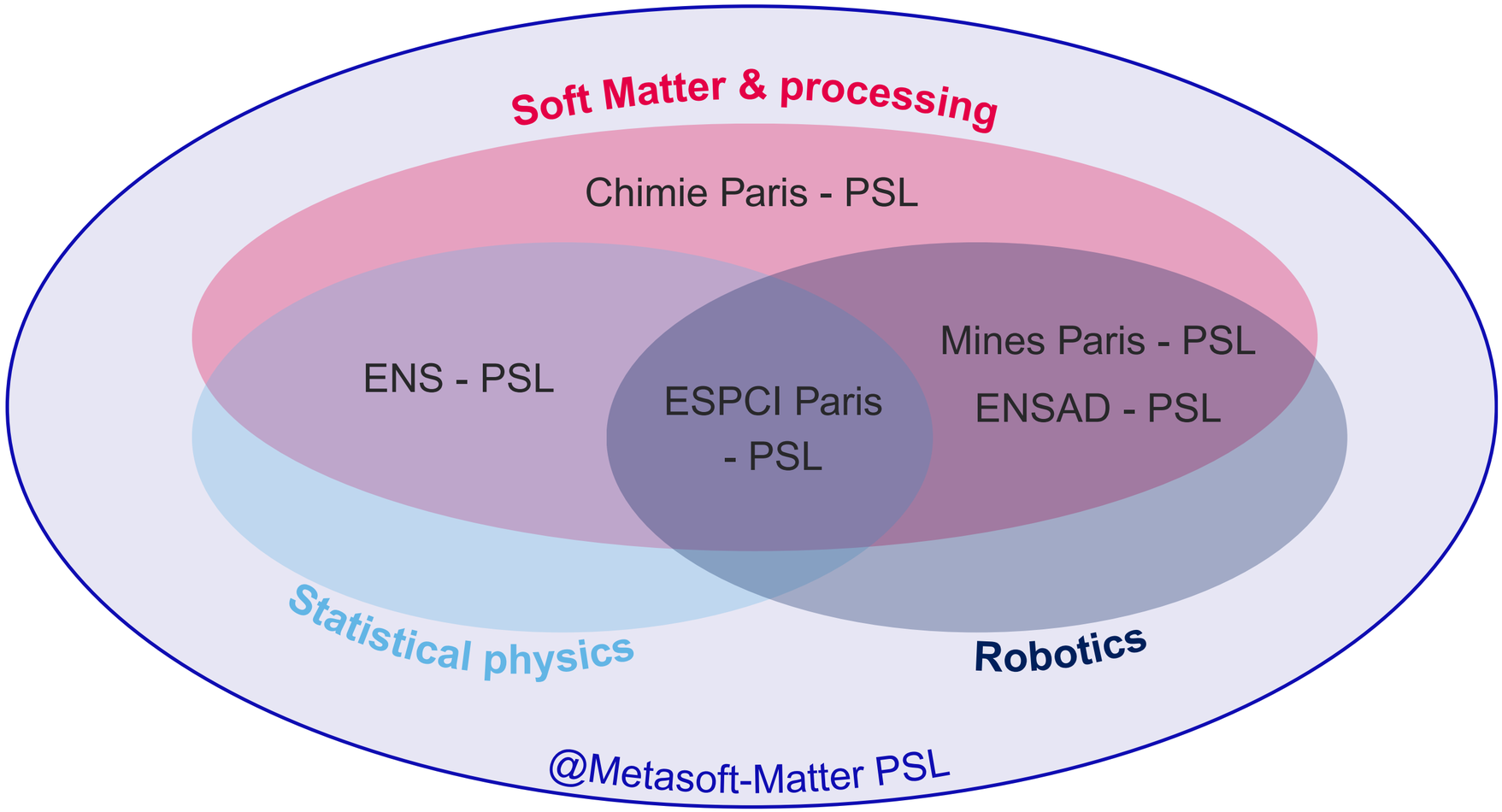
METASOFT MATTER

Grand programme de recherche de l'Université Paris Sciences & Lettres

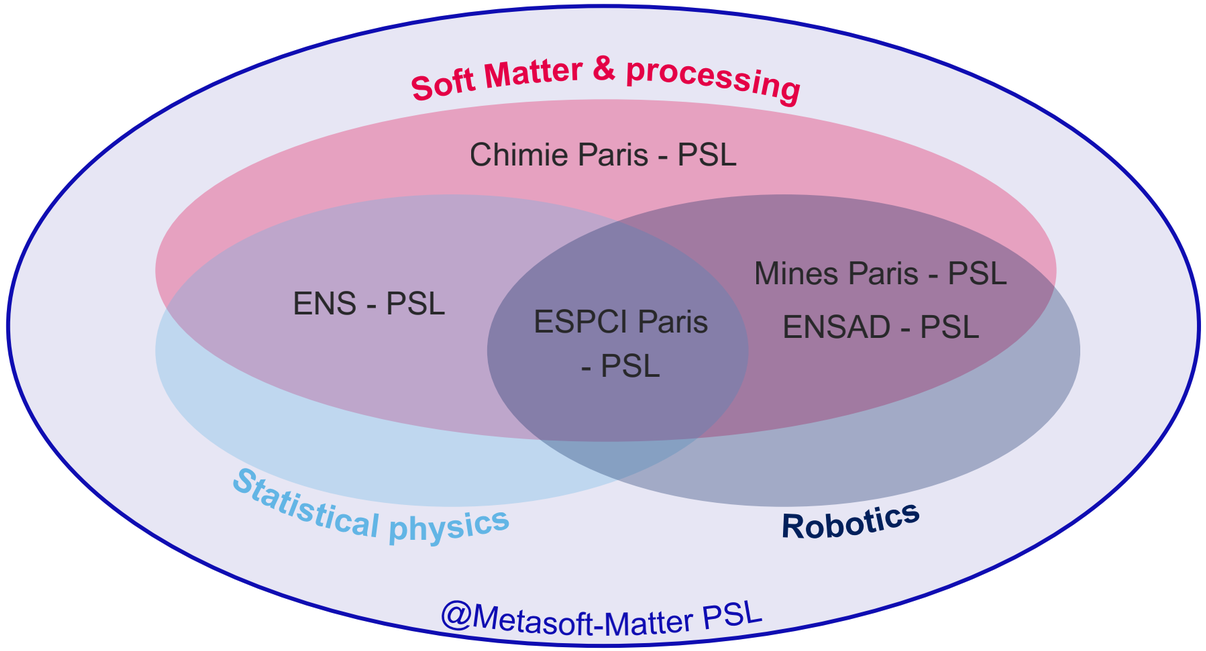
Université PSL's Major research program

METASOFT-MATTER

Major research program



Major research program



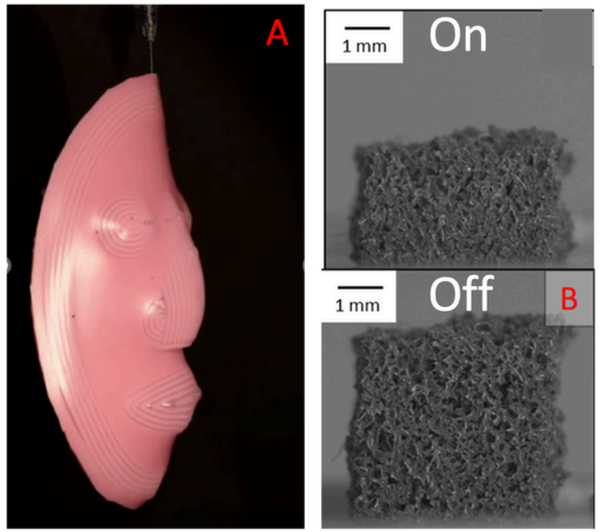
≈ 80 faculty members and 300 PhDs and postdocs

