

Fig. 7.1.1: Advanced analytical techniques for nanomaterials (AFM = atomic force microscopy, INS = inelastic neutron scattering, IXS = inelastic x-ray scattering, NMR = magnetic resonance, QNS = quasielastic neutron scattering, STM = scanning tunnelling microscopy, TEM = transmission electron microscopy).

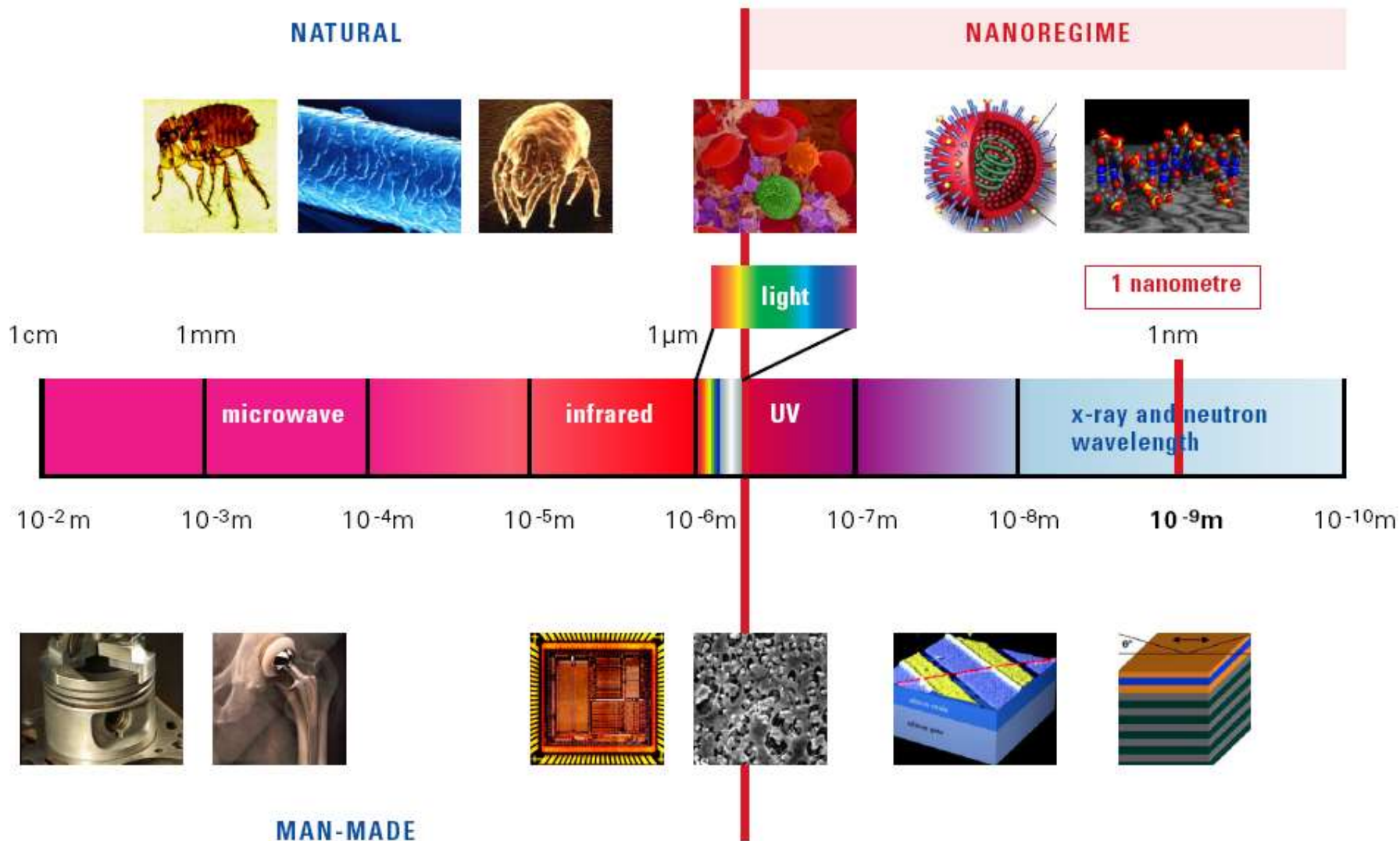


Fig. 1.2: Typical length scales in current and future technologies.

MEDIUM TERM CHALLENGES

FUNCTIONAL AND INTELLIGENT MATERIALS

- SENSORS
- PHOTOVOLTAICS
- ENERGY
- MOLECULAR RECOGNITION

HYBRIDS

NEW MATERIALS AND COMPOSITES

A SYNTHETIC ROUTE TO
SIMULTANEOUS PROPERTY
ENHANCEMENT

(e.g. IMITATION OF MOLLUSCAN SHELLS)

