

## Activities

- . Fundamental Research
- . Application Development
- . Technology Transfer & Training
- . Laser Process R&D
- . Research Commercialisation
- . Graduate Education

## Facility & Capabilities

- . 80 m<sup>2</sup> ISO Class 7 clean room
- . 400 m<sup>2</sup> laboratory space
- . Video conferencing suite



- . Ultrafast
- . Picosecond
- . Femtosecond
- . Short Pulse
- . Nanosecond DPSS
- . Excimer
- . Long Pulse-CW
- . CO<sub>2</sub>
- . Pulsed Nd: YAG

LASER EQUIPMENT

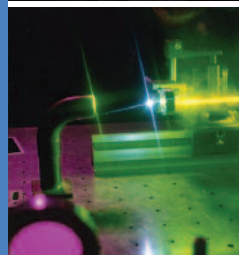
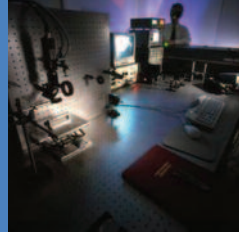
- . Optical Surface Profilometry
- . Scanning Electron Microscopy
- . Atomic Force Microscopy (AFM)
- . High Speed Imaging
- . Confocal Raman & Spectral Emission Microscope
- . Optical Microscopy
- . IR Thermography



FACILITY

CHARACTERISATION EQUIPMENT

www.ncla.ie



National Centre for Laser Applications, School of Physics, NUI Galway, Ireland  
tel. +353 91 493595 fax. +353 91 494594 email. ncla@nuigalway.ie

www.ncla.ie

## Funding Acknowledgement

The NCLA acknowledges the support of Enterprise Ireland, IRCSET, and EU FP7 for its research activities.



The INSPIRE research and capital investment programme was funded by the Irish Government's Programme for Research in Third Level Institutions, Cycle 4, National Development Plan 2007 - 2013



Investing in your future

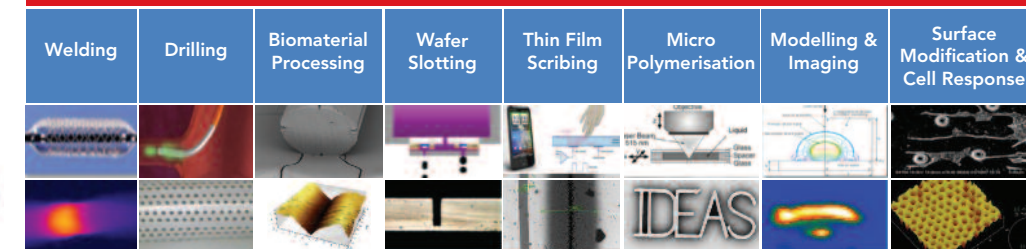


## Research & Development of Laser Materials Processing Solutions

National Centre for Laser Applications  
School of Physics  
NUI Galway, Ireland



ncla@nuigalway.ie



www.ncla.ie

## Mission

To create a technology centre of excellence in the field of laser materials processing that conducts internationally recognised research, commercialises proprietary research activity, and promotes technology transfer to industry.

## INTRODUCTION



The National Centre for Laser Applications (NCLA) was established in NUI Galway in 1989 in order to promote the use of lasers in manufacturing in local industry through research, training and technology transfer.

Today the NCLA continues this role in applied research while also focusing on fundamental laser processing research and graduate education.

## RESEARCH

- . Advanced Laser Machining
- . Nano & Micro Scale Surface Structuring & Functionalisation
- . Laser Process & Material Characterisation
- . Ultrashort & Short Pulse Laser Ablation Dynamics
- . Realtime Monitoring & Diagnostics of Laser Material Interactions

## INNOVATION FOR INDUSTRY

- . Technical Concepts & Feasibility Studies
- . Access & Research Services
- . Prototype & Process Development
- . Technology Workshops & Networking Events

## TRAINING

- . Laser Safety in the Workplace
- . Basics of Laser System Engineering
- . Laser Technology & Applications

## GRADUATE EDUCATION

- . Full Time & Part Time structured MSc and PhD programmes

## Laser Applications

MICROMACHINING

Laser milling to create micro features in a range of materials for applications such as microfluidics and medical devices.



