



**The Australian Industry Group**  
Suite 1, "Nautilus", 265 Wharf Road  
Newcastle NSW 2300  
PO Box 811  
Newcastle NSW 2300  
Australia  
ABN 76 369 958 788

## **Ai Group Hunter Trade Mission to Pittsburgh USA 12<sup>th</sup>-16<sup>th</sup> October 2015**

**Objective:** to develop trade and city to city collaboration between Pittsburgh and the Hunter Region in parallel with existing university collaborations in Engineering Research. The delegation was joined by three representatives from Upper Spencer Gulf in South Australia. Pittsburgh is a diverse manufacturing region employing 100,000 people and rising. It has seen a remarkable transformation from the 1980's when it lost half of its population due to the demise of their steel industry. Ai Group Hunter took a delegation of manufacturing, university and city representatives to learn from their story and to develop new connections in trade and research. The assistance provided by the Pittsburgh Regional Alliance is gratefully acknowledged.

### **Delegates:**

#### **Hunter Region:**

1. Darren and Gunilla Burrowes, Directors, ATSA Defence Services/UVS. Gunilla is also Chair of local technology incubator Eighteen04
2. Nicholas Percy, Engineering Manager, Defence and Aerospace, Varley Group
3. Professor Kevin Hall, Deputy Vice Chancellor, Research and Innovation, University of Newcastle
4. Professor Mark Jones, Head of School of Engineering, Faculty of Engineering and Built Environment, University of Newcastle
5. David Leask, Head Teacher in Electronics, Hunter Institute of TAFE
6. Adrian Price, Regional Manager, Hunter, Central Coast and Northern NSW, Australian Industry Group (Ai Group)

#### **Upper Spencer Gulf:**

7. Robert Schmitz, Councillor , Whyalla City Council (also Electrician employed by member company ICE Engineering and Construction Whyalla)
8. Paul Havelberg, Regional Manager: Whyalla Campus, University of South Australia
9. Associate Professor Brenton Dansie, Dean: Teaching and Learning, Adelaide Campus University of South Australia.

### **Sites Visited:**

#### **Monday**

- Pittsburgh Regional Alliance: Official Welcome and Pittsburgh Regional Overview including agenda briefing
- Visit to Westmoreland County:
- Elliott Turbo - 100 year old large company now owned by Japanese parent. Manufactures compressors and turbines <http://www.elliott-turbo.com/>
- CK Composites - components in a cross section of industries including Industrial, Electrical, Nuclear, Military, Transportation, Medical, and Water & Gas. [www.ckcomposites.com](http://www.ckcomposites.com)

#### **Tuesday**

- Visit to Pittsburgh Energy corridor – Washington County:
- Auma Actuators [www.auma.com](http://www.auma.com). German owned company which manufactures actuators for the operation of large valves.
- Lunch and Washington County Briefing by Jeff Kotula, CEO of Washington County Chamber
- Driving tour of Southpointe Business park



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- AccuTrex Products <http://www.accutrex.com/contact-us> A general sheet metal and fabrication company with a specialisation in making gaskets. <http://www.accutrex.com/industries-served>

### **Wednesday**

- Partner in Lafayette County for the day: Fay-Penn Economic Development Council .
- Gerome Manufacturing. – General steel fabrication and engineering company. <http://www.geromemfg.com/>
- Johnson Matthey – UK Owned manufacturer of catalytic converters for combustion engines. Highly automated batching and packing plant. <http://www.matthey.com/>
- Penn State University - Eberly Corporate Training Center – provider of 2 year degrees equivalent to TAFE.
- RIDC Westmoreland – Advanced Technology Center – A very large state of the art Community College which provides for excellent trade training. <http://ridc.org/view-roperity/westmoreland/>

### **Thursday 15<sup>th</sup> October**

- Carnegie Mellon University – Robotics Institute – national research hub, best in the world. <http://www.cmu.edu/index.shtml>  
<http://www.nrec.ri.cmu.edu/>
- Pittsburgh University: Swanson Center for Engineering- The University of Newcastle has strong links with Pitt (UoP) in medical and engineering research. [http://www.engineering.pitt.edu/Industrial, Mechanical & or Materials](http://www.engineering.pitt.edu/Industrial_Mechanical_%20or_Materials)
- The university hosted a cocktail function for us at conclusion of the formalities. Our host the Emeritus Chancellor Professor Mark Nordernberg, had been in Newcastle three weeks previous and had met and the Newcastle delegates there.

