

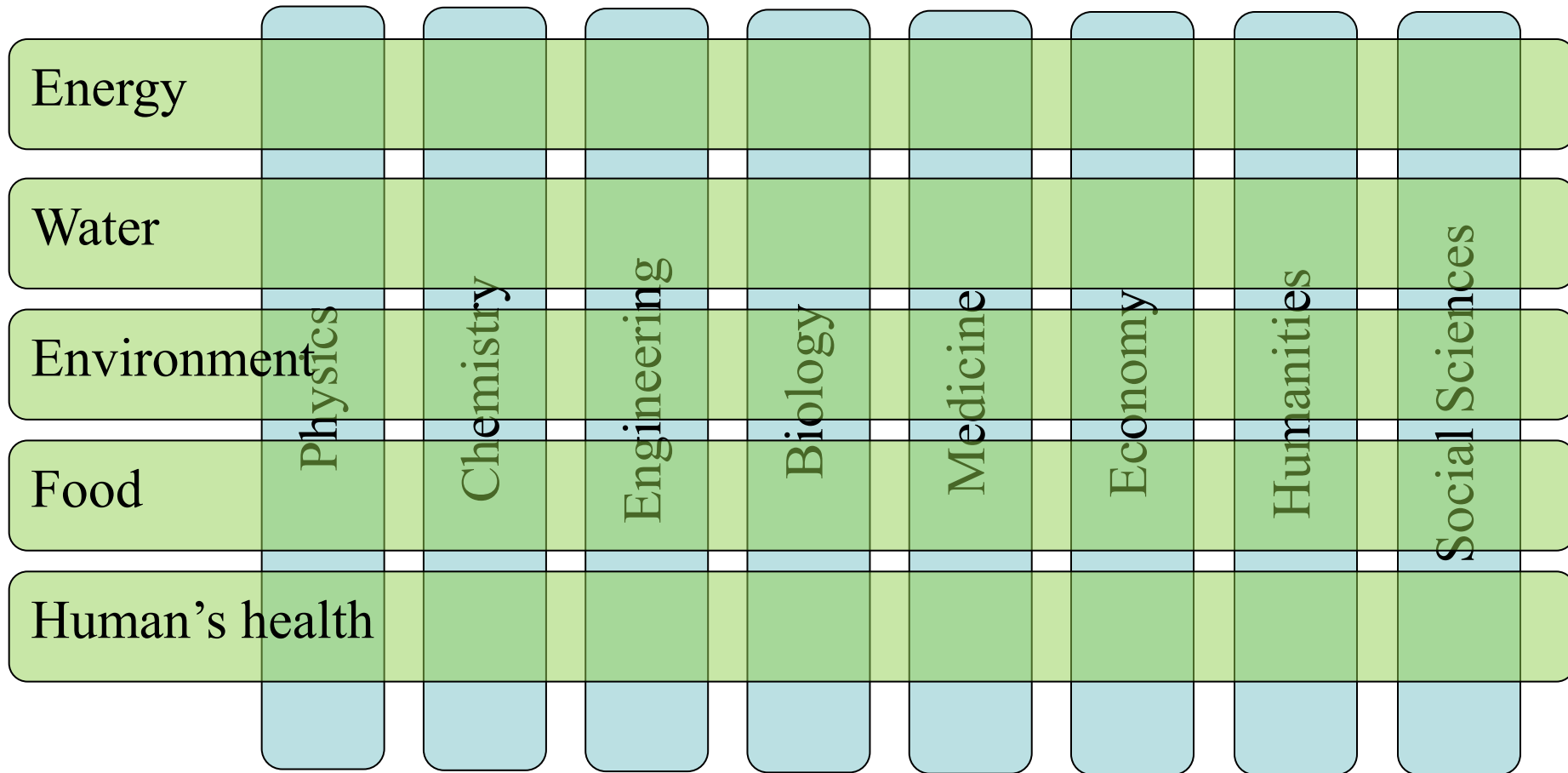
**“ Collaboration in
Danube:
creating an attractive
environment to facilitate
investments ”**

Maurizio Fermeglia

rettore@units.it



Disciplines and relevant themes for the world





Horizon2020 Structure

Societal Challenges

- Health, demographic change and wellbeing
- Food security, sustainable agriculture and bio-economy
- Secure, clean and efficient energy
- Smart, green and integrated transport
- Climate action, efficiency and raw materials
- Inclusive, innovative and secure societies

Industrial Leadership

leadership in enabling and industrial technologies

KET

facilitate access to risk finance

support for innovation in SMEs

ICT

Advanced materials

Biotechnologies

Advanced Manufacturing

Space

Nanotechnologies

support for cross-cutting actions combining several Key Enabling Technologies

Horizon 2020

Excellence Science

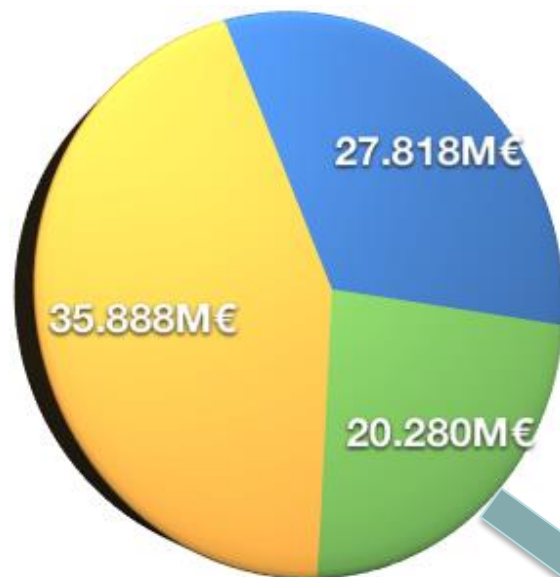
Marie Curie actions

Support for Future and Emerging Technologies

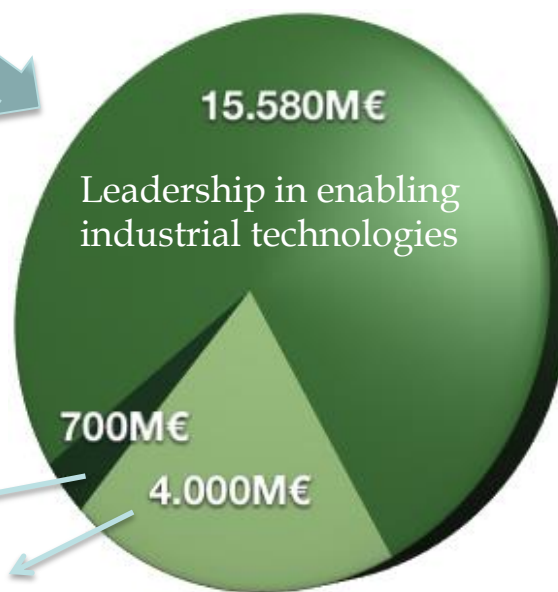
Research infrastructures (including e- infrastructures) accessible to all researchers in Europe

Support the individuals and their teams to carry out frontier research by building on the success of the European Research Council