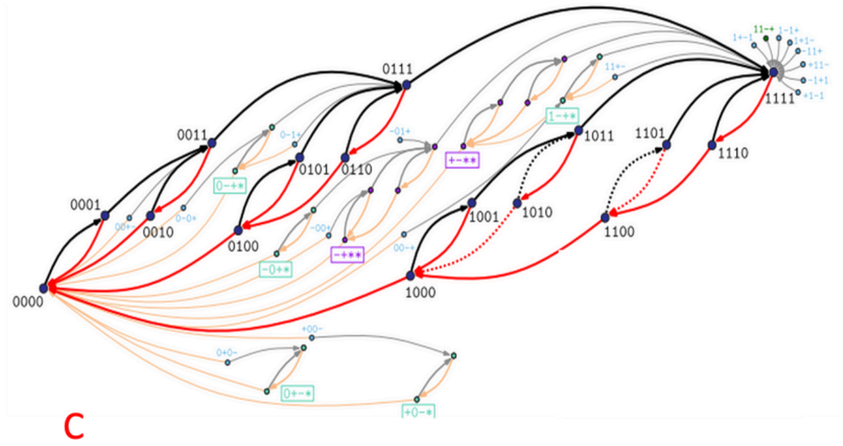
- Chimie ParisTech - PSL (1 team, 4 researchers),
- ENS - PSL (3 teams, 12 researchers),
- Mines Paris - PSL (4 teams, 12 researchers),
- ENSAD - PSL (1 team, 2 researchers)
- ESPCI Paris - PSL (9 teams, 57 researchers)

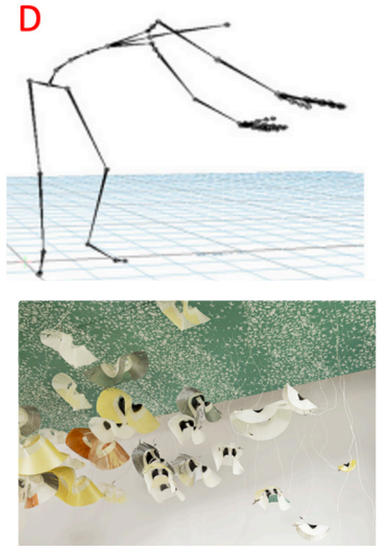
Advisory industrial board :

Urgo, Saint-Gobain, SafranTech, Syensqo, LVMH, Softpath

Scientific perimeter

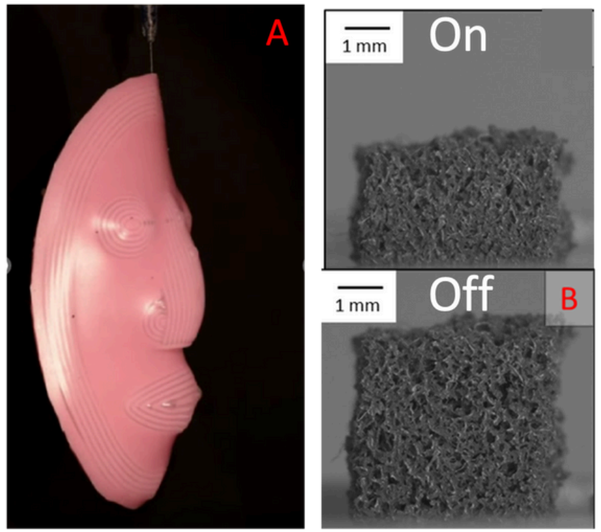


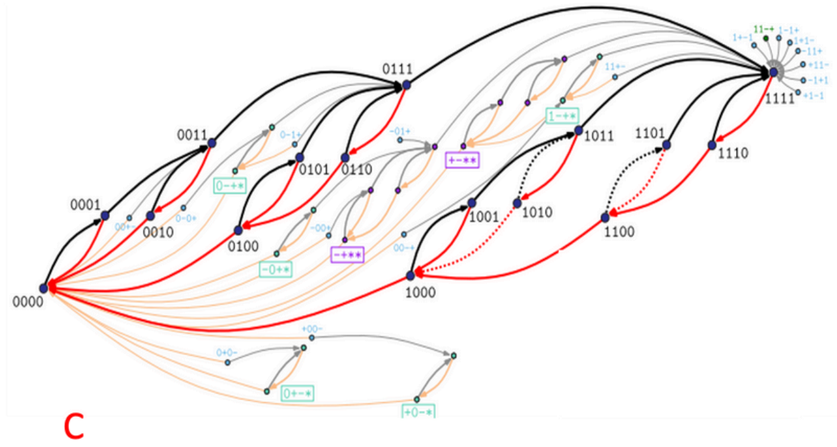


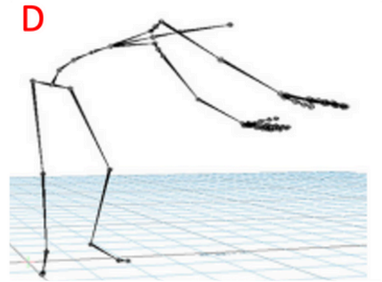


Smart matter	↔	Learning matter	↔	Robotics
ESPCI & Chimie Paris		ENS, ENAD, Mines Paris		Mines Paris

