Knowledge Map
Representation of key skills and strategies in design prototyping, automatically generated using a mapping algorithm. Source is a prototyping literature database.
Jump Start for Aussie Space

Gilmour Space Technologies is the first space launch organization in Australia. The engine, pictured-right, was developed with the smallest team to ever produce an orbital class engine. This was achieved with strategic implementation of low cost design prototypes.

I was the most senior design lead from founding through to current, 100M $ AUD valuation. I managed numerous creative, and funding efforts over the last 3 years.

(top-left) 70kN thrust, orbital launch class engine test
(bottom-right) centimeter scale combustion prototype
Empowerment by Design

Secret Moon is an enterprise that emerged from a series of ethnographic design studies and co-design workshops for the design of a re-usable sanitary pad in rural Papua New Guinea. Christine Kumbungan maintains the initiative by training girls to make and sell re-usable sanitary pads.

I led ethnographic studies with local citizens, conducted collaborative workshops and produced the first design which is now the template used in the social-product.

(top-left) local participants interviewed to support prototyping
(bottom-right) final-stage production of Secret Moon sanitary pad
A series of design workshops were conducted for the Singapore Ministry of Culture Community and Youth, to extract a concept for the narrative defining Singapore’s upcoming national founders memorial. Participants built designs to express their vision of Singapore’s founding.

I architected and led a series of workshops for hundreds of Singaporeans. I also created a simplified design process model and prototyping kits to enable innovation.

(bottom-left) snapshot of the Sg founders memorial homepage
(top-right) design innovation cards, used to guide the workshops
Atomic Vision for High Schools
The LEGO2NANO workshops in Beijing are sponsored by LEGO as a mechanism to design an atomic force microscope accessible to high schools. Guided by a design centric approach, high school students fed ideas to post-doctoral scientists who prototyped a working model.

I organized all design activities and workshop events in order to ensure that high-school students needs were met and guided the scientists through low cost prototyping.

(bottom-left) students prototyping microscope interactions
(top-right) final microscope with nanometer resolution
School Excellence Model

The Singapore Ministry of Education SEM portal is used to assess and rank all primary and secondary education centers in Singapore. A design centric process was employed to innovate mechanisms for less fortunate schools to adopt best practices of top ranked institutes.

I designed a new brand and web platform. I also ran workshops with active user engagement for MOE administrators to see the limits of the current system.

(bottom-left) concept prototype in user studies for web design
(top-right) snapshot of a co-design workshop
Tectonic Origami Structures

To commemorate the contributions of actor Jackie Chan to the Singapore University of Technology and Design in the form of two historic architectural pavilions, a new class of flat-packing transforming structures were designed to bridge traditional and digital methods.

I designed and hand-crafted the tectonic origami folding bag. I also patented this technology which is now to be used in a series of commercial hand-bags.

(top-left) tectonic origami collapsible hand-bag
(bottom-right) conceptual paper prototype
Space Flight Academy
The Space Flight Academy in Gold Coast, Australia is based on astronaut training activities at NASA’s Johnson Space Center in Texas. Depicted is a reusable launch vehicle simulator. Projection mapping and real-time motion control enable an immersive user experience.

I designed the concept architecture as well as the detail design for several of the simulators, zero-g wall climb, RLV, Rigel capsule through to the opening of the camp.

(bottom-left) function-material prototype of the image mapping
(top-right) full-scale production simulator
Waste-Free B2B Packaging
A Singaporean logistics startup spun-off from the recently sold Goodpack, a manufacturer of Intermediate Bulk Containers (IBC) for shipping, will supply innovative modular crates to reduce millions of kilograms of waste material each year.

I designed the product architecture, and invented a new form of conformal modular packing (1 part type, $10^{857}$ configurations). est. 30 million units will be produced.

(top-left) prototype modular divider,
(bottom-right) rendering of the first production run design