BioSC

Bioeconomy Science Center

Skills for an Integrated Bioeconomy of the Future

Prof. Dr. Ulrich Schurr

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Integrated Bioeconomy

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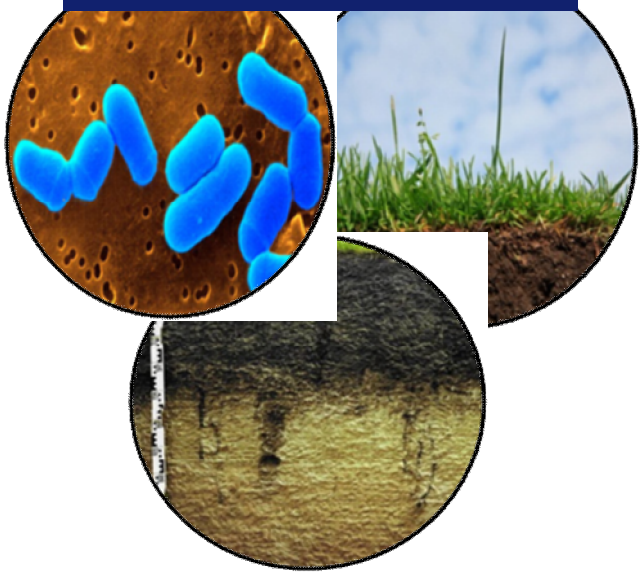
Climate Change

Energy

Sustainable Bioeconomy



Food/ Feed

Natural Resources

Challenges – Needs – Skills - Instruments

Challenge

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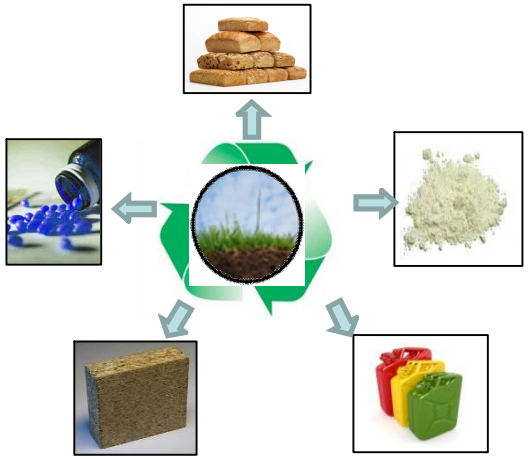
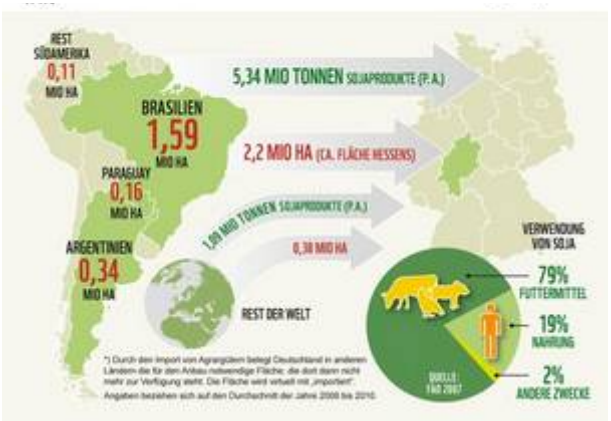
Limitation: yield, land, natural and biologocal resources

