

# Green with four legs

**Unitec lecturer Roger Bateman discusses his Biochair. Photos: Hilary Upton.**



**The Biochair is designed to be manufactured from byproducts and waste from the forestry industry. The project began in early 2009, a collaboration between Unitec and the Government-owned Crown Research Institute Scion. The idea of combing wood with natural bio-based polymers in the design of an exportable commercial furniture product offers, says designer Roger Bateman, an opportunity to combine “the ‘naturalness’ of**

**New Zealand with industrial design, creating an original product that can express a new contemporary country brand”.**

**Have you always been interested in chair design? Do you have a favourite piece?** I designed my first piece of furniture when I was at school: it was an ‘A’ level project and I designed library shelving and seating. From then on I went to Art and Design School and when I had the chance I

designed furniture. I wrote an essay on the designers Charles and Ray Eames - I was hooked at an early age. After this I went on to Design School in London and studied furniture and Product Design and then a Masters in Furniture Design. A favourite chair? that’s a very difficult question to answer - maybe the Eames Aluminium Group of chairs as these were the first ones I studied in detail and that makes them very special to me.

**Does the world need another chair?** No - is the short answer. Does the world need ‘better’ chair, chairs that are not fashion statements, chairs that are honest, chairs that are more benign and that are designed and built to last - yes, indeed. So, why a chair? As environmental issues become more mainstream companies aren’t going to suddenly stop buying chairs but they are going to ask for more environmentally friendly

options. Any business that strives to remain competitive, open to new markets and new opportunities will recognise the challenges, and the opportunities of global demands for environmental quality. Products that are more energy efficient, which reduce water consumption, decrease pollution and reduce end-of-life waste, will increasingly have a clear competitive edge in the market. New Zealand products intended for export have to meet these new global-market standards for environmental quality.

**The style of chair is obviously important...** It’s less about style and more about type. From initial market research, we decided that there existed an opportunity to design a general purpose visitor’s chair for the business market sector that used injection moulded biopolymer as a significant construction material. To ensure that the design would bridge the widest possible market sectors, and be useful and useable in as many environments as possible, I chose to work on a ‘multi-purpose chair design’.

The Biochair has been designed to provide for a variety of solutions - meeting spots, multipurpose rooms, workstation guest seating, conference rooms, break-out spaces, and training areas. The design will work in the office and beyond: retail, hospitality, education and recreational environments. To ensure the chair is both

physically and environmentally ‘light’ the design is lightweight, stacking and compact in size: the design uses valuable floor space efficiently. In terms of ergonomics the chair needed to be ‘healthy’ and comfortable; The Biochair has a seat and back that helps evenly distribute weight, minimize pressure points, and let the user move freely.

**Let’s take it back to basics for the non-scientific amongst us. What’s a biopolymer, why are they important, and where does one source them?** Biopolymers are polymers that are generated from renewable natural sources, are often biodegradable, and not toxic to produce. They can be produced by biological systems or chemically manufactured from biological starting materials such as sugars, starch and natural fats or oils.

Bioplastics are replacement plastics for the traditional petrochemical-based plastics used daily. Combinations of wood or wood fibres and polymers are increasingly being used to enhance the performance of bioplastics. Scion has a track record of more than eight years researching biopolymer-based materials and has developed novel technologies for their processing and resulting products.

Scion’s research focuses on understanding the interactions of polymers with wood and pulp fibres, and how these interactions impact on processing and performance.

**In issue 100 of ProDesign, Peter Gilderdale, the head of the Graphic Design department at AUT, predicted that designers and scientists might be becoming better acquainted in the future. This seems to be proof. How did you develop a relationship with Scion?** Biopolymers are in the ‘now’ but I predict they will be used to a much greater extent in the coming years.

I agree with Peter, and it was with a similar thought in mind I started working with Scion. Business development manager Jeremy Warnes was very keen to see a large-scale product designed using a Scion formulated biopolymer and so it was a realisation made in heaven!

My current research into biopolymers and their application to designed products began in early 2008 when I worked with Scion and student designers from the Unitec Bachelor of Product Design on developing design solutions for desktop-sized products. Working with Scion, a range of bio-polymers were identified as being suitable for manufacturing small interior products and small-scale design projects were undertaken with Unitec to utilise these polymers.

**In a recent talk, the Australian-based designer Alexander Loteszain spoke of ‘mono-materiality’ in design, his desire to use the least number of materials possible. This chair also seems to embody that idea. Is that**

**principle something you kept in mind during the design process?** Doing more with less is a key strategy of Design for Environment. The Biochair design adheres to the principals of Design For Environment DfE, and the relevant safety standards for fixed height four-leg chairs. I have used basically two materials in this chair design: raw polymer and timber. There is the option for wool upholstery and padding to be used too. Mono-materiality could mean just using petrochemical based plastics or carbon fibre which for me would be illogical.

**How will the chair be constructed - what does the production process involve?** Injection moulding and some timber machining.

**Previously, you mentioned that at the end of its life cycle the chair will be reclaimed and burnt to produce energy for the production of new chairs. How did you decide upon this model of recycling?** This was a turning point in the project for me. The idea was suggested by Jeremy Warnes from Scion and it immediately made sense to me. Burning is not something I would have thought of. I was considering regrinding the plastic and looking at ways of re-processing it. We were also looking at compostability and that hasn’t been ruled out for future development but it is of utmost importance that the material is fit for purpose

**The BioChair is a collaborative undertaking between Unitec and the Crown Research Institute Scion. It is designed to be manufactured from bio-polymers, non-toxic polymers generated from natural sources.**





so that future development will need to be fully tested before any decisions on using a compostable material could be made. The current Biochair material is being tested at Furntech in Tasmania.

**Has anyone been making furniture out of biopolymers?**

There are other designers using biopolymers for furniture. My friend Chris Martin in Stockholm has designed a chair made entirely from a biopolymer and there are other chairs like the 'Imprint' chair designed by Johannes Foersom and Peter Hiort-Lorenzen and manufactured by Lammhults. Imprint is a 'shell' type chair made in compressed cellulose fibres with the addition of bark or spruce. Strangely the metal underframe is available in chromium plated steel tubing

which, considering how toxic the chromium plating process is is very disappointing.

**What would be the best model for distribution, from an environmental point of view?**

Good question. There are various models that could be pursued. I have been looking at RTA (flat-pack) and because the chairs are lightweight stacking 3/4 to a box is an option. Alternatively the product could be made close to market but as tooling costs will be high, and material usage in the tooling considerable it makes sense to manufacture in one country. As the Biochair has been designed to use a material formulated in New Zealand and to tell the story of New Zealand design while being as eco-sustainable as possible, I would ideally like for manufacture to be undertaken here. **MB**



**Coke with that?** Around these parts we tend to admire the styling of Emeco's Navy Chair and interestingly Emeco recently teamed up with Coke to create a variant of the chair made out of 111 recycled plastic bottles (from the company's South Carolina recycling plant). The chair is made out of rPET (Recycled

Polyethylene Terephthalate - recycled plastic bottles), and Emeco developed the proprietary formula with scientists from BASF. The chair's design includes the original stretcher (structural brace) below the seat, a detail that creates great structural integrity. Replicating the chair required an

advanced molding technique. A gas assist process adds internal structure to the chair while minimising the amount of material required. The chair body is manufactured upside down in a special core island while a robotic function inserts the stretcher into place while the chair is hot. **emecowithcoke.com**



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