Horizon2020 Budgets

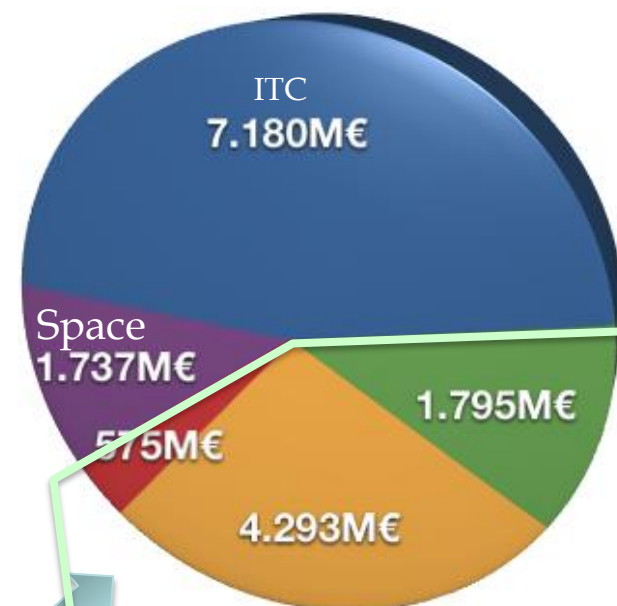


- Industrial Leadership
- Societal Challenges
- Excellent Science



Innovation for SMEs

Access to risk finance

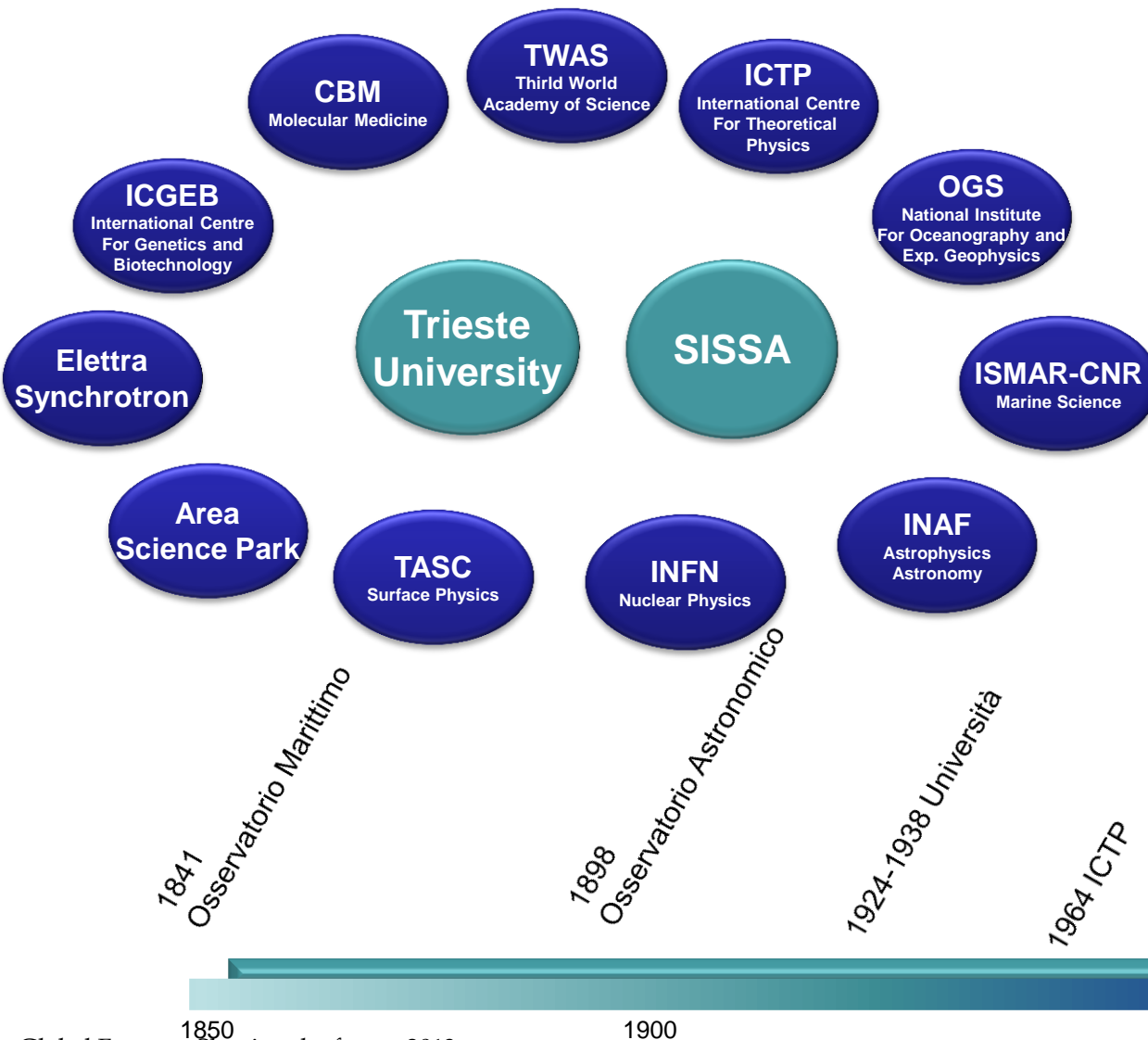


KETs

- Nanotechnology, Advanced material and Advanced manufacturing/processing
- Photonics and micro-electronics
- Biotechnology



Trieste System



Over 30 researchers every 1,000 active citizens (8.1 in USA, 9.1 in Japan, 5.7 in Europe)