Novel demands in quality and scale

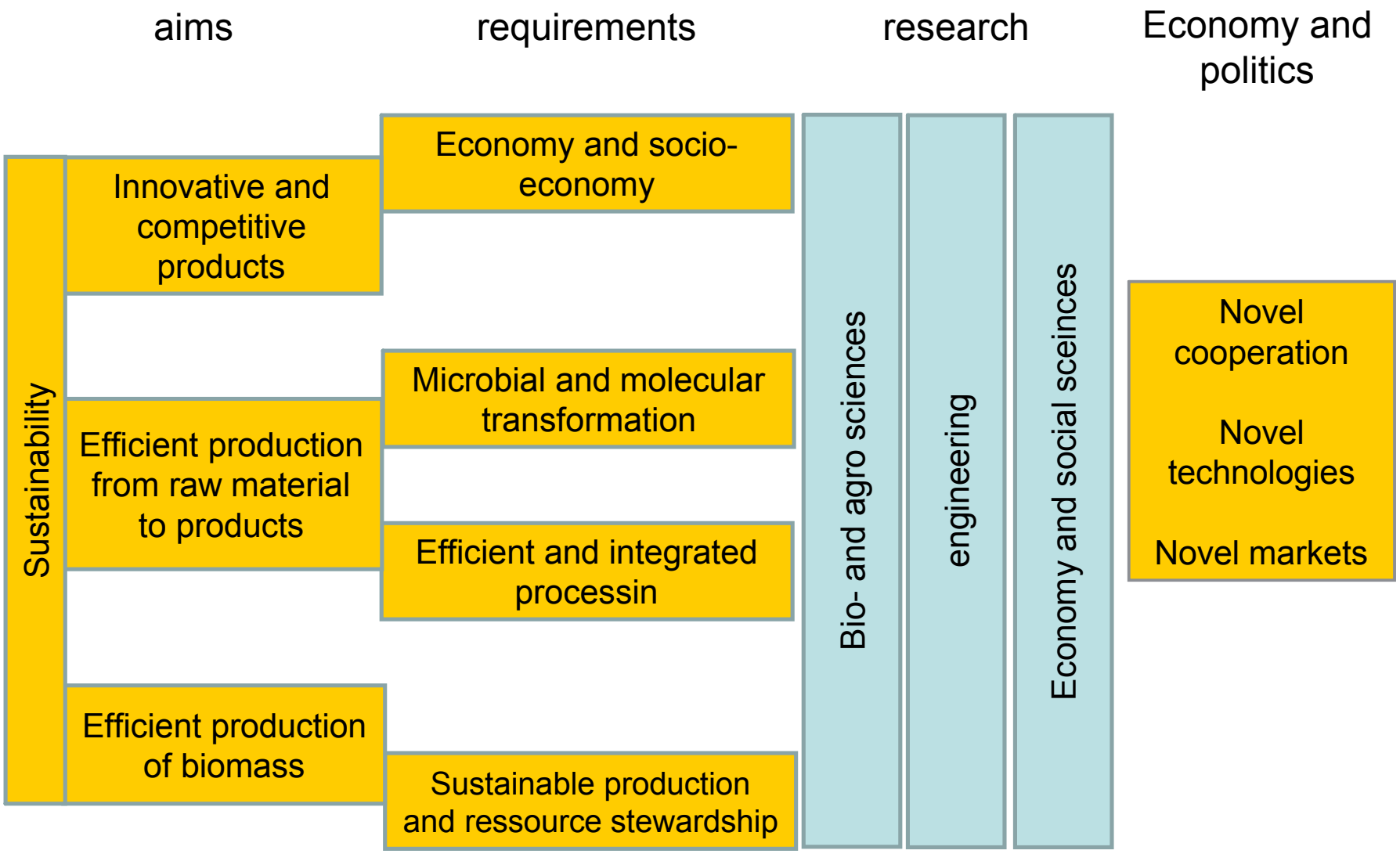


Global perspective



Industry and consumers

The way towards a sustainable bioeconomy



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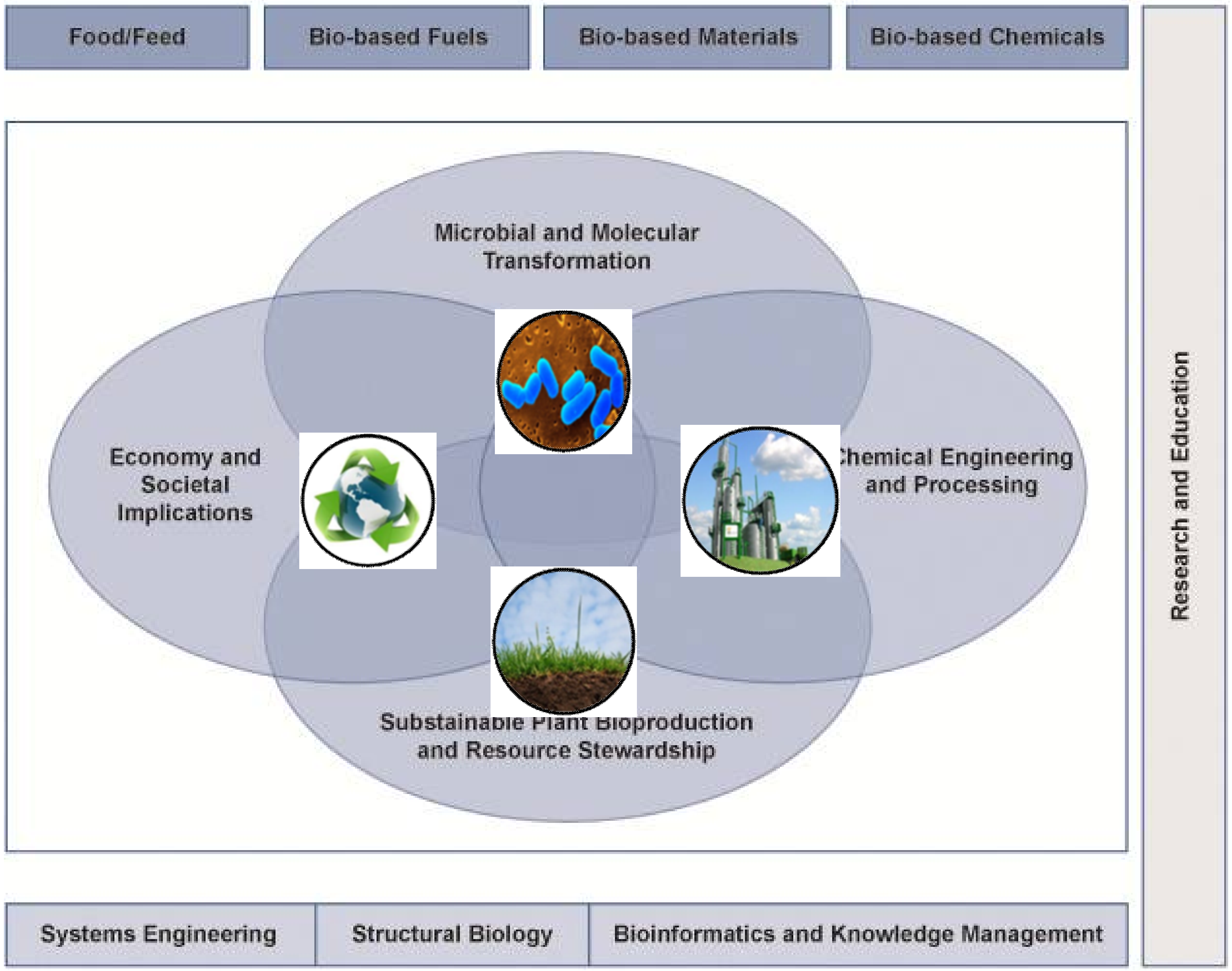
Bioeconomy Science Center -
Regional competence for a global sustainable bioeconomy

- *engineering meets natural sciences*

- Technology platforms
- Strategic research

- Excellent natural sciences

- Modern agro-sciences
- Food – renewable ressources - energy


Food/Feed
Bio-based Fuels
Bio-based Materials
Bio-based Chemicals
Microbial and Molecular Transformation
Economy and Societal Implications
…hemical Engineering and Processing
Substainable Plant Bioproduction and Resource Stewardship
Systems Engineering
Structural Biology
Bioinformatics and Knowledge Management
Research and Education