INORGANIC MATERIALS

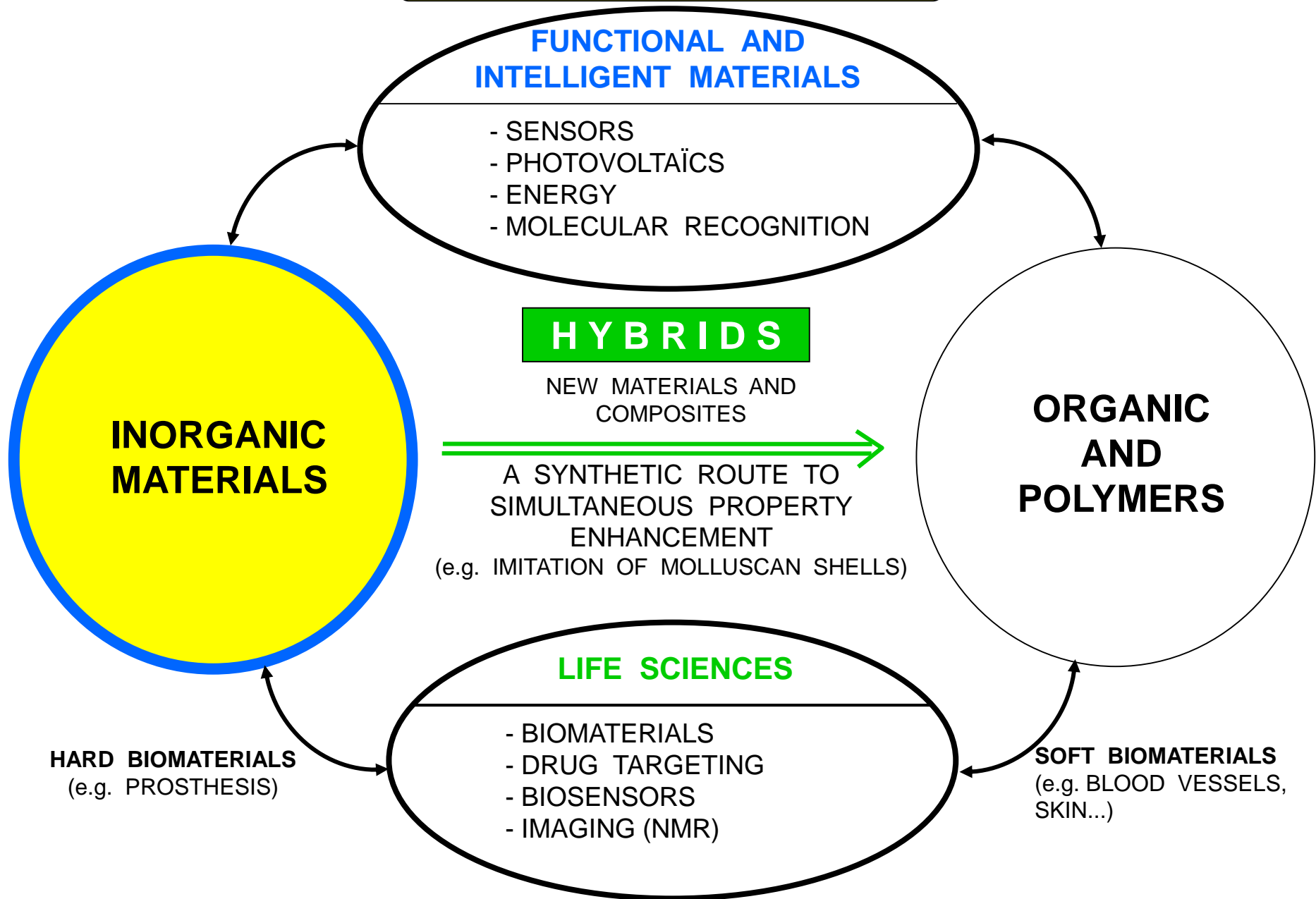
ORGANIC AND POLYMERS

LIFE SCIENCES

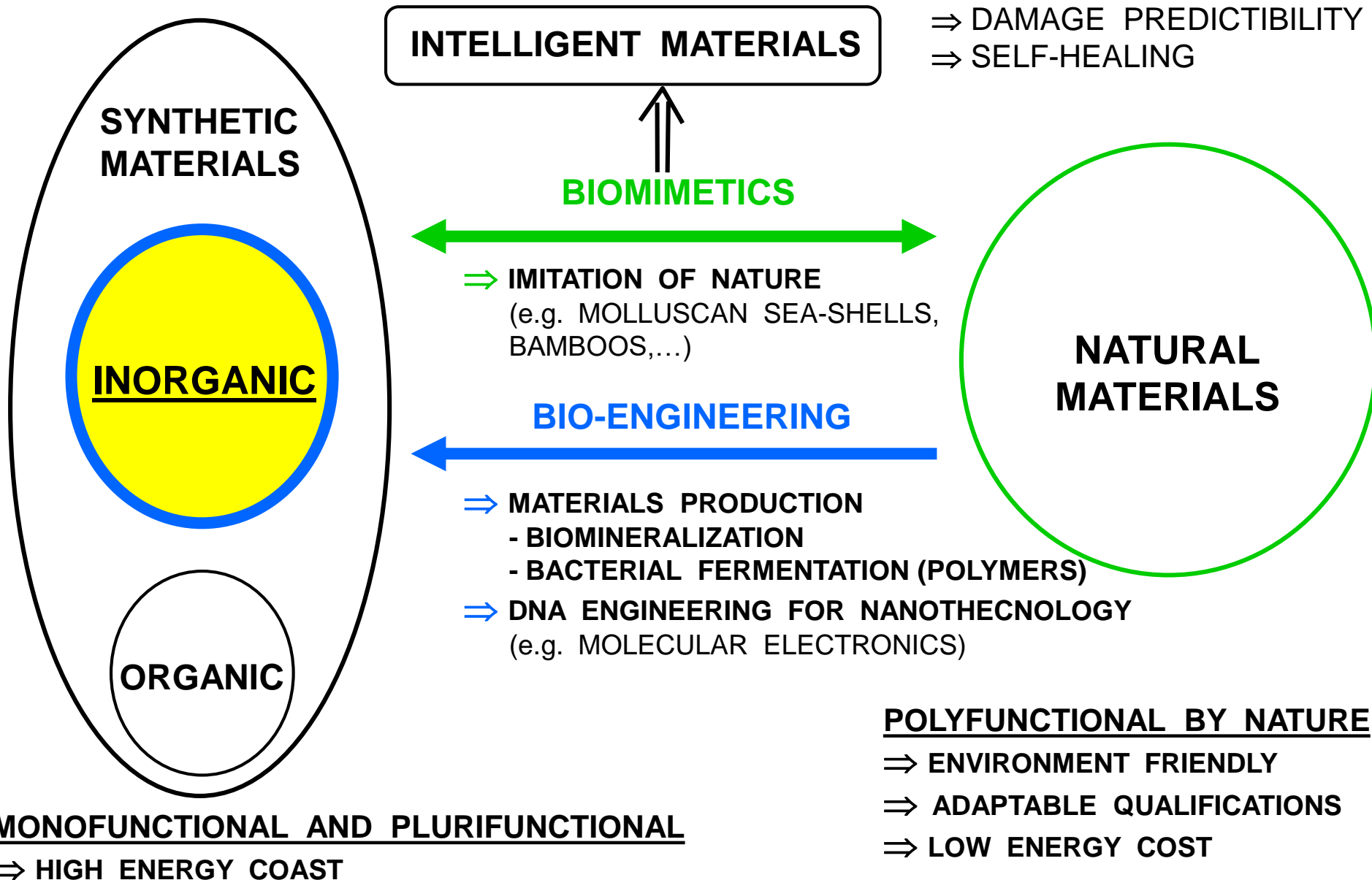
- BIOMATERIALS
- DRUG TARGETING
- BIOSENSORS
- IMAGING (NMR)

