



swerea|SICOMP

# Composites Centre Sweden

An LTU and Swerea SICOMP  
collaboration

[www.ccswe.se](http://www.ccswe.se)

# Aim of the Composites Centre Sweden

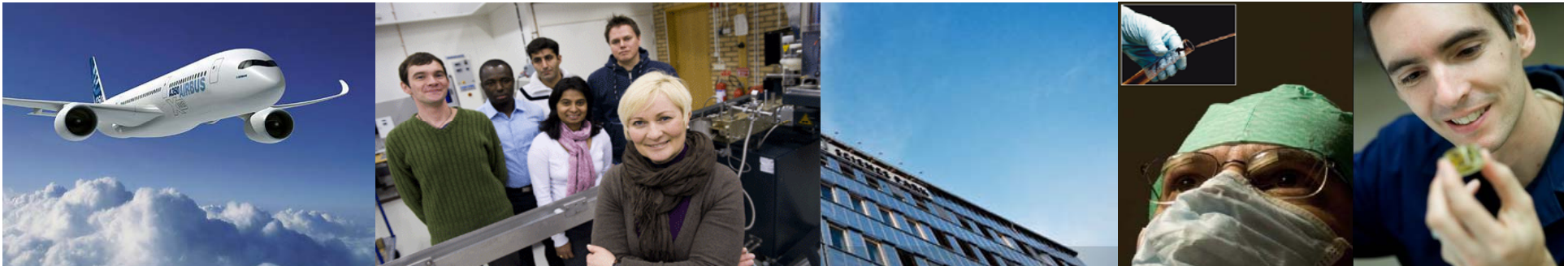
*To advance research and education in composite materials and manufacturing*

Why?

- To provide industry with the skills and technology to lead sustainable development using composites

Why LTU?

- Strong composite research and existing courses in composite material
- Good co-operation and geographically close to Swerea SICOMP
- Good network for industrial contacts



# How?

## Research

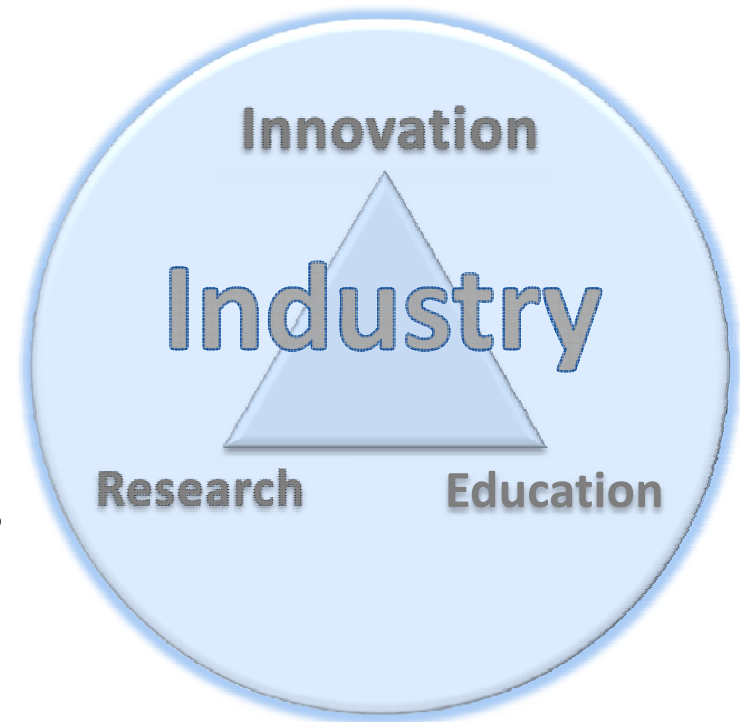
- Build on existing scientific excellence
- Increase the research in and between the institutions
- Create industrial projects

## Education

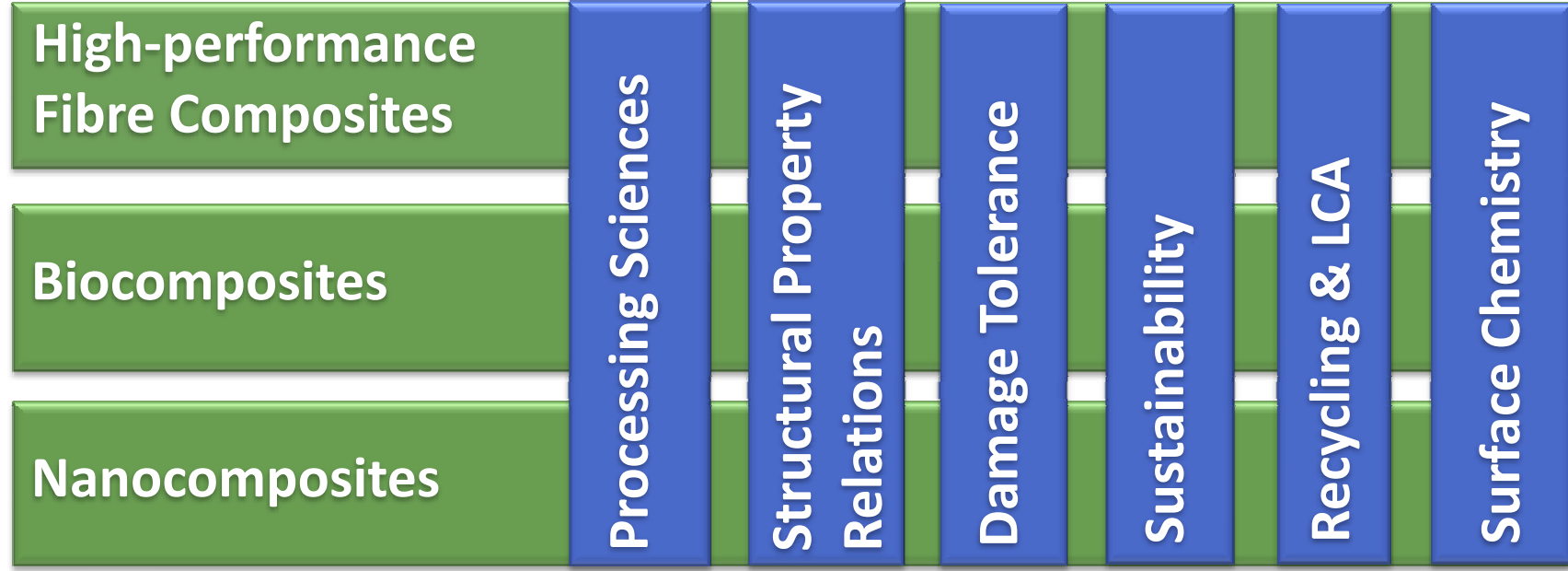
- Establish an internationally renowned centre for composites education