### **Friday**

- Alphalab Gear – an incubator for hardware and robotics start-ups [www.alphalabgear.org](http://www.alphalabgear.org) . Part of two larger not-for-profit organisations - AlphaLab (mostly software) and Innovation Works [www.innovationworks.org](http://www.innovationworks.org)
- Some delegates also visited other start-up incubators REvv Oakland and StartUptown.
- City of Pittsburgh – Mayor Councillor Bill Peduto. Robert Schmitz Councillor from Whyalla City Council and Adrian Price presented gifts and greetings from our respective cities.

### **Executive Summary:**

As both former steel manufacturing cities, Newcastle and Pittsburgh share a common heritage, deep engineering skills and a recent history of significant job losses when the steel making activities of both cities were impacted by global changes that saw the industry move to low-cost labour countries. Pittsburgh has undergone a renaissance lead by the knowledge power-houses of the University of Pittsburgh and Carnegie Mellon University which are co-located near the city downtown. When the universities moved away from a culture of competition towards collaboration for the benefit of the region, it provided the nucleus for the establishment of new industries in several markets including ICT, defence, education and medicine.

The first part of the week long visit focused on the manufacturing capability that historically defined Pittsburgh and it's adjacent counties. The trade mission found that many manufacturers had diversified to provide products to multiple markets and so had moved away from reliance on one major customer.



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At Elliot Turbo it was interesting to see a more than 100-year old company that was now Japanese owned and provided products to global market. CK Composites showed a very diverse production capability including the use of a more than 100-year old press for manufacture of densified wood components for electrical distribution networks and the New York City subway. Auma Actuators demonstrated a strong commitment to LEAN/5S principals that enabled production of more than 6,000 variations of actuators for customers in many markets. Gerome Manufacturing was a manufacturing company which was very close to the majority of fabrication and machining companies in Australia. At Johnson Matthey the LEAN/5S paradigm was stepped up to the next level in a facility that produced catalysts to cut diesel-engine emissions. During a tour of the plant the delegates watched as large mixing vessels were moved from station to station completely by autonomous robots.

The second part of the week included visits to the engineering powerhouses of Carnegie Mellon University and Pittsburgh University. At CMU the delegates were hosted at the Robotics Institute and enjoyed a thought-provoking presentation on the robotics work that had spanned more than thirty years. Examples of the first autonomous cars were inspected and topics such as soft-robots and co-working robots were discussed. At Pitt the relationship with Newcastle University was further developed with a detailed and thorough tour that included the Additive Manufacturing Initiative, the Swanson Center for Product Innovation and the Petersen Institute of Nano-Science and Engineering. The strong industry connections of both universities was emphasised a number of times with processes in place to support the movement of university developed knowledge to industry that included "entrepreneurial leave" for faculty staff, clear and straightforward processes for establishing IP ownership and a strong focus on readying students for life in industry.

The final day of the tour included visits to organisations in the business start-up and innovation community including Innovation Works, AlphaLab Gear, Thrill Mill, Revv Oakland and StarUptown. It was clear that there was a strong ecosystem that had developed that encouraged both students and others to consider business start-up both to provide their own employment and also to create sustainable jobs in the new manufacturing economy for others.

In the meeting with the Mayor of Pittsburgh we were treated with great openness about the perilous position the city faced in 1983 when it hit "rock bottom" with the demise of the steel making industry. There was no recovery plan for some time. It was hatched out of a community of like-minded people who wanted to make a difference. Focussing on higher education and research as a means of attracting new business was a hugely transforming feature.

A detailed account of places visited follows the Observations and Recommendations.

