



The e-KnowNet Project seen from the Scientists' Point of View

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CNRS researcher at the Francis Perrin Laboratory

I Presentation of the Francis Perrin Laboratory

II Building exhibits: what were the difficulties for scientists?

III Opinions about the project

Location - Institutions

Francis Perrin Laboratory is a joint research unit between two organisms



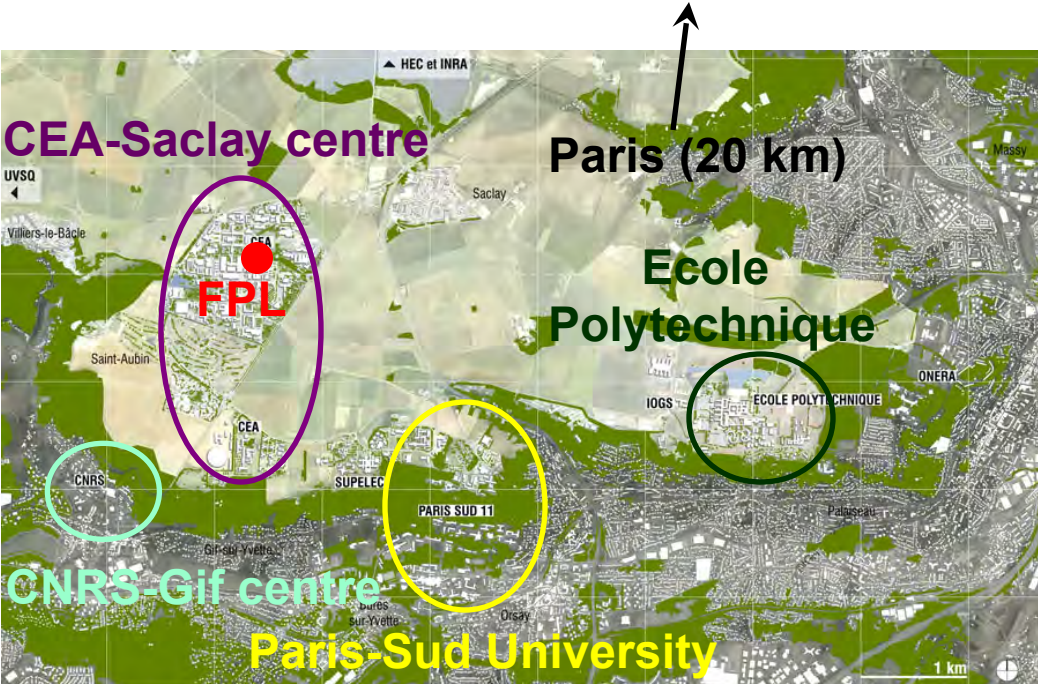
National Centre for the Scientific Research (CNRS)

- Fundamental research (Mathematics...Humanities and social sciences)
- 11500 permanent scientists +1000 laboratories



Atomic Energy Commissariat (CEA)

- Fundamental and applied research on atomic energy and alternative energies
- 7000 engineer-researchers -10 research centres



Paris-Saclay Campus Project

Math + Physics + Chemistry

6000 publications/year

Stanford University : 6500

MIT : 4500

Nature **467**, 897 (2010)

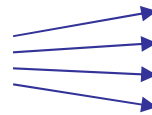


FPL gathers scientists studying interactions between light and molecular systems

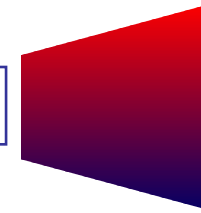
➤ **Photochemistry**

Head: Dr. Dimitra Markovitsi

16 CEA engineer-researcher
13 CNRS researchers
07 Technical & administrative staff
30 Non permanent scientists
(Postdocs – PhD and undergraduate)



