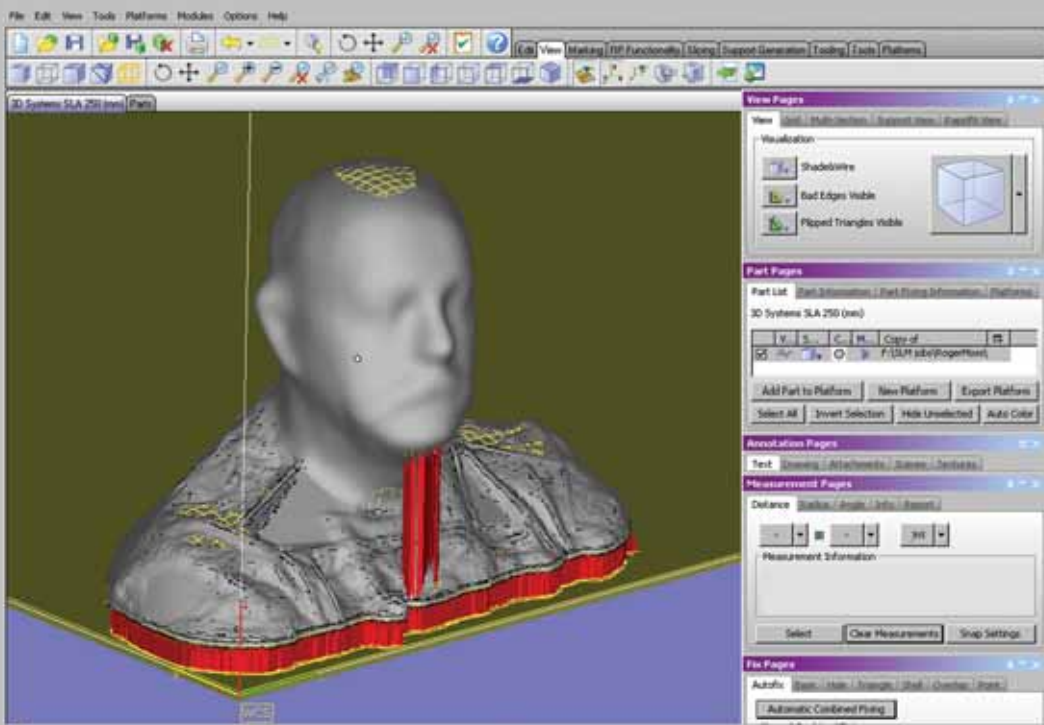


TAKING SHAPE

TECHNOLOGIES AT PDR





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THE SENEDD, CARDIFF BAY
14 - 18 NOVEMBER 2007

An exhibition of sculpture by Roger Moss
together with other examples of work from UWIC's
National Centre for Product Design
& Development Research (PDR)

ACKNOWLEDGEMENT

The National Centre for Product Design & Development Research gratefully acknowledges the support of:

The University of Wales Institute, Cardiff
National Assembly of Wales
Maxillofacial Unit, Morriston Hospital

We would like to thank all those who have helped to make this exhibition possible, especially, Roger Moss, Andrew Davies AM, Professor Robert Brown, Dr Richard Bibb, Dominic Eggbeer, Lloyd Stoker, Daniel Thomas, Lee Griffith and Sherine Holden.

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INTRODUCTION

Taking Shape is a celebration of work produced by the National Centre for Product Design & Development Research (PDR).

PDR was founded in 1994 by The University of Wales Institute, Cardiff (UWIC) with the clear vision: to create a facility that pushes the boundaries of research and knowledge transfer in design and product development, and embraces the very best of academic knowledge, industrial expertise and innovative technologies.

Since then, PDR has grown to become an internationally recognised centre of excellence in design, research and product development. Its success is attributed to its multidisciplinary approach and the use of cutting-edge technologies to deliver a complete service to industry; from research through to product launch. It is also a recognised Centre of Excellence for Technology and Industry Collaboration (CETIC) by the Welsh Assembly Government.

PDR has won many prestigious international awards including two Red Dot awards, three iF awards and an Industrial Design Society of America IDEA award.



PREFACE

Design is at the very heart of every product, commodity and service that we encounter each day. We appreciate a product as much by its good design and aesthetics as by its functionality.

