



THE **P**ARTNERSHIP FOR **S**TRUCTURAL **B**IOLOGY

A Great Environment for Great Science



Florent Bernaudat – scientific coordinator



The Partners

International Institutions:

- Institut Laue Langevin  NEUTRONS FOR SCIENCE
- European Synchrotron Radiation Facility  ESRF
- European Molecular Biology Laboratory  EMBL

National Institution:

- Institut de Biologie Structurale: CEA, CNRS, Université Joseph Fourier 

PSB

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“A European Centre of Excellence”

The collaboration brings together the remarkable expertise and facilities available for structural biology on this unique international campus.

PSB

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PSB associate member:

- Unit of Virus Host Cell Interaction: CNRS, EMBL, UJF 

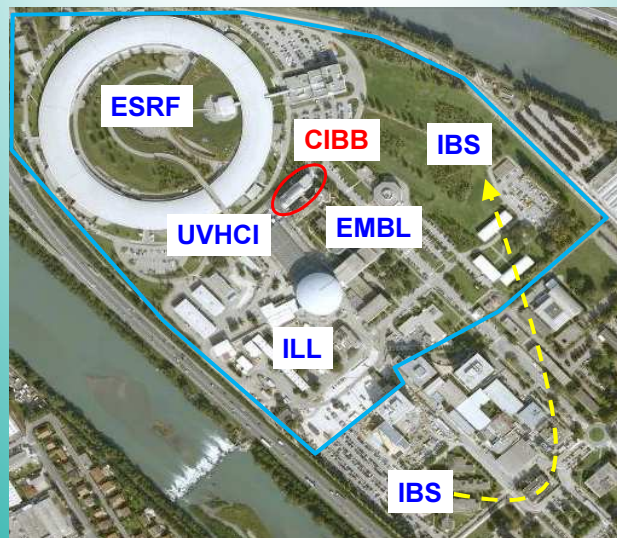


The PSB in 4 dates


- **November 2002:** The PSB was established by a Memorandum of Understanding by the EMBL, the ESRF, the ILL and the IBS
- **January 2006:** Inauguration of the joint laboratory building (Carl-Ivar Brändén Building (CIBB)) for the PSB and Institute for Structural Virology, University Joseph Fourier (IVMS).



- **January 2007:** Merge of the EMBL and the CNRS/University virology unit into UVHCI (Unit of Virus Host Cell Interactions).
- **October 2013:** The IBS moved onto the EPN campus



The Partnership for Structural Biology - Grenoble
350 scientists within walking distances



PSB Training activities

- Crystallography tutorials and SANS/SAXS courses for PSB Students
- EMBO Courses co-organised by the partners
- HERCULES
- Erasmus Mondus Program
- Master in Structural Biology (Univ J. Fourier, Grenoble)



PSB Science

broad and diverse

BIOLOGICAL RESEARCH


Host-Pathogen Interactions
Bacterial pathogens
Immunity
Virology & viral infection

DNA/RNA & Gene Regulation
Nucleic acid structure
Gene regulation

Stress Responses in Prokaryotes
Extremophilic bacteria
Heavy atom homeostasis

Cell Division
Eukaryotes
Prokaryotes

Metalloproteins/Enzymology



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PSB: 200 peer-reviewed articles/year

15% multi-institute authorship



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Cell Division
Eukaryotes
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TECHNOLOGY DEVELOPMENT

Methodologies for Structural Biology
Protein Expression
Crystallisation
Functional Studies
Structural Methods

Instrumentation
Synchrotron
Neutron scattering



PSB: a unique palette of 23 technological platforms for integrated structural biology studies

Protein Expression
Cell Free
ESPRIT
Eukaryotic Expression Facility
Deuteration Lab
Isotopic Labeling
Robiomol


Sample Characterization
Analytical Ultra Centrifugation
Biophysics
Cell imaging
Mass Spectrometry
Membrane Protein Purification Platform
NMR Quality Control
Protein Sequencing
Surface Plasmon Resonance

High Resolution Studies
Cryobench
FIP Beamline (BM30)
High Field Nuclear Magnetic Resonance
HT Crystallisation
HT Membrane Protein Crystallisation
Neutron Diffraction
Structural Biology Beamlines


