

ORGANISATION NAME:

Morrison Industries

CHIEF CONTACT PERSON:

Paul Morrison

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WODEN ACT 2606**

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E-MAIL:

ONE PARAGRAPH SUMMARY OF ACTIVITIES INVOLVING OPTICS
AND LASERS:

**Development and manufacture of laser entertainment
systems. Refurbishment and repairs of lasers.
Development of scientific laser control systems.**

ORGANISATION NAME:

**Electronic Materials Engineering Department
Research School of Physical Sciences and Engineering
Australian National University**

CHIEF CONTACT PERSON:

Dr R.G. Elliman

POSTAL ADDRESS:

**EME, R.S.PHYS.S.E.
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ONE PARAGRAPH SUMMARY OF ACTIVITIES INVOLVING OPTICS
AND LASERS:

**Materials, measurement, spectroscopy.
Optical-based analytical tools have been developed for
characterisation of semiconductor materials.**

ORGANISATION NAME:

**Physics Department, Faculties
Australian National University**

CHIEF CONTACT PERSON:

Dr H. -A. Bachor

POSTAL ADDRESS:

**Department of Physics, The Faculties
The Australian National University
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ONE PARAGRAPH SUMMARY OF ACTIVITIES INVOLVING OPTICS
AND LASERS:

Quantum optics, including the generation of squeezed states, properties of frequency doublers and fibre lasers. Instrumentation at the quantum noise limit, stabilisation of laser intensity and frequency. Atom manipulation - in particular diffraction of atoms from evanescent light fields, trapping atoms. Diagnostics of plasma sources and hypersonic flows using lasers, in particular CARS and LIF.

ORGANISATION NAME:

**Optical Sciences Centre
Australian National University**

CHIEF CONTACT PERSON:

Dr John Love

POSTAL ADDRESS:

**Optical Sciences Centre
The Australian National University
CANBERRA ACT 0200**

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ONE PARAGRAPH SUMMARY OF ACTIVITIES INVOLVING OPTICS
AND LASERS:

The Optical Sciences Centre undertakes mainly theoretical research into optical waveguides, fibres and devices, as well as both theoretical and experimental work into pattern recognition and visual processing in vision research. The former ranges from futuristic ideas in nonlinear optics through to direct application to commercially available Australian products. There is very significant collaboration with Australian universities and industries through CRC's, GIRD's and research contracts. As well as training PhD students, lecturing in optical waveguides is undertaken both at ANU and Sydney University, as well as for companies in Canberra and Melbourne.

ORGANISATION NAME:

Electro Optic Systems Pty Ltd

CHIEF CONTACT PERSON:

Dr B. Greene

POSTAL ADDRESS:

**PO Box 201
ERINDALE ACT 2903**

PHONE: (06) 299 2470

FAX: (06) 249 2477

E-MAIL:

ONE PARAGRAPH SUMMARY OF ACTIVITIES INVOLVING OPTICS
AND LASERS:

Design and manufacture of picosecond YAG lasers

Design and manufacture of eyesafe lasers.

ORGANISATION NAME:

**Laser Physics Centre
Australian National University**

CHIEF CONTACT PERSON:

Prof. B. Luther-Davies

POSTAL ADDRESS:

**Laser Physics Centre
Australian National University
CANBERRA ACT 0200**

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ONE PARAGRAPH SUMMARY OF ACTIVITIES INVOLVING OPTICS
AND LASERS:

The Laser Physics Centre is at the forefront of Australian research into the growing technology of lasers, with research offering exciting implications for future all-optical communications. There are prospects, for example, of controlling light beams by using optical solitons, and at present new materials are being prepared and investigated. Research is also underway into the study of plasmas and x-rays produced by a very powerful, short laser pulse. The relevant laser is being reconstructed to provide one of the world's highest peak power lasers. Another laser has exceptionally high frequency stability, for high resolution laser spectroscopy of solids, and there also is a specially constructed laser giving tunable ultraviolet radiation for studying atmospheric gases. Many more lasers are used for investigating unusual optical effects.

ORGANISATION NAME:

**Research School of Earth Sciences
Australian National University**

CHIEF CONTACT PERSON:

J. Stone

POSTAL ADDRESS:

**Research School of Earth Sciences,
Australian National University
CANBERRA ACT 0200**

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ONE PARAGRAPH SUMMARY OF ACTIVITIES INVOLVING OPTICS
AND LASERS:

**Laser used for rock sample fusion/gas release, as part of
system for microanalysis of stable isotopes of oxygen
and carbon.**

ORGANISATION NAME:

Australian Defence Force Academy

CHIEF CONTACT PERSON:

Professor Colin Pask

POSTAL ADDRESS:

**Department of Mathematics
University College, ADFA
CANERRA ACT 2600**

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ONE PARAGRAPH SUMMARY OF ACTIVITIES INVOLVING OPTICS
AND LASERS:

The Optics Group within the Department of mathematics at ADFA carries out research in two broad areas: (1) Fibre optics and optical waveguide theory (fibres and waveguides for communication systems, optical devices, nonlinear optical physics, nonlinear guided waves and their stability); (2) Graded-index optics (general ray and wave theory, application to visual systems, measurements on insect visual systems).

ORGANISATION NAME:

**Visual Sciences, RSBS
Australian National University**

CHIEF CONTACT PERSON:

Dr M.V. Srinivasan

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Australian National University
CANBERRA ACT 0200**

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ONE PARAGRAPH SUMMARY OF ACTIVITIES INVOLVING OPTICS
AND LASERS:

I have been interested in understanding vision in small animals, such as insects, that possess relatively simple nervous systems, and are yet visually very competent. I am also involved in applying the insights gained from studying information processing in biological systems to the development of novel, short-cut solutions to problems in machine vision such as range sensing and measurement of optic flow.