In the world of innovation many of the most exciting and fruitful ideas are in those interesting areas that exist between various disciplines. It was in this spirit of cross-disciplinary design research and knowledge transfer that PDR appointed Roger Moss, a leading artist and sculptor working in Wales for over 30 years. He was to consider the possibilities of using in-house design expertise and cutting-edge technologies, to create a body of physical art.

In this exhibition, Roger explores the nature of sculpture and the implications of working in a virtual space compared to physical interaction with a chosen medium. Many fundamental questions on the nature of sculpture have been investigated through practice, resulting in the pieces you see in this exhibition. These pieces reflect Roger's exploration of the new opportunities and possibilities for the disciplines of fine art and design-crafts by using these innovative technologies and embracing their inherent qualities.

Included also are examples of work by the Medical Applications Group at PDR, demonstrating expertise in reconstructive surgery applications, along with award winning designs produced by the Design Team.

The exhibition displays the achievement of the shared aim of combining design knowledge, technology and creativity to produce art works of outstanding originality.

Andrew Davies AM

*Minister of Finance and
Public Service Delivery*

"It is misleading to divide human actions into art, science or technology, for the artist has something of the scientist in him, and the engineer of both... one man may be mainly motivated by a desire to promote utility, while others may seek intellectual understanding or aesthetic experience. The study of interplay among these is not only interesting but is necessary..."

Cyril Stanley Smith Metallurgist

PDR

The National Centre for Product Design & Development Research (PDR) is the award winning, multi-disciplinary design and research centre at the University of Wales Institute, Cardiff.

It undertakes world class design, engineering and product development support to industry. It has specialist areas of research and application, including the Medical Applications Group which delivers medical modelling for reconstructive surgery to over 60 hospitals throughout the U.K.

THE TECHNOLOGIES

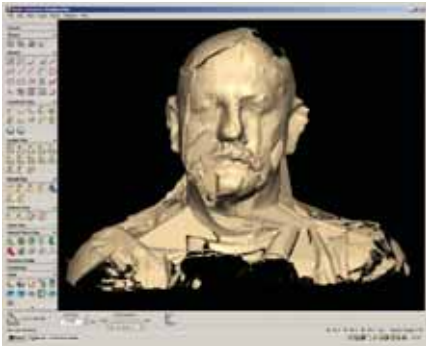
PDR has some of the best resources and facilities available to industry, supported by a wealth of knowledge and experience, turning these cutting-edge technologies into potent capabilities for business and industry. Along with high speed machining, injection moulding, modelmaking and batch production methods, there are state-of-the-art digital technologies from 3D computer packages to rapid prototype machines, using laser technologies to build prototypes, products, medical models etc., in a variety of materials, from resins to stainless steel.



TAKING SHAPE

I first encountered this world through the enlightened philosophy of PDR engaging a sculptor into their research team to experiment with and investigate the potential of these technologies for the creative industries. I was spellbound!

I know, as a sculptor of 35 years of 'traditional' practice, that sculpture is, and always has been a devourer of concepts, materials, tools and techniques.



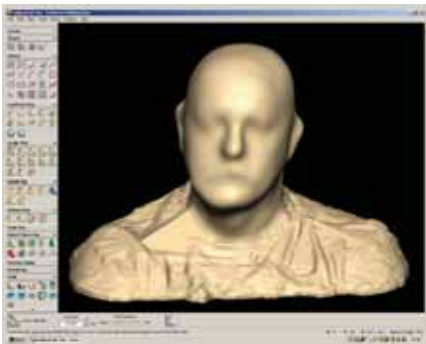
And here was a magnificent feast!

I also know that many working in the 3D disciplines of fine art and design-crafts feel that computer processes are somewhat cold, lacking the sensual contact with materials, the familiar relationships with tools and not allowing intuitive working practices. Through the expertise, enthusiasm, encouragement and collaboration of colleagues at PDR, I was able to engage with the enormous potential of these technologies for creative working.



All that one could wish for in a working environment.