1850

1900

2000

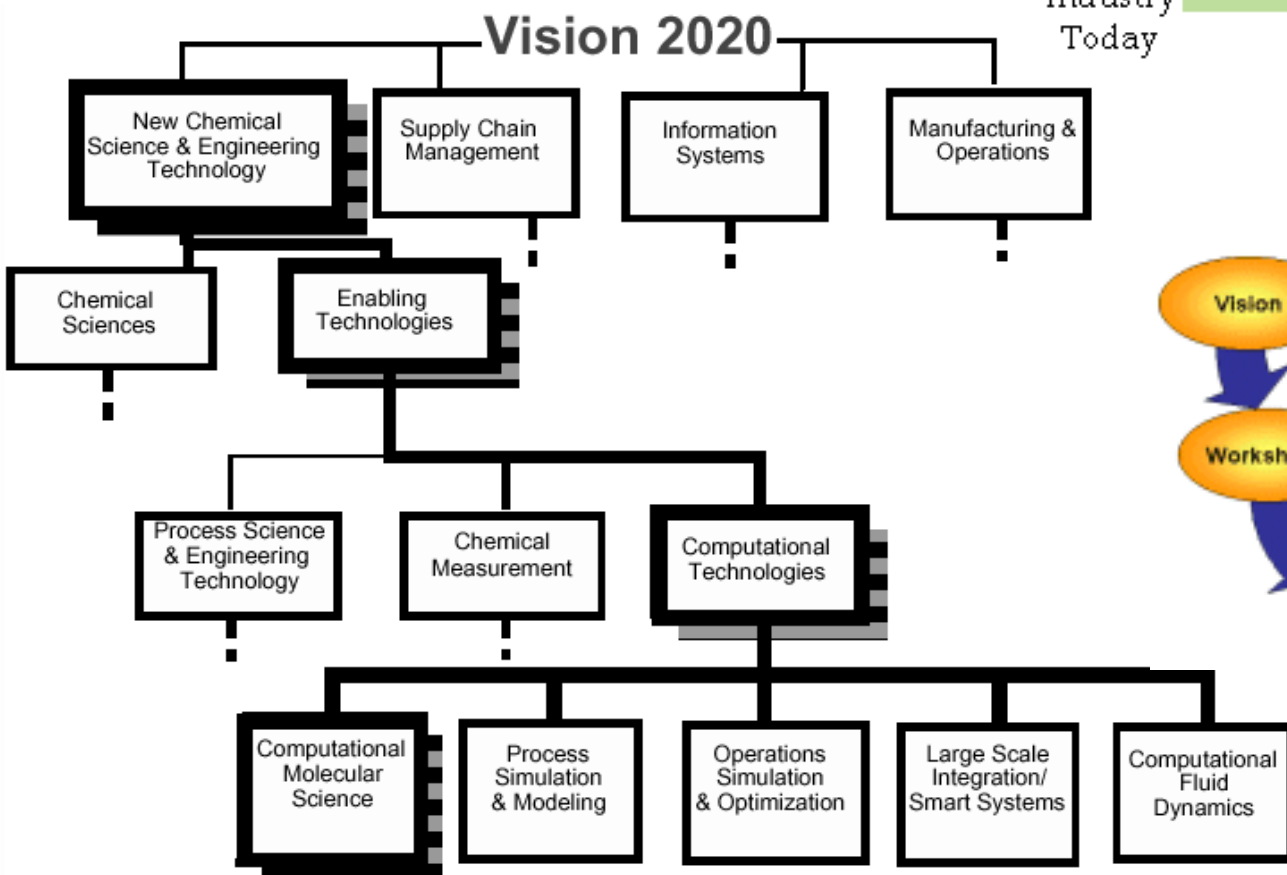


Central-Eastern Europe

- 2010-2011- President of Alps Adriatic Rectors's Conference (AARC: Albania, Austria, Croatia, Germany, Hungary, North Italy, Slovenia,)
- Collaborative Action (AARC-Conference of Danube Rectors).
- 2012 – Member of DRC
- 2013 – DIANET: Danube Initiative and Alps Adriatic Network. With UNIUD, SISSA, Area Science Park.
- Financed by Region FVG.

The technology vision 2020

Vision Roadmap Implementation



Nanoscale science and engineering



- Ability to work at molecular level, atom by atom, to create large structures with fundamentally new properties and functions*
 - At least one dimension is of the order of nanometers
 - Functionality is critically dependent on nanoscale size
- Promise of unprecedented understanding and control over basic building blocks and properties of natural and man-made objects*
- Recent survey: Nanotechnology Long-term Impacts and Research Directions: 2010 – 2020 **
- Theory, modeling and simulation (TMS)
 - Expected to play key role in nanoscale science and technology
 - INVESTIGATIVE TOOLS: THEORY, MODELING, AND SIMULATION, M. Lundstrom, P. Cummings, M. Alam, M. Ratner, W. Goddard, S. Glotzer, M. Stopa, B. Baird, R. Davis
 - Springer, September 30, 2010
 - Also available on the web at <http://www.wtec.org/nano2/>

* M. Roco, FY 2002 National Nanotechnology Investment Budget Request

** M.Roco, FY 2010 WTEC, Inc., 2010



Springer, September 30, 2010
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Nanotechnology



