

Electrical and Computer Engineering - Nanotechnology Research Group

People involved

Maan Alkaisi, Martin Allen and Volker Nock



The MacDiarmid Institute
for Advanced Materials and Nanotechnology

Nano and Micro Fabrication Facilities:

Pattern Definition

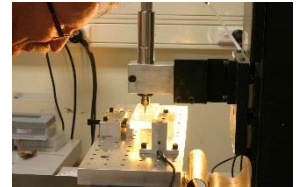
- Photolithography (Suss MA-6)
- Laser Mask Writer (Heidelberg uPG101)
- Electron Beam Lithography (Raith 150)
- Interference Lithography
- Nanoimprint Lithography (EVG)
- Soft-lithography
- Dry Etching (Oxford PlasmaLab)
- Micro-milling (Mini-Mill/GX)

Deposition technologies

- RF and DC Sputtering (Edwards Auto500)
- Electron Beam Evaporation
- Thermal Evaporation
- Electroplating
- Spin-coating (Laurell and Headway spinners)
- Wire bonder (K&S 4526)

Furnace for annealing, oxidation and doping.

- Three tube 3" wafer furnace

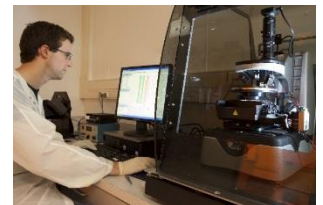
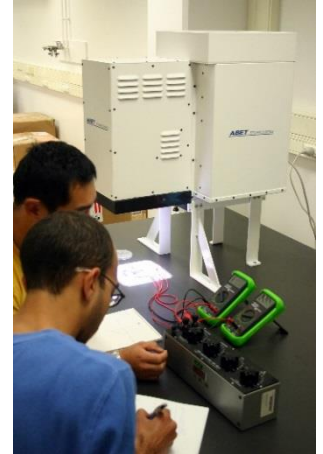


Device Characterization laboratory:

- Semiconductor parameter analyzer (HP 4155A)
- Deep level transient spectroscopy (DLTS)
- Hall measurement
- Solar simulator (ABET Sun 3000)

Thickness measurements and high resolution imaging

- Optical microscopy
- Atomic Force Microscopy (AFM)
- Veeco Dektak 150
- Ellipsometry
- Scanning Electron Microscopy (SEM)



Biological applications laboratory:

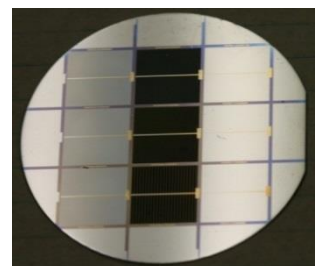
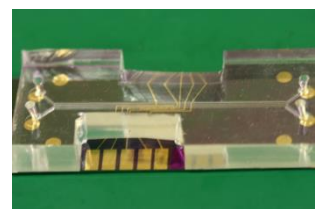
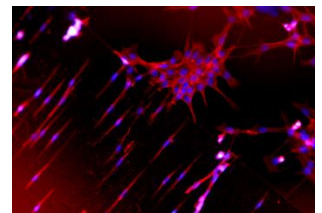
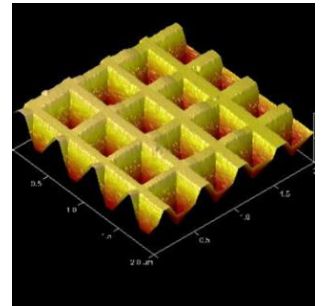
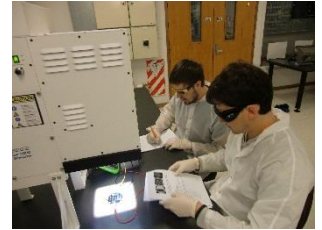
- PC-2 biological containment
- Fluorescent microscopy (Nikon Eclipse 80i)
- Brightfield microscopy
- Digital imaging system (Hamamatsu ORCA Flash4 V2)
- Cell-culture incubator (Contherm)
- Class 2 Biological Laminar Flow Hood
- Syringe pumps (Harvard PHD2000)



Projects offered:

Maan Alkaisi

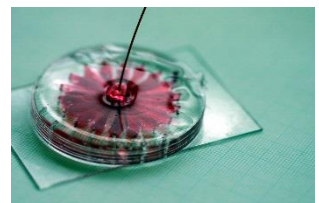
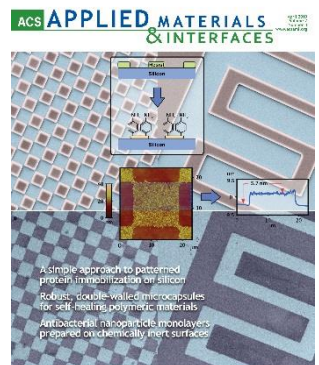
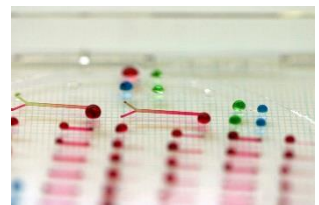
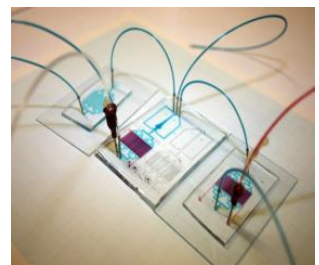
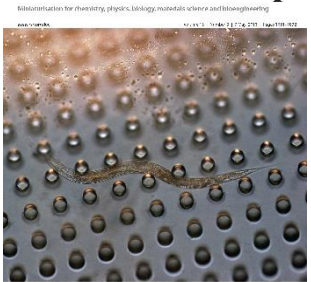
- Solar cells fabrication and texturing, surface modifications using nanoparticles and nanostructures
- Transparent solar cells, smart windows
- Bio imprint; replication of biological cells in biocompatible polymers for high resolution imaging
- Interactions of biological cells with surfaces, materials and patterns
- Bio imprints for the formation of customized cell culture platforms
- Mechanical forces and cancer treatment



Volker Nock

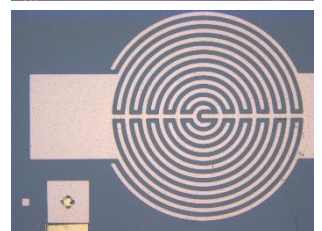
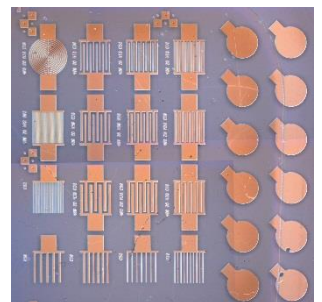
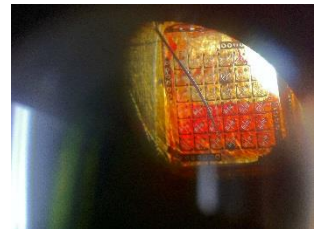
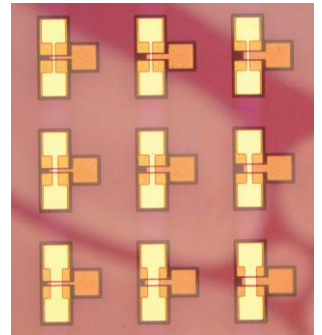
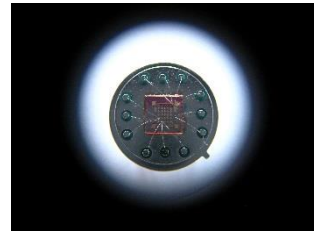
- Microfluidic device fabrication technologies
- Lab-on-a-chip design and development
- Biological force measurement, micro-organism handling on chip
- On-chip oxygen control and sensing
- Physics of fluid transport and mixing, digital microfluidics on surfaces, droplet-in-oil generation and transport on chip
- Fabrication of protein and bioimprinted scaffolds
- Protein-based micro- and nanotechnologies for sensing and chromatography applications

Lab on a Chip



Martin Allen

- Metal oxide wide band gap semiconductors
- Zinc oxide based optoelectronic devices
- Soft x-ray material characterisation
- Sensors for medical data-logging applications
- High Mobility Transparent Metal Oxide TFTs for the flat panel display and smart window industries
- Tunable UV Metal Oxide photodetectors for medical research
- Indium free TCO's for photovoltaic electrodes



Contacts:

Prof. Maan Alkaisi

maan.alkaisi@canterbury.ac.nz

Ph: +64 (0)3 364 2987 ext 7272

Fax: +64 (0)3 364 2761

Department of Electrical and Computer Engineering
University of Canterbury
Christchurch, New Zealand

Dr. Martin Allen

martin.allen@canterbury.ac.nz

Ph: +64 (0)3 364 2987 ext 7051

Fax: +64 (0)3 364 2761

Department of Electrical and Computer Engineering
University of Canterbury
Christchurch, New Zealand

Dr. Volker Nock

volker.nock@canterbury.ac.nz

Ph: +64 (0)3 364 2987 ext 7539

Fax: +64 (0)3 364 2761

Department of Electrical and Computer Engineering
University of Canterbury
Christchurch, New Zealand