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Powerhouse Ventures Limited  
**Portfolio Report**  
As at 31 December 2017

powerHouse



# Half Year Portfolio Report

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Dear shareholder,

I am pleased to provide you with our half yearly portfolio report for the period to 31 December 2017.

Powerhouse's vision is to transform seed-stage companies into real-world success stories by following a proven investment pathway.

Our aim is to produce attractive returns for our shareholders through the successful commercialisation of intellectual property-based opportunities.

Powerhouse is perfectly positioned to take advantage of breakthrough technologies as they emerge.

A summary of our existing Investment Portfolio as at 31 December 2017 is set out below.



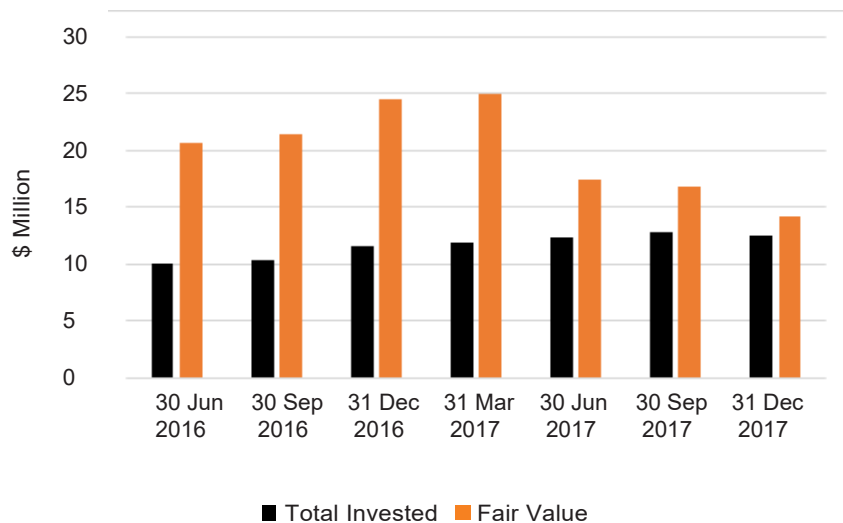
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**Yours sincerely**  
**Paul Viney**

Chief Executive Officer  
Powerhouse Ventures Limited

# Investment Portfolio

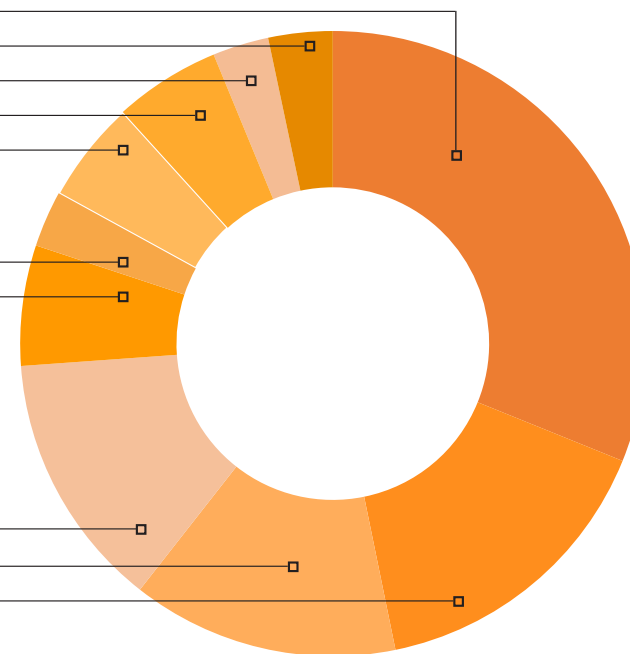
The Powerhouse Portfolio consists of 25 companies with a Fair Value of \$14.3 million at 31 December 2017, from a total investment to date of \$12.4 million.



## Investment Portfolio Total Value \$14.3 million

<b>Invert</b>	\$4.3m	30.06%
<b>Upstream</b>	\$0.5m	3.56%
<b>Tiro</b>	\$0.4m	2.86%
<b>Modlar</b>	\$0.8m	5.56%
<b>Mars</b>	\$0.7m	4.86%
<b>Veritide</b>	\$0.4m	2.86%
<b>Fluent</b>	\$0.9m	6.36%

<b>Photonic</b>	\$1.8m	13.06%
<b>Croplogic</b>	\$1.9m	13.26%
<b>Other</b>	\$2.6m	18.16%