Medicine
and
Health

Information
Technology

Energy
Production
/ Storage

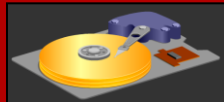
Materials
Science

Food, Water
and the
Environment

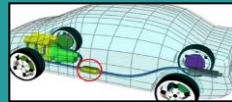
Instruments



Drug
delivery



GMR Hard
Disk



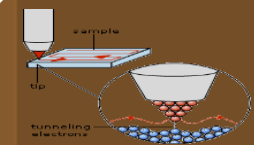
Hydrogen
Fuel Cells



Lightweight
and strong

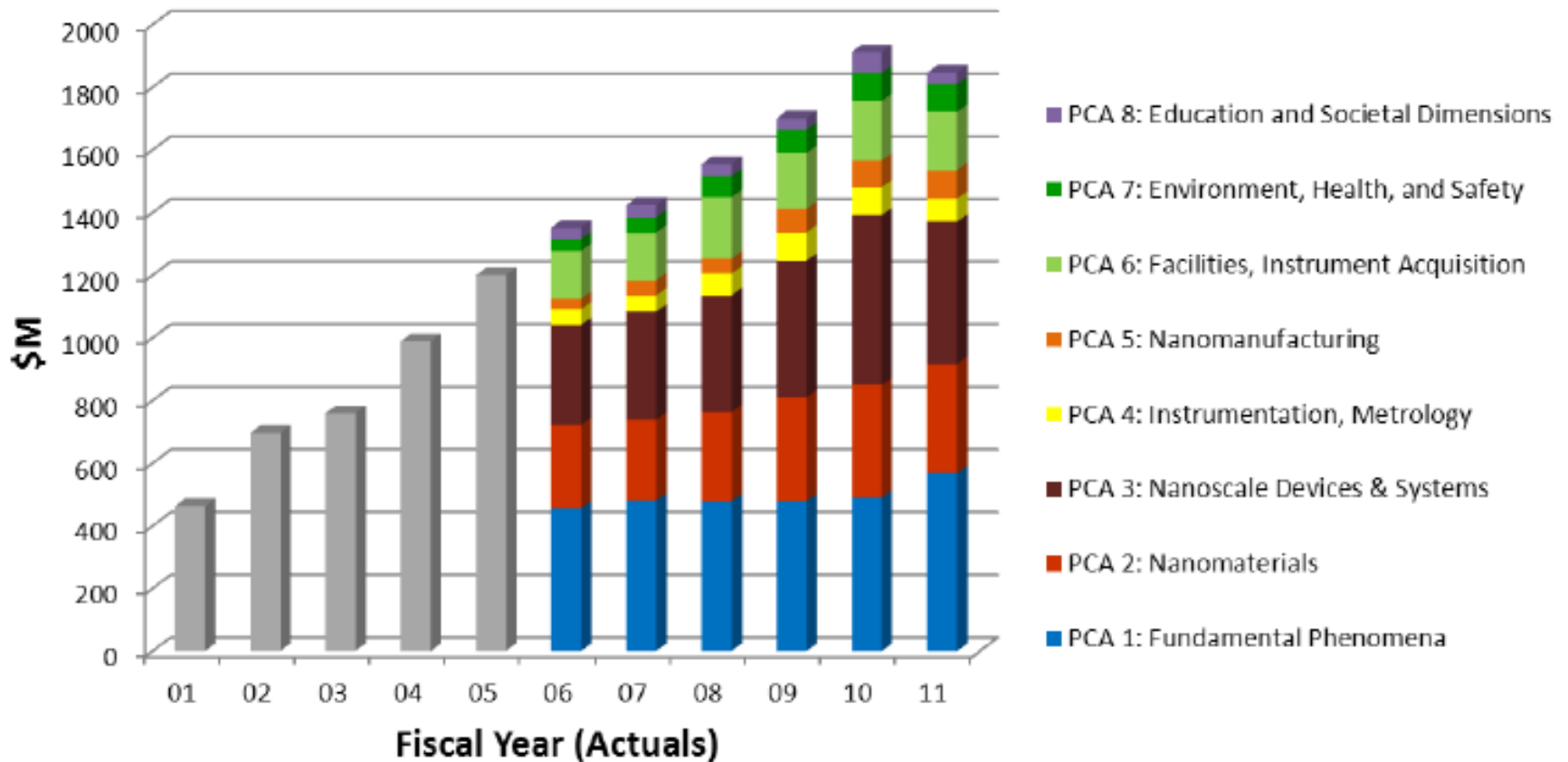