### **Observations and Recommendations**

1. It was evident that there exists strong collaboration between the University of Newcastle and the University of Pittsburgh - the source of inspiration for the Trade Delegation. Regular exchange visits are happening and there is strong acknowledgement of the comfort of each institution with each other. Since returning from our visit, both universities have been jointly awarded an Australian Research Council grant in engineering research.
2. Our party was warmly received wherever we went and our hosts were very open and humble about their experiences and achievements. Pittsburghians not only share a common industrial history with the Hunter, but they are very similar people in their tastes, manner and outlook. We are all "can do" people who do not shrink from the complex economic and structural



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- challenges we face. There are particular county development agencies and educational establishments with whom we will maintain contact.
3. There is a positive outreach between the City of Newcastle and the City of Pittsburgh reflecting the values identified in Point 2 above. Ai Group will encourage the City of Newcastle to explore entering into a formal collaboration with the City of Pittsburgh to parallel and support the research and commerce collaborations.
  4. A first step has been taken in developing collaboration in commerce, manufacturing and technology. We are now known to representatives of the State, larger County and sub county economic development agencies. However, specific collaborations at the commercial level will need to be identified and developed. It would be beneficial for an Australian Manufacturing and Technology delegation to exhibit at a trade show in Pittsburgh to show our capabilities and openness to doing business. I am making inquiries about such opportunities.
  5. Among the participants of the Delegation, I believe strong and enduring friendships have been developed, including with our Whyalla compatriots. I look forward to further engagement between our two regions.
  6. From the point of view of Ai Group Hunter, the learnings about start-up incubators has been very beneficial. I will be engaging with Gunilla Burrowes to see how Ai Group Hunter can collaborate with Eighteen04 and like organisations to better understand and support the workings of the innovation eco-system. Mapping the innovation eco-system will also be of great benefit to all stakeholders.
  7. I will be seeking advice from the two UoN delegates about the inputs they have collected for use in their university and to see how Ai Group Hunter may be able to further deepen its relationship and activities in the innovation space with the University.
  8. RDA Hunter's substantial initiatives in the STEM education space were of particular interest to several counties and I will be providing them with ongoing information. It would be good for RDA Hunter to develop connections with the counties as well.

#### **The Big Challenges:**

1. How can we have the Hunter recognised and promoted as a Global Centre of Engineering Excellence?
2. How can we attract some large tech companies to the Hunter?
3. How can we develop an Investment Community in the Hunter?
4. To organise a "Makers Festival" to lift industry and community spirits, to celebrate and showcase innovation and acknowledge our strengths as an engineering and technology region of excellence.

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[Specific Site notes follow:](#)



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### **Specific Notes:**

#### **Monday**

##### **Pittsburgh Regional Alliance**

- Our host Suzi Pegg, VP Global Business Development, gave an impressive overview of the County of Pittsburgh, its strengths and facilities as a manufacturing and engineering business destination. Her presentation was very detailed and a full set of the Powerpoint slides is available on our webpage [www.aigroup.com.au/contact/hunter](http://www.aigroup.com.au/contact/hunter)
- A brief insight is as follows comparing Pittsburgh Region with the Hunter Region:
  - Gross Regional Product : \$US131bn/\$US26.9bn (based on 38.462 billion in 2013 and converted at an exchange rate of \$US0.70)
  - Population: 2.6million/661,466 in 2013
  - Manufacturing workforce: 100,000/28,000

##### **Elliott Turbo**

- Operating in Pittsburgh for 100 years. Taken over by Ebara Corporation of Japan in 2000.
- 1200 employees in Pittsburgh split equally between engineering, trades and indirect.
- Has its own welding lab. Fabrication and welding are key competencies for about 15 different metals.
- Work with Penn State, Virginia Tech and Pittsburgh universities on R&D and also recruit from and do interns with them.
- Make a very big investment in employee education. Re Lean Manufacturing, they have trained 1600 employees and run 150 different events on continuous improvement. They are committed to continuous learning by employees.
- Prior to takeover by Japanese parent, they had been doing 5S, fishbone and lean events but the Japanese showed how to take Lean to another dimension.
- Experiencing recruitment problems at the trade level. Working with local high schools to "counter the degree culture". Some high schools are now seeing the need to meet the needs on non-degree seeking students.
- Bright office with many meeting spaces. Good feeling about the culture of the working environment.

##### **CK Composites**

- An old company with old and fairly low-tech processes. They make filament wound fibreglass tubes (used in MRI machines and missile nose cones), cast and moulded epoxy resin products and densified wood laminate. They have their own IP in making the resins for impregnating the beech wood ply materials before compressing under heat and pressure to make a very strong but non-conductive material. The company has been very successful in seeking out new markets and applications for their products.



