



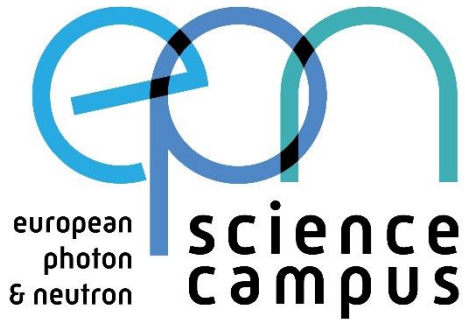
| The European Synchrotron



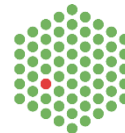
ESRF

The European Synchrotron

A UNIQUE SITE FOR RESEARCH AND INNOVATION



EMBL



AT THE HEART OF THE GLOBAL INNOVATION CAMPUS GIANT





1980

1988 Launch of the construction of the ESRF



1990



1992 1st electron beam in the storage ring

2000



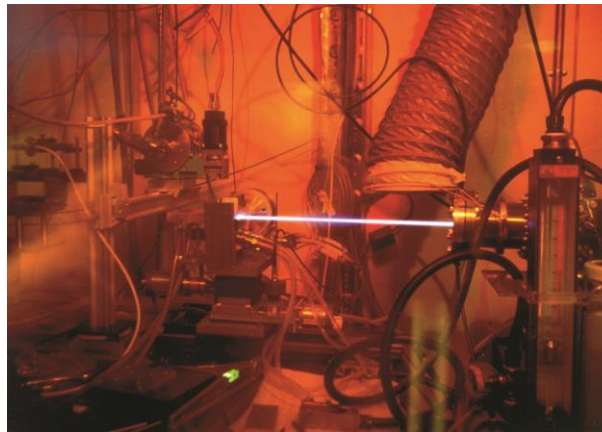
1980

1994 The ESRF opens for the users



1990

1998 40 beamlines are in operation



X-ray beam and
its air-ionization

2000

Today – The ESRF: 22 partner nations

13 Member states:

| Country | Contribution to the budget in % |
|--|---------------------------------|
| France | 27.5 % |
| Germany | 24 % |
| Italy | 13.2 % |
| United Kingdom | 10.5 % |
| Russia | 6 % |
| Benesync (Belgium, The Netherlands) | 5.8 % |
| Nordsync (Denmark, Finland, Norway, Sweden) | 5 % |
| Spain | 4 % |
| Switzerland | 4 % |

9 Associate countries:

| | |
|--|--------|
| Israel | 1.75 % |
| Austria | 1.75 % |
| Centralsync (Czech Republic, Hungary, Slovakia) | 1.05 % |
| Poland | 1 % |
| Portugal | 1 % |
| India | 0.66 % |
| South Africa | 0.3 % |