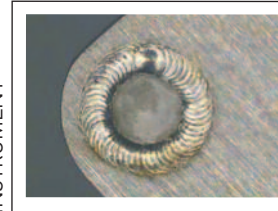
Fabrication of micro-parts and devices using thermal and cold laser ablation processes

PRECISION CUTTING / DRILLING

MICRO WELDING

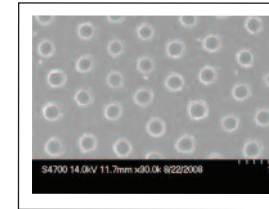
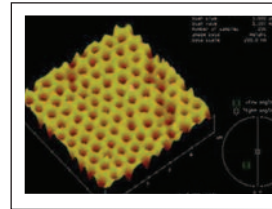
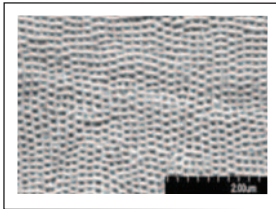
Joining for materials (metals, polymers) using laser welding

WELDED SS SURGICAL INSTRUMENT



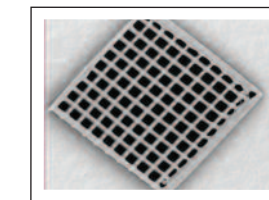
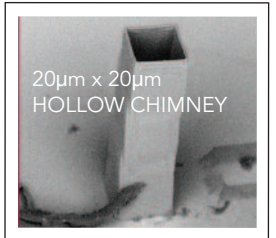
SURFACE ENGINEERING

Structuring and modifying the surface properties of materials to control interaction with fluids and living cells.



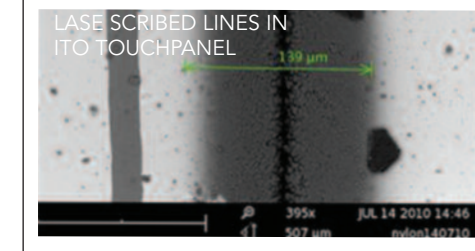
PHOTOPOLYMERISATION

Fabrication of 3D microstructures through multi-photon polymerisation



## Characterisation & Analysis

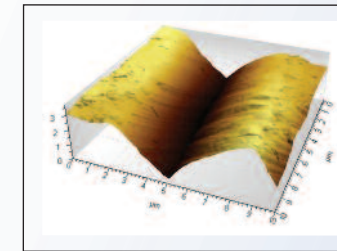
SEM IMAGING OF MATERIALS AND DEVICES



Desktop SEM for high throughput imaging of samples

SPECTROSCOPIC CHARACTERISATION

Spectral 2D imaging and characterisation of materials and processes with Raman Spectrometer.

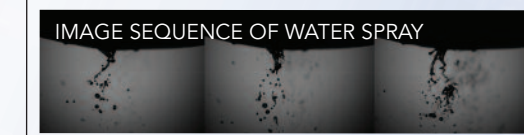


AFM ANALYSIS OF GROOVE ON FIBRE

Characterisation of micro and nano-scale surface topography.

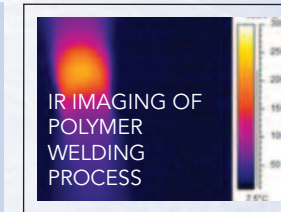
AFM ANALYSIS OF MATERIALS

HIGH SPEED IMAGING



High speed imaging (4000-100000 fps) to analyse processes.

INFRA-RED IMAGING



Thermographic imaging for laser process and materials analysis.



Non-contact optical technique used to measure surface features and roughness to nanometer accuracy.

SURFACE PROFILOMETER