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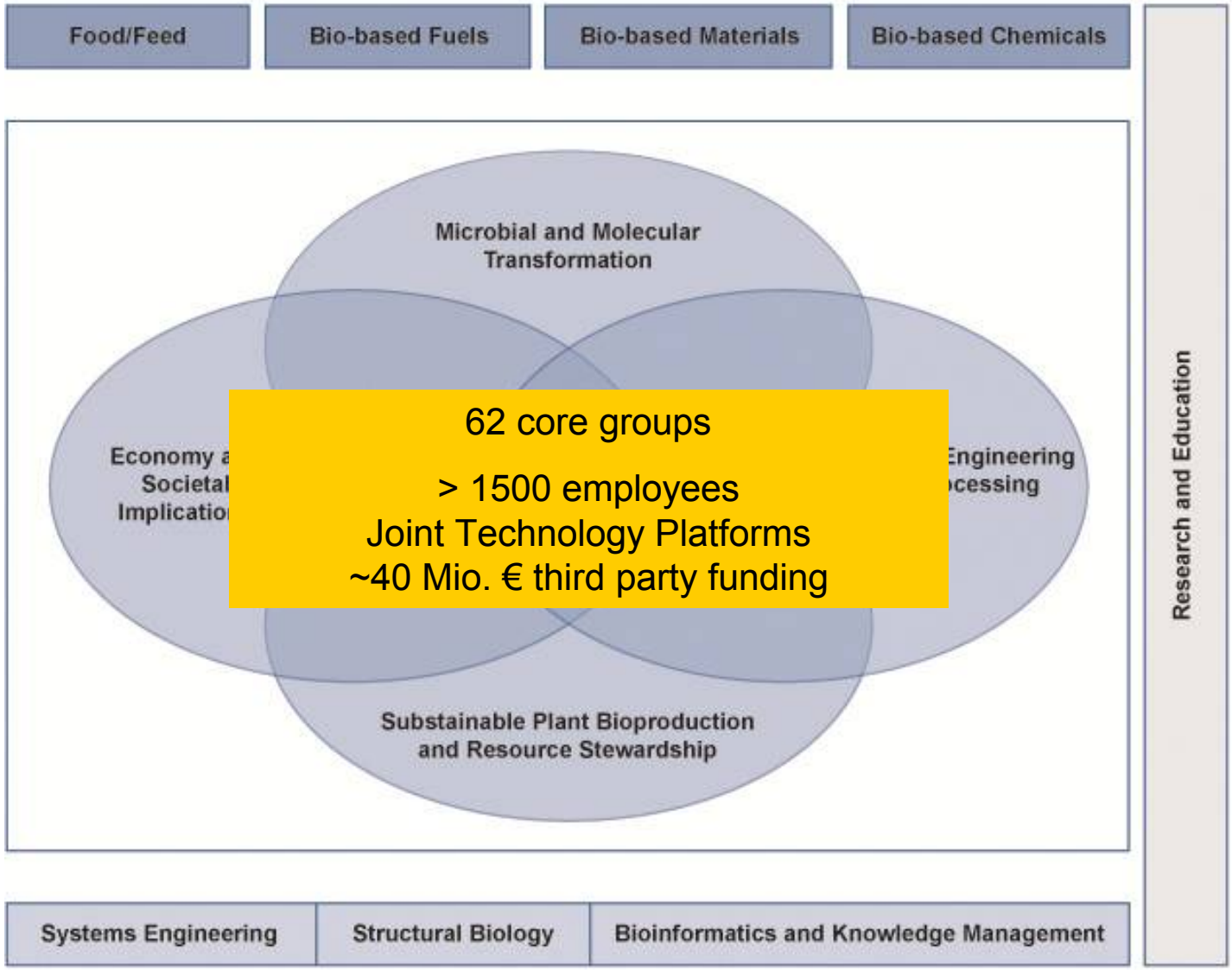

Topics in the BioSC

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- Improvement of quality and quantity of biomass
- Resource use and stewardship (land, soil, nutrients, water)
- Production systems in global change

- Chemicals, pharma and proteins from renewable resources
- Whole cell, isolated enzyme and chemical catalysis (hybrids)
- Synthetic biology for novel products for chemical industry and pharma

- Extraction – from plants to intermediates
- Transfromation – from intermediates to products
- Product design – from molecule to function

- Global and regional socio- and economic frameworks and conditions
- Environment and resource economy
- Organisation and management of process and value chains
- Consumer and acceptance

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Mission and pillars of BioSC