The computer programme I have worked with for the most part is called 'FreeForm'. It is a multi-disciplinary instrument that gives fantastic flexibility for creative work... it can be a sketchbook, an ideas manipulator, a finishing tool, a tool for thinking and intuitive shifts... and all in virtual three dimensions. From concept to final visualisation, it is a powerful tool for creative thought and problem solving.



And amazingly, you can 'touch' the virtual sculpture on the screen. This is called haptic technology.

Its versatility and facility for immediate and intuitive working is immeasurable. Alternatives are easily saved, easily amended, all is reversible, all is cancellable... you can go back to earlier proposals immediately, you can rapidly create numerous combinations and alternatives to make new objects. Nothing ventured, nothing gained, but brilliantly, nothing lost.

This would not be so easy in the real world of gravity, mass and material.

The ability to quickly advance the evolution of individual pieces also effects my development. This facility has made me re-assess some of the fundamentals of sculpture... aspects that impinge when working in the third dimension... those of space, light, mass, gravity, form. This is true for understanding the importance of these qualities whilst making sculpture, but it is equally true for experiencing sculpture.



After the conceptual phase of 'shaping' comes the magic of building the piece using one of several rapid prototype technologies available at PDR. Most are digital machines using lasers to catalyse, cut or melt a variety of materials, building layer upon layer of the material until the piece is complete.

These processes and materials have their particular intrinsic and aesthetic qualities, that can be exploited to play an important role in the creative process and transform the character of the finished piece.

They allow the production of forms and surfaces that have their roots in the medium in which they are created. There are aspects of these technologies that give unique qualities that would not be possible to replicate by traditional modelling, carving or fabricating. So the selection of a particular system is an important part of the creative process.

It is strange working in the virtual world.

There is no seductive hands-on contact whilst making and only when the sculpture is built, and miraculously emerges from the vat of resin, or container of metal powder, like Excalibur rising from the lake, can you truly experience the sculpture. But, of course, you only, and always get what you input into the computer. The piece can be as complex as you wish but it is always extremely accurately reproduced. And that accuracy of reproduction can be repeated time after time, ad infinitum.



Bringing together the accuracy and power of digital tools, processes and methods with intuitive and creative approaches is opening up new possibilities, potentials and directions for fine art and design-craft practices. Some think that these technologies may revolutionise those disciplines in a similar manner to that of photography on painting. I have found them intriguing, fascinating and liberating.

New tools offer new ways of working, which if taken without prejudice, lead to a myriad of possibilities.

PDR is opening the door to those possibilities.