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## Tuesday

### **Auma Actuators**

- Actuators open and close valves for water, chemicals, oil and gas.
- Established in 1976 as a branch of German company based in Muelheim in SW Bavaria. 135 employees in USA and 1400 in Germany.
- There are a lot of German owned companies in Western Pennsylvania. There is a local German-USA Chamber of Commerce operating there.
- Behring is the Auma agent in Australia.
- R&D is carried out in Germany with a close relationship with the University of Freiburg. Interns are also sourced from UoF.
- Local engineering department customises the German product for the particular needs of customers.
- As in German companies, sales reps are technicians with detailed knowledge of the products.
- In terms of employee skilling, Auma liaises with leading technical schools and provides internships for students to acquire skills. They have a STEM agreement with a local high school and encourage factory visits etc. Students are encouraged to ask questions and make suggestions for improvement. They have a policy of internal promotion.
- Like many German SME's, the company operate more like a family business - "we increase productivity with our head and not the whip." At the end of the month, they recognise all birthdays, anniversaries and other important events.
- Auma participates in the National Bring a Child to Work Day.

### **County of Washington – Business Development**

- Addressed by Jeff Kotula President of the Washington County Chamber of Commerce. Senior VP Economic Development is Mary Stollar [washcochamber.com](http://washcochamber.com)
- Build high quality business parks (in the style of NW Sydney Business Park). 10,000 people go in and out of the Southpointe Business Park each day. Low County taxes attract tenants.
- Have responded to trend of companies moving out of the big cities. They market the desirability of the destination.
- Six of the eight US major gas companies are located in the County.
- The Marcellus Shale Oil Gas contract ([https://en.wikipedia.org/wiki/Marcellus\\_natural\\_gas\\_trend](https://en.wikipedia.org/wiki/Marcellus_natural_gas_trend)) is the largest gas reserve in the USA located in Pennsylvania and West Virginia. It has delivered money to the county and the municipality which greatly helps with the development of infrastructure.
- Jeff had a sayings "A rising tide raises all boats! The more relationships you build the better it is all round" referring to the value of collaboration rather than competition.

### **Accutrex**

- Essentially a contract manufacturer with a base load niche in manufacturing shims and gaskets. 99% custom made products for Original Equipment Manufacturers. \$US30m business. With 3 sites and 130 employees.
- Owners are Vietnam Veterans and have an active hiring program of hiring vets.
- Peelable shimstock is made by water jet cutting at 80,000 psi.



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- The company is an engineering solutions business – they solve customers’ problems. Have 20 year relationships with some customers built on trust and “removing the pain” for the customer. Export around the world.
- Training: they work with local vocational schools but most training is on the job. Significant repetition engineering.
- Have a monthly bonus program based on exceeding KPI’s and an employee stock ownership program with dividends based on profit. The ESOP owns 33% of the capital.
- Have a research connection with the University of California.
- Only competitive advantage is continuous improvement. Mechanisation of tasks is actively examined.
- Vocational training schools (VOTECHs) have branched out to train adults at night time.

### Wednesday

#### **Fayette County – Business Development – Fay-Penn Economic Development Council**

- Bob Shark Executive Director and Dana Kendrick Economic Development Manager [www.faypenn.org](http://www.faypenn.org). The Fayette County is a low socio-economic mostly rural area.
- Fay-Penn’s focus is on attracting “hard’ industries who export at least 60% of their output. The services sector receives less attention.
- They aim to:
  - Attract companies
  - Who attract talent
  - And become new tax payers who fund new community infrastructure.
- They provide land, working capital and loans for companies wanting to set up in the County at <3% interest, negotiated through the State of Pennsylvania. Start-ups are funded at 4%.
- Bob had some interesting statistical comparisons between Australia and the USA. Some highlights are:
  - Unemployment 6.2 v USA 5.5%
  - Annual average wage (In USD) 72,908 v USA 52,187
  - Cost of living in AUS is 8% higher
  - GDP growth similar at 2.7% AUS v @2.4% USA
  - Population in poverty AUS 13.9 v 15.1%
  - Degree holders AUS 37% USA 28% and Fayette County 14%
  - Both populations are ageing and not replacing sufficient numbers
  - In the USA by 2020, there will be a 5 million people deficit in skilled labour availability. (Opportunity for the Hunter Region where we have surplus of STEM skills).