- Scientific excellence in knowledge generation and transfer
- Education for needs and careers
- Long-term strategy and joint development
- Innovation and transfer
- Contract-based implementation (new appointments, etc)

Challenges for a future Bioeconomy

- Increase sustainable plant production on limited land resources
- Resource- and energy-efficient processing to valorize as much and as diverse as possible
- Diversify products and integrate processes
- Market orientation
- Competitiveness in global science and markets
- Acceptance of society and customers

Challenges for a future Bioeconomy

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Optimising the science base

- Accelerate knowledge generation and implementation through novel breeding and plant management technologies
- Bio- and agro sciences need to become quantitative
- Integration of all possible technology options to increase throughput and quantitatification (robotics, IT, mathematics, nanotechnology, etc.)
- Systemic approaches overcoming borders of disciplines
- Globalising bioeconomy science community (work force and utilising natural resources globally)

Challenges for a future Bioeconomy

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Optimising the science base

Integrating with economy

- Systemic approaches linking novel knowledge into integrated processes for products (science-to.business)
- Improving knowledge about markets and economy (business-to-science)
- Realising and impementing international cooperation

Challenges for a future Bioeconomy

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Optimising the science base

Integrating with economy

Integrating with society

- Communication with society about risks and benefits for acceptance and science-based decision making
- Developing a perspective of the role of science and bioeconomy on a global scale
- Life-long learning (from schools to senior scientists)

Challenges for a future Bioeconomy

- Increase sustainable plant production on limited land resources
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Needs

Optimising the science base

Integrating with economy

Integrating with society

Different roles for all relevant stakeholders

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Multidisciplinary and cross-sectorial education - Many sciences are needed