4 groups

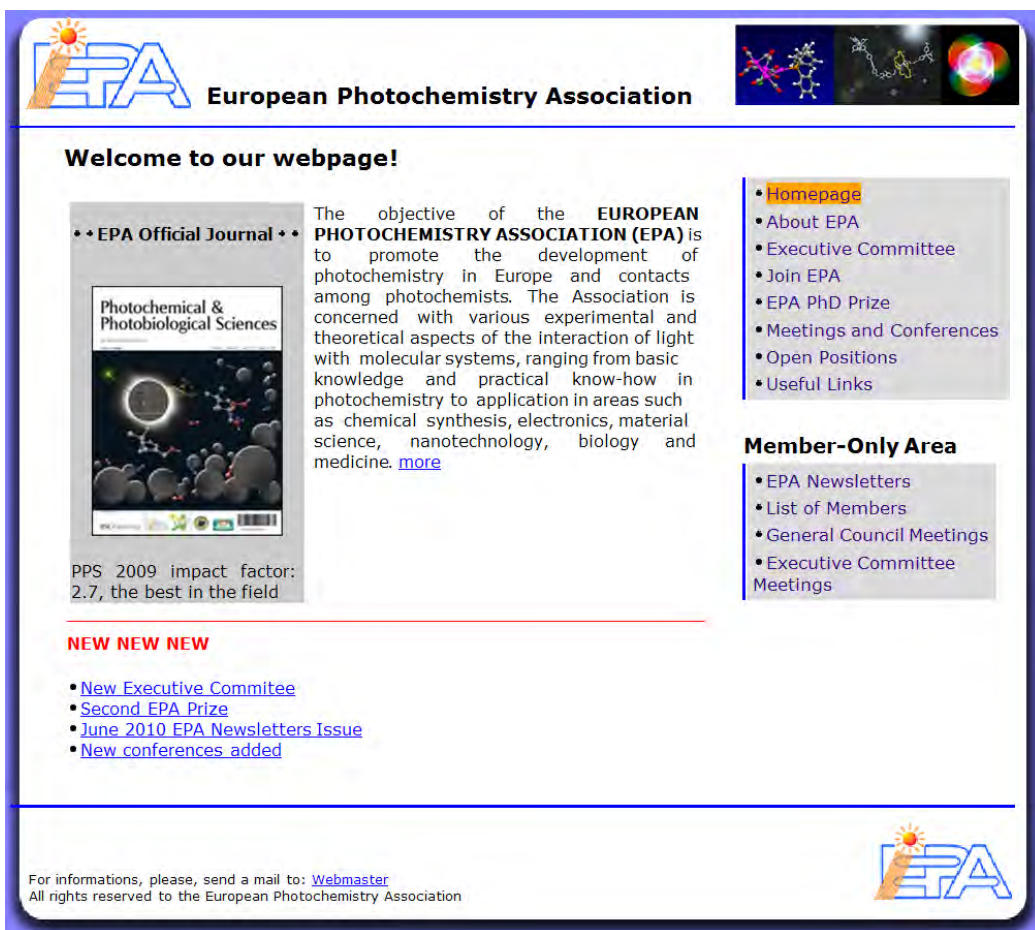


**scientific projects
having in
common
photochemistry**

**10 projects have been popularised
→ 10 digital exhibits**

FPL is part of several networks

EPA: Community of European Scientists working in the field of photochemistry



The screenshot shows the EPA website homepage. At the top left is the EPA logo, which features a stylized sun and the letters 'EPA'. To the right of the logo is the text 'European Photochemistry Association'. Below the logo is a navigation menu with links for 'Homepage', 'About EPA', 'Executive Committee', 'Join EPA', 'EPA PhD Prize', 'Meetings and Conferences', 'Open Positions', and 'Useful Links'. The main content area is titled 'Welcome to our webpage!' and contains a section for the 'EPA Official Journal' with a cover image of 'Photochemical & Photobiological Sciences'. Below this is a paragraph describing the association's objective: 'The objective of the EUROPEAN PHOTOCHEMISTRY ASSOCIATION (EPA) is to promote the development of photochemistry in Europe and contacts among photochemists. The Association is concerned with various experimental and theoretical aspects of the interaction of light with molecular systems, ranging from basic knowledge and practical know-how in photochemistry to application in areas such as chemical synthesis, electronics, material science, nanotechnology, biology and medicine. [more](#)'. To the right of this paragraph is a 'Member-Only Area' section with links for 'EPA Newsletters', 'List of Members', 'General Council Meetings', and 'Executive Committee Meetings'. At the bottom left, there is a 'NEW NEW NEW' section with links for 'New Executive Committee', 'Second EPA Prize', 'June 2010 EPA Newsletters Issue', and 'New conferences added'. At the bottom right, there is a footer with the text 'For informations, please, send a mail to: [Webmaster](#)' and 'All rights reserved to the European Photochemistry Association'. The EPA logo is also present in the bottom right corner of the page.

