Biomedical engineering opportunities at CSIRO

Dr. Phil Gurney, CEO, Australian eHealth Research Centre
Our purpose

By igniting the creative spirit of our people...

Great people

...we deliver great science and innovative solutions...

Great science

...for industry, society and the environment

Great impact
CSIRO today: a snapshot

Australia’s national science agency

One of the largest & most diverse in the world

6500+ staff over 55 locations

Ranked in top 1% in 14 research fields

20+ spin-off companies in six years

160+ active licences of CSIRO innovation

Building national prosperity and wellbeing
National Research Flagships

- Climate Adaptation
- Light Metals
- Sustainable Agriculture
- Energy Transformed
- Minerals Down Under
- Water for a Healthy Country
- Food Futures
- Preventative Health
- Wealth from Oceans
- Future Manufacturing
Divisions with Biomedical Engineering requirements

- Food and Nutrition Sciences
- ICT Centre
- Livestock Industries
- Materials Science and Engineering
- Mathematics, Informatics and Statistics
The joy of research

Can you imagine a world where everyone gets the best medical care, wherever they are....

and where hospitals and the health system runs efficiently..

Then do something to make it happen!
Organisational structure

Information & Communication Technology Division (~250)

Joint Venture formed 2003

Research areas

Health Informatics
Health Service Delivery
Tele-medicine
Advanced imaging
Surgical simulation

>6500 Staff

DEEDI Qld Health

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National Research Flagships
Preventative Health

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Preventative Health
Health Informatics

Making use of data by making data useful!

Selected partners, collaborators and commercialisations

IHTSDO, WA Health, Qld Health, QCAT, Cancer Australia, NEHTA, Royal Brisbane Hospital, Precedence Healthcare, Australian Cancer Grid, Flinders University, Royal Melbourne Hospital, and many more
Pathology Report

**HISTORY**

Left upper lobe and partial chest wall.

**MACROSCOPIC**

One specimen received. The left upper lobe and partial chest wall measuring 155 x 100 x 45 mm. The chest wall and partial chest wall measuring 60 x 60 mm. Deep to this sectioning, there is a white sclerotic mass measuring 45 x 42 x 40 mm. Surrounding the tumour there is obstructive pneumonitis. No other lesions are identified on sectioning of the lung. The chest wall will be decalcified and a further report will be issued.

**MICROSCOPIC**

Sections show a poorly differentiated adenocarcinoma which in most areas comprises sheets of large cells with vesicular nuclei, prominent nucleoli and moderate amounts of eosinophilic cytoplasm. Focally within the tumour there is a cribriform architecture and occasional cells contain mucin vacuoles. Areas of necrosis are present. Tumour invades the overlying pleura and foci of lymphatic permeation are noted within pulmonary parenchyma. No peribronchial lymph nodes are seen, although thrombus is present within a vascular space towards the inferior aspect of the tumour. Tumour does not appear to involve the pleura.

Sections of these areas show mild centriacinar emphysema.

Staging Guidelines

- T2 N2 Mx
- N2
- Mx
- Stage:
- II
- Tumour not present by the present or bronchial washings but endoscopy.
- Extension, surrounded by lung or visceral pleura.
- Evidence of intrapulmonary metastatic foci, not in the main bronchus.
- Invasion of the diaphragm, or more than 2 cm from the carina.
- Intraoperative metastatic foci.
- Involvement of the hilar nodes, which involves any of the following structures:
  - Common hepatic duct, celiac trunk, or superior mesenteric artery.
  - Inferior vena cava, or pericardium.
- Involvement of the hilar lymph nodes.
- Involvement of systemic lymph nodes.
- Involvement of the pulmonary artery or inferior vena cava.
- Involvement of the liver, bone, adrenal gland, or brain.
- Involvement of distant lung parenchyma.
- Involvement of the regional lymph nodes.
- Involvement of the hilar lymph nodes.
- Involvement of the mediastinal lymph nodes.
- Involvement of the ipsilateral hilar lymph nodes.

Extrathoracic metastases.

- Bone, liver, lung, pleura, skin, adrenal gland, brain.
- Ipsilateral hilar lymph nodes.
- Ipsilateral subcarinal lymph nodes.
- Ipsilateral mediastinal lymph nodes.
- Ipsilateral paratracheal lymph nodes.
- Ipsilateral paracardiac lymph nodes.
- Ipsilateral scalene lymph nodes.
- Ipsilateral supraventricular lymph nodes.