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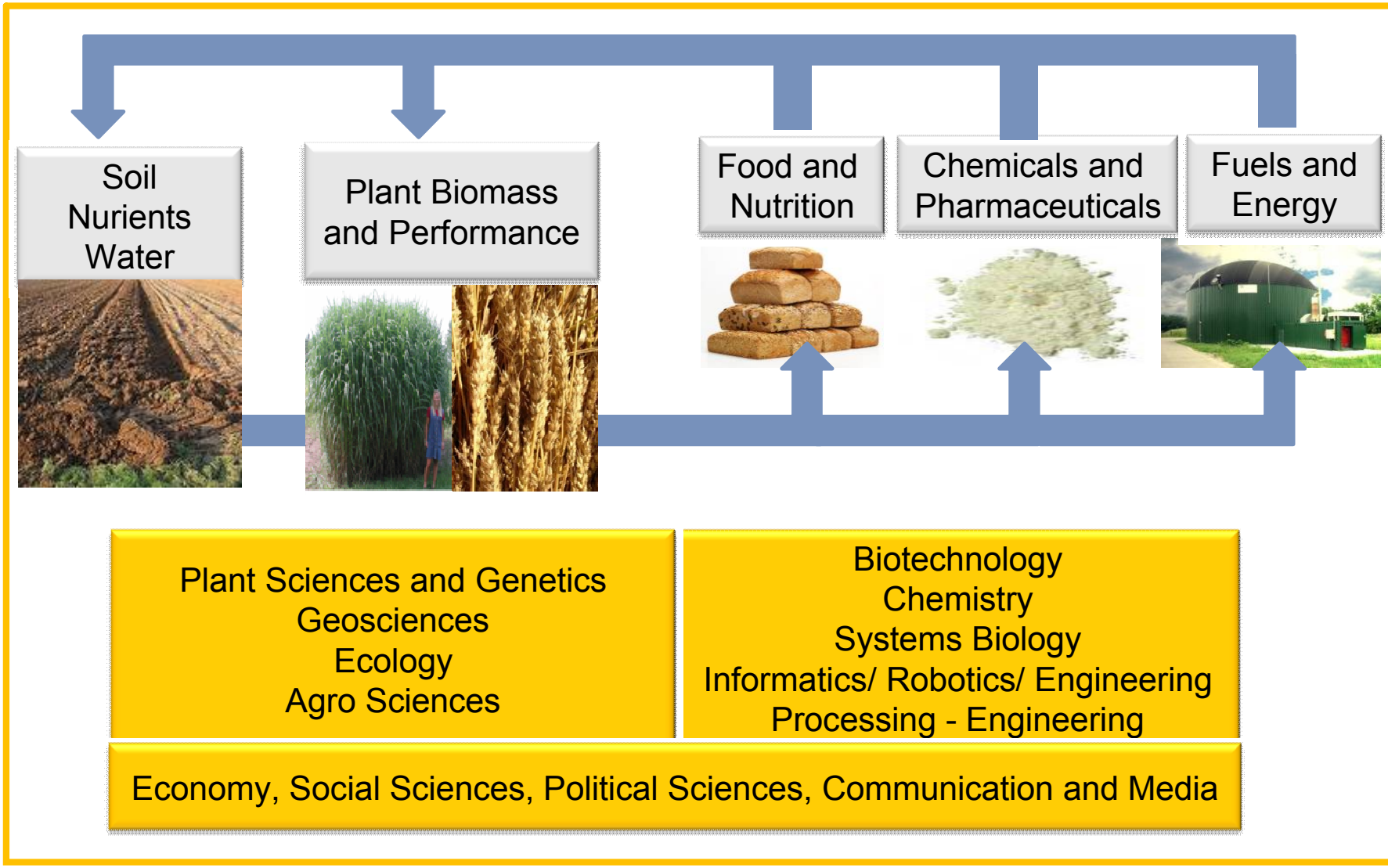
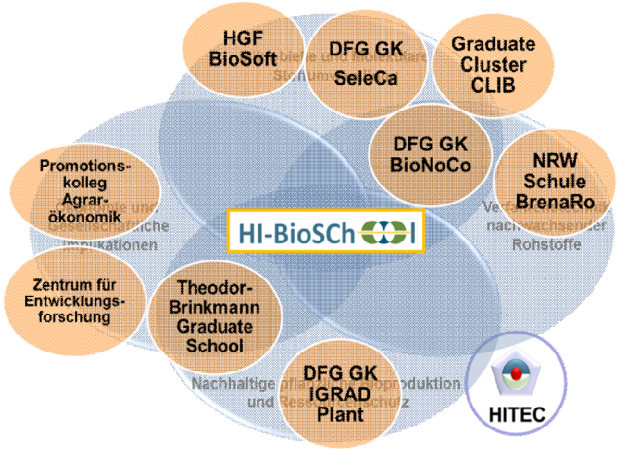


Skills and Instruments

- **Skills**
  - **Sound basis** science and discipline
  - **Soft skills** in management, networking, multidisciplinary team skills, media, etc.
  - **Team skills** – beyond the individual excellence



- **Integrated Education Networks**
  - **Graduate education:** coordination of bioeconomy specific education based on existing disciplinary approaches
  - **Regional** education clusters linked to **international networks**
  - **Senior scientists in academia and industry:** Specific add-on education for bioeconomy professionals
  - **Utilising demonstration projects** for teaching specific skills
  - **Integrating** academic education with practical industry experience
  - **Adapting incentive systems in sciences** for translational research and carrier flexibility

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Skills and Instruments

- **Building adequate skills starts at schools**
  - Overcoming the **„bio- illiteracy“** of today to form an educated public and enthusiastic students

- **Technical training:**
  - **Training on novel technologies** to farmers, horticulturalists, engineers, etc.: add-on training for special skills (e.g. molecular gardening, biomass web economics, etc.)

- **Academic Training**
  - **See „**Multidisciplinary and cross-sectorial education“
- **Life-long learning and training**
  - Education of **senior professionals** across discipines, sectors from academia and industry

Skills and Instruments

- Industrialised, emerging and developing countries share the vision of Bioeconomy
- Implementation of Bioeconomy requires regional context and its link to international and global interaction of bioeconomy

- **International bioeconomy education and training**
  - in other countries – global workforce
  - global perspectives including trade, globalisation, etc.
  - diversity of regional implementation