#### **Penn State University – Fayette campus**

- Provide 2 year degree programs similar to TAFE level quals. Students can then go on to Pittsburgh to do 2 more years. Penn State has a large network of campuses across Pennsylvania so than no student need travel more than 30km to any campus.
- Consult actively with business and the community to identify course needs.
- One current priority is in providing training in oil and gas technology.
- Has an active school engagement program but struggles in a largely rural community.
- Great interest in maintaining contact with AUS delegation.



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### **Laurel Business Institute**

- Small privately operated college offering post-secondary training up to a 2 year degree qualification.
- Very responsive to customising the curriculum. They have a "Grow your own Graduate" program with local employers to recognise RPL and then design the program.
- Focus is on job preparation
- Train in welding and electrical trades to US and Canadian standards for oil and gas sector.

### **Advanced Technology Centre – Westmoreland County Community College**

- A purely trade training facility on a grand scale – 73,500 feet. It also offers specialised training in advanced manufacturing and oil and gas [www.wccc.edu/atc](http://www.wccc.edu/atc)
- We had a walk through many workshops and labs which were very new, clean and state of the art. Among other things they had a virtual welding lab. Machine Company OEM's were keen benefactors of equipment.
- There was an obviously older age group cohort late in the afternoon who may be like our adult apprentices but studying at night.
- Closest college we saw to a TAFE. Very engaging management and teachers. They are keen to keep in contact with us.

### **Thursday**

**Carnegie Mellon University, The Robotics Institute**, host Martial Herbert Director  
<https://www.ri.cmu.edu/>

- Founded in 2009, the RI is one of seven departments in the Faculty of Computer Science. It offers in Masters of Robotics, Robotics Systems and Computer Vision.
- RI has 600 researchers and 400 students. It has an international focus and post-graduate students and researchers from Australia are very welcome.
- One quarter of RI's funding comes from the private sector and half comes from Defence.
- CMU has been working on autonomous vehicles (AUV's) and smart vehicle systems for 40 years and some current projects involve:
  - Vehicle to vehicle communication eg. An oncoming vehicle will detect the other vehicle and then switch off some LED cells in its headlight which would otherwise shine into the eyes of the driver of the other vehicle.
  - Similarly, an array of lighting can detect the speed and distance rain drops and switch on and off particular cells to reduce light blindness in the driver at night in rain.
  - Systems for unmanned cars work from developing a probability map of speed and direction of objects in their vicinity.
  - Systems for data collection about road conditions and transmission to road maintenance authorities for attention before major deteriorating happens.
- Other projects involve:
  - Artificial skin, including soft artificial muscles and soft robotics ("live" prostheses)
  - Machine learning for automatic guidance to avoid objects
  - Data mining and artificial intelligence
  - Computer vision – recognising objects.



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- A large part of robotics now is working with people rather than trying to replace people – “Human – Robotics Interaction.” This involves
  - Anticipating human behaviour
  - Mimicking human behaviour (by writing maths mathematical models of human interaction)
  - Artificial movement by wiring an artificial arm into the nerve impulses of the brain to receive commands from its disabled host person.
- Some examples include:
  - Detailed information on facial expressions of a driver can be a predictor of driver fatigue which then instigates an alarm or other action.
  - A robot which will “wrestle” with a human by imitating the human’s actions

**University of Pittsburgh, Swanson School of Engineering, host Paul Kovach**

<http://www.engineering.pitt.edu/>

The University of Pittsburgh (Pitt is the abbreviation) has well developed ties with the University of Pittsburgh from the professional friendship of Professor Mark Jones (UoN) and Professor George Klinzing (Pitt). Pitt organised a very comprehensive introduction to its programs as follows:

|                |  |
|----------------|--|
| 2:30 - 2:45 pm | Howard Kuhn – Additive Manufacturing Initiative  |
| 2:45 – 3:15 pm | Albert To and Ravi Shankar – Three D Printing  |
| 3:15 -3:30 pm  | Andy Holmes – Swanson Center for Product Innovation  |
| 3:30 – 3:45 pm | David Waldek – Petersen Institute of NanoScience and Engineering   |
| 3:45 – 4:00 pm | Marc Malandro (Evan Facher) – Innovation Institute   |
| 4:00 – 4:45 pm | Tour Three D Printing Facility, Peterson NanoScience and Engineering Facility, Swanson Center for Product Innovation |
| 4:45 – 5:00 pm | Rick Winter - Coordination of Manufacturing Initiatives at the Swanson School of Engineering                         |
| 5:00 – 5:25 pm | Further Discussions on Manufacturing Initiatives   |
| 5:30 – 6:30 pm | Reception at UClub   |

Some highlights (in the eyes of the writer) are included below.