# Investment Portfolio

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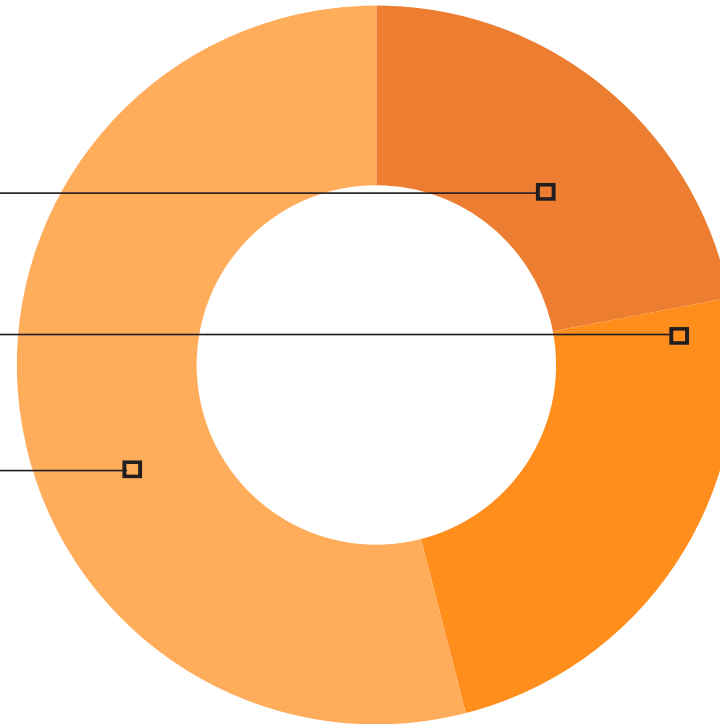
## By Stage of Growth

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**Pre-Seed**                      \$3.1m    22%

**Seed**                              \$3.5m    24%

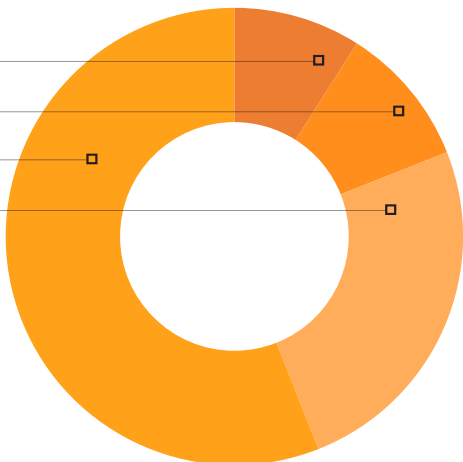
**Post-Seed**                      \$7.7m    54%



## Post-Seed Stage

4 companies; \$7.7 million

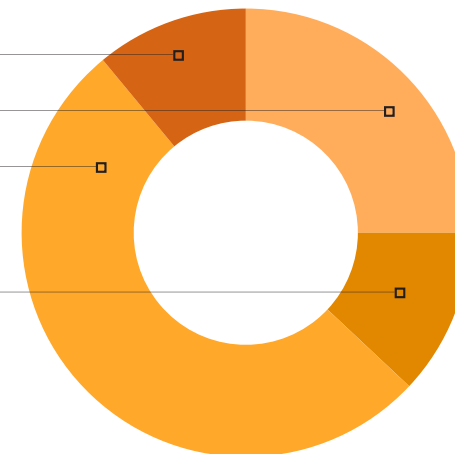
<b>Mars</b>	\$0.73m	9%
<b>Modlar</b>	\$0.75m	10%
<b>Invert</b>	\$4.33m	56%
<b>Croplogic</b>	\$1.89m	25%



## Seed Stage

6 companies; \$3.5 million

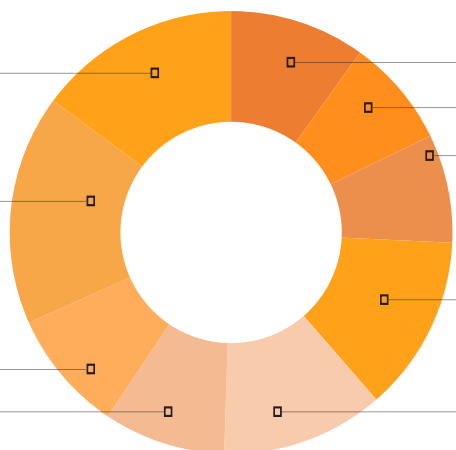
<b>Veritide</b>	\$0.4m	11%
<b>Fluent</b>	\$0.86m	25%
<b>Photonic</b>	\$1.83m	52%
<b>Tiro</b>	\$0.4m	12%
<b>Solar Bright</b>	-	-
<b>Motim</b>	-	-