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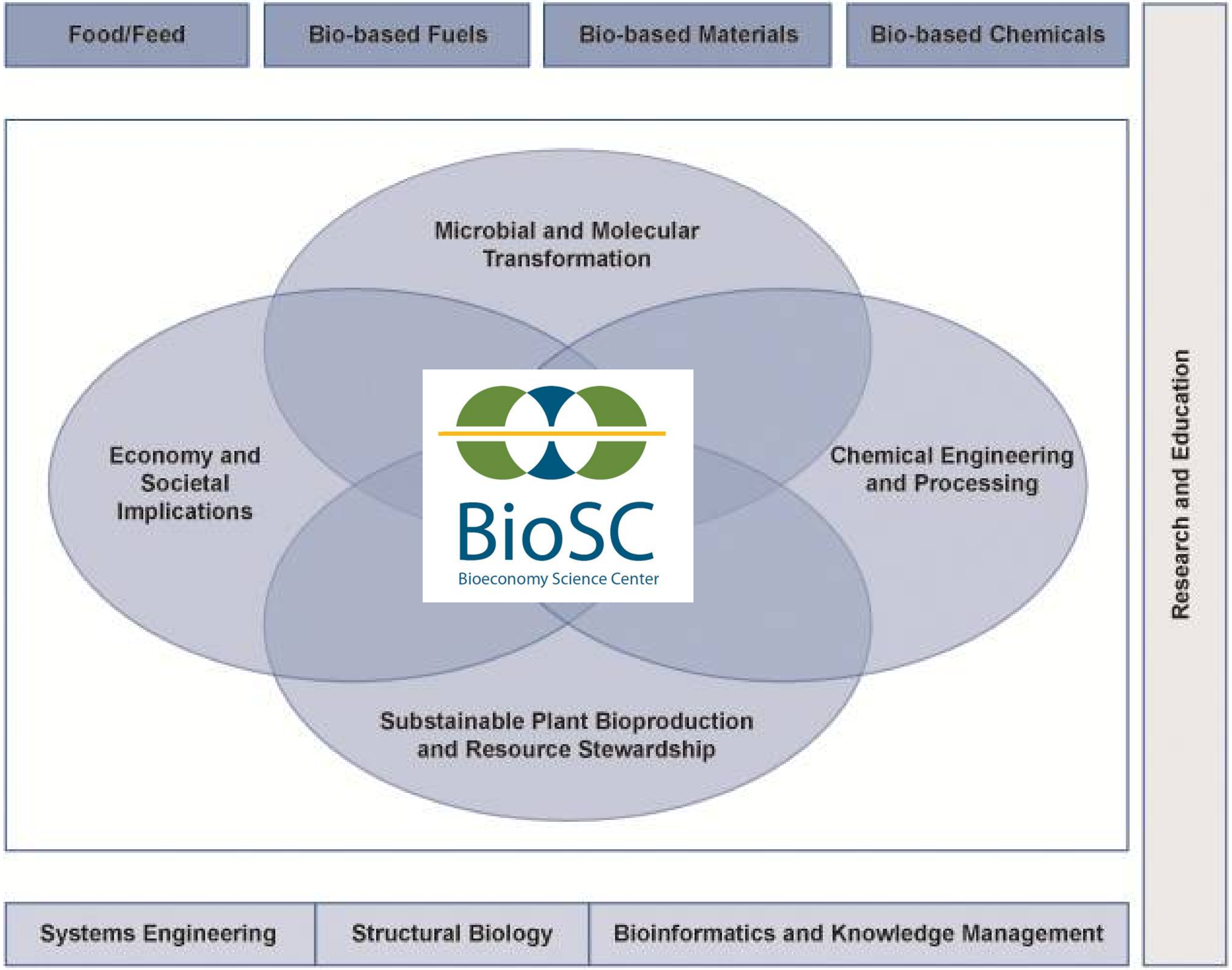

Skills for an Integrated Bioeconomy

- **Multidisciplinary and cross-sectorial** education

- Education at **all skill levels** and in **all levels** of education and **lifelong**- learning

- International and global perspective
- **International** training
- Encourage **mobility**
- International recognition of qualification

- **Soft skills**
- Management
- Communication and media