



UNIVERSITÀ DEGLI STUDI
DI SALERNO

Ten simple rules to make your teaching more effective

Workshop on
**Effective Academic Teaching's
Outcomes**

Allegra Via & Vincenza Colonna



 **IBBE**
Istituto di Biomembrane e Bioenergetica

 **IGB** CNR
Institute of Genetics and Biophysics
Adriano Buzzati-Traverso

EXCELERATE WP11

Train the Trainer (TtT) subtask

develop new courses and materials

methodologies, tips and best practices

guidance for course design, development and delivery

new trainers

Survey across all ELIXIR nodes:
Training offerings, needs, and capacity

Workshop on using VMs and clouds in training

2nd TtT course
Gulbenkian, Portugal

Review workshop

Dec 2015

Jan 2016

May 2016

July 2016

Oct 2016

... 2016-19

Workshop to review methodologies and identify effective training approaches

First TtT course
University of Cambridge

3rd TtT course
CNR, Rome

21 TtT events



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- The teacher is busy in transferring content → no time for other activities



**People generally remember...
(learning activities)**

**People are able to...
(learning outcomes)**

10% of what they read

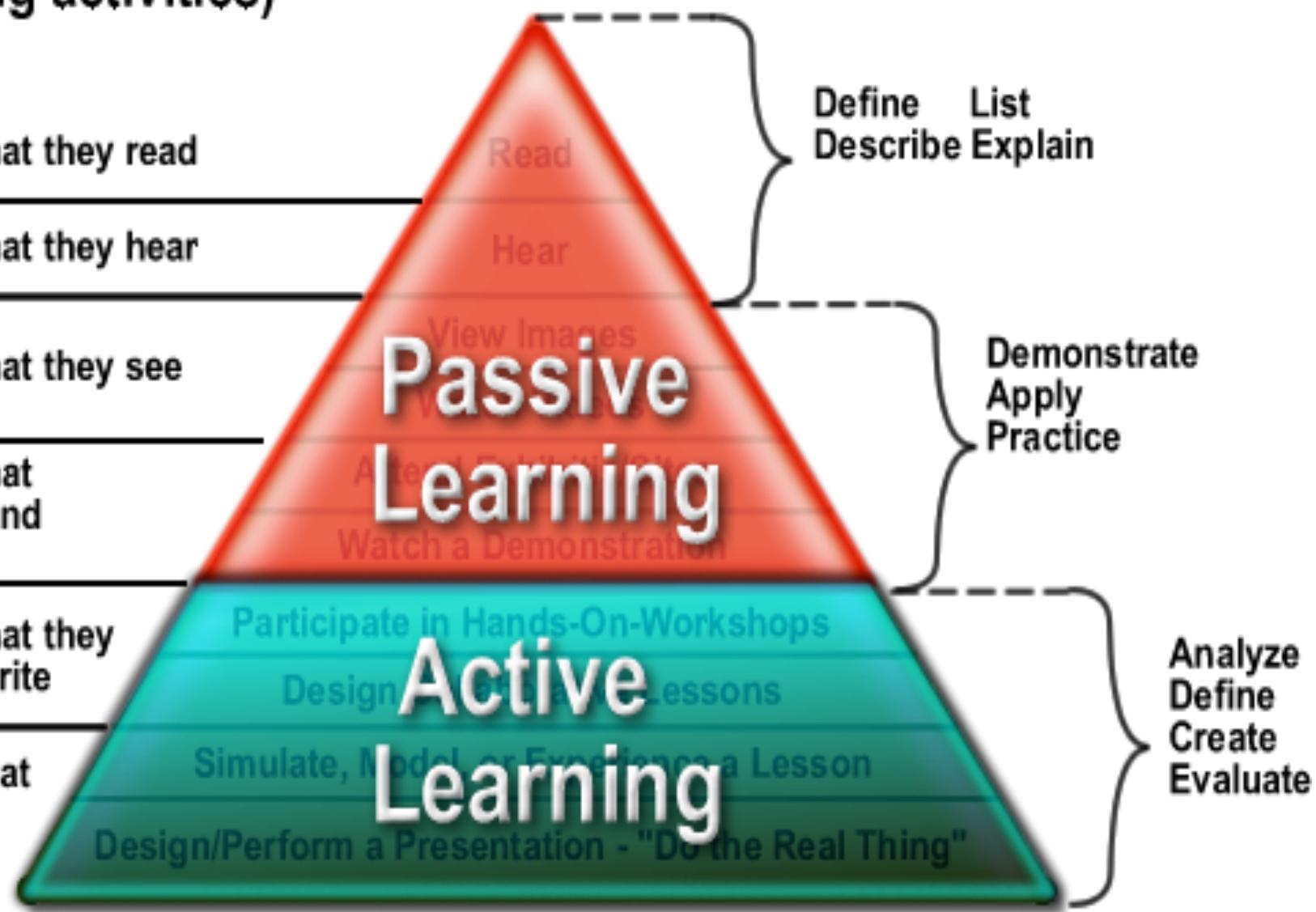
20% of what they hear

30% of what they see

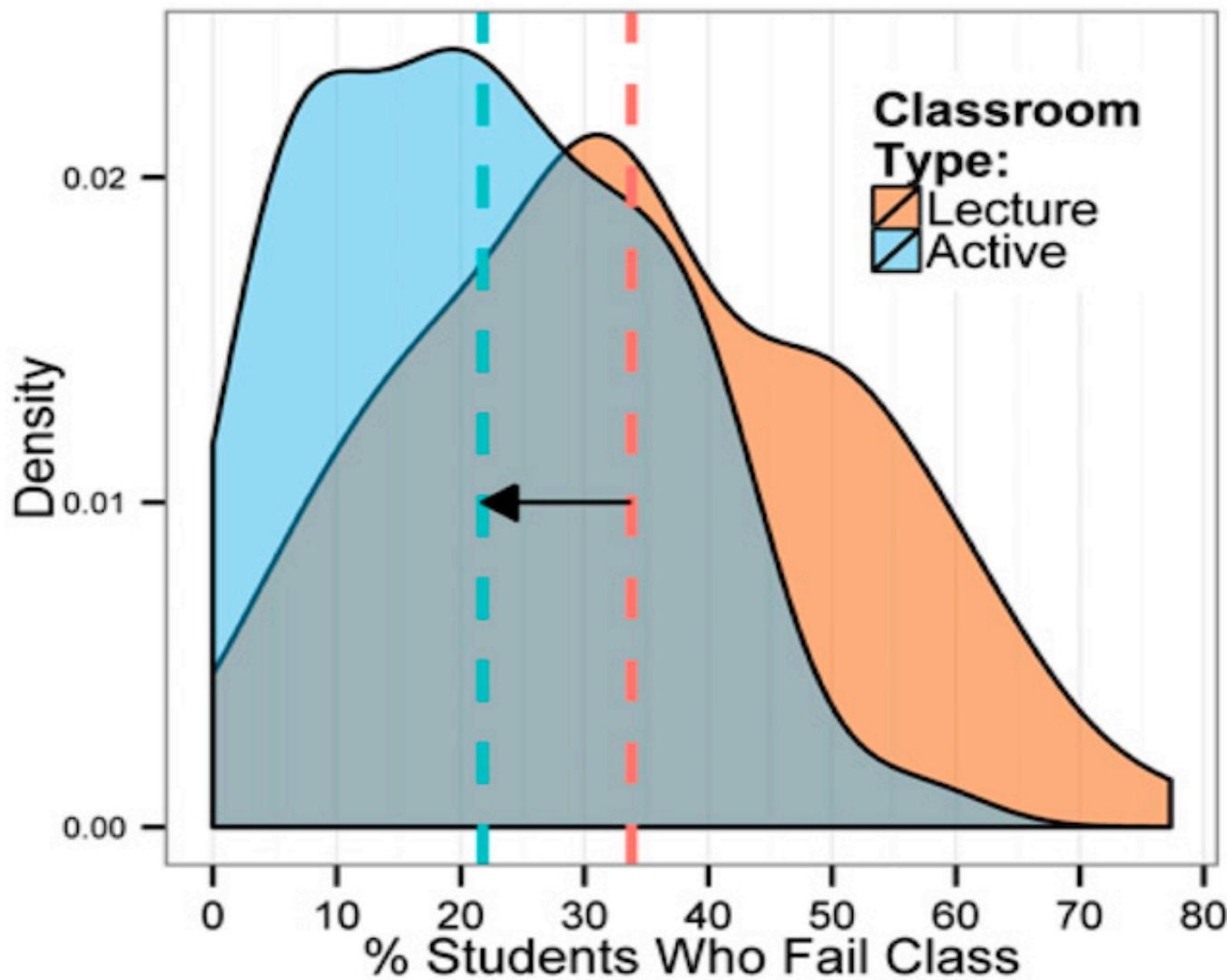
50% of what they see and hear

70% of what they say and write

90% of what they do.