HARD BIOMATERIALS
(e.g. PROSTHESIS)

SOFT BIOMATERIALS
(e.g. BLOOD VESSELS,
SKIN...)



REVOLUTIONARY : NEW VISIONS FOR MATERIALS AND PROCESSING



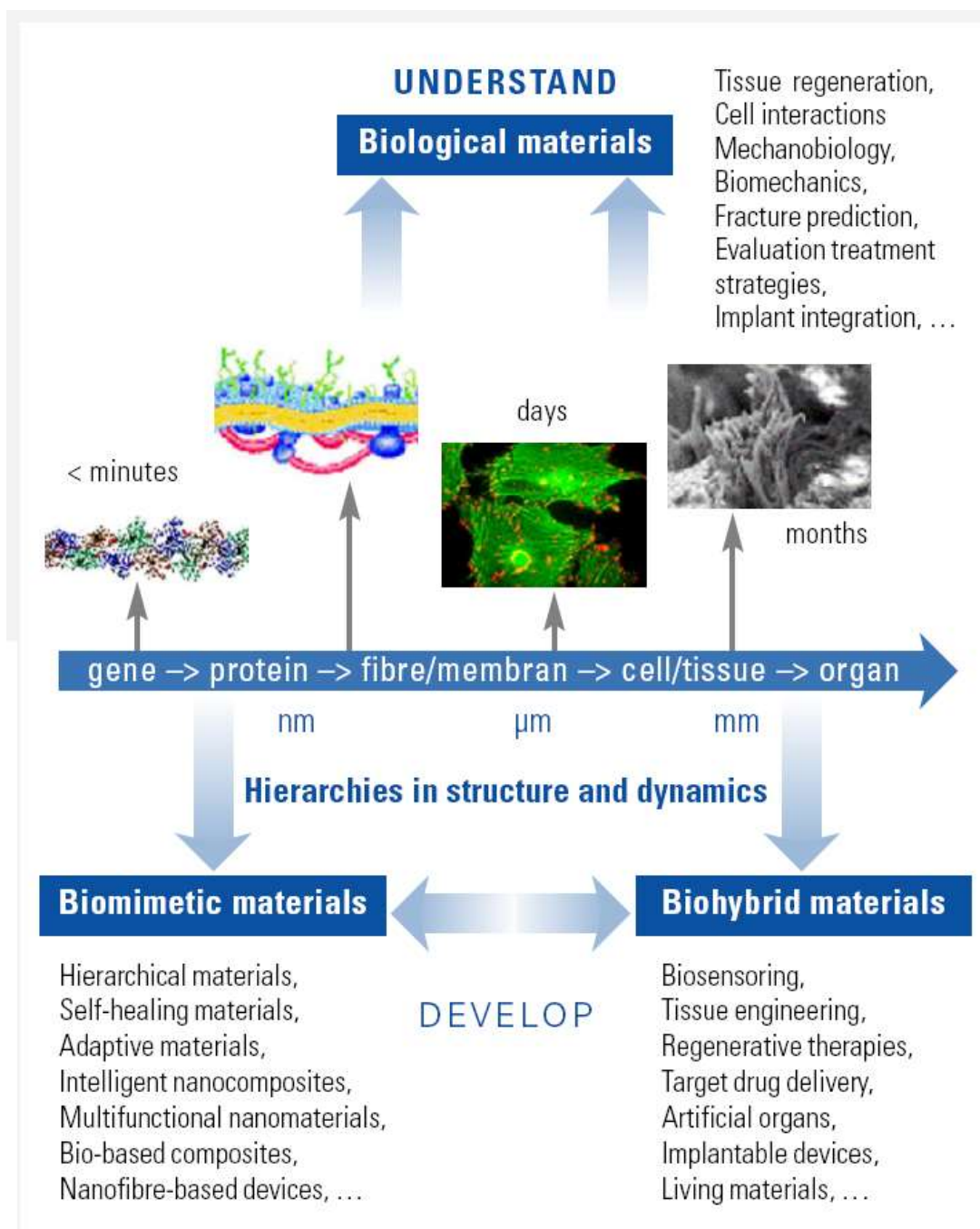


Fig. 3.XX: Overview of research directions in bio-nanomaterials.