## Pre-Seed Stage

15 companies; \$3.1 million

<b>Upstream</b>	\$0.45m	15%
<b>Other</b>	\$0.54m	16%
<b>CertusBio</b>	\$0.27m	9%
<b>Auramer</b>	\$0.28m	9%



<b>Hi-Aspect</b>	\$0.30m	10%
<b>Objective Acuity</b>	\$0.25m	8%
<b>Koti</b>	\$0.26m	8%
<b>Ferronova</b>	\$0.39m	13%
<b>Avalia</b>	\$0.36m	12%

# Investment Portfolio

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## By Sector

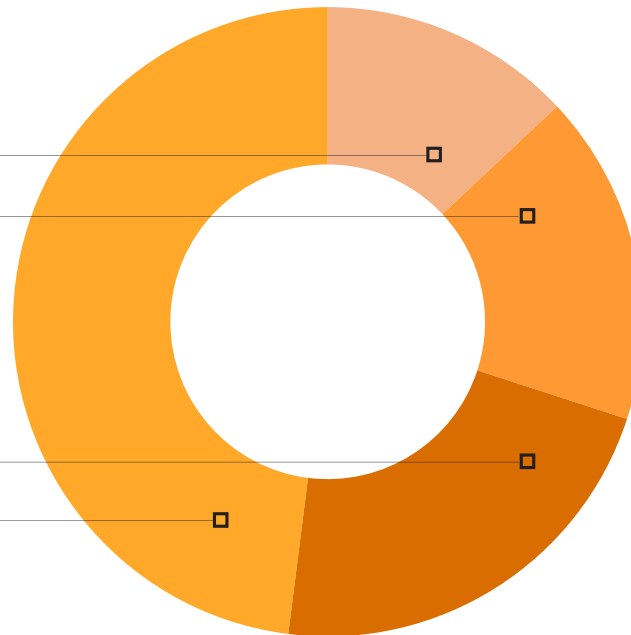
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**IT & Communications**      \$1.8m      13%

**Cleantech & Engineering**      \$2.4m      17%

**Medical & Healthcare**      \$3.2m      22%

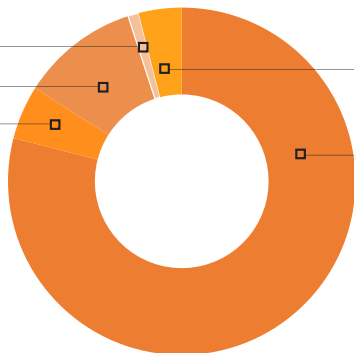
**Agritech & Environmental**      \$6.9m      48%



## Cleantech and Engineering

6 COMPANIES; \$2.4 MILLION

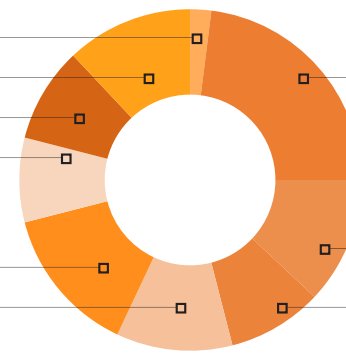
<b>2.2gForce</b>	\$0.02m	1%	<b>Inhibit Coatings</b>	\$0.10m	4%
<b>Koti</b>	\$0.26m	11%	<b>Photonic</b>	\$1.83m	79%
<b>Cirrus</b>	\$0.11m	5%			
<b>Solar Bright</b>	-	0%			



## Medical and Healthcare

9 companies; \$3.2 million

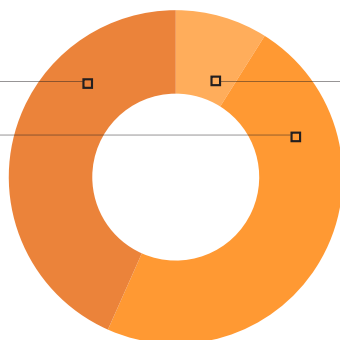
<b>Silventum</b>	\$0.07m	2%	<b>Mars</b>	\$0.73m	23%
<b>Ferronova</b>	\$0.39m	12%	<b>Tiro</b>	\$0.40m	12%
<b>Hi-Aspect</b>	\$0.30m	9%	<b>Auramer</b>	\$0.28m	9%
<b>Objective Acuity</b>	\$0.25m	8%			
<b>Upstream</b>	\$0.45m	14%			
<b>Avalia</b>	\$0.36m	11%			



## Information and Communication Technologies

4 companies; \$1.8 million

<b>Modlar</b>	\$0.75m	43%	<b>EdPotential</b>	\$0.15m	9%
<b>Fluent</b>	\$0.86m	48%			