Active learning cut course failure rates by around one-third

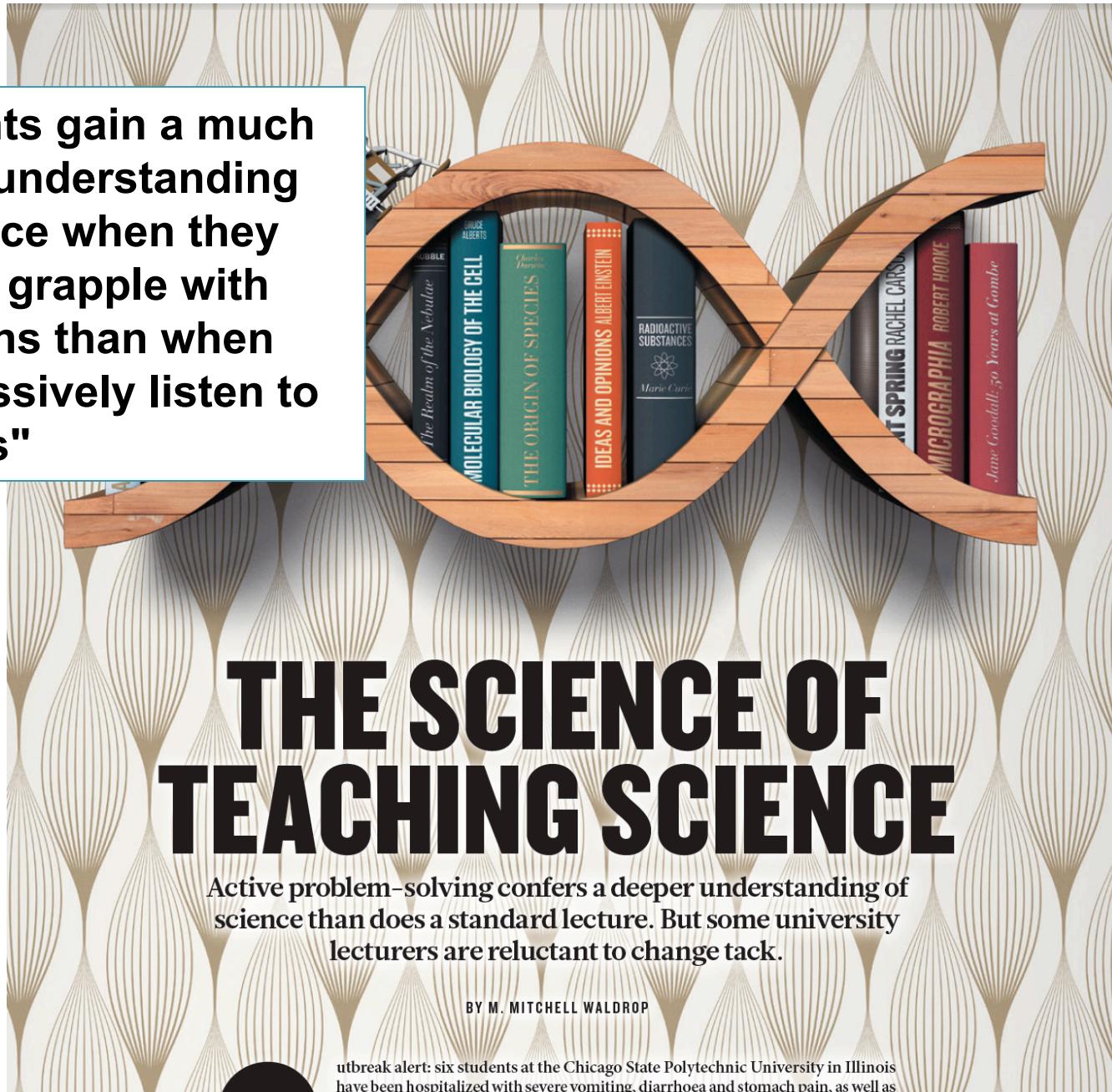


Analysis of 225 studies of active learning in science, technology, engineering and mathematics

Freeman et al. PNAS (2014) Active learning increases student performance in science, engineering, and mathematics.