Remediation
methods



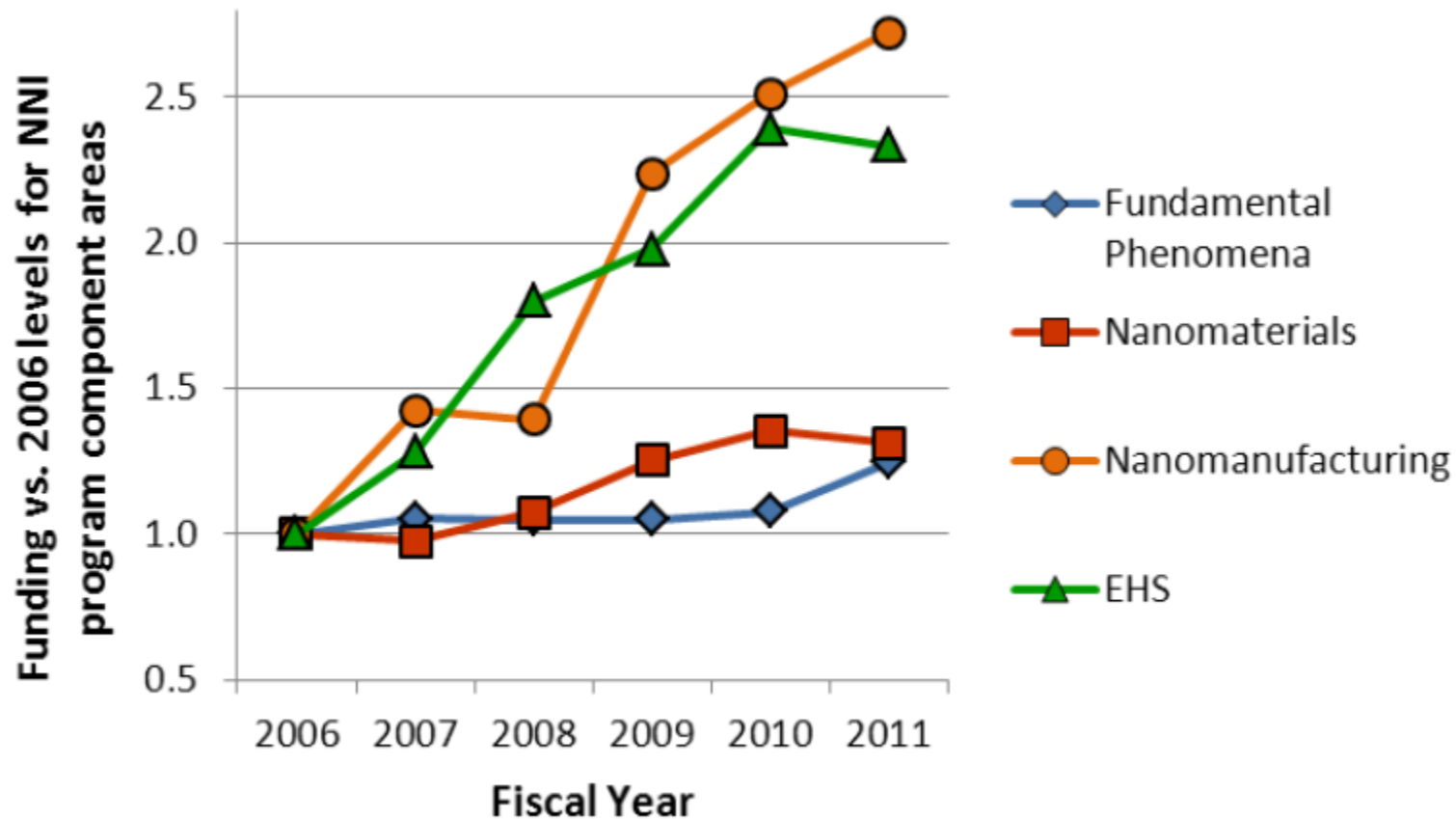
Tunneling
microscopy

National Nanotechnology Initiative Investments



Evolution of NNI investments

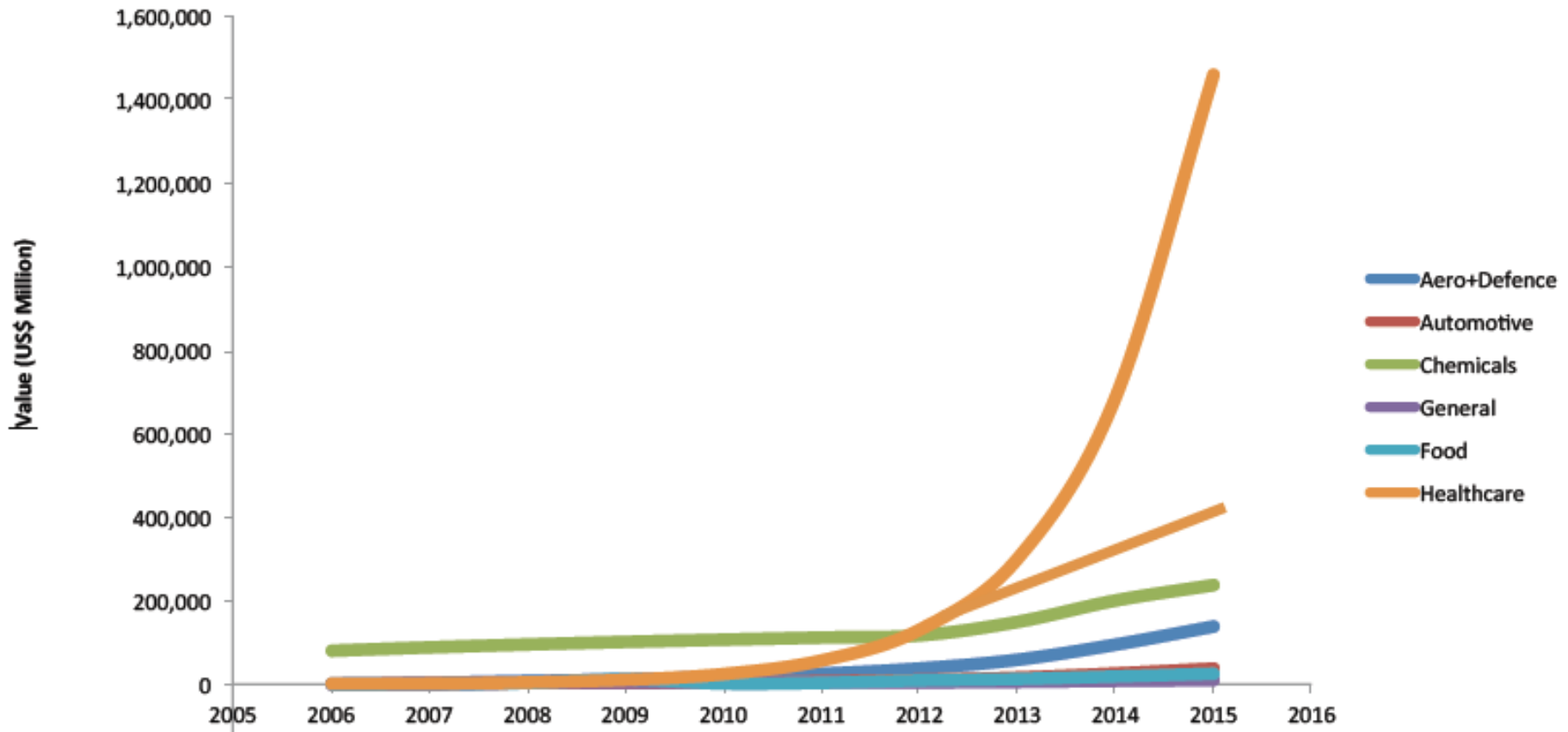
- Funding for more fundamental work maintained
- Large percentage increases for nano manufacturing and for environment, health, and safety