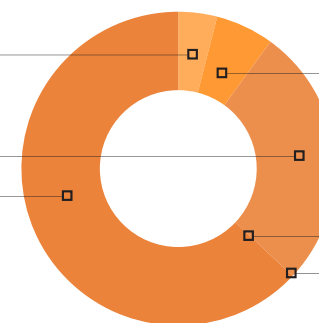


<b>Motim</b>	-	0%
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## Agritech and Environmental

6 companies; \$6.9 million

<b>CertusBio</b>	\$0.27m	4%	<b>Veritide</b>	\$0.40m	6%
<b>Croplogic</b>	\$1.89m	27%			
<b>Invert</b>	\$4.33m	63%			



<b>Hot Lime Labs</b>	\$0.02m	0%
<b>Orbis</b>	\$0.01m	0%

## Post-seed companies



Within the food-processing industry, food-safety is driven by eliminating bacterial contamination which can be harboured by cracks in industrial vessels such as tanks, dryers, silos. Historically these vessels have been serviced by scaffold or rope-based inspections, a hazardous process which is prone to errors.

Invert Robotics provides remote inspection services to global blue chip customers using its proprietary robotics technology. The mobile climbing robot system allows identification, recording and reporting of cracks in mission critical infrastructure.

Invert is currently expanding geographically into Europe, following success with inspection of milk silos and dryers in Australasia.

### **Agritech and Environmental\***

Stage: Post-seed  
 Revenue: \$1m - \$5m  
 Indicative market capitalisation: \$10m-\$15m  
 Employees: 7  
 PVL shareholding: 22.9%  
 PVL invested: \$834k



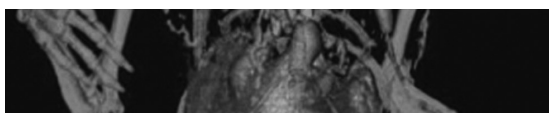
Pharmaceutical companies currently spend ~US\$1.5b developing each new drug. It can take 12–24 months for the pre-clinical trials of ~250 prospective drugs, with only 5 proceeding to clinical trials. These companies have a strong need for tools that will speed up this elimination process and aid getting drugs onto the market quicker.

MARS Bioimaging has developed a small animal x-ray molecular imaging system that has spectral resolution, using CERN-developed detector technology. This additional “colour” information provides new imaging capabilities.

Having initially targeted key opinion leaders, MBI has launched its first commercial release system and is now building a human scanner.

### **Medical and Healthcare\***

Stage: Post-seed  
 Revenue: <\$1m  
 Indicative market capitalisation: \$5m-\$10m  
 Employees: 10  
 PVL shareholding: 8.5%  
 PVL invested: \$726k



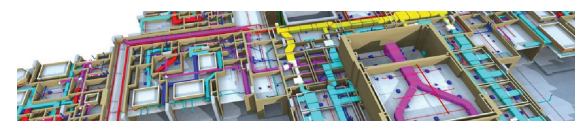
The architecture and construction industry is going through a rapid shift from 2D CAD (Computer Aided Design) to modelling buildings in full 3D BIM (Building Information Modeling).

Modlar's core product is a network which connects architects to building products manufacturers. This allows architects to more easily discover, discuss and specify real world products into their projects in full 3D. This in turn speeds up the design process and reduces errors on site.

Having raised ~\$3M of NZ Venture Capital, the company is now rapidly expanding into the North American market. Modlar is currently used by 130,000+ professionals globally including 80% of the world's top 100 firms.

### **Digital and ICT\***

Stage: Post-seed  
 Revenue: <\$1m  
 Indicative market capitalisation: \$5m-\$10m  
 Employees: 7  
 PVL shareholding: 9.9%  
 PVL invested: \$570k





## Post-seed companies



High-volume crop growers and processors have significant challenges ahead in order to meet rising food-demand. Growers need to optimise resources and processors need to plan to ensure efficient processing.

CropLogic delivers specialist agronomy services to growers using technology developed over 30 years at The New Zealand Institute for Plant & Food Research. CropLogic brings together crop science, environmental data and agronomic expertise to offer input for daily decision making that improves on typical "rule of thumb" recommendations. In addition to its expert system, CropLogic provides the telemetry required to gather field data.

CropLogic listed on the ASX in September 2017 (CLI).

### **Agritech and Environmental\***

Stage: Post-seed

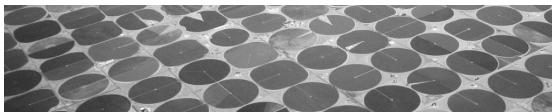
Revenue: \$1m - \$5m

Indicative market capitalisation: \$10m-\$15m

Employees: 20

PVL shareholding: 14.9%

PVL invested: \$1.87m



## Seed companies



The global mobile marketing sector is a high-growth area that is seeing innovation as technology and marketing mix, with consumers becoming increasingly 'connected' and smartphone technology becoming almost ubiquitous in the modern world.