Roger Moss
Sculptor

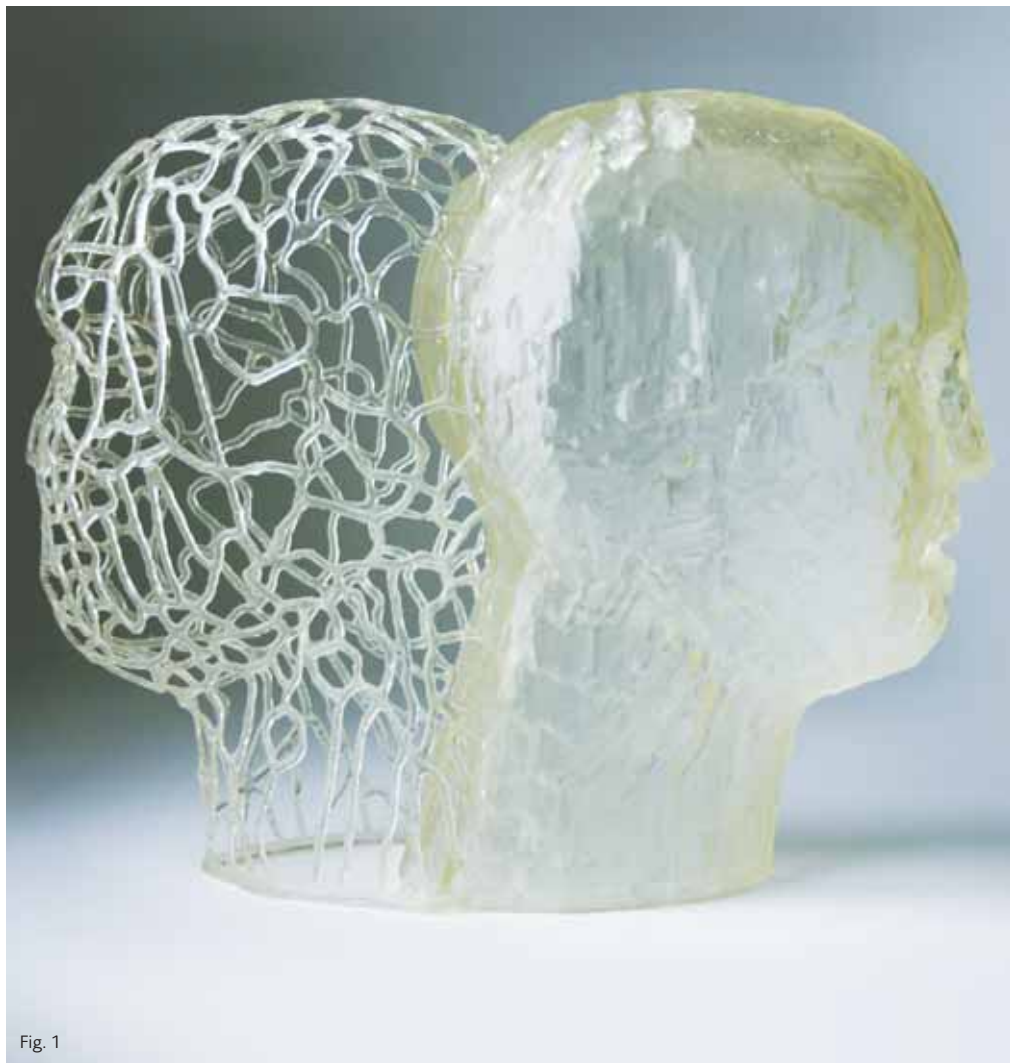


Fig. 1





Fig. 2



Fig. 3