Supramolecular Structures
Electron microscopy
SANS/ SAXS

PSB

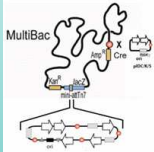
Protein expression




Robiomol



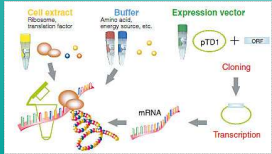
Eukaryotic Expression Facility



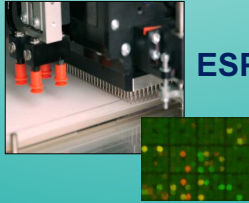
Isotopic Labelling



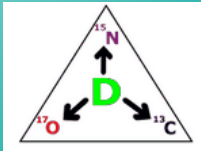
Cell Free



ESPRIT



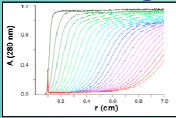
Deuteration Lab




PSB

Sample Characterisation And Preparation

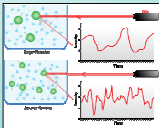
Analytical UltraCentrifugation




1-D NMR




Biophysical platform



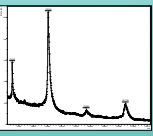
Negative stain EM




Membrane Protein Purification Platform



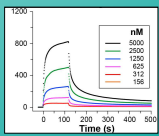
Mass Spectrometry



Protein Sequencing



Surface Plasmon Resonance



PSB

Crystallisation

High Throughput Crystallisation (HTX)

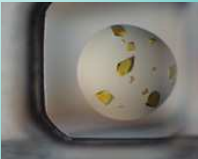


- 200 Regular Users (Over 681 registered scientists)
- 1900 samples processed/year (~1000000 crystallisation experiments)
- Granted access to 110 Scientists in 15 countries (many of which are users of ESRF or ILL)


PSB

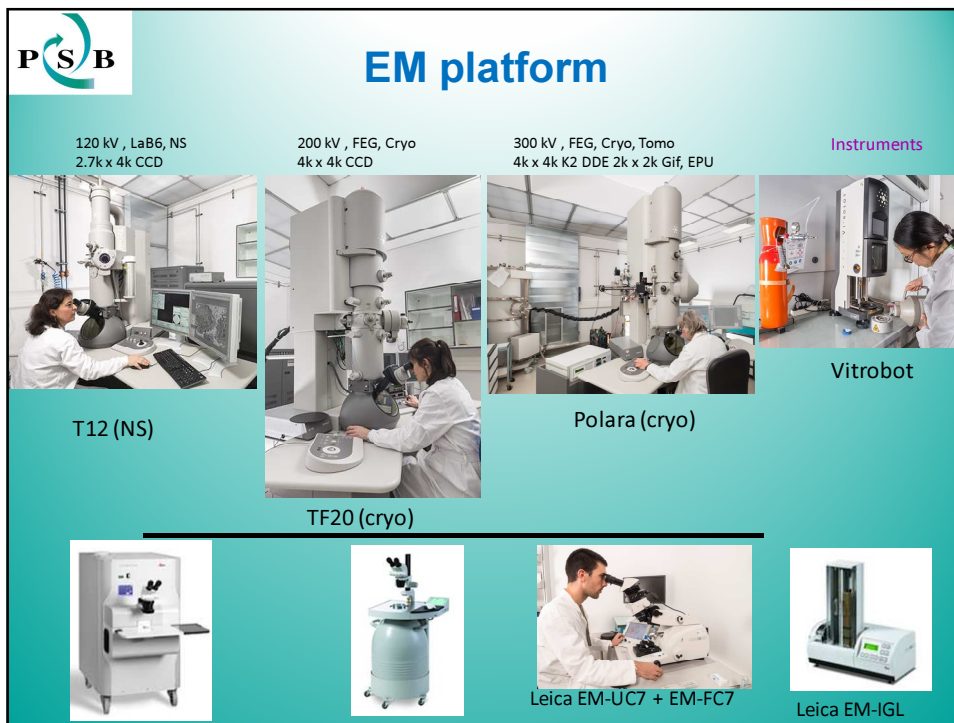
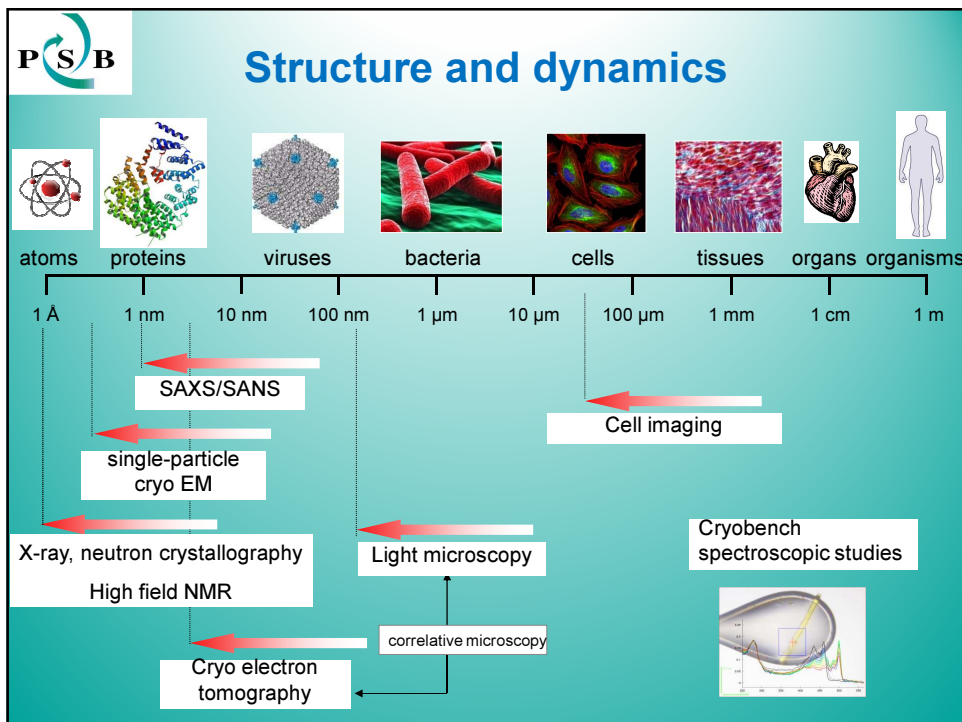
Crystallisation