Motim Technologies has developed a range of mobile interaction technologies, based on expertise in computer vision, augmented reality, image-recognition and mobile-software development alongside deep creative experience and expertise.

Securing direct relationships with major global brands is validation that Motim has a special proposition and the ability to execute and deliver on a global stage.

### Digital and ICT\*

Stage: Seed

Revenue: <\$1m

Indicative market capitalisation: <\$1m

Employees: 3

PVL shareholding: 41.8%

PVL invested: \$719k



SolarBright is positioned to capitalise on the LED and Solar LED lighting phenomena that are changing the way the world is illuminated.

SolarBright is taking its innovation and manufacturing excellence to the international market with customers in over 20 countries, including the World Bank, Government Agencies, Local Authorities and blue-chip companies.

SolarBright's approach of innovation and collaboration has led to use of its patented products in a wide range of applications and markets – from the supply and installation of solar street lighting in Pacific islands to development and manufacture of PATeye, the world's first commercially-available solar-powered ice-detection road stud.

### Engineering and Cleantech\*

Stage: Seed

Revenue: <\$1m

Indicative market capitalisation: \$1m-\$5m

Employees: 3

PVL shareholding: 30.3%

PVL invested: \$1.04m



The food industry is driven by food-safety. Detection of harmful microorganisms through improved process control leads to higher-quality food, with better shelf-life and fewer product-recalls. Annually in the US, one in six people become ill and there are 200,000 hospitalisations and 4,000 deaths, all attributable to food poisoning.

Veritide is the creator of disruptive technology for real-time detection of faecal contamination on meat within meat processing plants. Providing both portable hand-held devices and fixed full carcass scanner technology Veritide scanners can be integrated throughout each stage of the food processing line.

Veritide's platform technology has many other applications in food, health and bio-safety areas.

### Agritech and Environmental\*

Stage: Seed

Revenue: <\$1m

Indicative market capitalisation: \$1m-\$4m

Employees: 4

PVL shareholding: 19.7%

PVL invested: \$980k



## Seed companies



Many industrial and commercial operations manage controlled environments, where variables such as temperature, humidity and air quality need to be maintained within specific limits and dangerous substances such as toxic gases need to be contained.

Photonic Innovations uses a combination of ultra reliable, connected sensors combined with cloud based data management to address these challenges with minimal human intervention. Under a recurring revenue business model, PIL will monitor environmental variables, take corrective action and use the data to provide added value services such as predictive maintenance and energy management. The first target market is cold stores where patented highly reliable laser-based detection of gas leaks forms the platform for an Internet of Things business.

### Engineering and Cleantech\*

Stage: Seed

Revenue: <\$1m

Indicative market capitalisation: \$5m-\$10m

Employees: 6

PVL shareholding: 29.9%

PVL invested: \$630k



Over 2 Billion people use English to communicate on a regular basis every day. The negative impact of substandard English proficiency is significant and felt worldwide on both an economic and social level.

Fluent is combining new linguistic science with “big data” and machine learning to build an artificial intelligence platform that can provide improved and faster analysis of verbal communication skills and placement against real-world expectations.

This technology applies to a range of applications and industries. As a first step to market Fluent is initially applying it to language learning through a tool that will guide English language learners around the world towards real-world fluency.

### Digital and ICT\*

Stage: Seed

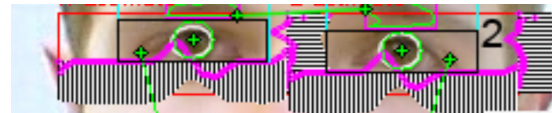
Revenue: <\$1m

Indicative market capitalisation: \$1m-\$5m

Employees: 6

PVL shareholding: 20.1%

PVL invested: \$410k



## Tiromedical

Mammography is the dominant method of breast cancer screening in New Zealand. However, mammograms are much less effective with radio-dense tissue (affecting 40% of the screened population).

The University of Canterbury has developed a painless, zero-radiation screening technology unaffected by radio-dense tissue.

Tiro Medical will develop technologies to enable more accurate diagnoses and treatments across a range of medical areas, improving care whilst reducing expenditure. Tiro's initial focus will be on the breast screening market, developing the University's technology for use as a supplementary scan to mammography of radio-dense tissue.

