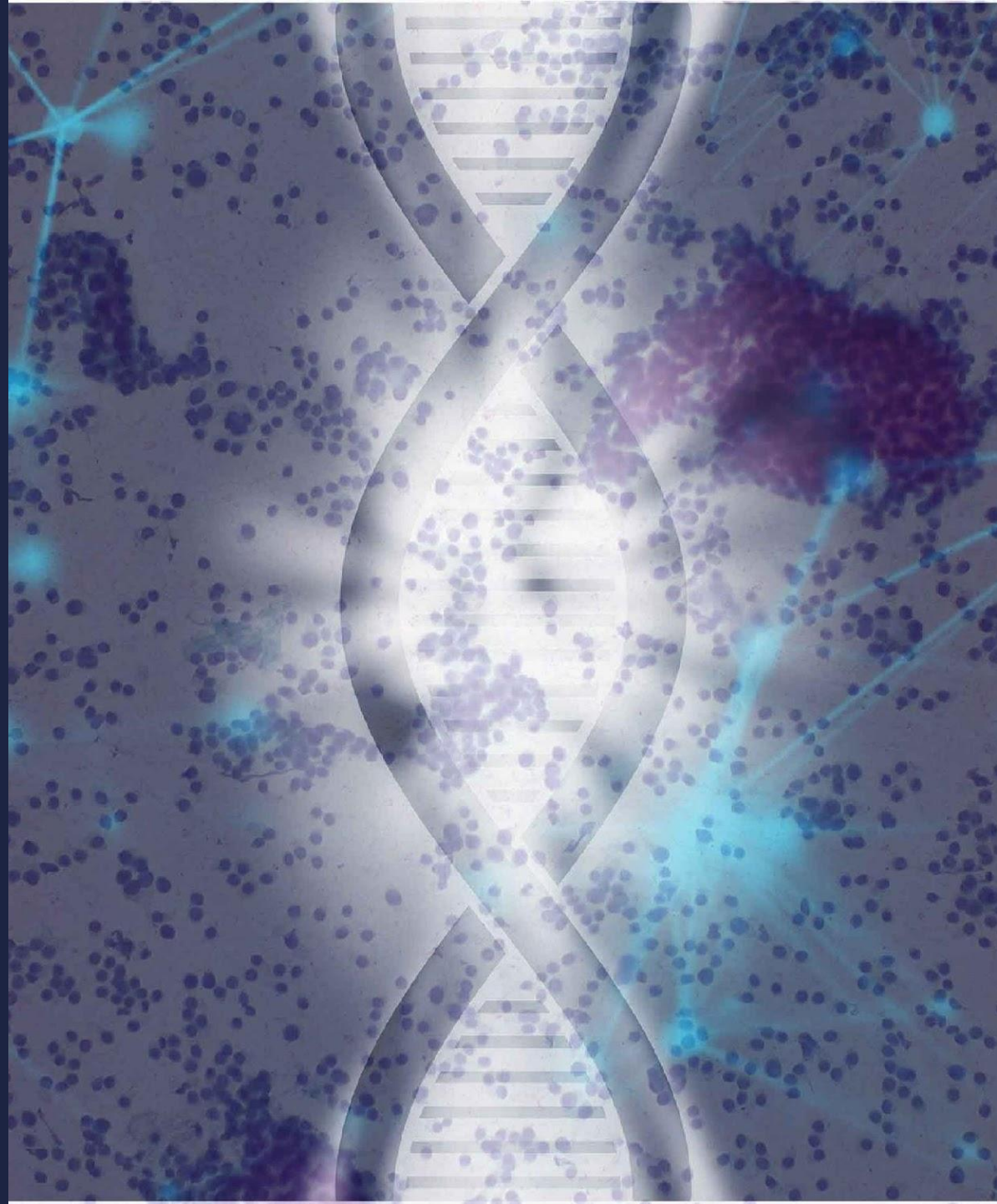


First Name	Last Name	Computational Group	Teams
warda	BOUTEGRABET	Computational contributor	G1-C
Barbora	Zwinsová	Computational contributor	G1-C
Joana	Ribeiro Pinto	Computational contributor	G1-C
Swann	Meyer	Computational contributor	G1-C
Juan Manueñ	Garcia	Computational contributor	G2-C
sara	salah	Computational contributor	G2-C
Khawla	Seddiki	Computational contributor	G2-C
Luis	Vale Silva	Computational contributor	G2-C
Agnieszka	Kraft	Computational contributor	G3-C
Yohann	Trivino	Computational contributor	G3-C
Fabien	Quinquis	Computational contributor	G3-C
Marc	Aubry	Computational contributor	G3-C
Yiwen	Lu	Computational contributor	G4-C
Marie	DE TAYRAC	Computational contributor	G4-C
Grégoire	MARRET	Computational contributor	G4-C
Lisa	SALHI	Computational contributor	G4-C
Ayyoub	Salmi	Computational contributor	
delphine	rossille	Computational contributor	
JULIA	GERONIMI	Computational contributor	
Surabhi	JAGTAP	Computational contributor	
Kinga	Ilyes	Computational contributor	