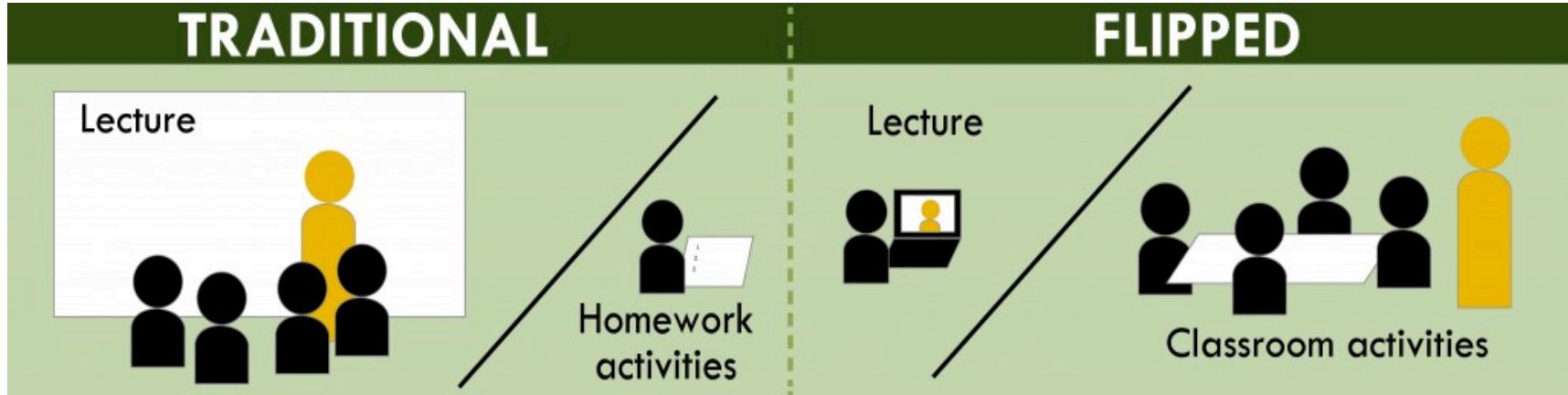
"AT THIS POINT IT IS UNETHICAL TO TEACH ANY OTHER WAY" *

"Students gain a much deeper understanding of science when they actively grapple with questions than when they passively listen to answers"



*Clarissa Dirks, co-chair of the US National Academies Scientific Teaching Alliance, an initiative to reform undergraduate STEM education

What changes?



- Teacher lecturing (partially) replaced by students' activities
- student-centred/individual interactions
- maximise interactivity among students and with the teacher
- role of the teacher: sage on the stage → guide on the side

Group work: what can we do to promote active learning in university courses?



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- Make them available

*appropriate/stimulating/interesting

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- Use questionnaires (google forms) - Formative assessment
- Initial lesson(s): fill the gaps and level students out
- Heterogeneous groups for discussion, problem solving, carrying out "real-life" projects
- Divide topics in **subtopics** and assign them to groups. The teacher may eventually **connect** all the parts

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- The teacher can use the recap to expand concepts/topics
- Use training techniques to promote interactivity and involvement (games, competitions, rewards)
- Teachers should be allowed to **change topic** every few years

Post-course/lesson

- Use (also) **self-evaluation**

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- Give extra **points** for extra **activities**

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- Stimulate students to attend the exams of their classmates
- Share active learning principles with colleagues in the department/area to induce a change at the **system level**



Conclusions I

- Many more active learning techniques than we thought can be transferred from non formal to formal learning
- Key points:
 - Be aware of diverse student motivation
 - Find ways to reward students
 - It takes a lot of work: start simple

Conclusions II

- We asked workshop participants to commit to introduce some active learning techniques in their courses in the next semester
- We will collect their thoughts at the end of semesters
- Present the results @ BITS2017??