### Medical and Healthcare\*

Stage: Seed

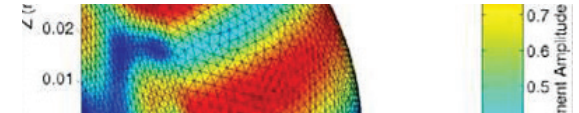
Revenue: <\$1m

Indicative market capitalisation: \$1m-\$5m

Employees: 2

PVL shareholding: 31.6%

PVL invested: \$285k



## Pre-seed companies



AuramerBio is a custom sensor development company. Its novel technologies allow accurate measurement of biologically relevant molecules at the point-of-testing. AuramerBio's technologies are being developed for application in drug and fertility testing.

The technology can be rapidly adapted to measure a wide range of targets in liquid samples (saliva, urine, blood, environmental water) providing access to a large number of future market opportunities.

AuramerBio is developing both simple economic 'qualitative' dipstick tests and also more complex 'quantitative' digital devices with its industry partners.

### Medical and Healthcare\*

Stage: Pre-seed

Revenue: <\$1m

Indicative market capitalisation: \$1m-\$5m

Employees: 3

PVL shareholding: 18.9%

PVL invested: \$200k



Avalia Immunotherapies' first vaccine product is a cancer vaccine to treat patients suffering from HPV associated cancers. Its vaccine approach has the potential to induce patient responses against HPV cancers that are not currently responsive to checkpoint immunotherapy.

Every day in the US, about 12,000 people ages 15 to 24 are infected with the human papillomavirus (HPV). Of those, 2,600 are infected with the HPV16 strain, which is responsible for 50% of human cervical cancers and more than 85% of HPV-positive head & neck, anal and anal-genital cancers. Preventative vaccines cannot cure established HPV infections and standard of care treatments cannot eliminate HPV outside the treated area. This unmet need will be satisfied with Avalia's vaccine.

### Medical and Healthcare\*

Stage: Pre-seed

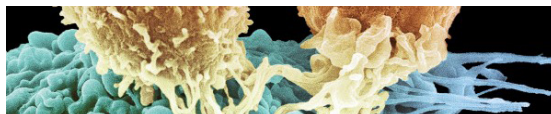
Revenue: <\$1m

Indicative market capitalisation: \$1m-\$5m

Employees: 3

PVL shareholding: 10.2%

PVL invested: \$300k



## CertusBio

Increased industrial efficiency and tighter environmental regulations are driving the global process analytical instrumentation market, currently worth US\$2.8b and projected to grow exponentially.

CertusBio's flagship biosensor technologies combined with process control systems will have the ability to make real-world efficiency gains in the primary industries across New Zealand and overseas. Analysis and shaping has revealed an opportunity from multiple research projects.

Detecting lactose in dairy processing plants is a customer need, and rapid detection of biological oxygen demand (BOD) is another. Both can be solved using hi-tech biosensor solutions emerging from the region's research organisations.

### Agritech and Environmental\*

Stage: Pre-seed

Revenue: <\$1m

Indicative market capitalisation: <\$1m

Employees: 2

PVL shareholding: 30.6%

PVL invested: \$272k



## Pre-seed companies



Cirrus is an easily adopted process technology that significantly improves the mechanical properties of plated coatings in electronics, aerospace, and hi-tech manufacturing, without degrading the conductivity, corrosion resistance or appearance of the coating material.

Cirrus technology has been developed and patented at The University of Auckland and is currently in early evaluation with some of the world's largest manufacturers, manufacturing process and chemistry suppliers.

### Engineering and Cleantech\*

Stage: Pre-seed  
 Revenue: <\$1m  
 Indicative market capitalisation: \$1m - 5m  
 Employees: 4  
 PVL shareholding: 7.1%  
 PVL invested: \$113k

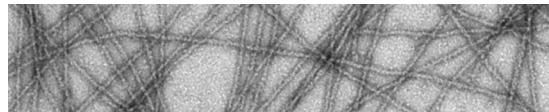


Hi-Aspect provides topical formulations using its proprietary natural protein scaffolds to deliver active ingredients for skin and wound care. The skincare and medical markets have an increasing need to use natural materials with sophisticated functional properties instead of synthetic nanomaterials and polymers, which can be costly, toxic and persist in the environment.

The fibrils form strong gels that bind and release active ingredients in a controllable way, while holding them close to the site of action. With dimensions of 9–50 nanometres across and up to 1000 nanometres long, the fibrils have a high surface area to act as a scaffold. They can be made from a number of proteins and tailored to different applications.