Histopathologic Type:
- Carcinoma
- Sarcoma
- Lymphoma
- Metastasis
- Other

Histology Report

- Underlying this there is a firm, solid, grayish mass measuring 3 x 3 x 3 cm.
- The lesion is subpleural and appears to be focal into the pleural surface.
- Right middle and lower lobes and lymph nodes are moderately differentiated adenocarcinoma.
- Pulmonary adenocarcinoma.
- Pleural invasion.
- Hilar and number lymph node metastases.
The Snapper Mapping Tool

Mapping table

Search view

Ontology View

The Snapper Mapping Tool is a tool designed for mapping in e-health research. It features a mapping table and a search view to facilitate the process. The ontology view provides a visual representation of the mapping relationships among different terms and concepts.
Surgical Simulation

Using virtual reality for off-patient training

Selected partners, collaborators and commercialisations

Surgical Science (Sweden), EPFL (Switzerland), Queensland Health Skills Development Centre, Nanyang Technical University, (others under NDA)
Integrated colonoscopy simulation system
Simulated (left) and Real (right)
Ultrasound simulator
Advanced Biomedical Imaging

Advanced tools for image analysis and surgical planning

Selected partners, collaborators and commercialisations

AIBL consortium, University of Queensland, University of Melbourne, National Stroke Research Institute, Harvard Medical School, UCLA, ANSTO and many more
Main projects

Knee cartilage segmentation

Neuroimaging for ageing and Alzheimer's

Prostate radiotherapy planning with MRI

Brain tumour characterization Using PET and MRI
Looking at plaque in vivo with positron emission tomography (PET)

Pittsburgh compound B (PiB) is a new imaging agent.

PiB is currently being evaluated worldwide for the early diagnosis of Alzheimer’s disease.
Alzheimer’s Disease
Qualitative evaluation of thickness information

Significant differences between AD and NC in the temporal, parietal and occipital
Surface smoothing
Telemedicine: Non-invasive remote diagnostics

- Use the eye as the window to the body
  - Low cost camera, on-site analysis software
  - Images transmitted for remote expert consultation
- Detecting changes related to a range of conditions
  - Prevent needless blindness
  - Screening and early detection of diabetic retinopathy, glaucoma and other eye disease
  - Screening and early detection of systemic disease: Alzheimer’s disease, cardiovascular disease, stroke and CMV-Retinitis
Self observations and measurements entered in Wellness Diary software

Daily motivational SMS, educational video and relaxation audio

Web portal access for self management

Data synchronisation and messaging

Wellness Diary Connected

- Diary data
- Measurement data
- Health Reports
- Educational material
- Discussion, messaging

Service Provider

Community Care Team

Patient mentoring and goal setting via the phone

Preventative Health
Biomedical Manufacturing (Sydney / Melbourne)
120 sensor fibre optic catheter
SEM images of nitrocellulose membrane with gold nanoparticles before (left) and after (right) exposure to a light pulse from a photoflash.
Stage I: coat silicon with 5 nm Pt

Stage II: rotate and bring surfaces together in UHV to create atomic bonding

System developed to bond silicon wafers in the construction of implantable electronic enclosures
Jobs at CSIRO

• Research scientists/engineers
  • Scientists, Engineers, Managers
    • Undertake and manage research activities
    • PhD or equivalent qualifications

• Research Projects staff
  • Software engineers
  • Project managers
    • Support scientific projects, experimentation and practical work
    • Relevant qualifications and skills

• Research support services
  • Technical staff
  • Admin staff
  • Communications
Working at the AEHRC

• Undergraduate projects
• Vacation students
• Interns and casual employment
• PhD and Masters projects
• Research staff
  • PhD qualified
• Research projects
  • Software engineers
• Administration
• Specialist staff
  • Medical Director
CSIRO Positions Vacant

Career Opportunities
CSIRO has a worldwide reputation for excellence and achievement in basic and applied research. Working for CSIRO will give you the satisfaction of making a vital contribution to the future. To view current career opportunities and apply online use our job search facility.

To find out more about the kinds of research CSIRO undertakes within our 2010-2011 vision.

CSIRO’s values are: integrity of excellent science, trust and respect, initiative to explore new horizons, delivering on commitments and a commitment to safety and sustainability. To be successful you will need to demonstrate behaviours aligned to these values in your application and at interview.

Applications can be submitted until midnight (AEST) on the closing date shown in the vacancy information.

Previous Applicants
To amend your contact details or previously lodged Resume/CV online please visit here.
To reload an application for a specific position, re-apply for the position.

Job Search

Division
Location
Date Added
Reference

Find Jobs Now  Clear
The Australian e-Health Research Centre
Dr Phil Gurney - CEO
Phil.Gurney@csiro.au

Thank you