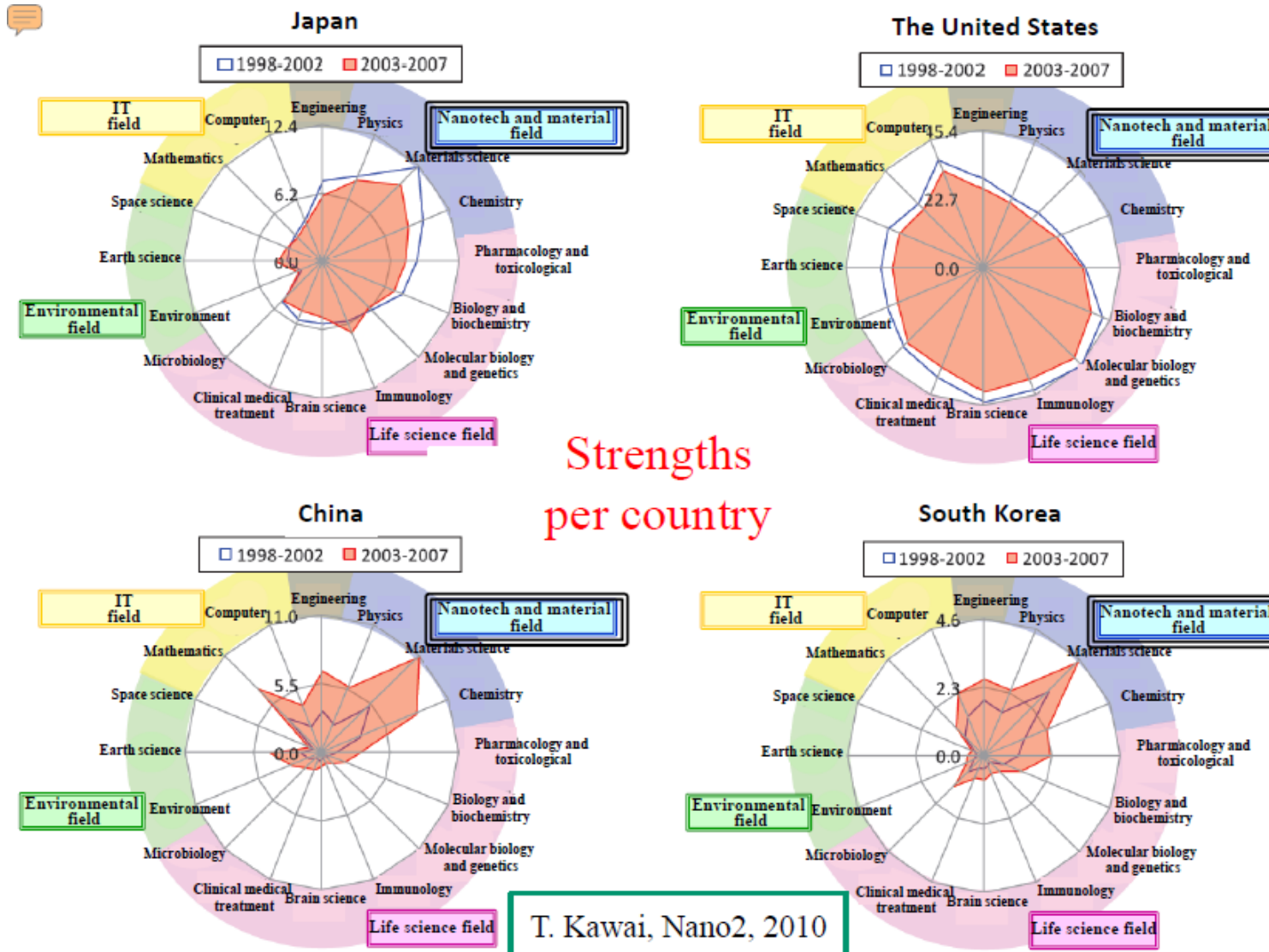
Nanotechnology: global market evolution



Nanotechnology Market Evolution 2006-15

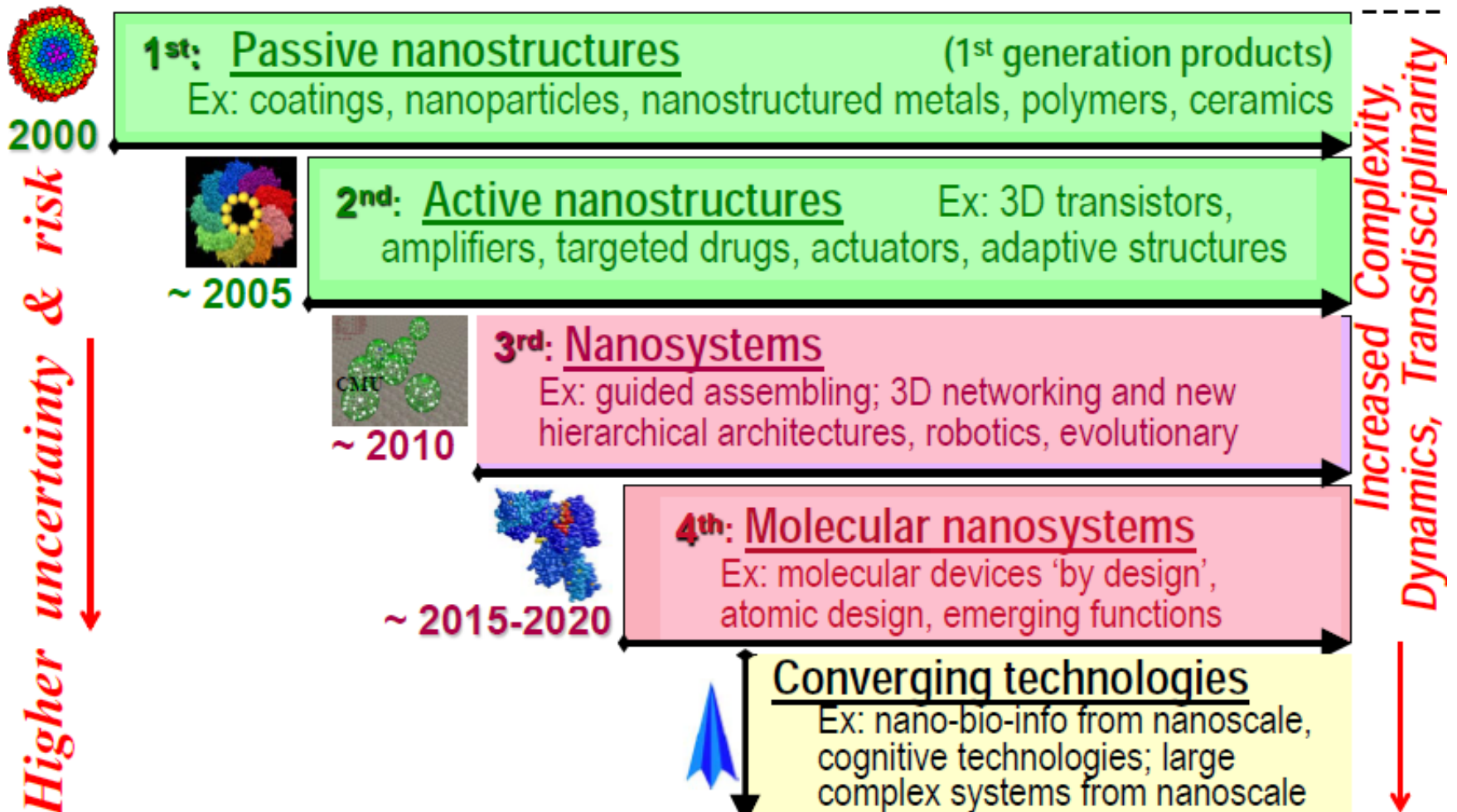


Nanotechnology in different countries



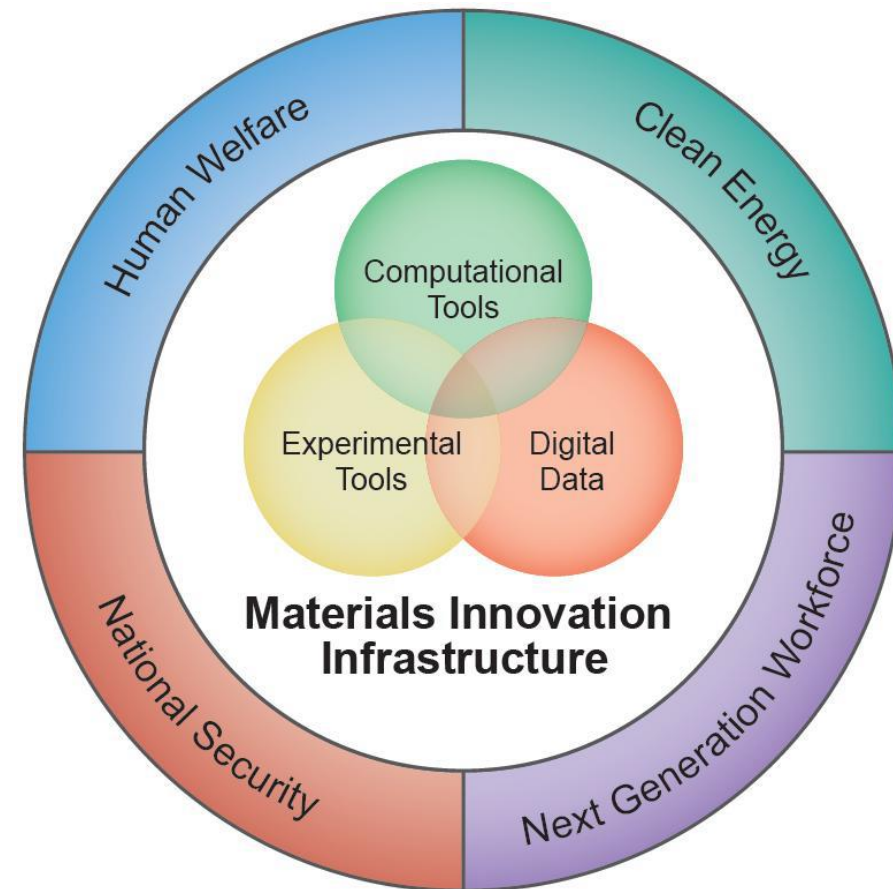
New generation of products and productive processes (2000-2020)

- Timeline for beginning of industrial prototyping and nanotechnology commercialization



Materials Genome Initiative (MGI)

- Developing a materials innovation infrastructure, through advances in and integration of:
 - Computational tools
 - Experimental tools
 - Digital data and informatics
- Achieving National goals in energy, security, and human welfare with advanced materials
- Equipping the next generation materials workforce