22 partner nations

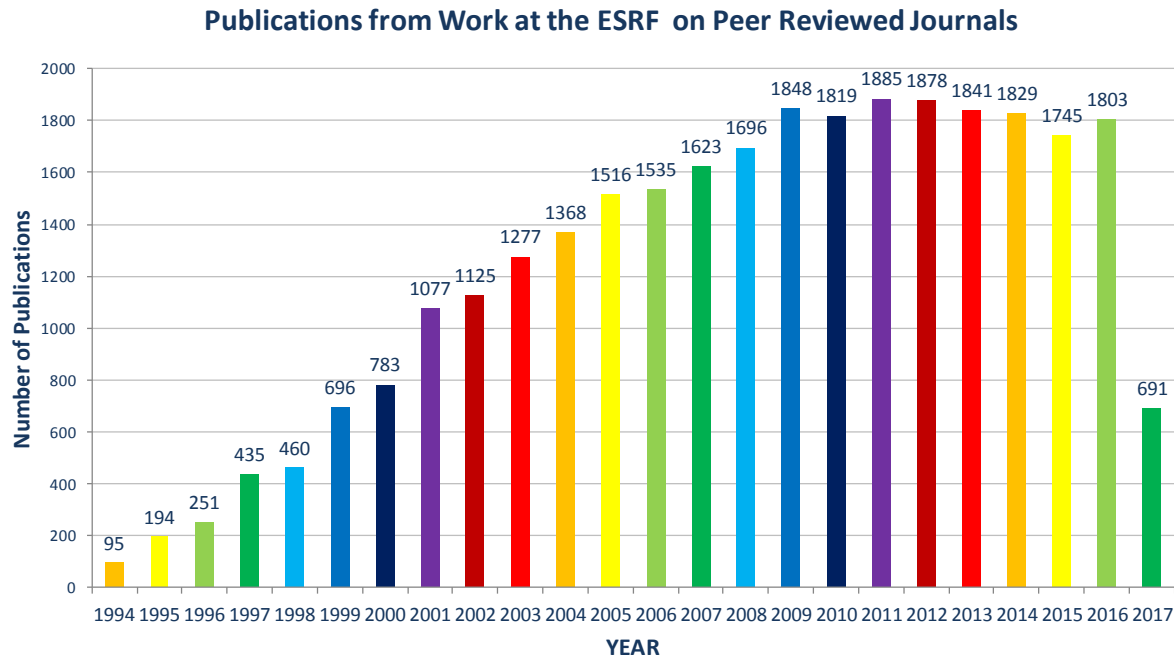
Annual budget: 100 million euros

Staff: 650 people, 40 different nationalities

Legal status: French “société civile”

Research at the ESRF: How does it work?

- Scientific committee selects the best proposals
- More than 6,000 scientific visits every year



- Public research and industry

Research at the ESRF: How much does it cost?

| | Member states | Other states |
|----------------------|---|--------------|
| Public research | Free + All travel expenses are covered | Free |
| Proprietary research | 450€/hour | 540€/hour |

Health, Biology



Earth sciences, Paleontology



Nanosciences, Information technology



Chemistry, Energy, Materials



Cultural heritage



Scientific example: Palaeontology

Australopithecus Sediba

1.9 million years



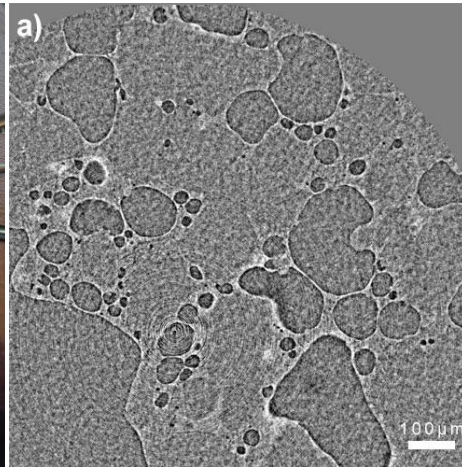
Scientific example: Food

Ice cream

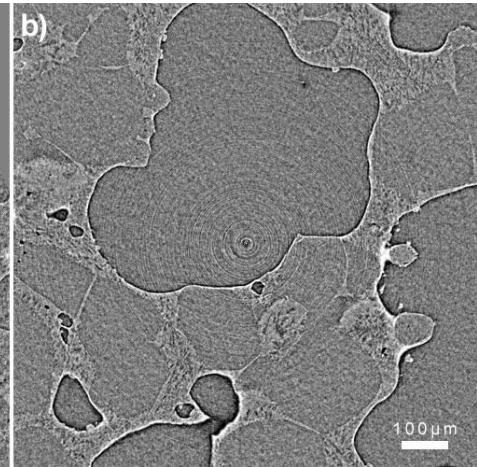
Microstructures characterization of ice cream