Fig. 4



Fig. 5





Fig. 6



Fig. 7

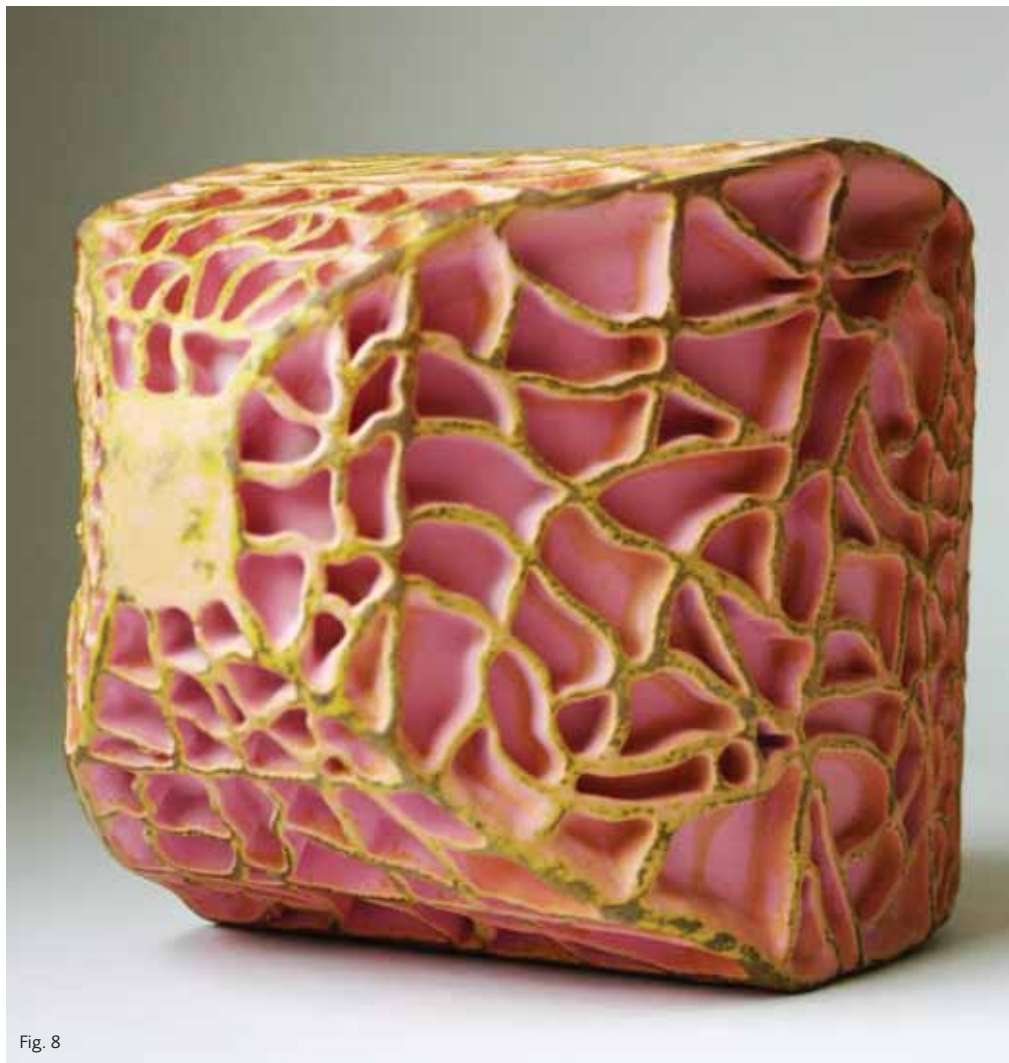


Fig. 8