ORGANISATION NAME:

AOFR Pty Ltd

CHIEF CONTACT PERSON:

Dr Scott Rashleigh

POSTAL ADDRESS:

**9 Lyell Street
Fyshwick. ACT 2609**

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ONE PARAGRAPH SUMMARY OF ACTIVITIES INVOLVING OPTICS
AND LASERS:

R & D, manufacture and international sale of passive fibre optic system components, principally couplers and cable assemblies. 95% of production is exported to 20 countries through subsidiary companies in Dallas, USA and Munich, Germany.

ORGANISATION NAME:

CSIRO Environmental Mechanics

CHIEF CONTACT PERSON:

Dr J.J. Finnigan

POSTAL ADDRESS:

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CANBERRA ACT 2601**

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ONE PARAGRAPH SUMMARY OF ACTIVITIES INVOLVING OPTICS
AND LASERS:

We use optical components in two areas of research in our laboratory. 1) Flow measurement and flow visualisation. A 6 watt argon-ion laser is used to illuminate the movement of tracer particles in a fluid flow. Light sheet optics and an acoustic-optic modulator are used. 2) Measurement of the 3D lsurface structure of soil. A 10 mw He-Ne laser is scanned over a soil surface and the illuminated laser spot is imaged to record the surface shape.

Both projects ues one and two dimensional digital video cameras to image the laser targets.

ORGANISATION NAME:

**Division of Neuroscience,
John Curtin School of Medical Research,
Australian National University**

CHIEF CONTACT PERSON:

S. Redman

POSTAL ADDRESS:

**Div. of Neuroscience,
John Curtin School of Medical Research
Australian National University
CANBERRA ACT 0200**

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ONE PARAGRAPH SUMMARY OF ACTIVITIES INVOLVING OPTICS
AND LASERS:

Development of a lens scanning confocal microscope.

ORGANISATION NAME:

Photolithographic Laboratory

CHIEF CONTACT PERSON:

Dr Andrew Blakers

POSTAL ADDRESS:

**Engineering Department
Australian National University
CANBERRA ACT 0200**

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ONE PARAGRAPH SUMMARY OF ACTIVITIES INVOLVING OPTICS
AND LASERS:

- 1. Photolithographic facility has been constructed for the purpose of fabrication of microelectronic devices. A headway photoresist spinner and a Quintal mask aligner with a resolution down to 1 μm are installed, as well as related equipment such as fume cupboards, process furnaces, air and water filters and vacuum evaporator. The facility will be used mainly for the fabrication of optical waveguides and solar cells.**
- 2. 20 m² and 400 m² paraboloidal dishes for the collection and concentration of sunlight are being characterised. The flux distribution at the focal region will be measured and modelled to facilitate design of thermal and photovoltaic receivers.**

ORGANISATION NAME:

University of Canberra

CHIEF CONTACT PERSON:

Prof. Paul Edwards

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ONE PARAGRAPH SUMMARY OF ACTIVITIES INVOLVING OPTICS
AND LASERS:

The radiowave and lightwave technology group in the Faculty of Information Sciences and Engineering is working in collaboration with NTT and Hana Matsu Photonics KK towards novel applications of sub-Poissorian light using laser & light-emitting diodes. Collaborative work with University College, ADFA and the Department of Electronic Engineering, University of Melbourne is also directed towards laser diode array applications and quantum optics and electronics R & D. The group is also engaged in laser and fibre communications engineering development in association with the Department of Transport and Communications.

ORGANISATION NAME:

**Research School of Physical Sciences and Engineering
Australian National University**

CHIEF CONTACT PERSON:

Prof. Erich Weigold

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ONE PARAGRAPH SUMMARY OF ACTIVITIES INVOLVING OPTICS
AND LASERS:

Electron momentum spectroscopy of laser-excited atoms.

The coupling of a photon beam from a CW dye laser with an electron coincidence spectrometer opens the way to a whole new class of experiments on atoms prepared in excited states. In addition to the capability of preparing the target system in a specific state, the excitation of an outer electron can significantly modify the effective potential seen by the other electrons, including the inner valence electrons. This atomic rearrangement can best be studied using the technique of electron momentum spectroscopy.

Perhaps the most exciting aspect of the use of lasers in preparing target states is that it enables the study of aligned and oriented states. In the past the researchers have been limited to observing spherically-averaged momentum densities in atoms. The determination of aligned momentum densities is a most exciting new development. It provides a much more stringent test for structure theories, and reveals much more detailed information on electron correlation effects than can be achieved by measuring the spherically-averaged momentum distributions.

ORGANISATION NAME:

Research School of Chemistry

CHIEF CONTACT PERSON:

Dr. Elmas Krausz

POSTAL ADDRESS:

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Australian National University
Canberra ACT 0200**

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ONE PARAGRAPH SUMMARY OF ACTIVITIES INVOLVING OPTICS
AND LASERS:

**Optical spectroscopy of inorganic compounds and
complexes.**

ORGANISATION NAME:

**UV Physics Group,
Atomic and Molecular Physics
Research School of Physical Sciences and Engineering**

CHIEF CONTACT PERSON:

Dr Brenton Lewis

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**Australian National University
Canberra ACT 0200**

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ONE PARAGRAPH SUMMARY OF ACTIVITIES INVOLVING OPTICS
AND LASERS:

**High resolution vacuum ultra violet laser spectroscopy
and high sensitivity VUV monochromator measurements
of atmospheric molecules, principally oxygen.**