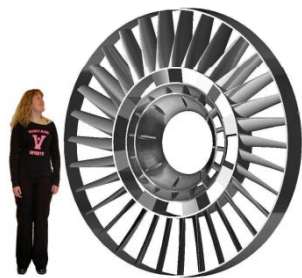
## Innovation

- Create high technology spin-off companies
- Technology insertion in existing companies



# Our research areas





# High-performance fibre composites

## *Vision:*

- *Expanding the range of application*
- *Energy saving by lightweight design in a lifecycle perspective*
- Fields: aerospace, marine, power and automotive applications
- Today's challenge: expansion of limits of application
  - Service at high temperatures
  - Chemically aggressive environments
  - Performance-cost efficiency
  - Added functionality



# Biocomposites

*Vision: Develop next-generations renewable lightweight composites for structural applications*

Fields: transportation, building, furniture etc.

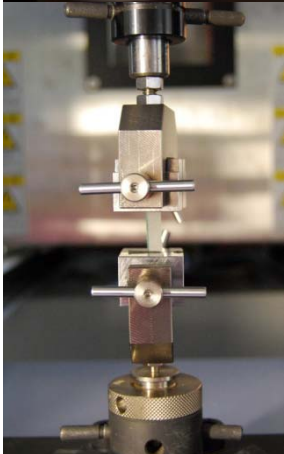
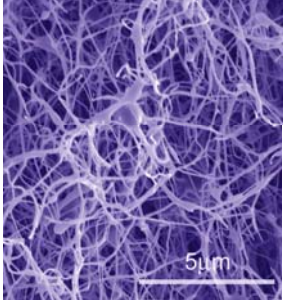
Challenges:

- Complex behaviour of natural materials
- Processing technologies
- Durability, strength and toughness
- 100% natural materials
- Lack of accurate materials models

Why us?

- Long experience on natural materials and composites
- Processing-property relations, mechanics, modelling, design
- Excellent laboratory facilities





# Nanocomposites

*Vision: Develop new environmentally friendly, multifunctional nanostructured composites*

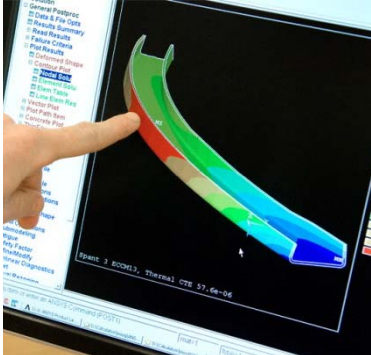
- Fields: medical, membranes, transportation etc.
- Next generation of nanomaterials and nanocomposites
- Nano-sized materials are either created by nature or are man-made as e.g. carbon nanotubes

## Challenges

- Processing technologies
- Dispersion and distributions
- Nanomaterials of desired size and size distribution, morphology, crystallinity and chemical composition
- Characterization methods

## Why us?

- Competencies in processing, advanced characterisation, chemistry, mechanics, modelling



# Education

## *Education programs at MSc and PhD-level*

- Phase 1: Establish an engineering education programme package
  - *Master degree in composites*
- Phase 2: Establish a research school on composites materials ( example Lighter)
  - *For PhD students*
- Courses with invited industrial and international lectures
- Students to educate themselves within composite materials science
- Industrial aspects an essential part of the course package
- Co-ordinated on a national and Nordic level to avoid unnecessary overlap





# Master degree on composites 120 ETC

Some possible partners:



## Obligatory courses

Composite Materials  
 Biocomposites  
 Composite Design and Numerical Methods  
 Organic and Biochemistry

Project course, 30 ECTS  
 Master thesis, 30 ECTS

## Selectable courses

Advanced Materials Characterization Techniques  
 Aerospace Materials  
 Materials Modelling  
 Materials Selection and Eco Design  
 Nanostructured Materials and Nanotechnology  
 High Temperature Materials  
 Polymer Science and Engineering II- Processing and Design  
 Mechanics of Fibre Composites

## Year 1 (Example)

Composite materials	Biocomposites	Materials modelling	Aerospace materials
Organic chemistry and biochemistry	Composite design and...	Polymer science and engineering II...	Nanostructured materials....

## Year 2

Project course 30 ETC	Master thesis 30 ETC
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