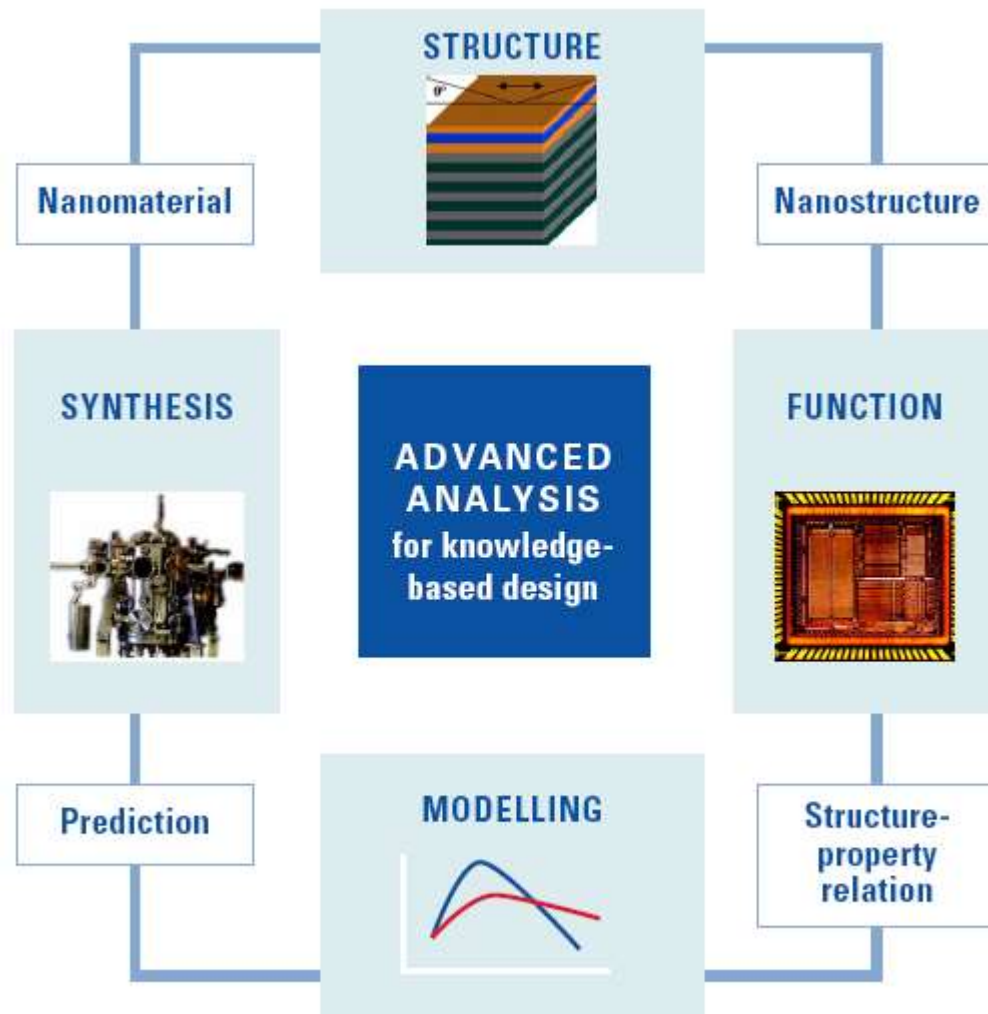


Fig.1.4: Role of advanced analysis for nanomaterials science and nanotechnology.