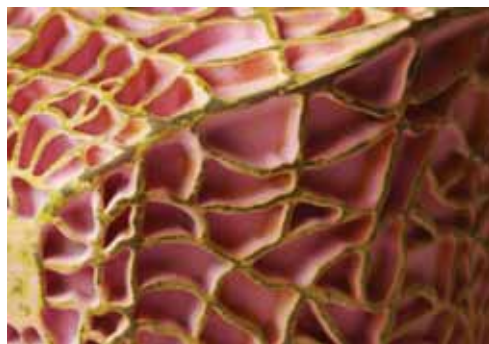




Fig. 9



Fig. 10



Fig. 11



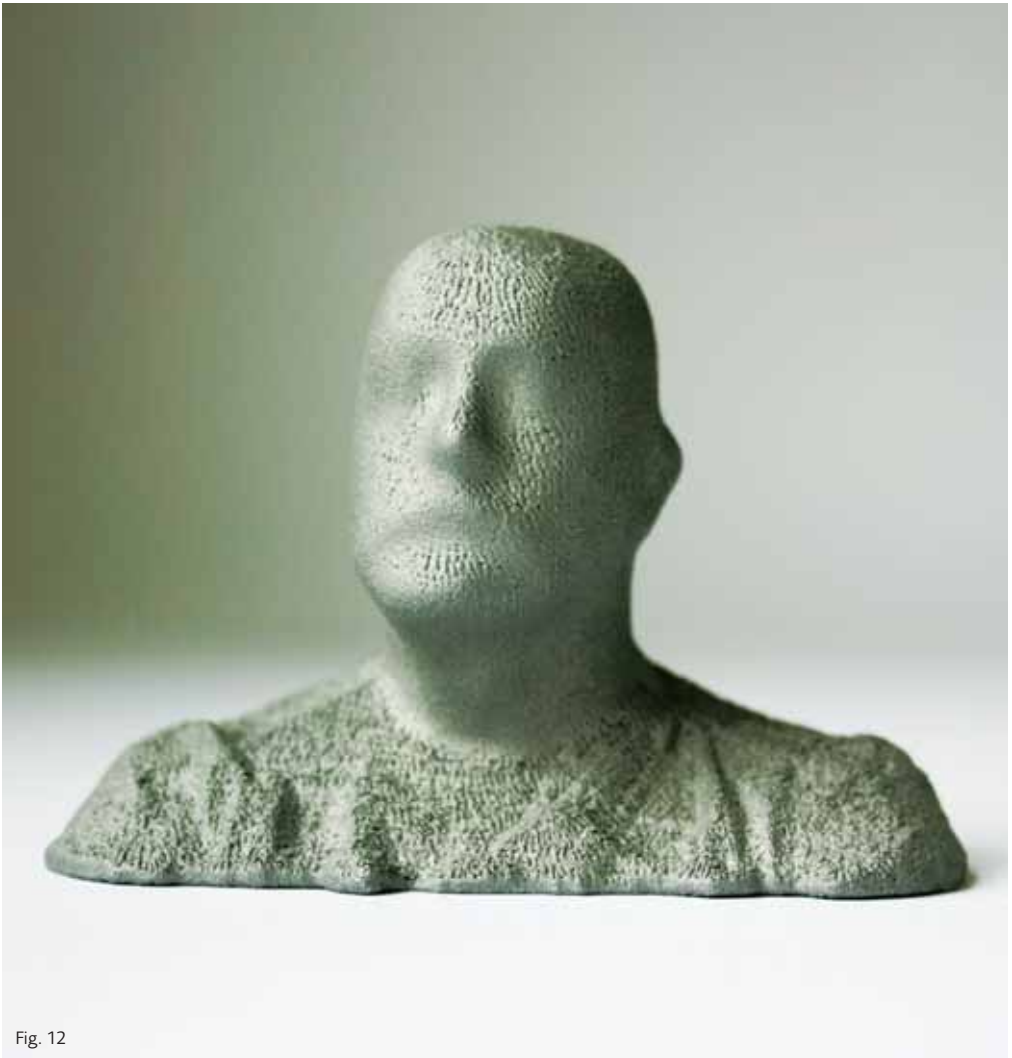