~800 scientists

President:
Prof. Dr. Eric Vauthey

Past presidents:
Dr. Dimitra Markovitsi (2007-2010)
Prof. David Phillips (2005-2007)

**3 additional exhibits brought by
EPA members outside the FPL**

Laboratory Organisation

Each researcher is independent :

- **Freedom** to choose their own scientific projects
- **Control** of the work (Laboratory – Committees – Funding agencies...)

Project leader:

- Definition of the **scientific objectives** of the project
- Projects are funded depending greatly on the records of the project leader

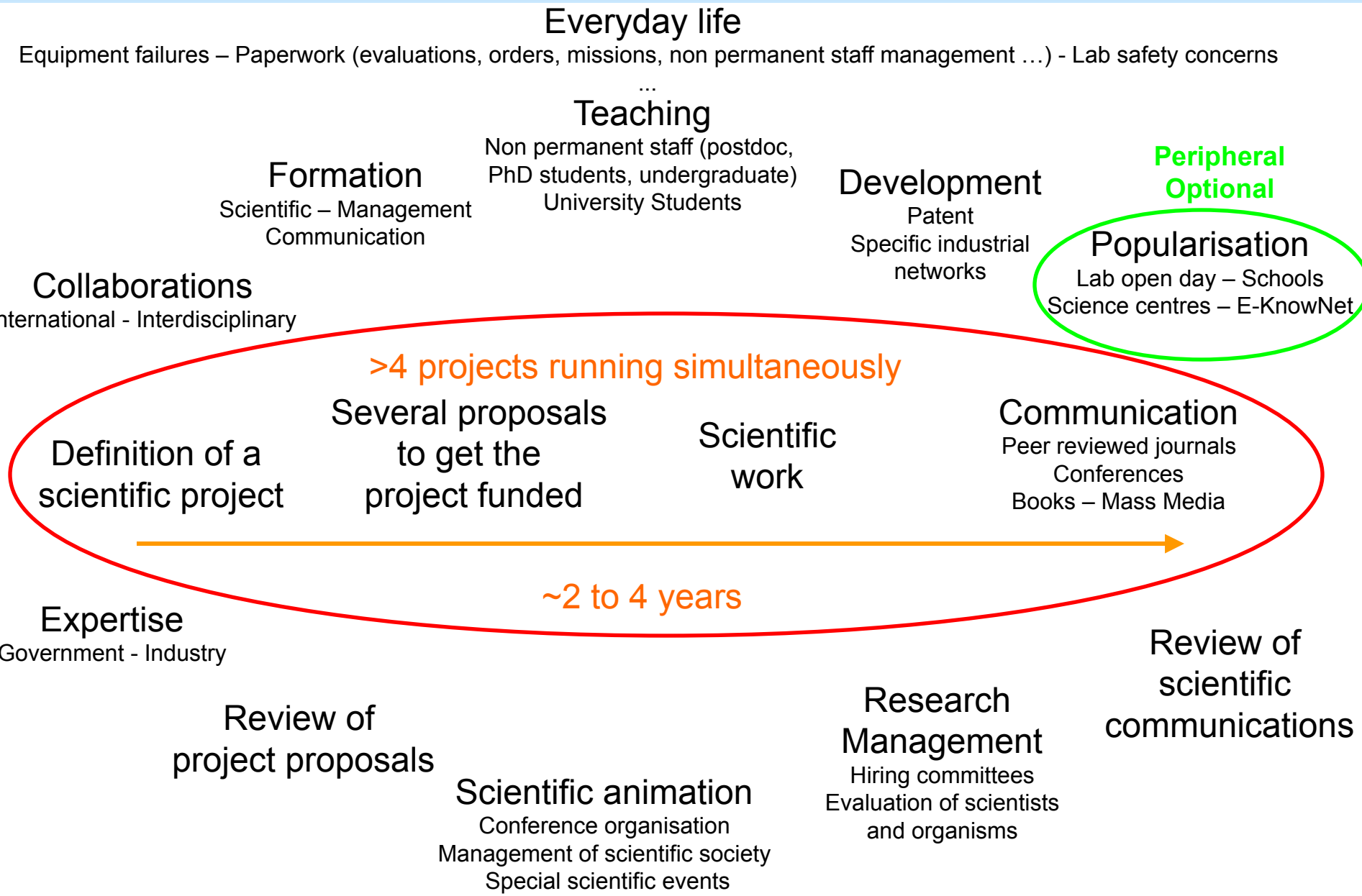
Scientific teams:

- People sharing scientific projects, equipment, funds
- A **team leader** is usually involved in most of the projects of his team, and leads several of them

Laboratory (lifetime ~5 years)_

- Gathers teams sharing common interests
- **Organises** the common resources
- **Controls** that rules are followed
- **Does not pilot** scientific projects

Researchers job: main and peripheral activities



Applied and fundamental research

Applied research

Fondamental/basic research

What is the main objective of the scientific project?

Fix an identified practical problem

Increase knowledge

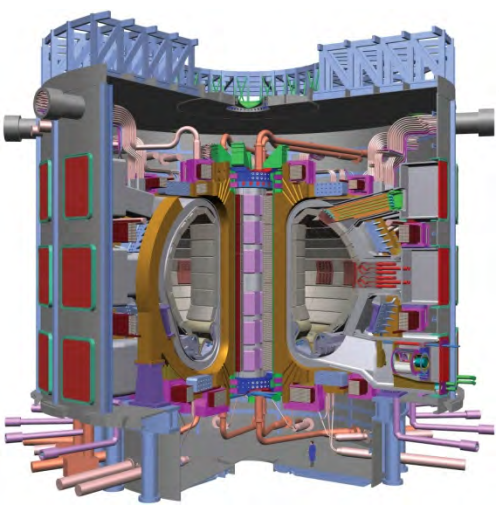
- Make a new object
- Improve specific properties
- Design a new process

- Close links with society
- Repercussions can be anticipated

- Understand a natural phenomenon
- Answer a scientific question
- Discover new area of science

- Uncertainty of the future use of the results
- Public funds – Low attractiveness

Characteristics:



ITER
International
Thermonuclear
Experimental
Reactor

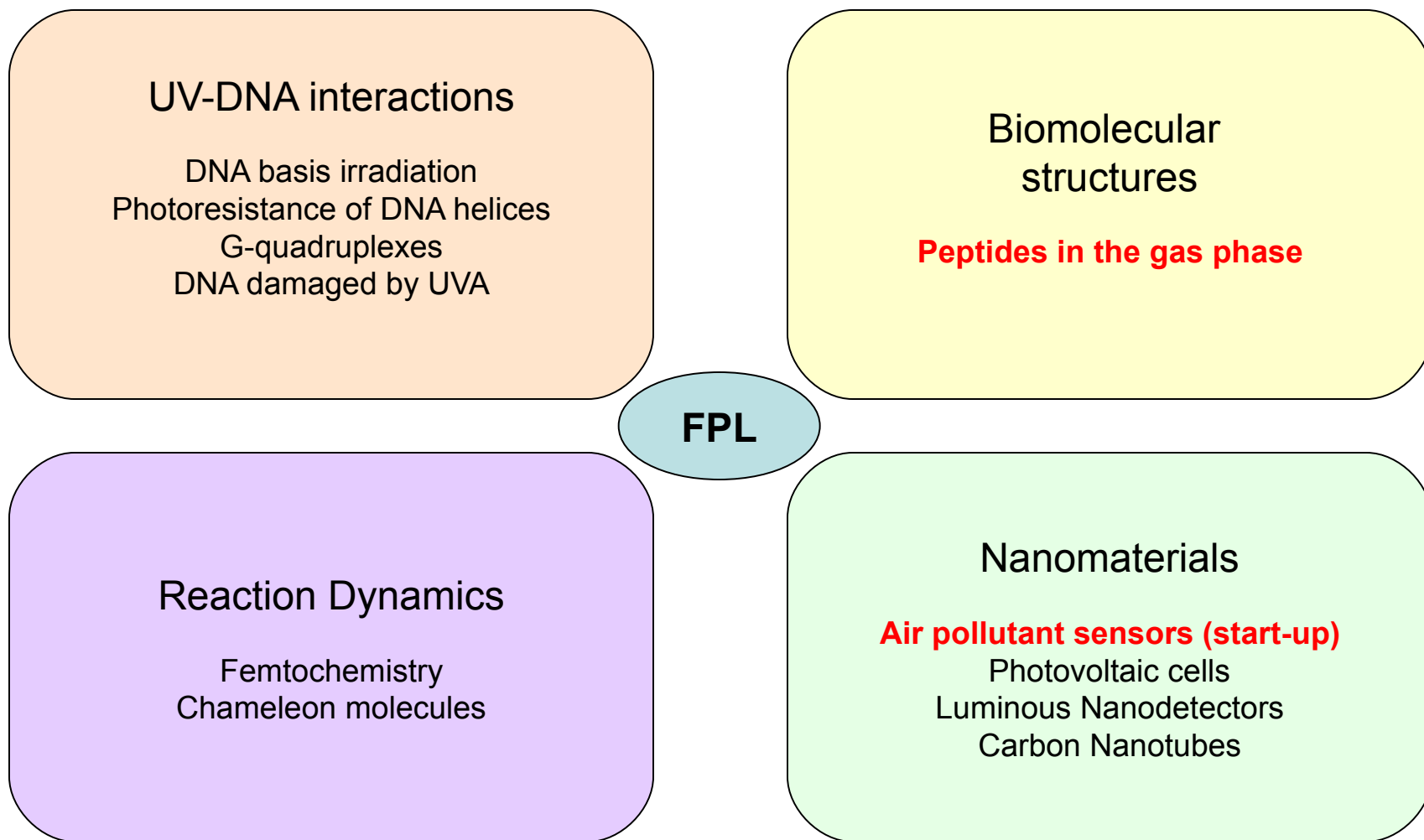


Human Genome Project

Hubble telescope



Exhibits



→ Feedback from the FPL scientists who contributed to the E-KnowNet project

First contact

1st work for scientists: give an overview of their research project

Scientific context - motivations – project definition – realisation – results
give hints about the attractiveness for a general audience

Main problem: Find the appropriate scientific level of communication

where to start the story? Usual starting level: Licence Degree in Chemistry/Physics

Air pollutant sensors



Answers

- What the story is about
- Why everybody should feel concerned



What is going on in this lab ?

- Original work of the scientist

Peptides in the gas phase



Questions

- What is the story about ?
- Why should everybody feel concerned ?

- What are peptides? Small parts of proteins
- What are proteins? Large molecules fulfilling biological functions in our body
- Why should everybody care? These molecules are, for example, involved in Alzheimer or Parkinson diseases, cancers...
- Why studying peptides and not proteins ?
- Why studying these in the gas phase?

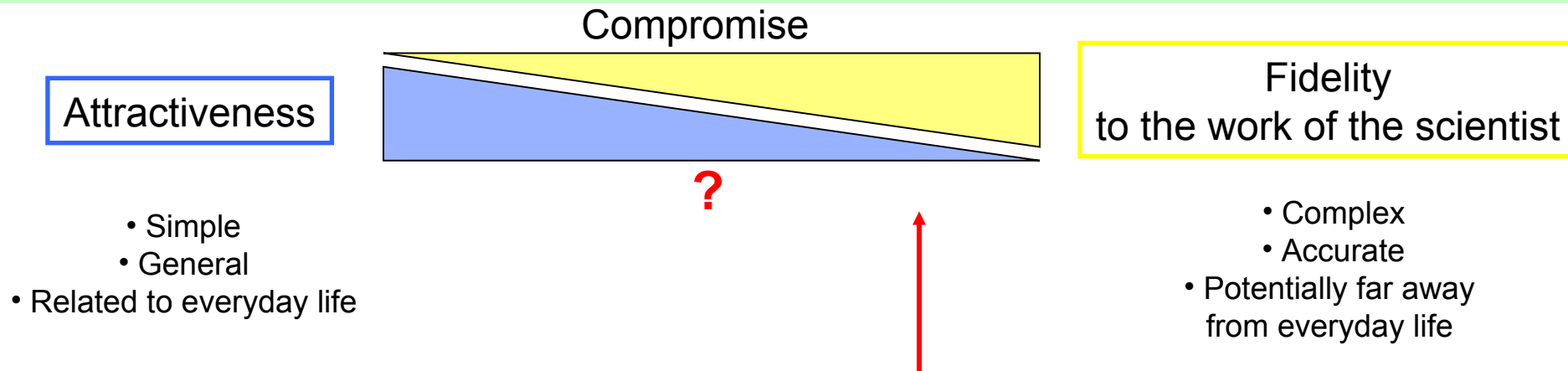
...