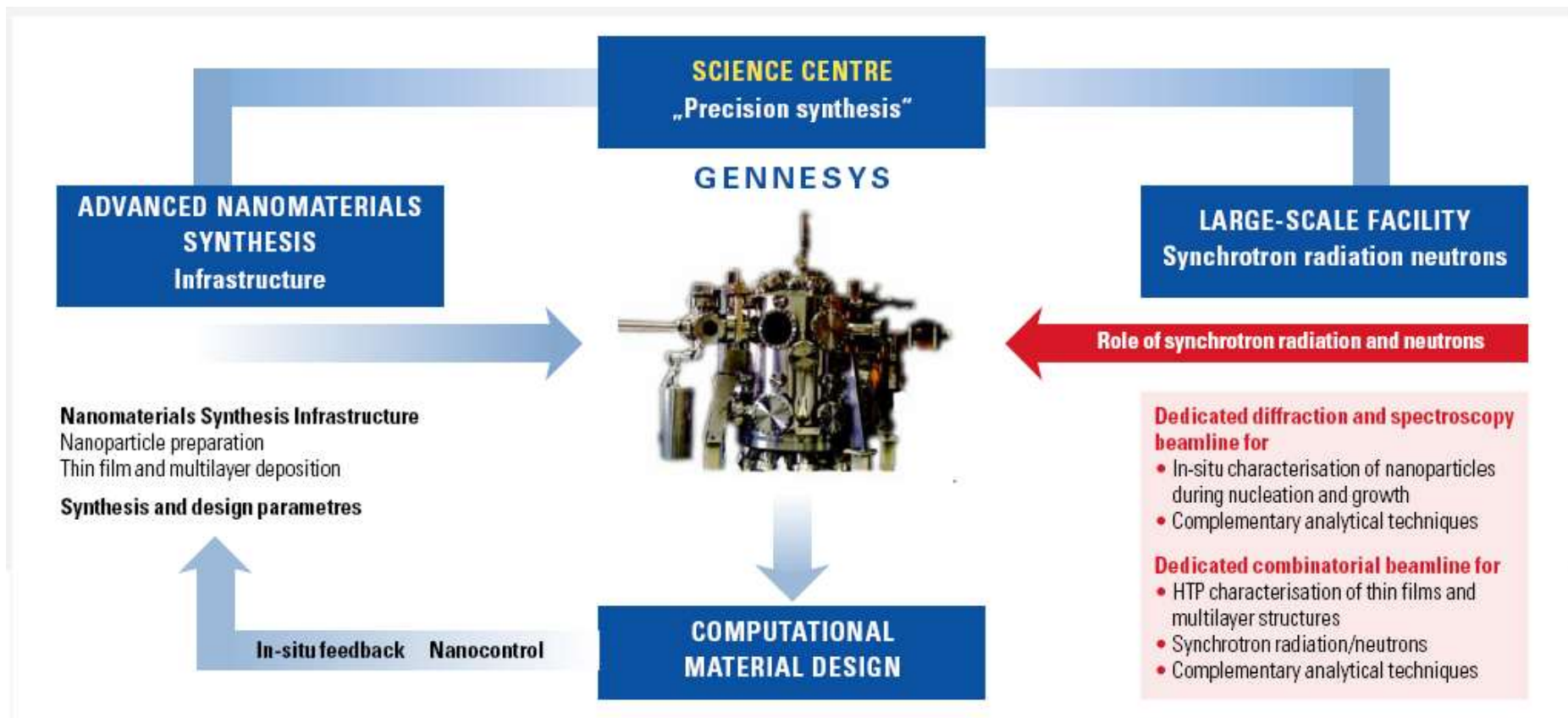


Fig. 2.23: Structure of a science centre on "precision synthesis".

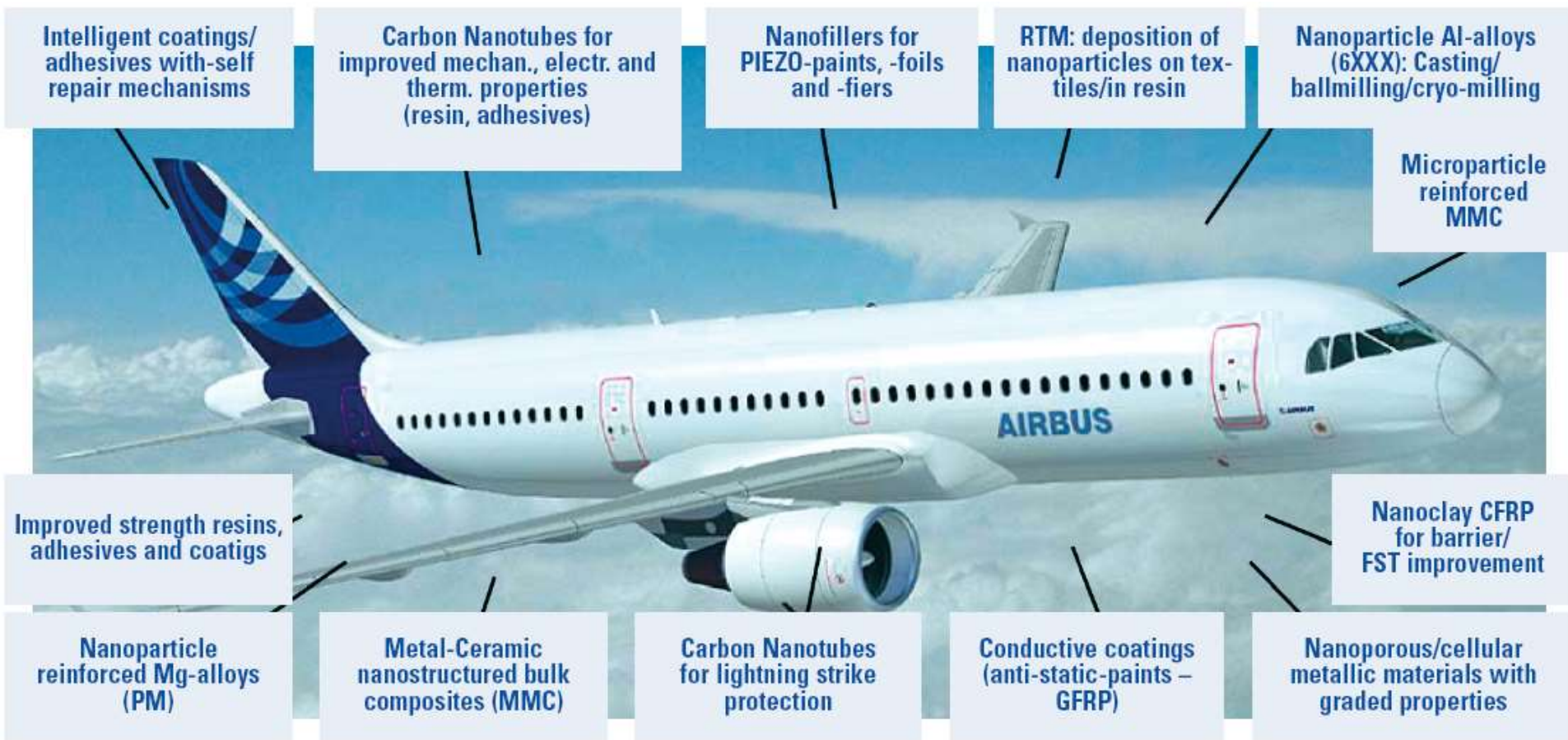


Fig. 4.5.6: Nanomaterials applications in aircraft.