Scientific perimeter



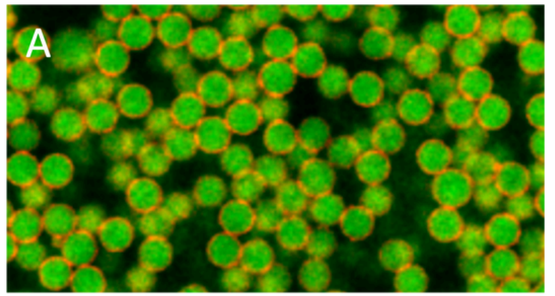


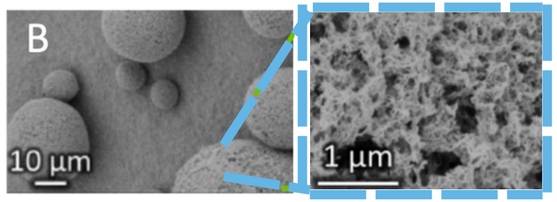


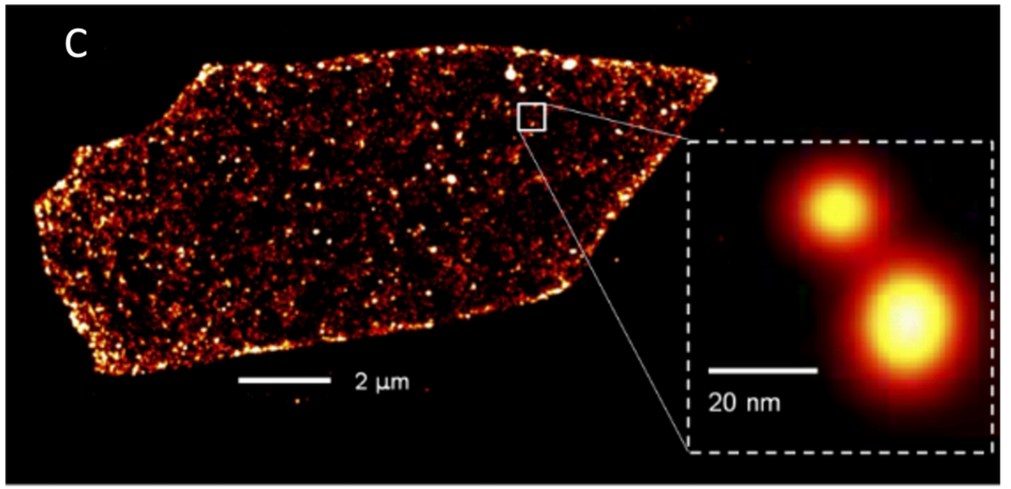
Programmable and learning materials

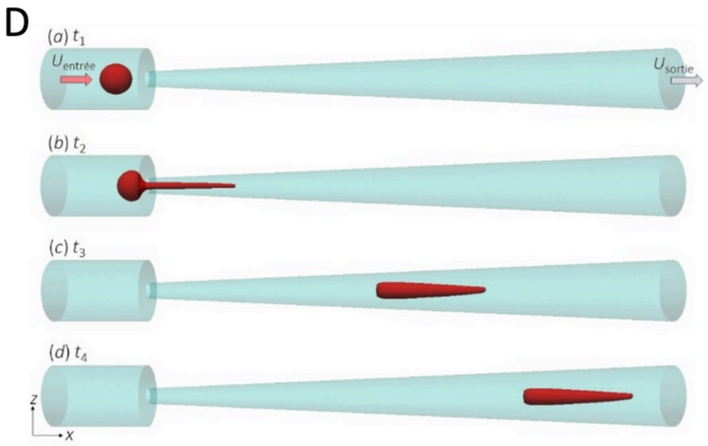
- Can we program soft solids ?
- Whichmaterials are suitable for programming soft matter ?
- Can we create evolving soft matter ?
- Can we train soft matter ?
- What are the synergistics applications withrobotics ?