Special thanks to

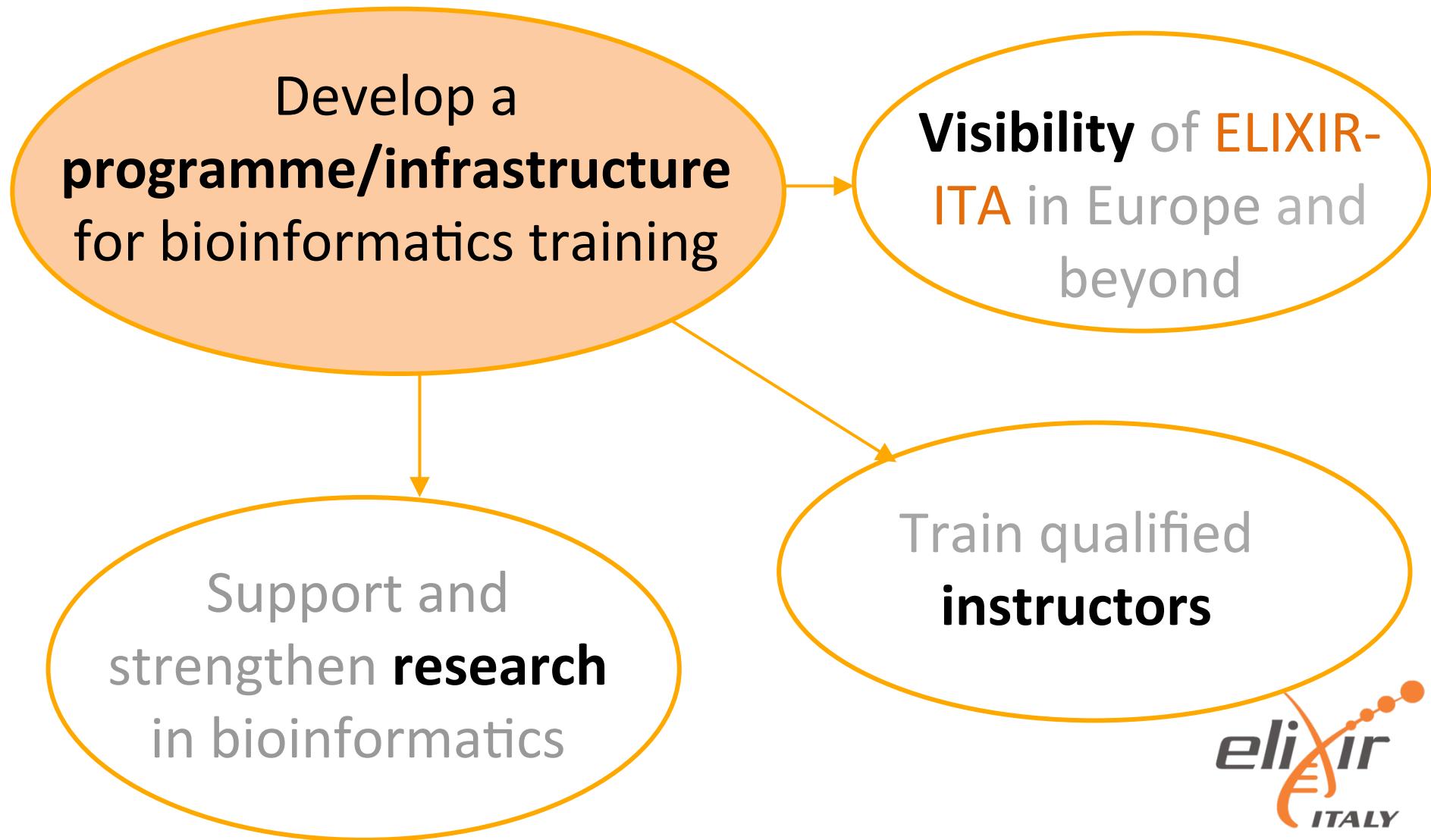
- Anna Marabotti
- Pedro Fernandes (ELIXIR-PT TrC)
- All the workshop participants
- BITS

