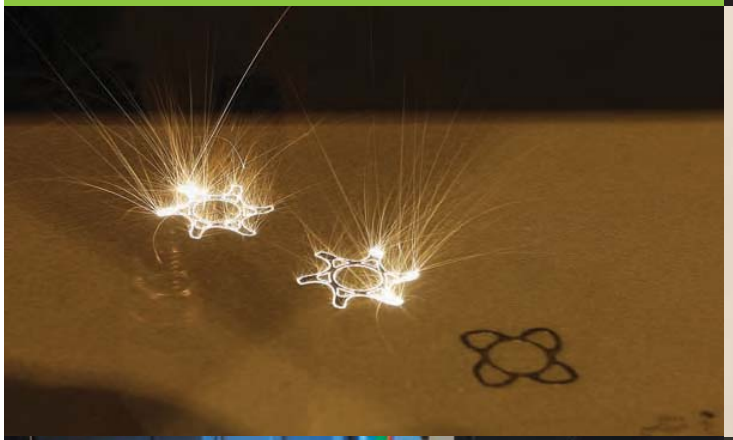
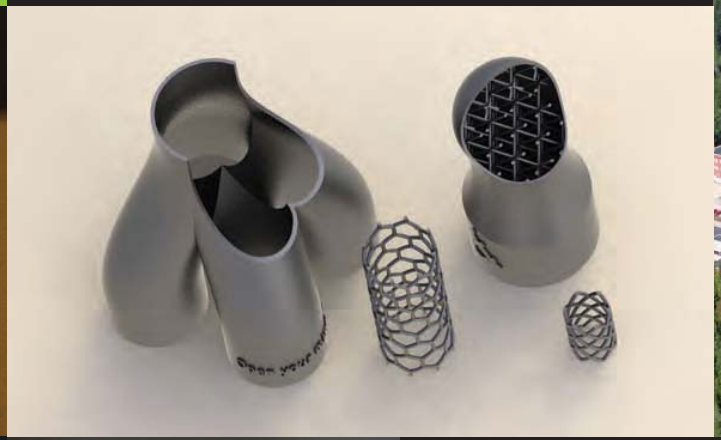
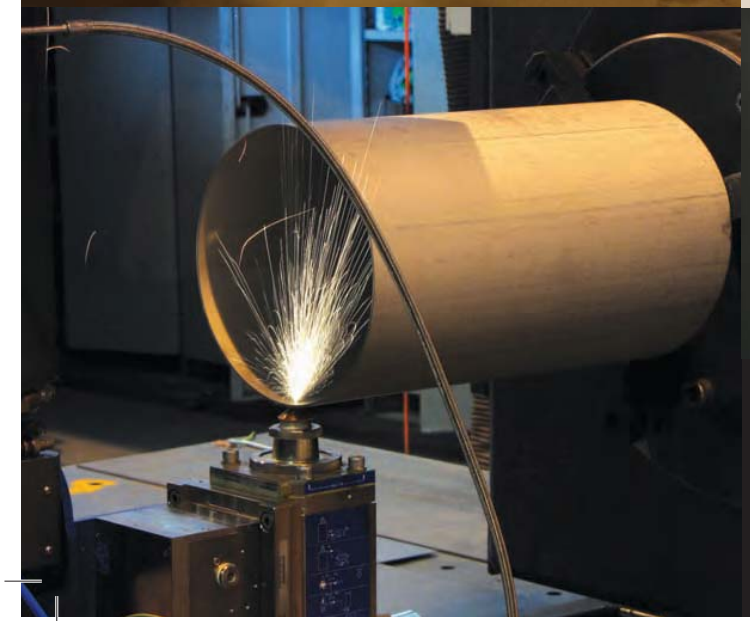
Lappeenranta University of Technology – Determined together

Ever since its foundation in 1969, Lappeenranta University of Technology, LUT, has brought together technology and economics in a pioneering spirit. LUT's strategic focus areas are green energy and technology, the creation of sustainable competitiveness and operation as a hub of international Russian relations. Our international scientific community consists of 7 000 students and experts.