The power of simulation

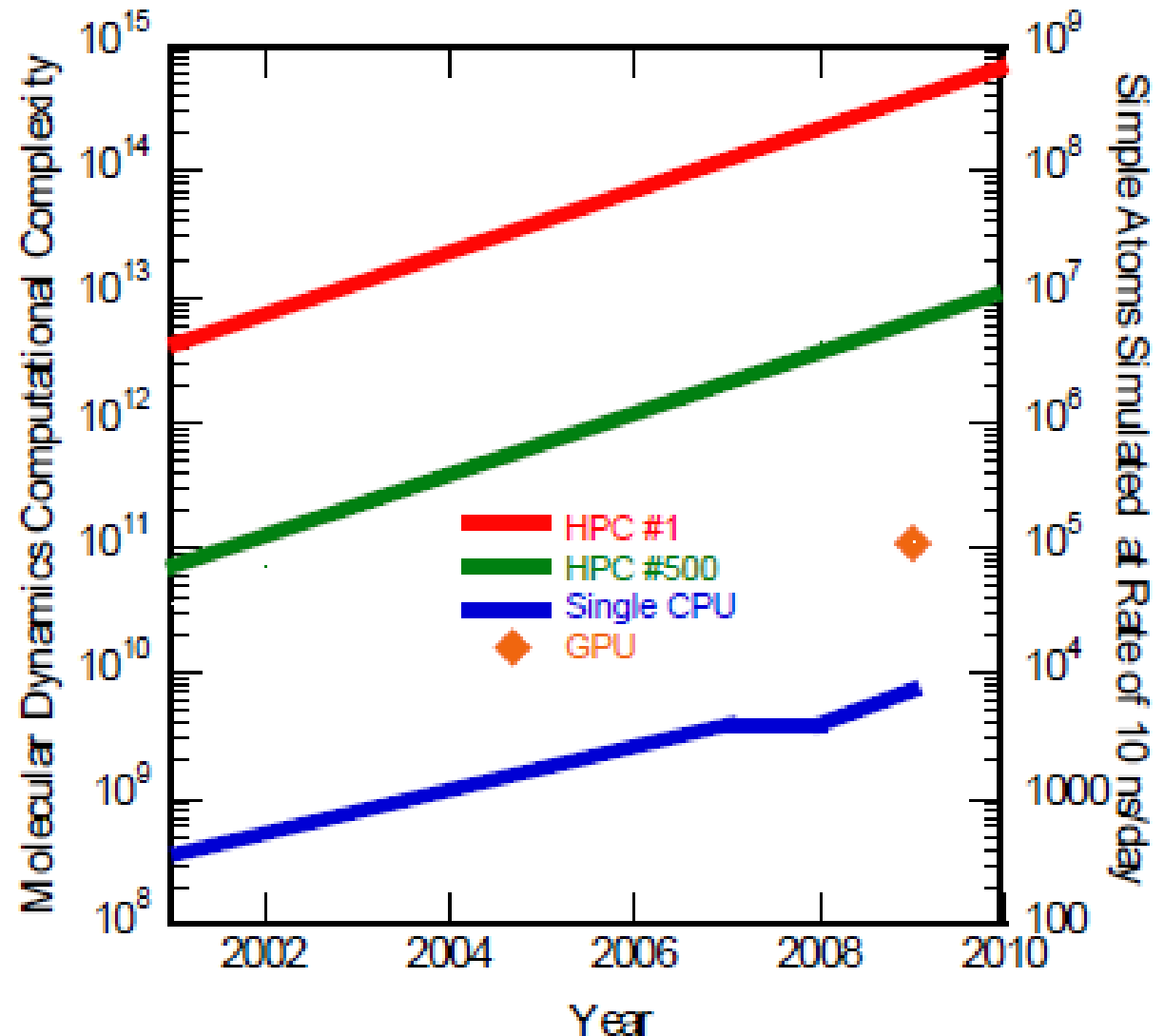
... and the role of GPUs

Molecular complexity

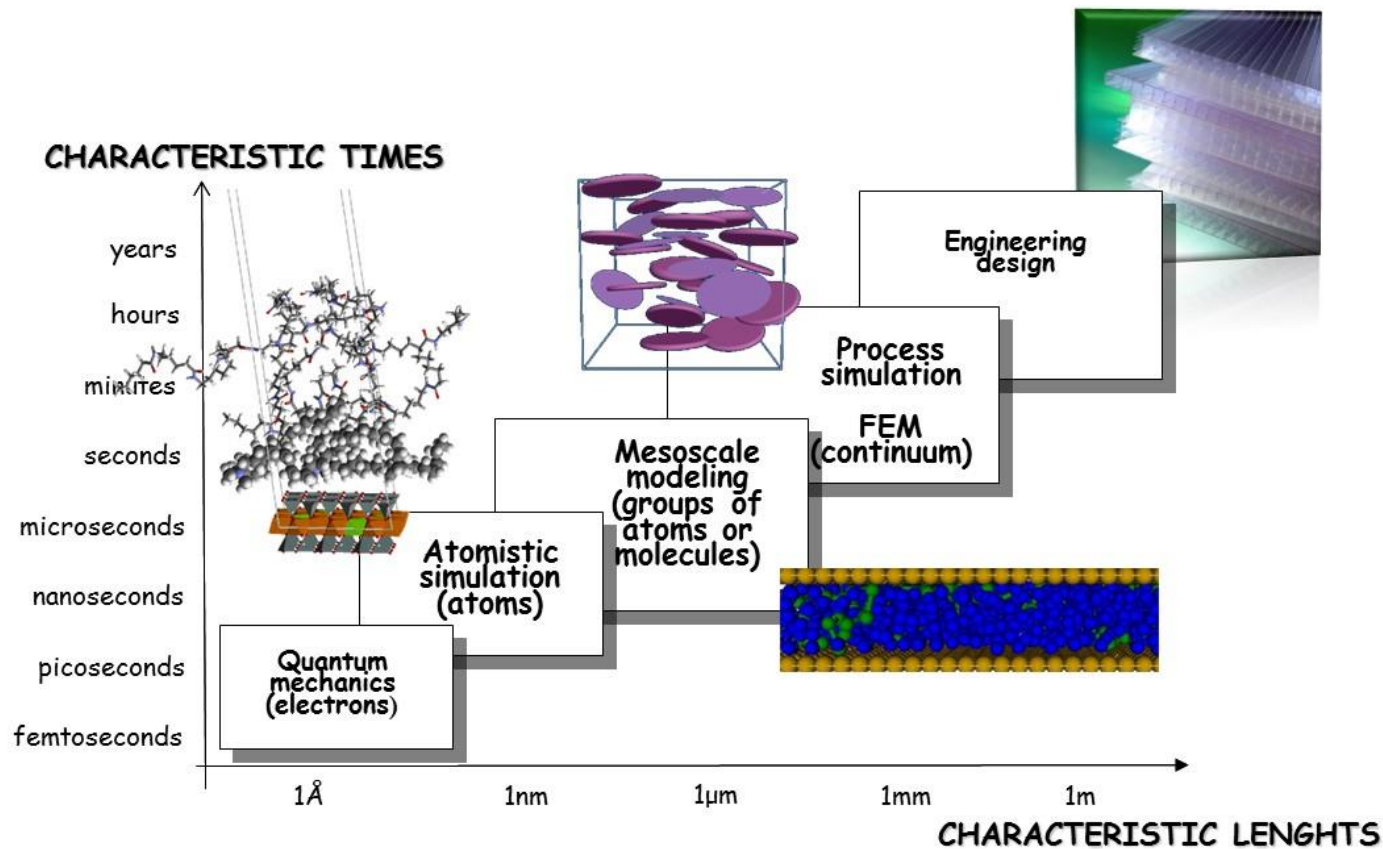
N. of time steps * n. atoms
simulated in one day

Simple atom simulation

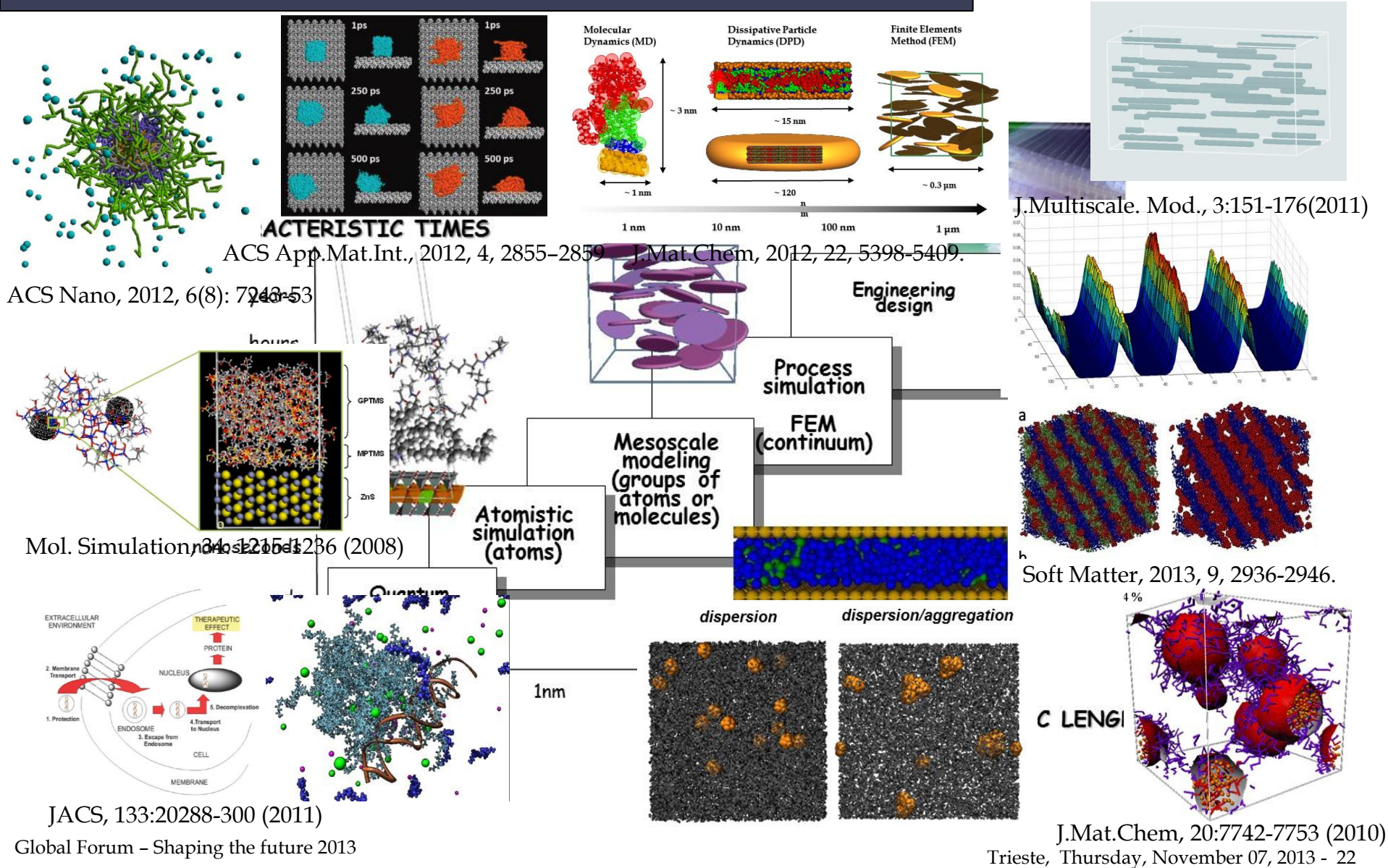
For a simple monoatomic
fluid is the n. of atoms
that can be simulated for
10ns in one day