STRUCTURAL INTEGRITY IN GAS TURBINES

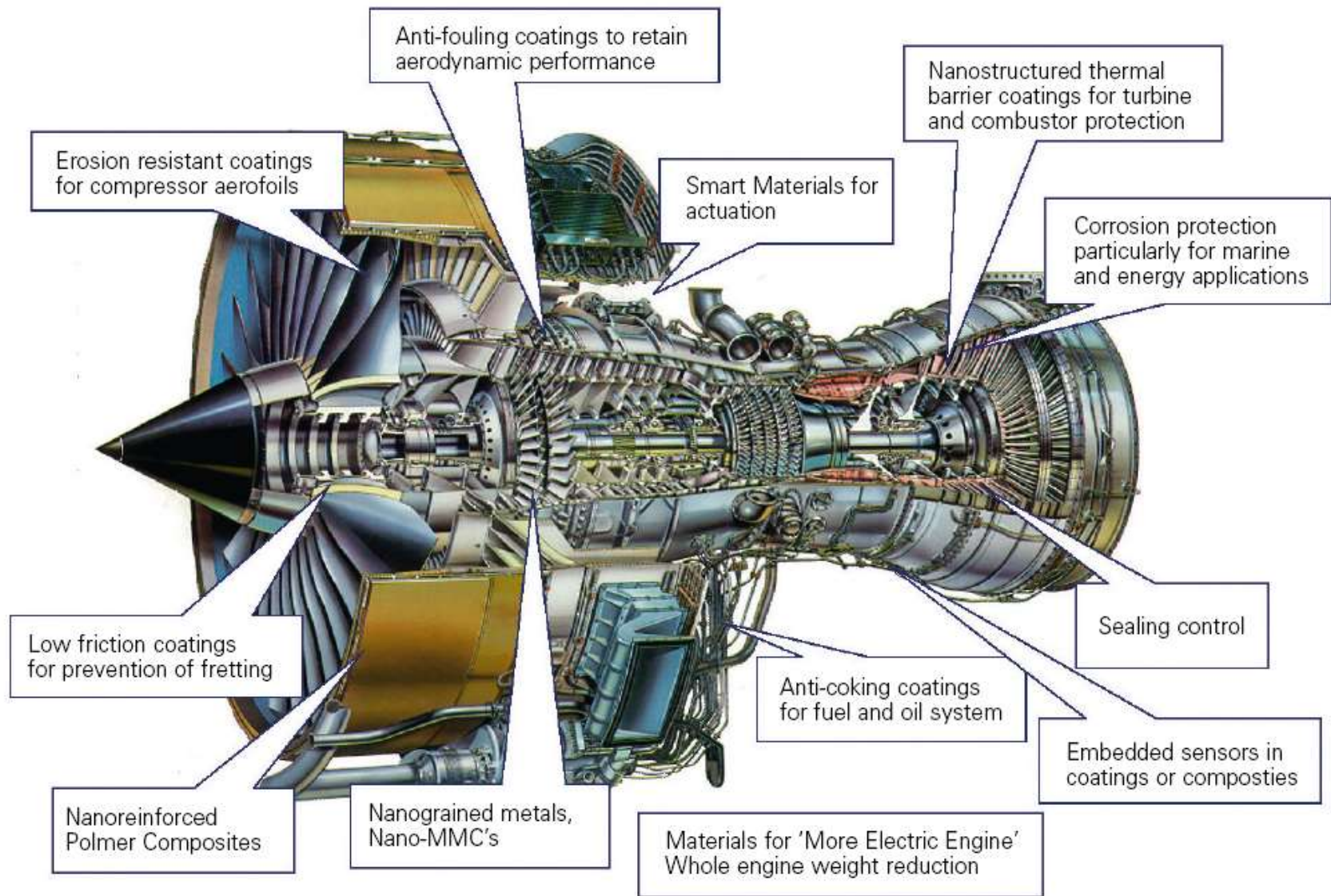


Fig. 4.5.9: The role of nanomaterials in the aeronautics propulsion systems sector.