Credit: ElinorD, creative commons

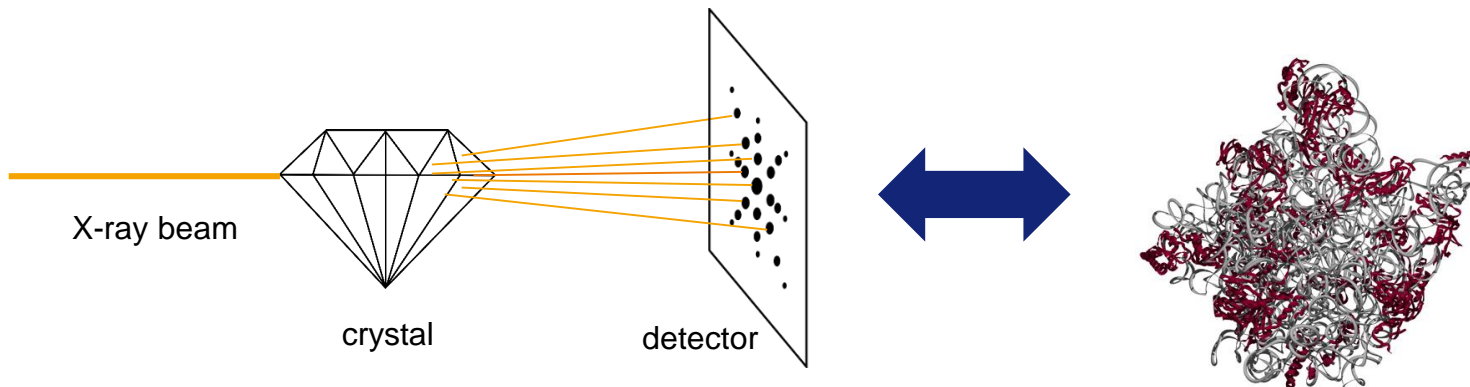
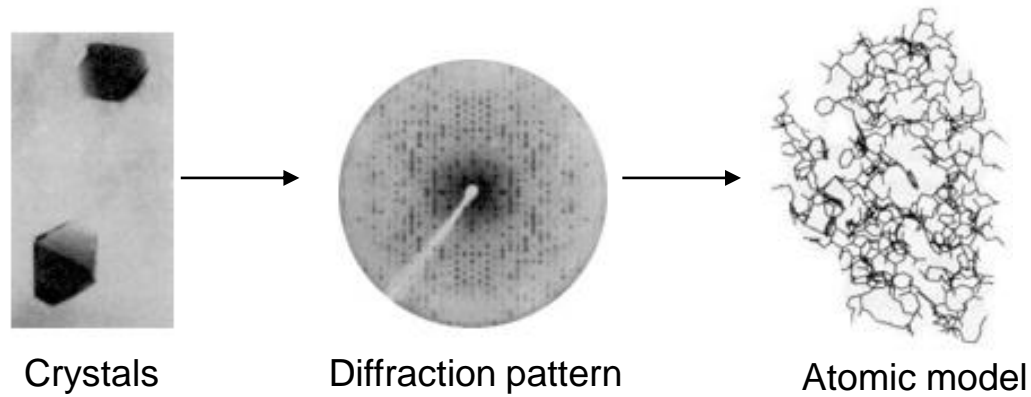