Trainers



Detailed program and visio tools



The program

DAY1

9:00-12:00 am LECTURE

9:00-9:30 am Introduction
9:30-10:30am Clinical point of view

virtual coffee Break

11:00-12:00 am Bioinformatician point of view

Lunch Break

2:00 -3:15 pm LECTURE

2:00-3:00 pm Data pre-processing
(normalization, transformation…)
3:00-3:15 pm How do I contribute?

3:15 -5:00 pm Practical work

Medical contributors

Presentation of the user-friendly COMETH web app

Computational contributors

Presentation of Codabench
First basic submission

4:45-5:00 pm Debriefing

DAY2

9:00 -10:00 pm LECTURE

9:00-10:00 pm Visualization and interpretation

10:00 -12:00 pm Practical work

Medical contributors

Using COMETH web app on real datasets: small projects

Computational contributors

Submit novel computational methods on codabench

Lunch

2:00-4:00 pm Practical work

2:00-2:30 pm Debriefing with slides from teams

Medical & Computational contributors

2:30-4.00 pm Focus on biological interpretation

4:00-4:45 pm PRESENTATIONS

2:00-2:45 pm Results presentation & discussion

4:45 -5:00 pm CONCLUSION

Visio conferencing tools

zoom

DAY1:
https://univ-grenoble-alpes-fr.zoom.us/meeting/register/tJAscOyvrzktH9Mh_c
I-EHGZN7mxu1rZa

DAY2:
https://univ-grenoble-alpes-fr.zoom.us/meeting/register/tJIkduiopzsjGtG_ovpi
R6MCZbiGFXKyG

Discord 

https://discord.com/invite/ZPxszeQxnT

Go on our website to retrieve the links: **https://cancer-heterogeneity.github.io/cometh_training.html**

The program

DAY1

9:00-12:00 am LECTURE

9:00-9:30 am Introduction
9:30-10:30am Clinical point of view
Break
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Medical contributors

Presentation of the user-friendly COMETH web app

Computational contributors

Presentation of Codabench
First basic submission

4:45-5:00 pm Debriefing

VISIO TOOLS

ZOOM plenary sessions

Medical	Computational
3:15 - 3:30 pm ZOOM Breakroom Introduction to the cometh app	**3:15 - 3:30 pm** ZOOM Breakroom Presentation of Codabench
3:30 - 4:45 pm Explore cometh using provided Datasets	**3:30 - 4:45 pm** Basic submission
4:45 - 5:00 pm ZOOM Breakroom Debriefing	**4:45 - 5:00 pm** ZOOM Breakroom Debriefing

The program

ZOOM plenary sessions

Medical

10:00 - 10:15 pm
ZOOM Breakroom
Explore cBioPortal

10:00 - 12:00 pm
Small projects in teams

2:00 - 2:30 pm
ZOOM Breakroom
Debriefing: each team 5 min presentation

2:30 - 4:00 pm

Computational

10:00 - 12:00 pm
Submit novel computational methods on Codabench in teams

2:00 - 2:30 pm
ZOOM Breakroom
Debriefing: each team 5 min presentation

2:30 - 4:00 pm

Focus on biological interpretation in teams (#4)

+ each team prepare 5 min presentation for the plenary session

DAY2

9:00 -10:00 pm LECTURE
9:00-10:00 pm Visualization and interpretation

10:00 -12:00 pm Practical work

Medical contributors
Using COMETH web app on real datasets: small projects

Computational contributors
Submit novel computational methods on codabench

Lunch Break

2:00-4:00 pm Practical work
2:00-2:30 pm First debriefing (slides from teams)

Medical & Computational contributors
2:30-4.00 pm Focus on biological interpretation

4:00-4:45 pm PRESENTATIONS
2:00-2:45 pm Results presentation & discussion

4:45 -5:00 pm CONCLUSION

Any problem, questions?

Discord

https://discord.com/invite/ZPxszeQxnT

Contact us on the discord chat

Yuna Blum, Ligue contre le Cancer

Jérôme Cros, APHP

Clémentine Decamps, Uni Grenoble Alpes

Carl Herrmann, Medical Faculty Heidelberg

Slim Karkar, Uni Grenoble Alpes

Yasmina Kermezli, Uni Grenoble Alpes

Magali Richard, Uni Grenoble Alpes

Ashwini Sharma, Uni Grenoble Alpes

https://cancer-heterogeneity.github.io/cometh_training.html

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EIT Health is supported by the EIT, a body of the European Union