Pitt

- Swanson was an engineer in the same league as George Edison. He founded a company which simulates engine performance.
- It has benefited from public funding in the recovery of Pittsburgh from a steel making city through “Eds and Meds” – the investment in education and medical development. Pitt and CMU agreed to collaborate in the rebuilding of Pittsburgh by avoiding competition and collaborating where mutually advantageous. They avoided competition for available funding.
- Pitt has exchange programs with many countries and aims for 50% of students with international experience.
- Bio-medical engineering joins medicos and engineers and has been operating since the 1990’s. David Vorp Assistant Dean Research, is an ex medical graduate heads engineering research



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### America Makes

- Adjunct Professor Howard Kuhn spoke about the National Additive Manufacturing Innovation (NAMII) at Youngstown in the neighbouring state of Ohio. NAMII is an accelerator for technology development drawing on the best expertise from government, business and academia.
- The Youngstown facility focuses on Lightweight Materials drawing on the foundry technology experience of the industrial age, particularly in sintering. They develop material for 3D printing and are currently working on microwavable magnesium powders for medical uses.
- It was established in 2012 with \$50m pilot funding and the remainder to be contributed by the public. It will be self-sufficient in 2017. It is a membership organisation - Silver for \$15k, Gold for \$50k and Platinum for \$200k per annum. Currently there are 134 members.
- GE is setting up a new facility at Pittsburgh Airport for the implementation of NAMII outcomes for their own business units.
- The first 6 projects have been awarded \$9.5m. The program is very successful and is being expanded to other regions
- Similar incubators have been set up in Detroit and Chicago for:
  - Digital manufacturing and design
  - and power electronics
- NAMII has developed the very riveting slogan **"When America makes, America works"** .  
<http://americamakes.us>

### Pitt Innovation Institute [www.innovate.pitt.edu](http://www.innovate.pitt.edu)

- Evan Facher, Director Enterprise Development, said there is \$700m of R&D funded at Pitt each year. Pitt Innovate is like Newcastle Innovation and is responsible for the commercialisation of research.
- It has a lot of liaisons with other universities and is committed to driving more results to the marketplace. It focuses on the selection of research topics by the customer.
- Undergrads in marketing help get research opportunities into the market place.
- Researchers can apply for "entrepreneurial leave" for up to a year to work on a spin-off of research. It also helps in the creation of practical knowledge of products and markets for the researchers.

### Other Speakers

- Albert To – 3D printing of a light weight metal bracket which had multiple embedded "drill holes" (not by drilling) to reduce weight. Testing the durability is in progress.
- Ravi Shankar – reducing or eliminating heat stress in 3D layers to produce uniform heat transfer, uniform shrinkage and minimise build- time and waste materials.
- Daeho Hong - resorbable materials for bone tissue repairs as an alternative to metal implants. Biodegradable Iron and Manganese alloys developed for various medical applications such as craniofacial screws, orthopaedic plates and screws and trachea and fistula stents. These innovations reduce time of implanting, nerve damage, complications and rework and they have good integration with the bone structure.



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### Evening Reception

- Hosted at the University Club by Emeritus Chancellor Mark Nordenberg who had been a speaker on Pittsburgh as one of the "Magnet Cities" at the UoN Transforming Regions Conference on 22<sup>nd</sup> September 2015. He spoke very highly of Newcastle and enjoyed his visit to UoN as speaker.
- Professor Nordenberg was very positive about the ongoing research collaboration with UoN.
- The visit concluded with a visit to the "Cathedral of Learning" which is Pitts' imposing 37 storey building. Mark Nordenberg gives a tour at <https://www.youtube.com/watch?v=fjOdkFw0BX4> which includes a visit to the Gothic common area and the different rooms decorated in the cultural traditions of the founding immigrant groups that carried the industrial revolution and the steel industry in particular.