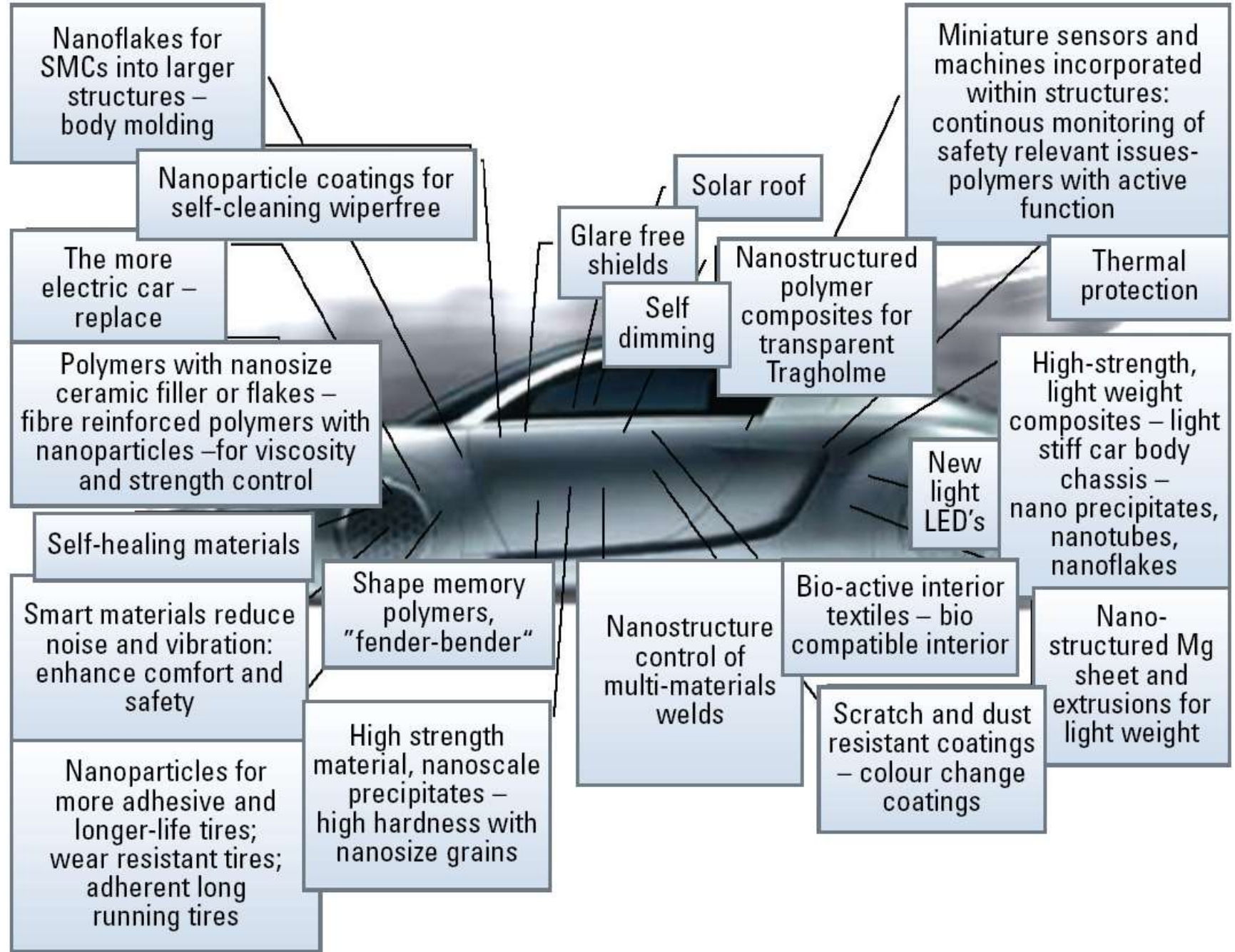


Fig. 4.5.12: The role of nanomaterials in the car structure.

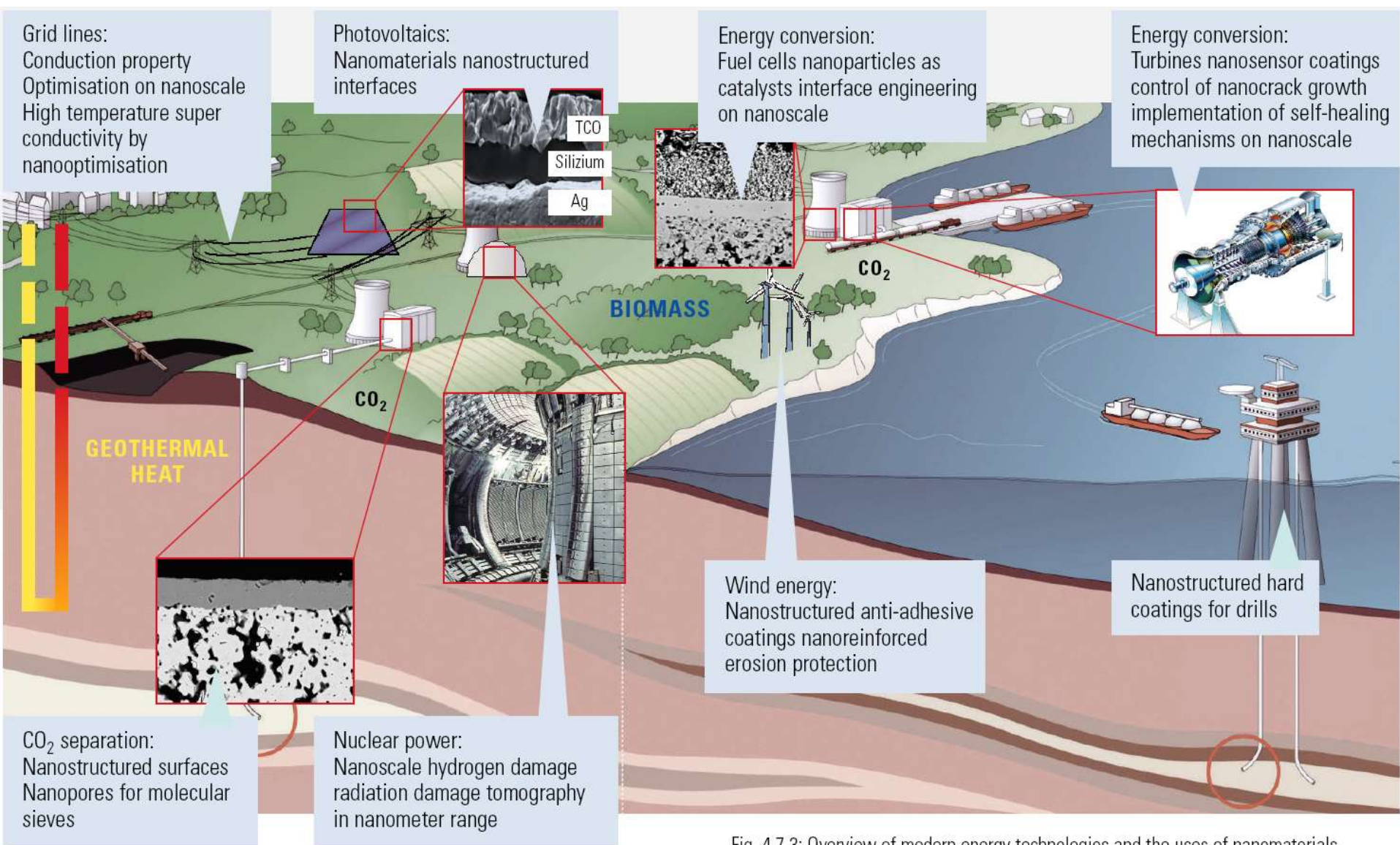


Fig. 4.7.3: Overview of modern energy technologies and the uses of nanomaterials.