Scientific perimeter









Complex fluids
ESPCI & Mines Paris

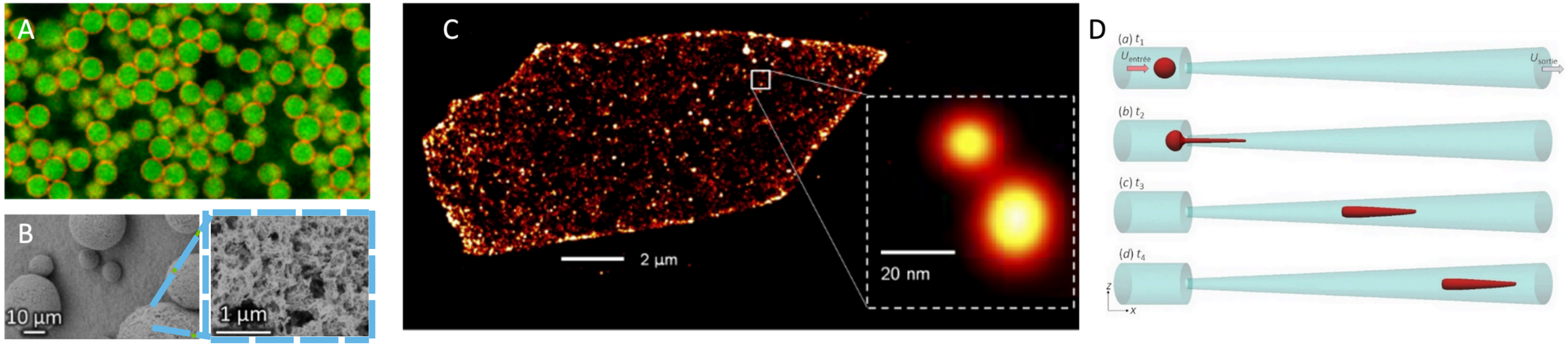
↔

New tools & methods
ESPCI, ENS, Mines Paris

↔

Controled particles
ESPCI & Mines Paris

Scientific perimeter

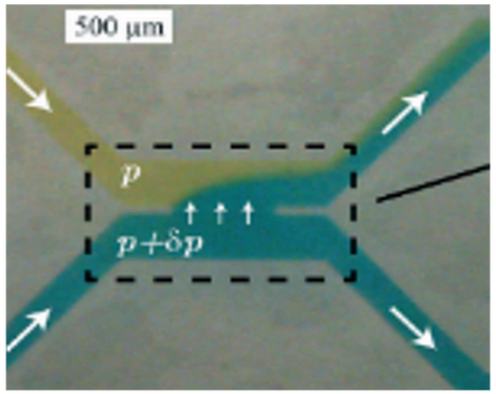


Complexfluids and suspension

- How to produce model particles with controlled shapes and surface properties ?
- How to measure the friction and adhesion between particles ?
- What is the role of reactivity and activity in the rheology of complex fluids ?
- How do soft solids behave under large deformations ?
- How to observe and control phase transitions in passive and active suspensions ?

Scientific perimeter

A



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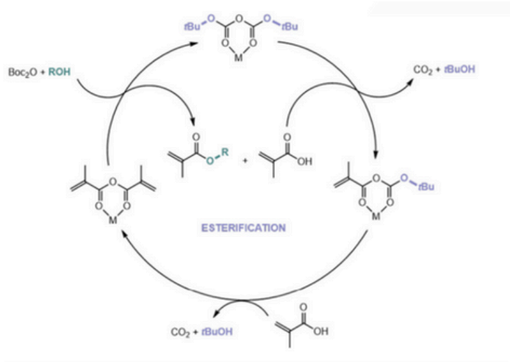