High Throughput Crystallisation (HTX)



High Throughput Membrane Protein Crystallisation Platform (HTMPC)







High Field NMR Facility



- 6 NMR Spectrometers from 600 to 950 MHz
- State of the art detection probes
- ^1H , ^2H , ^{13}C , ^{15}N , ^{19}F & ^{31}P NMR
- Solution & Solid State NMR applications



Neutron diffraction beamlines

LADI-III: quasi-Laue neutron diffractometer




- Data collection at RT or cryogenic temperatures using Cobra cryostream; e.g. cryo-trapping studies of enzymatic reaction intermediates
- Optimized for high- to medium-resolution (1.5 – 2.5Å) studies of large (50 – 120Å on edge) unit-cell systems using perdeuterated crystals (0.05mm³ – 0.5mm³)

D19: thermal neutron monochromatic diffractometer




- Monochromatic data collection (λ mono 0.8 – 2.4Å, e.g. $\lambda = 1.46\text{Å}$)
- Large (120° x 30°) PSD 'banana' detector
- Optimized for high-resolution (better than 1Å) studies of smaller (30 – 70Å on edge) unit-cell systems using crystals > 1mm³




How to access PSB platforms?

- Peer Review
 - next deadlines
 - ESRF: 1st March 2015
 - ILL: 17th February 2015
- Transnational access (INSTRUCT, BioStruct-X, BIO-NMR,...)
- Collaboration
- Proprietary/paid-for access mode




The Future

- EPN Structural Biology Access Hub web page



The Future

- EPN Structural Biology Access Hub web page
- Integrated access between PSB platforms



The Future

- EPN Structural Biology Access Hub web page
- Integrated access between PSB platforms
 - SAXS/SANS
 - HTX/MX beamlines

PSB www.psb-grenoble.eu

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F-38042 Grenoble
Intranet
contact@psb-grenoble.eu

Partnership for Structural Biology
> Welcome

Highlights of the month

Upcoming events

INSTRUCT-FRSBI-PSB workshop:
MOLECULAR INTERACTIONS: THE COMPLEMENTARITY BETWEEN BIOPHYSICAL METHODS

The goal of this workshop is to provide theoretical, practical and data analysis training in various modern methods for monitoring and quantifying molecular interactions (SEC-MALLS, UAC, SPR, ITC...).

The course will provide brief introduction to the biophysical concepts and theories, practicals to set experiments up on state-of-art instruments and introduction to data analysis methods.

The workshop will take place on
EPN campus - Grenoble
June 1st to 5th, 2015

For more information, please visit the workshop website : <http://workshops.ibs.fr/molecular-interactions>
The number of participants is limited to 20. Application deadline is fixed to March 8th, 2015.

Molecular interactions
The complementarity between biophysical methods
1-5 June 2015 | Grenoble, France

Technical Platforms

- Analysis and characterization
- Biophysical Platforms
- Cell Free expression
- Cryobench
- Deuterium Lab
- Electron Microscopy
- ESPRIT
- Eukaryotic Expression Facility
- FIP-BM30 Beamline
- High Throughput
- Crystallisation
- High-field NMR facility
- Isotope Labelling
- Mass Spectrometry
- MX Beamlines

News

[PSB et al. n°13 \(July 2014\)](#)
[\(p. more info\)](#)

Upcoming events

Next seminars

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