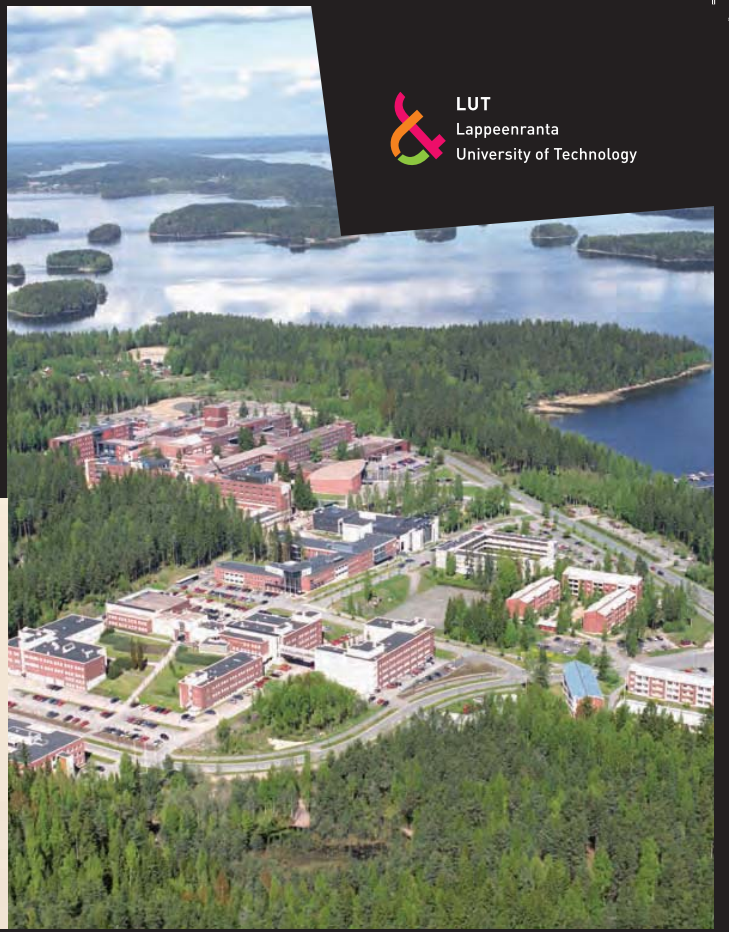
Contact Information

Antti Salminen, Professor
antti.salminen@lut.fi
+358 40 767 4387

Tapio Väistö, Research Scientist
tapio.vaisto@lut.fi
+358 40 163 7514

Tuomas Purtonen, Project Engineer
tuomas.purtonen@lut.fi
tuomas.purtonen@lut.fi
+358 40 515 3349

LUT
Lappeenranta
University of Technology



LUT Laser

Laser Processing Research

LUT
Lappeenranta
University of Technology

www.lut.fi/laser

LUT Laser in Brief

LUT Laser – Laboratory of Laser Materials Processing – is a part of Lappeenranta Laser Processing Centre (LPC) which is a joint institute between LUT and VTT (Technical Research Centre of Finland). The research facilities are located in the city of Lappeenranta in south-eastern Finland. LUT Laser has a significant influence to laser processing in Finland, and most of the laser related businesses in Finland today have history with LUT Laser.

LUT Laser has also a research unit Turku, which is located on the south-western coast of Finland. Today, LUT Laser is one of the most well-known laser processing research centers in the Baltic Sea region. The best known research areas in LUT laser are laser and hybrid welding processes with heavy industry.

Activities

- Basic and adapted research of laser processing
- Prototype and 0-series production
- Product and process development
- Expert services
- M.Sc., D.Sc. and industrial education
- Laser system development

Processes

Laser welding

- Heat input to the part small compared to other welding processes. Minimal welding distortions, welding of e.g. thin metal foils
- Thicknesses from below 1 mm up to 25 mm and beyond

Laser cladding

- Laser cladding of thin layers for improved wear and corrosion resistance
- Base material surface is clad using powder based cladding material

Laser additive manufacturing (LAM)

- LAM is 3D printing of strong and solid metal objects. Compared to conventional manufacturing, 3D printing gives great freedom of design.
- Education starts during 2013 at LUT

Other processes:

- Micro laser welding
- Other laser surface treatments
- Laser cutting, drilling, marking and fine machining
- Also non-metallic materials processing

Laser equipment:

- 5 and 10 kW fiber laser
- 2.7 kW CO2-laser
- 200 W single mode fiber laser with scanner optics
- 20 W pulsed fiber laser with scanner optics
- 200 W diode laser with scanner optics
- Workstations and other equipment:
  - 11x4 m gantry workstation
  - 125 kg robot
  - Several smaller workstations

Co-operation

LUT Laser has many international partners, who are located mostly in Europe, but also in Russia, North-America and Asia. On a national level LUT Laser is in co-operation with most of the Finnish research centers and universities in the manufacturing area.

- LAM research machine for metallic materials
- Process monitoring for quality control
- Different types of camera equipment with active illumination