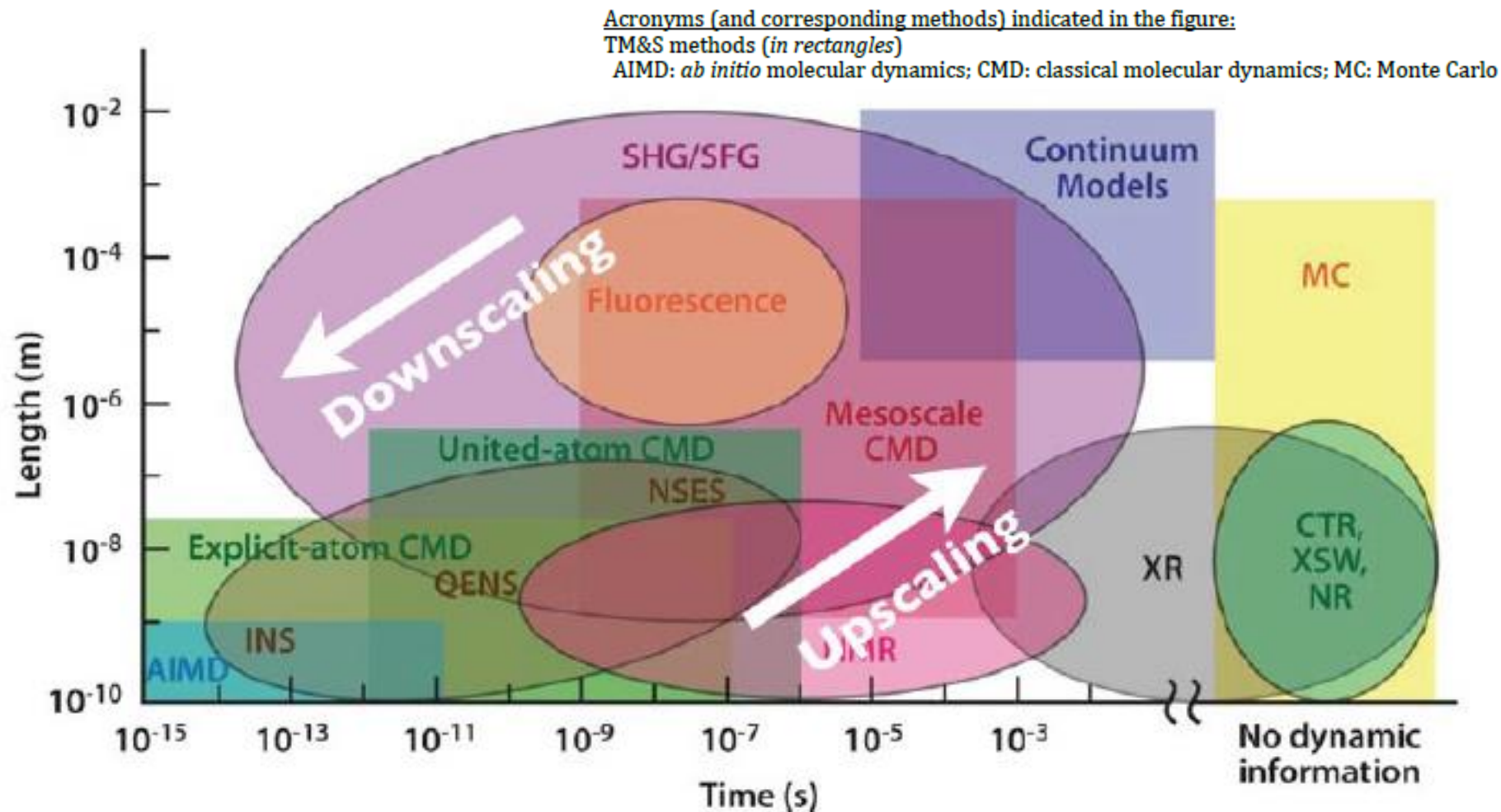
Multiscale Molecular Modeling



Multiscale Molecular Modeling



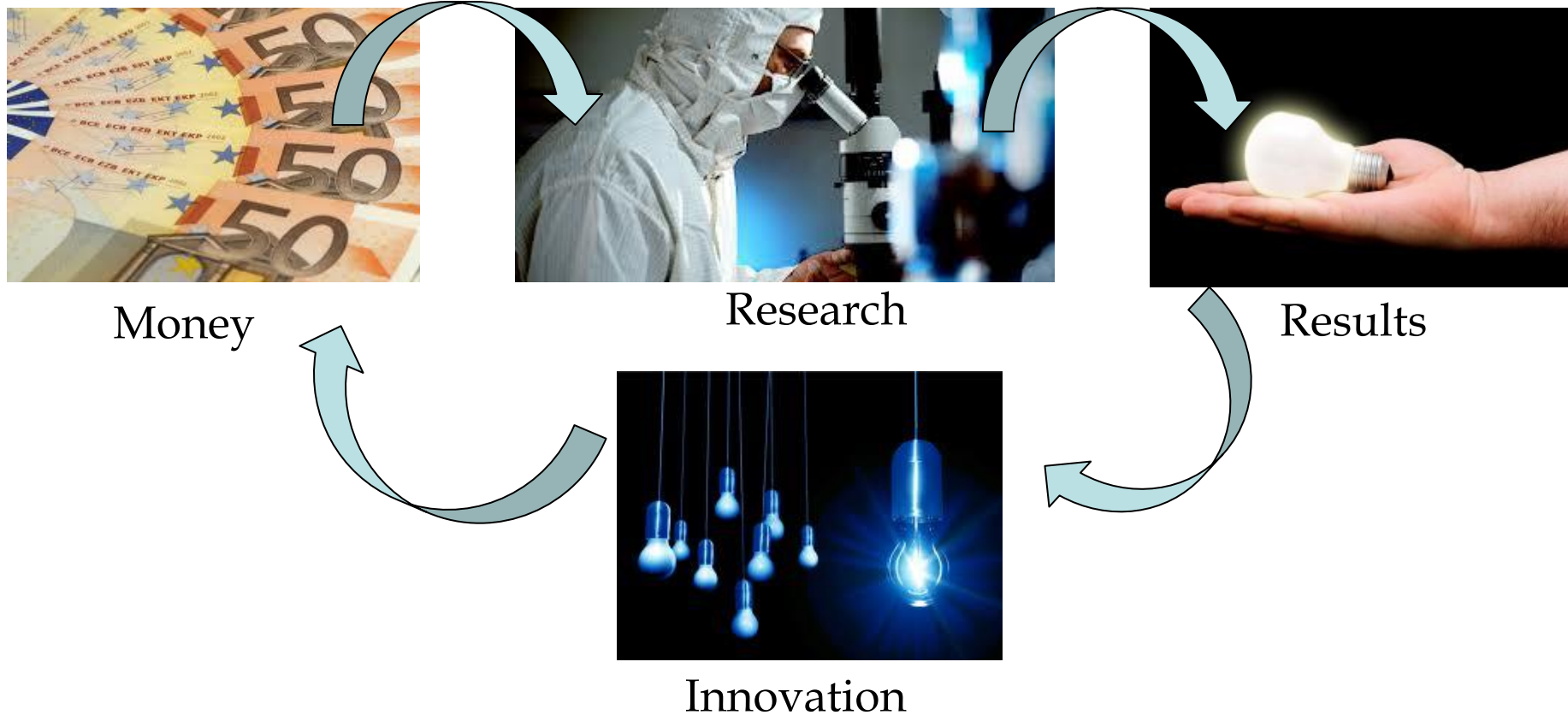
Modelling and experiments



Experimental techniques (in ovals)

INS: inelastic neutron scattering; QENS: quasi-elastic neutron scattering; NSES: neutron spin echo spectroscopy; NMR: nuclear magnetic resonance; XR: X-ray reflectivity; SHG: second harmonic generation; SFG: sum frequency generation; CTR: crystal truncation rod (an X-ray method); XSW: X-ray standing wave; NR: neutron reflectivity

Research and innovation



**Innovation is discontinuity in knowledge
.... Generating an advance of productivity**

Re-paving the Gemina roman road



Na poti v Sullā strada
Emono di Emona
4 junij-4 julij 2013 4 giugno-4 luglio 2013



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EMONA MM
LUGLIANA 2008

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in collaborazione del Ministero per i Beni
e le Attività Culturali, Soprintendenza
per i Beni Archeologici del
Friuli Venezia Giulia