✓ **Basic research topics demand additional motivation (remarkable efforts have been made)**

✓ **Avoid the temptation of over-simplification (scientists define the limits)**



Content definition



Where is the acceptable limit of simplification for scientists ?

- when what is said is wrong (science, motivations, nature of the work in the lab)
- when the level of detail needed to describe the originality of the work is not reached
- when an exhaustive understanding is suggested

- ✓ Many interactions were needed to find a compromise (difficult process, but unavoidable)
- ✓ Some corrections brought by the scientists have been misunderstood (repeated explanations)
- ✓ An acceptable compromise has been reached most of the time (many ideas were given up, but non-negotiable requests have been taken into account)

Material

Pictures, videos, audio files

- Most of the labs do not have the basic equipment
- CEA Restrictions (authorisations, skype forbidden...)
- ✓ Equipment of E-KnowNet partners
- ✓ Personal devices



External links

- ~100 links/exhibits

- ✓ Watching all videos, full reading of texts is impossible
- Scientists cannot certify the validity of these links
- Links to academic institutions, science centres should be preferred (Wikipedia or YouTube sources have to be avoided)

Interviews

- Most of scientists are not used to give interviews
- Answer must be simple, but not wrong
- ✓ A few scientists were not happy with their answers (a simple and correct answer is difficult to find during the interview)
- Prepare the answers in advance



Exhibits produced

Initial idea

1 exhibit
=
1 scientific paper



1 exhibit
=
1 scientific theme

- ✓ Ambitious
- ✓ Justify to work directly with scientists
- ✓ Highly detailed exhibits needed
- ✓ Poor attractiveness/interest

- ✓ Most of the potentially interesting science is popularised
- ✓ Enough details are given to keep the story original

Final exhibits

Satisfaction

Scientists must validate the final version of the exhibit
(scientific reputation at stake)

The resulting exhibits describe what happens specifically in
these laboratories (and not somewhere else)

→ Exhibit content allow other scientists in the field to identify
the original work

Exhibits are found too long

→ How to make them shorter/simpler, but still keeping enough
details to assign the exhibit to one scientist's work and not to a
more general research?

Many concerns were expressed about the attractiveness of the exhibits
“they will not attract somebody who is not concerned by science”
(exhibits are aimed at people already motivated)

Motivation

Scientists have great freedom to define their peripheral activities



Motivation to contribute to such a popularisation project is a key point

- Curiosity

(new work for most of the scientists)

- Share knowledge
- Talk about their work
- Have a nice final result

(science, usability, eye-catching)

- Contribute to the fame of a scientific team

- Repeat the same thing

(explanations, recommendations)

- Be taken away from their projects

(time consuming)

- Have no feedback

(Is what I am doing useful?)

- Fix the related practical problems

(find the appropriate equipment,

make movies/interviews,

additional work on audio/video files)

Conclusions

- ✓ Make the original work of a scientist attractive for a very general audience is an **ambitious project**
- ✓ Scientists were **happy to contribute** to this project (new work for most of them)
- ✓ Popularisation was an **interesting work**
- ✓ They would like to have a **feedback** from the final users about the exhibits
- ✓ They think that a **longer interaction** with the experts in popularisation may be needed for a better result
- ✓ Most of scientists are **not willing to contribute at the same level of implication to other exhibits** (time consuming)
- ✓ They would **recommend this work to young researchers**