Fig. 12

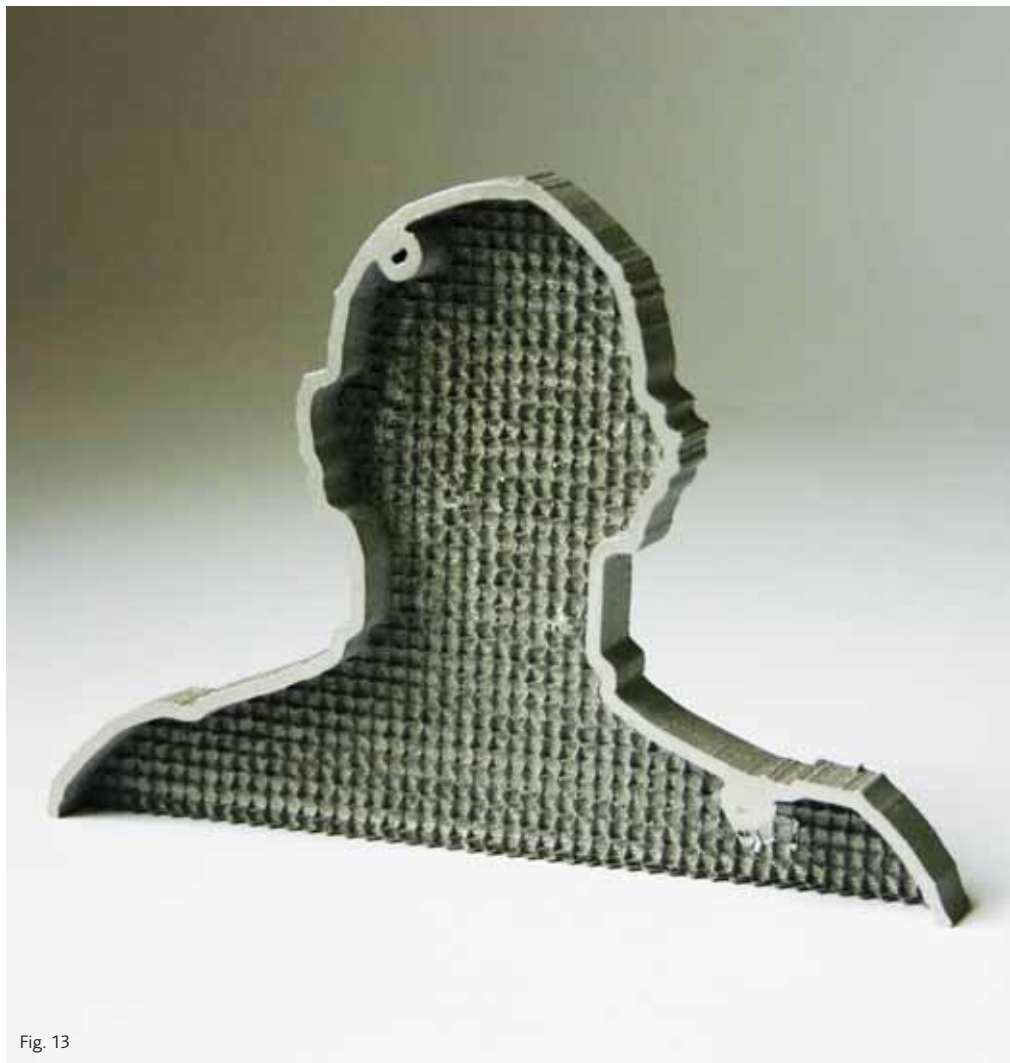
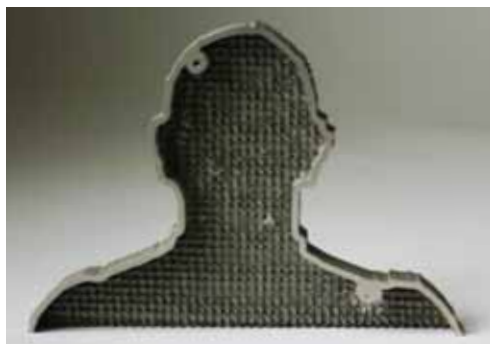