Fresh ice-cream



"Temperature-abused" ice cream

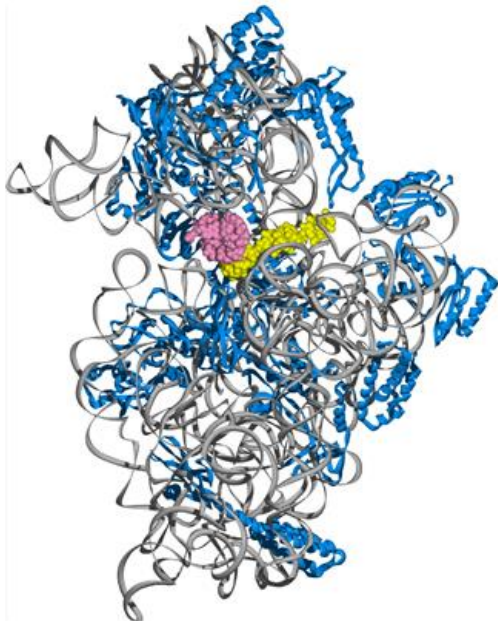
Scientific example: Structural Biology



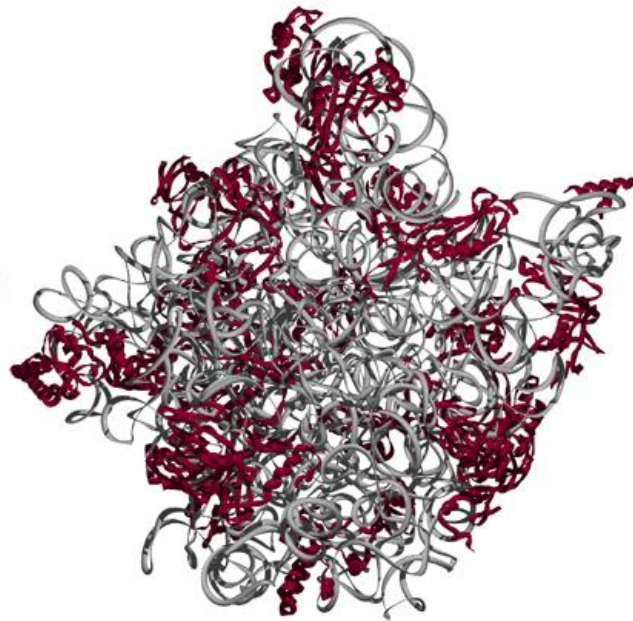
Scientific example: Structural Biology

Ribosome

Protein synthesis mechanism



SMALL RIBOSOMAL SUBUNIT



LARGE RIBOSOMAL SUBUNIT

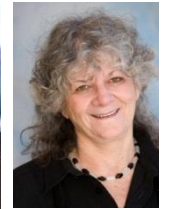
Nobel prize in Chemistry 2009



Venkatraman Ramakrishnan
MRC Laboratory of Molecular, Cambridge, UK



Thomas A. Steitz
Yale University, New Haven, CT, USA

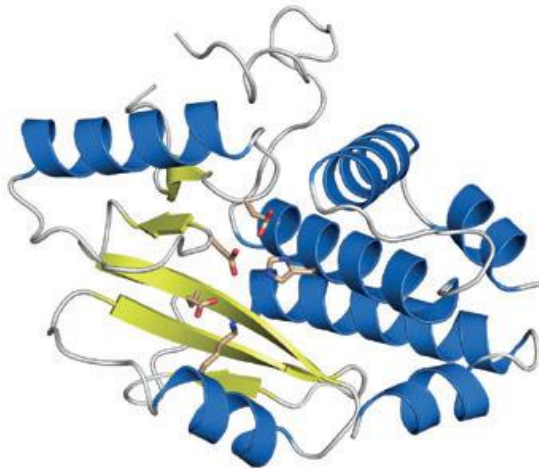


Ada E. Yonath
Weizmann Institute of Science, Rehovot, Israel

Scientific example: Health

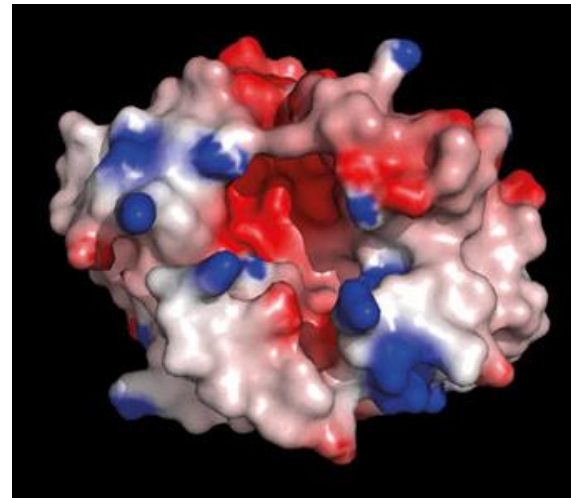
Influenza virus

Understand how the influenza virus works



Crédit : S Cusack/EMBL

Key domain of flu virus polymerase

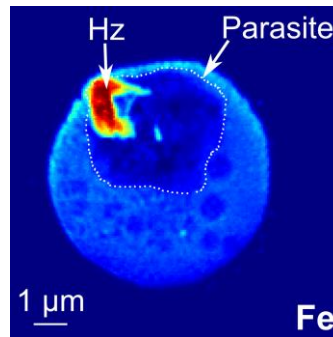
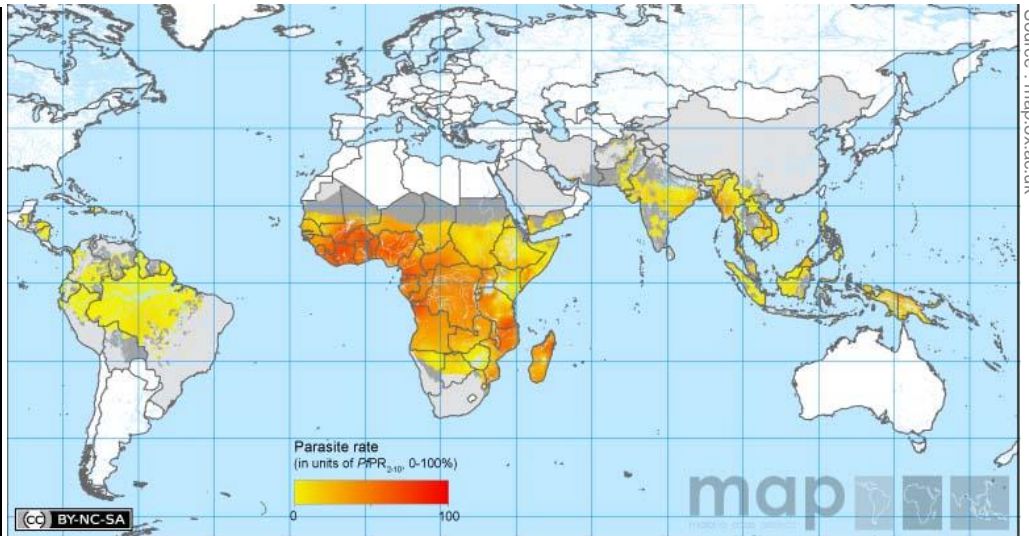