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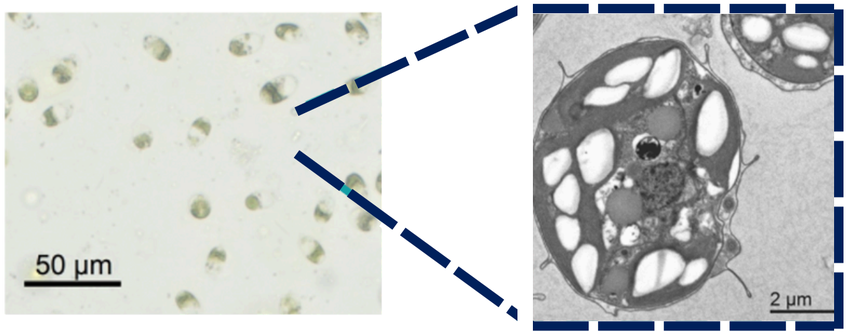


Filtration & desalination
ESPCI & CEMEF

↔

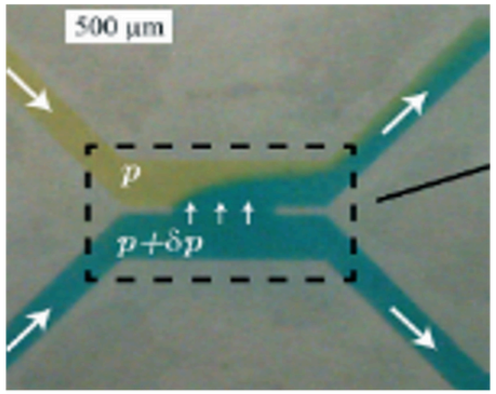
Metal recycling
ESPCI, CEMEF, Chimie Paris

↔

Catalysis and CO_2 valorization
ESPCI & Chimie Paris

Scientific perimeter

A



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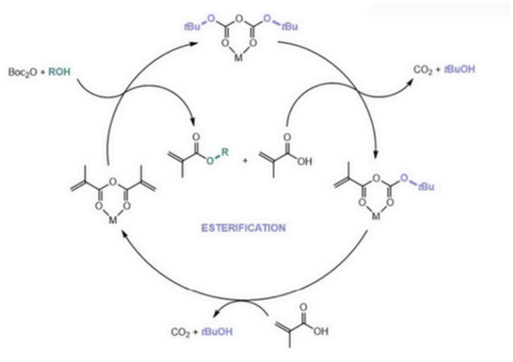

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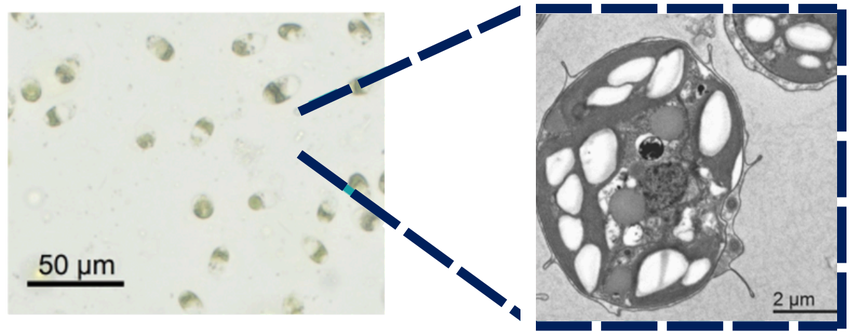


Soft matter for sustainability

- Using soft matter science for innovative recycling/upcyclingprocesses ?
- Can flows of liquid in soft materialsprovide new opportunities for water filtration or evaporative cooling ?
- Can we use self-assembly to produce soft opticalmaterialswith radiative coolingproperties?
- Can soft matter and soft materialsbeused for CO2 capture and valorization ?