Fig. 13



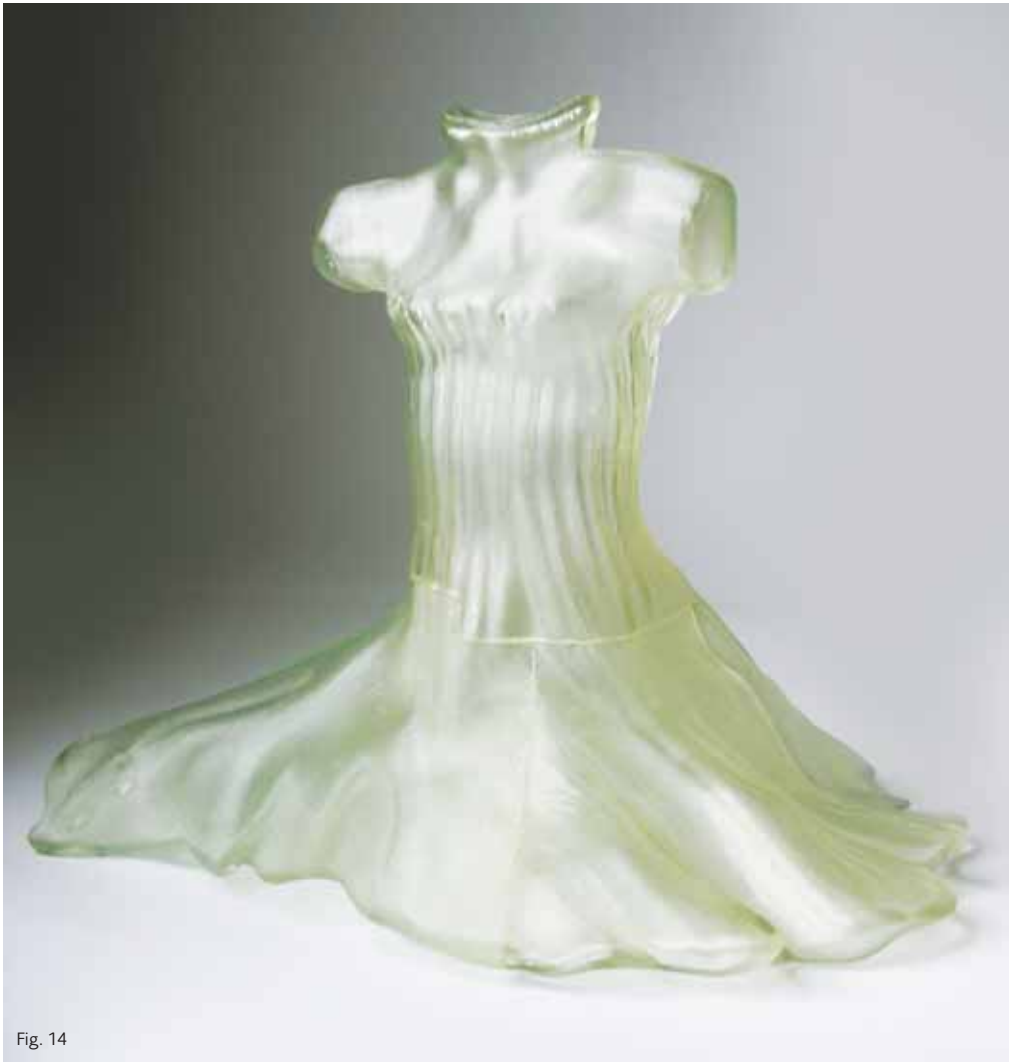


Fig. 14





Fig. 15





Fig. 16



Fig. 17



Fig. 18





Fig. 19





Fig. 20



Fig. 21



Fig. 22



Fig. 23



Fig. 24



product
design
award

2006 ■



DESIGNPREIS
2006

NOMINEE



reddot design award
winner 2006



Fig. 25





Fig. 26

INTERNATIONAL DESIGN
EXCELLENCE AWARDS '07

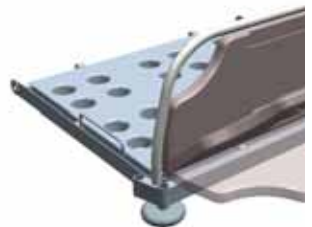




Fig. 27

ShakerScope has been shortlisted for the iF product design award 2008.



Fig. 28

LIST OF WORKS

	TITLE	TECHNOLOGY
1	JANUS	SLA
2	HEARTLAND	SLA
3	CURIOUSER	SLA, Thermojet, Aluminium
4	FLEDGELING	LOM, FDM
5	TRUNKING	SLA, FDM, Red Sandstone
6	BLODEUWEDD	SLA, FDM, Thermojet
7	T. BIRD	SLA, FDM
8	UNTI	SLA
9	SMOOTH SELF-PORTRAIT	Thermojet Wax
10	SEED	SLA
11	HERMAPHRODITE	SLA
12	SMALL SELF-PORTRAIT	SLM, Stainless Steel
13	SLICED	SLM, Stainless Steel
14	DRESSFLOW	SLA
15	MINIATURE MONUMENTS ONE, TWO & THREE	SLA
16	CONGLOMERATE	SLA
17	CELL	SLA
18	SKIN	SLM, Stainless Steel

MEDICAL MODELS

19	Surgical Cutting Guide
20	Medical Model
21	Dental Frameworks
22	Digitally Designed, Soft Tissue Prostheses
23	Bone Structures
24	Titanium Cranioplasty Plate

PDR DESIGN

25	INDIGO LTD - Smart Sharps Reusable Sharps Bin
26	NIGHTINGALE CARE BEDS LTD - ProAxis Hospital Bed
27	NACUR HEALTHCARE LTD - Nasal Spa
28	SHAKERSCOPE LTD - Compact Kinetically Powered Light Source

GLOSSARY

FreeForm

FreeForm is a computer software package that enables haptic sculpting and shaping of complex organic shapes.

Haptic

From Greek meaning to touch. Haptic refers to touch as optic refers to sight. Haptic devices make it possible to touch and manipulate virtual objects.

RP - Rapid Prototyping

They are new technologies that build physical objects, layer upon layer, directly from 3D computer data. The different RP systems vary in how they create the layers and in what material the object is built.

SLA - Stereolithography

An RP process using a laser to scan a vat of liquid acrylic resin, curing and bonding successive layers to create the object. Often referred to as Layer Manufacture.

SLM - Selective Laser Melting

A similar process to SLA. The building material is metal powder. Each layer-shape is scanned, melting and forming a bond with the previous layers.

FDM - Fused Deposition Modelling

Thermoplastic material is fed through a heated extrusion head, depositing a fine bead of molten plastic to form the layer. Successive layers bond due to partial melting.

Thermojet

This RP process creates highly detailed, wax parts using an inkjet printing-style process of building up successive layers.

LOM - Laminated Object Manufacture

This RP process uses flat sheet material, usually paper, to form the layers. Each layer is bonded to the previous one by heat and then the profile of the layer is cut using a laser.

This catalogue has been produced by PDR.

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