University Education

- Fundamentals of (nano)science: Physics, Chemistry, Biology,
- Scientific aspects of (nano)materials
- Social sciences
- Foreign languages

Educational in nanomaterials

Industrial innovation

Key technologies

- Information & Communication Technologies
- Health care
- Energy & Transport
- Chemistry & Petro chemistry
- Environment & Toxicology & Safety

Technological challenges; including industrial problems

Economical aspects

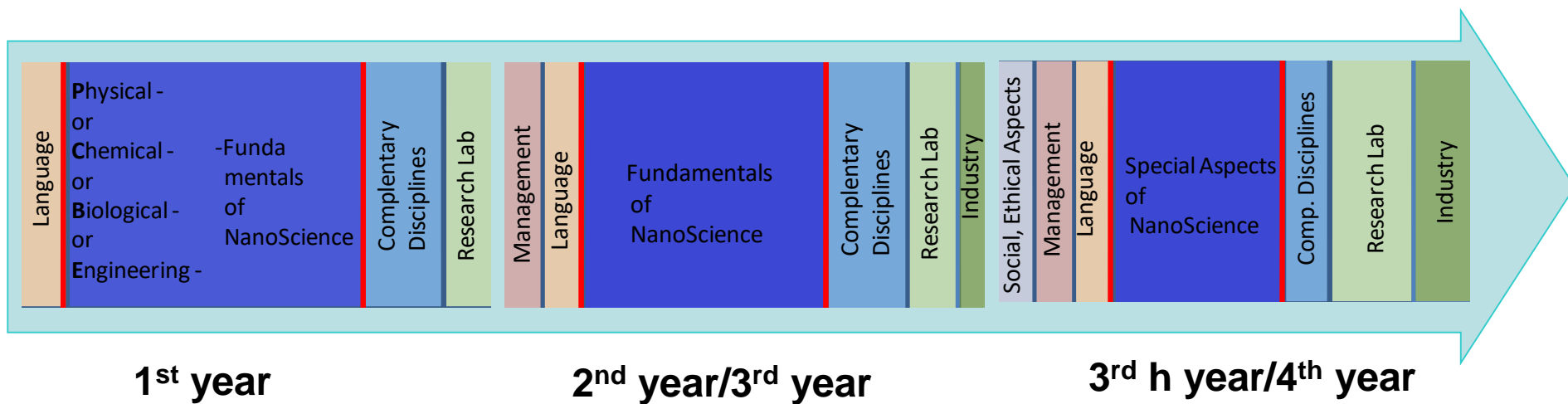
International Business

Research & Development

- Expertise in (nano)materials science
- Knowledge in (nano)engineering
- Technological challenges
- Literacy in management and international relations
- Law and ethical aspects



Syllabus
Master Programme



Brilliance of human resources
Interdisciplinary education

(Nano)materials European college
Economic competition & welfare of society

Industrial innovation and promotion

- Key technologies: energy, transport, information technology
- Early introduction to industrial environment
- Information on current technology exchanges
- Early contact to industrial management

Modern research centres

- International collaboration and mobility
- Provide leading scientists & advanced concepts for (nano)materials design
- Early access to complex research infrastructures

for Students

- Masters and PhDs: one curriculum should lead to degrees recognized across Europe;
- Courses from top experts on Literacy and Management Skills;
- Qualified for promotion to leading positions in universities, research institutes, industry and government in Europe;
- Flexible conditions for a degree programme. Students select the time- as short as they can do it and as short as they want to do it;
- Contact with key industrial issues.

for Universities

- Criteria and models are made for new and competitive nanomaterials education and to set up nanomaterials schools in Europe;
- Excellence-led initiatives will attract internationally the best students;
- Joint academic appointments across disciplines, between universities and industries;
- New professional degree programmes with research institutes, large test facilities and industry;
- Knowledge integration and transfer in addition to knowledge creation

for Research Institutes

- Seek synergies between, and promote collaboration between, the best materials research centres in Europe in order to make them internationally competitive;
- Promote and streamline new European cutting edge materials research centres

for Industry

- Recruitment of talented and skilled graduates in science and engineering, offering a reliable reference standard for recruitment;
- Direct contact with new scientific discoveries;
- Participation in the industrial innovation process;
- Creation of spin-off companies, with trained students involved in mature decision making processes.

for Society

- Generate talented young people;
- The best people working on the best science for the benefit for all Europe;
- Job creation in Europe for technical, administrative and service positions in support of the new nanoindustries;
- Promotion of wealth from new techniques and applications;
- Protection of the environment.

Masters and PhD with a European Degree
Top-Experts with literacy and Management Skills
Promotion for leading positions in Europe

Benefits for society

- Generate talented young people
- Direct contact with new scientific discoveries
- The best people working on the best science for the benefit for all Europe
- Job creation in Europe for technical, administrative and service positions
- Promotion of wealth from new techniques and applications
- Protection of the environment