Friday, 17th - 14.00-15.30

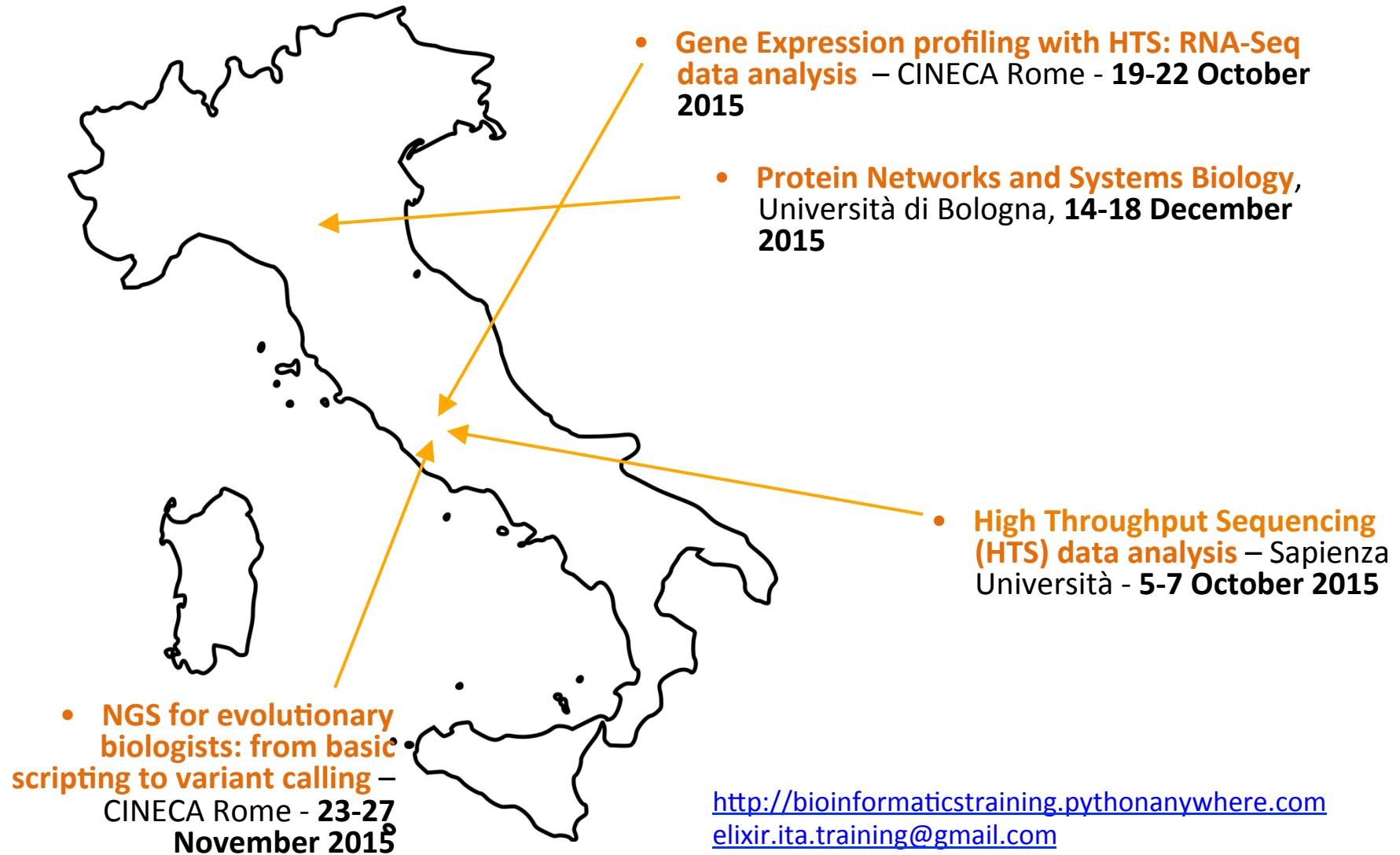
Round table on

Current needs in Europe for bioinformatics professionals: what it is and what should be taught in BSc and MSc courses in Italy?

Goals of ELIXIR-ITA Training



Courses 2015

- 
- NGS for evolutionary biologists: from basic scripting to variant calling – CINECA Rome - 23-27 November 2015
 - Gene Expression profiling with HTS: RNA-Seq data analysis – CINECA Rome - 19-22 October 2015
 - Protein Networks and Systems Biology, Università di Bologna, 14-18 December 2015
 - High Throughput Sequencing (HTS) data analysis – Sapienza Università - 5-7 October 2015

<http://bioinformaticstraining.pythonanywhere.com>
elixir.ita.training@gmail.com

Courses 2016

Metagenomics data processing and
Rimedical data analysis,

**interpretation and
representation**

Rome, December

Exome analysis using Galaxy

Milano Bicocca, **19-20 Sept**

RNA-seq data analysis

University of Naples Federico II,
Naples - **June 6-10**

**NGS for evolutionary biologists: from
basic scripting to variant calling**

CNR, Naples - **May 2-6**

**High Performance Molecular
Dynamics@CINECA - PRACE Edition**

CINECA, Bologna - **20-30 September**

Effective academic teaching

University of Salerno, Fisciano
(SA), Italy - **June 15th,**

Analyse your data using Python

University of Bari, **26-30 Sept**

**Metagenomics data processing
and analysis Bari, November**