### Medical and Healthcare\*

Stage: Pre-seed  
 Revenue: <\$1m  
 Indicative market capitalisation: <\$1m  
 Employees: 3  
 PVL shareholding: 63.2%  
 PVL invested: \$150k



Coatings that self clean, destroy bacteria and viruses as well as pollutants in air and water, simply by being exposed to light. Koti Technologies produces highly active, photo catalytic coatings via several novel application methods which produce coatings with exceptional performance characteristics.

Potential applications include antimicrobial healthcare and food production surfaces, air and water treatment and industrial catalysis applications.

Koti Technologies (translation from Maori is “to cloak or cover”) is a University of Canterbury spin-out commercialising ceramic coating technology developed by Professor Krumdieck and her research team.

### Engineering and Cleantech\*

Stage: Pre-seed  
 Revenue: <\$1m  
 Indicative market capitalisation: <\$1m  
 Employees: 2  
 PVL shareholding: 56.7%  
 PVL invested: \$250k



## Pre-seed companies



Orbis Diagnostics provides a platform technology for the analysis of fluids in agricultural and industrial processes using centrifugal microfluidics.

The first market is dairy farming, where the company will offer a single device for measuring all of the key variables in milk.

This will allow a farmer to make timely decisions around the yield, health and reproductive status of each cow.

### Agritech and Environmental\*

Stage: Pre-seed

Revenue: <\$1m

Indicative market capitalisation: <\$1m

Employees: 1

PVL shareholding: 2.4%

PVL invested: \$17k



A large number of patients present in Emergency Departments (ED) each year with chest pain. One in eight has a life-threatening disease. Causes for this pain are many; heart, lung, bone and nerve problems. ED physicians require rapid and accurate methods to determine which patients require immediate life saving medical treatment.

Upstream Medical Technologies (UMT) has a novel technology platform built on many years of research. This provides a new class of diagnostic tests designed for ED use.

The lead assay can detect imminent heart attack BEFORE tissue damage occurs. UMT is building a pipeline of tests that enable earlier diagnosis for improved patient recovery.

### Medical and Healthcare\*

Revenue: <\$1m

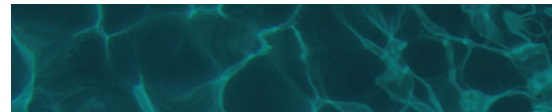
Stage: Pre-seed

Indicative market capitalisation: \$1m-\$5m

Employees: 2

PVL shareholding: 13.4%

PVL invested: \$450k



Objective Acuity is a breakthrough digital health company that achieves early detection of vision and related disorders leading to changing lifelong healthcare and learning outcomes. There are many approaches to the measurement of vision and development disorders, but all rely on a co-operative subject and are intrinsically subjective.

Objective Acuity's first product is an objective measurement device that stimulates optokinetic nystagmus (OKN), an indicator of an intact vision pathway to determine poor vision. Clinical trials are about to get underway in children (200) and adults (120) to complete market validation, with a first market launch forecast for 2018.

### Medical and Healthcare\*

Stage: Pre-seed

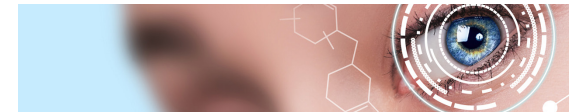
Revenue: <\$1m

Indicative market capitalisation: \$1m-\$5m

Employees: 2

PVL shareholding: 16.2%

PVL invested: \$250k



## Pre-seed companies

### edpotential

EdPotential delivers software-as-a-service products based on advanced algorithms and data analysis capability, enabling schools to make more informed decisions, enhance teaching practice, saving teachers time and improving student outcomes. EdPotential is cloud based and designed specifically for analysis of school assessment results, allowing teachers to query assessment data, analyse the data to identify gaps and strengths and act to develop solutions to target student achievement.

Many of New Zealand's leading schools are now utilising EdPotential software, delivering better student outcomes and saving schools and teachers significant time compared to manually entering and processing data.

#### Digital and ICT\*

Stage: Pre-seed

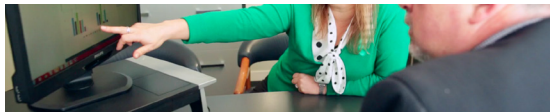
Revenue: <\$1m

Indicative market capitalisation: <\$1m

Employees: 4

PVL shareholding: 20.7%

PVL invested: \$150k



### ferronova

Ferronova is a medical device company, bringing together patented magnetic probe technology from University of South Australia and magnetic nanoparticle technology from Victoria University of Wellington.

Current cancer staging technology uses gamma probes with radioactive tracers; these have significant logistical issues and, due to their low resolution, are not suitable for more complex cancers.