Crédit : EMBL-UVHCI

3D image of the "PA" protein domain

Scientific example: Health

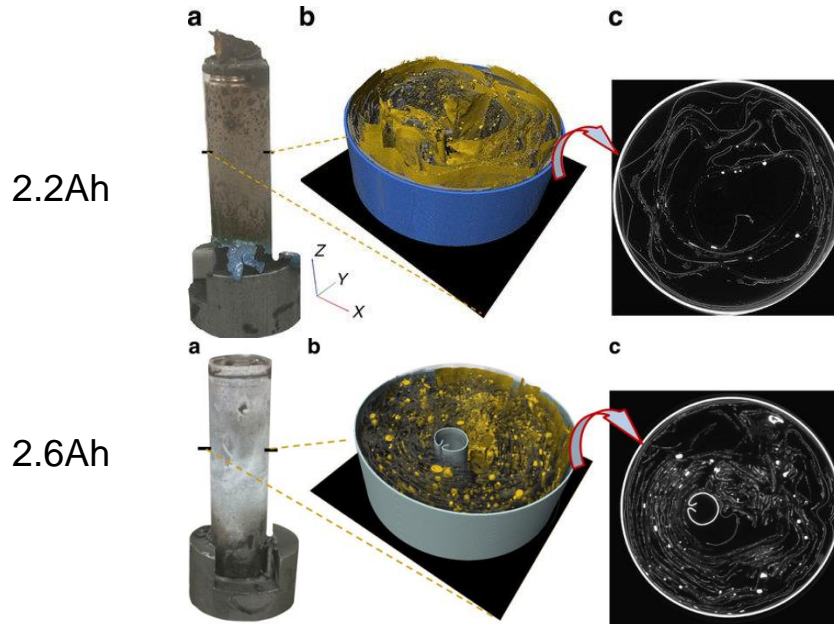
Anti-malaria drugs



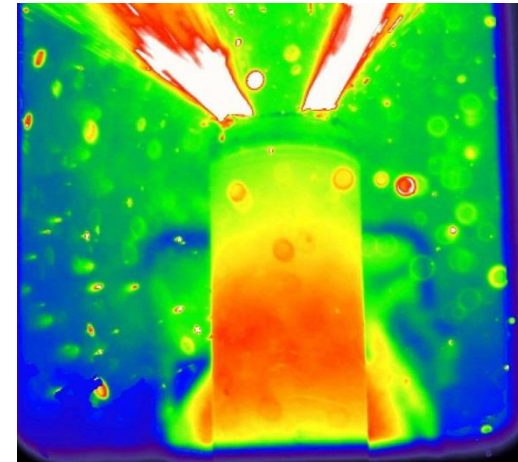
Fe fluorescence in malaria infected red blood cell

Scientific example: Energy and environment

Lithium-ion battery failure



Post-mortem tomography of batteries after thermal runaway (yellow = copper)



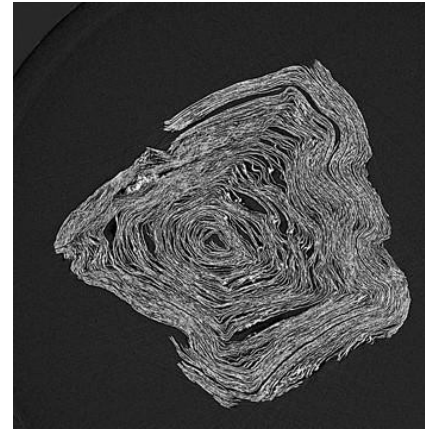
Thermal imaging of a battery undergoing thermal runaway

Scientific example: Cultural heritage

Reading carbonized papyrus scrolls



Herculaneum papyrus scroll



(a)



*Section of the papyrus and
reconstructed alphabet*



Thank you for your attention