Governance

Governing board

- Tatiana **Budtova** (Mines Paris),
- Elie **Hachem** (Mines Paris),
- Matthieu **Labousse** (ESPCI),
- Frédéric **Lechenault** (ENS),
- Cécile **Monteux** (ESPCI)

Supervisory board

- Cécile **Cottin-Bizonne** (Univ. Lyon 1),
- Yoël **Forterre** (Aix-Marseille Univ.),
- Jean-François **Joanny** (Collège de France),
- Sotiris **Manitsaris** (Mines Paris),
- Aurélie **Mossé** (ENSAD),
- Carine **Robert** (Chimie Paris),
- Nicolas **Vandewalle** (Liège Univ.),
- Invited chair (1 year rotation)

Industrial board

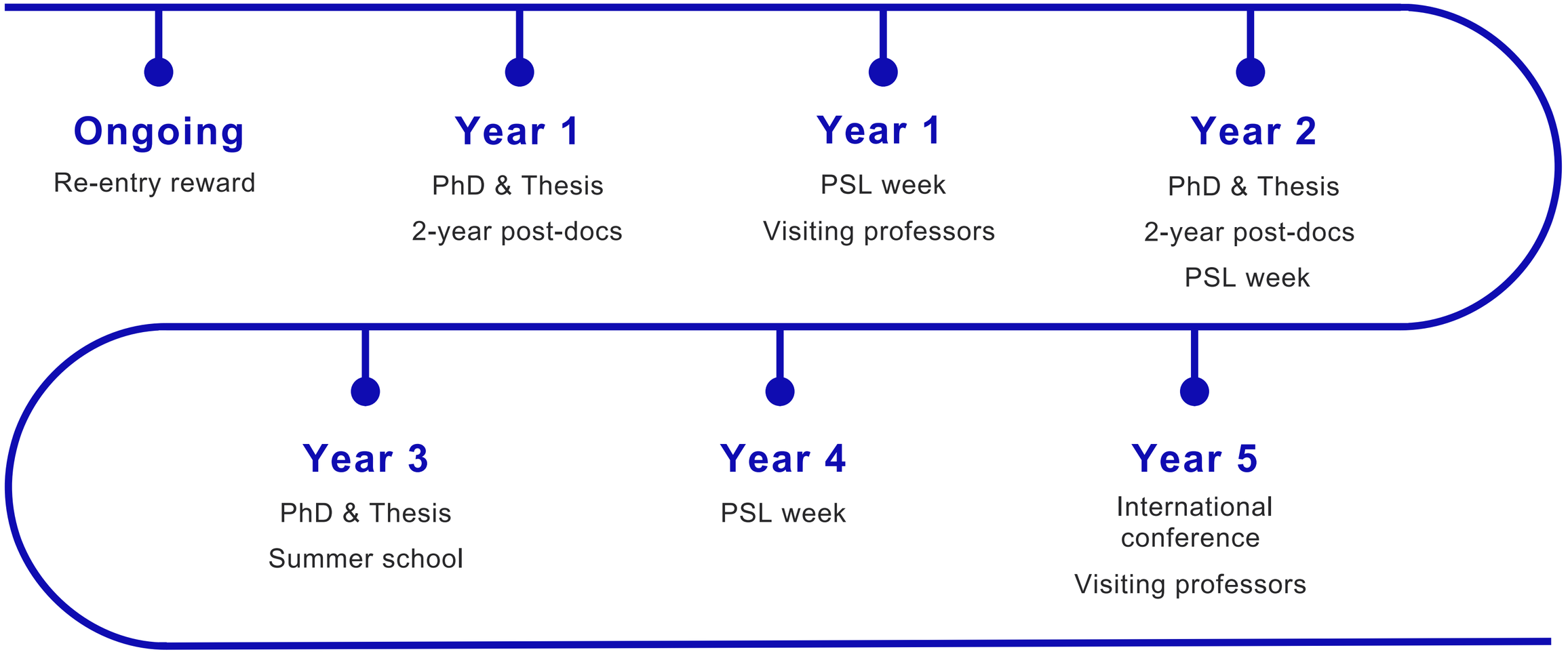
- Stéphane **Auguste** (Urgo),
- Fabien **Casenave** (Safran),
- Emmanuelle **Gouillart** (Saint-Gobain),
- Thierry **Le Mercier** (Syensqo),
- Ramy **Nemer** (Softpath),
- Karl **Pays** (LVMH)

Main actions

Budget of **2.75** million euros

- 10 PhD thesis + support (6 standards + 4 starting)
- Leverage effect for 5 theses (COFUND)
- Three 2-year post-docs
- International conference
- Summer school
- 3 PSL days (2-days workshops)
- Visiting professors
- Re-entry reward
- Exhibition for the general public, organized by ENSAD

Dates 2025 to 2029



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Thank you