The Ferronova magnetic probe and tracer system is being developed to allow staging of complex cancers, initially targeting oral cavity and other head and neck cancers. Improved staging of these complex cancers is anticipated to allow better treatment, lower patient morbidity and reduced healthcare system costs.

#### Medical and Healthcare\*

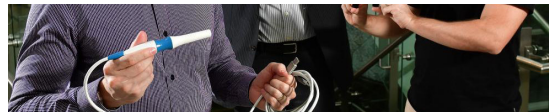
Revenue: <\$1m

Indicative market capitalisation: \$1m-\$5m

Employees: 4

PVL shareholding: 27.0%

PVL invested: \$395k



### Inhibit COATINGS

The marine and aquaculture industries face significant fouling issues, resulting in decreased yield, increased corrosion and operating costs.

Antifouling coatings are utilised extensively but remain expensive, ineffective or pose significant risks to the environment.

Inhibit Coating's surface coatings display strong antimicrobial activity against E.coli and prevent the settlement of microscopic algae. Preliminary tests show very good static resistance to biofouling in the New Zealand marine environment.

Inhibit Coatings novel coatings utilise very low biocide concentrations and exhibit very low leaching rates, providing robust coatings with a long antifouling lifetime and minimal environmental impact.

#### Engineering and Cleantech\*

Stage: Pre-seed

Revenue: <\$1m

Indicative market capitalisation: <\$1m

Employees: 2

PVL shareholding: 21.3%

PVL invested: \$100k



## Pre-seed companies



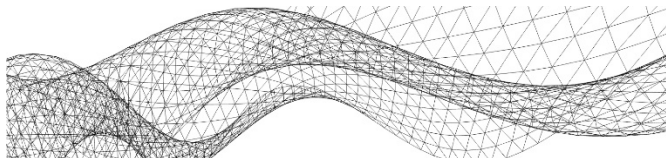
2.2gForce has been established to commercialise energy dampers developed by University of Canterbury researchers.

Energy dampers operate as “shock absorbers” that dissipate the kinetic energy of movement and cushion the impact between structures.

They are versatile, cost effective and can be designed to protect structures from wind load, thermal motion or seismic events.

### Cleantech and Engineering\*

Stage: Pre-seed  
 Revenue: <\$1m  
 Indicative market capitalisation: <\$1m  
 Employees: 1  
 PVL shareholding: 100%  
 PVL invested: \$25k



## Hot Lime Labs

Hot Lime Labs is developing CO2 capture technology for the commercial greenhouses to increase crop yields and transition to low carbon renewable energy sources.

Modern commercial greenhouse operations can produce up to 20 times the yields of open fields while using only a fraction of the resources typically needed. Commercial greenhouses produce \$35b of crops per annum and are growing rapidly.

CO2 enrichment enables up to 30% greater crop yields but the demand for CO2 far exceeds the current fossil-fule based supply. Hot Lime Labs technology will allow the production of clean CO2 from renewable biomass source, on site, to meet this global need.

### Agritech and Environmental\*

Stage: Pre-seed  
 Revenue: <\$1m  
 Indicative market capitalisation: <\$1m  
 Employees: 2  
 PVL shareholding: 2.6%  
 PVL invested: \$25k



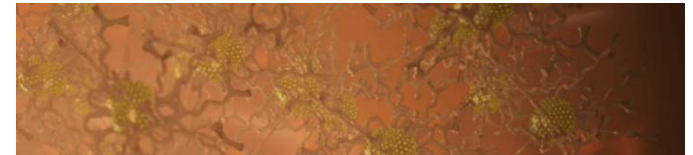
Silventum is a dental materials business that is commercialising a novel platform for filling materials that have enhanced mechanical, structural and aesthetic qualities and resist bacterial decay better.

This will result in reduced levels of dental decay, or caries, which is the most prevalent disease in humans.

Silventum arises from a collaboration between the Department of Chemistry and the Faculty of Dentistry at the University of Otago.

### Medical and Healthcare\*

Stage: Pre-seed  
 Revenue: <\$1m  
 Indicative market capitalisation: <\$1m  
 Employees: 1  
 PVL shareholding: 41.2%  
 PVL invested: \$70k





# Directory

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## About Powerhouse

Powerhouse is a leading intellectual property commercialisation company which focuses on developing brilliant research from New Zealand and Australian universities into world changing businesses. It has developed a unique approach to develop these innovations and businesses by providing access to business building expertise, capital, networks, recruitment and ongoing business support. Powerhouse has a successful track record with an existing active portfolio of over 20 early stage to mature businesses across four main sectors: engineering and clean-tech, medical and healthcare, agritech and environmental and digital and ICT.

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