### **Friday**

This day was devoted to exploring start-up some incubators and delegates pursuing their particular interests.

### **AlphaLab Gear**

Alpha Lab Gear <http://alphalabgear.org/> is a "hardware" technology incubator. It became an offshoot of Alpha Lab, the software incubator in 2013. The two organisations operate closely with Innovation Works which provides funding and guidance for incubators in south western Pennsylvania, where Pittsburgh is situated <https://www.innovationworks.org> . There are 7,000 manufacturers within a 3 hour drive of Pittsburgh.

The visit was very informative in how start-ups are assisted to commercialise innovations. Terri Glueck from IW is very keen to maintain contact about how incubators in the Hunter can be improved and sustained. Some key points are:

- 200 applications are received each year and 15% are accepted. 60% of applicants are from Pennsylvania and 40% from elsewhere. 40% of applicants come from universities and 60% from industry. Alpha Lab Gear provides start-ups with \$50k financial assistance in exchange for 9% of their stock or \$25k for 5%.
- There is a 10% success rate for start-ups however IW has evidence that for every \$1 of State investment, \$3.50 goes back to the Government. It takes a start-up between 5-10 years to make a profit.
- It connects start-ups with:
  - Angel investors
  - Potential customers
  - Mentoring (200 entrepreneurs to choose from)
  - Business skills and structures
  - Free rental for 18 months
  - Business advice and
  - Discounted software
  - The Tech Shop which rents time at \$100 per month on high-end manufacturing equipment.



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- ALG tries to help start-ups be the best company founders they can possibly be. It encourages them to engage with potential customers in the development of their product, so when it is finished it is what the customer wants. Have weekly start-ups meeting where the participants exchange info, experience and advice.
- ALG holds investor open days and also investment opportunity meetings in town halls to attract investors. The State of Pennsylvania invests in Venture Capital Companies through superannuation funds.
- ALG has an annual budget of \$7m and \$5m goes to start-ups. It invests in 40 companies a year and then reinvests in 15 of those. 60% of their budget comes from the State and the rest comes from Federal programs and charitable gifts (Charitable Foundations play a big role in business life in the US). ALG is becoming more self-sustaining
- There is a National Hardware Cup contest for start-ups.
- ALG introduces high school students to entrepreneurship as well as to new technologies.
- Pittsburghians have a feeling of being the underdogs in the USA and they want to be successful in transforming their economy. Since CMU and Pitt began to collaborate a few years ago, there has been a spread of openness into the community to make innovation happen!

### Thrillmill

A start-up incubator in same building as Alpha Lab:

- Initial seed funding of \$750m for early stage start-ups. Take 1% of their stock. Thrillmill runs on a budget of \$1.5 m per year.
- Thrillmill incubated their own music festival called Thrival to bring attention to the transformative things which are happening in Pittsburgh. Held at an abandoned steel mill, 11,000 people attended for a very reasonable fee of \$30 per head.
- Thrival connected start-ups, workshops were run on various themes, innovations were displayed and the innovation eco-system was described.
- Thrillmill has extremely strong Foundation backers from the old families of the city who built their fortunes on manufacturing. 8 of them subsequently bought the steel mill for community development projects.

### Mayor of City of Pittsburgh

- Adrian Price and Councillor Robert Schmitz, City of Whyalla, met Councillor Bill Peduto, Mayor of Pittsburgh. Councillor Peduto was very welcoming, engaging and interested in our respective cities. The delegates presented gifts from the Lord Mayor of Newcastle and Mayor of Whyalla.
- Councillor Peduto was very open and frank in discussing the recent past of Pittsburgh. When the city hit "rock bottom" (as it is commonly referred to) in 1983, with the closure of so many steel mills and allied industries, no one knew what to do. There was no plan. Gradually there formed an alliance of key persons who wanted to bring about change and a plan was developed out of the collective mind.
- The role of CMU and UoP were pivotal in identifying some of the means to a new future. He also spoke of the importance of the Foundation Community in providing funding for innovative initiatives to assist the transformation. 30 years later the job is not finished but there has been considerable progress.
- Robert Schmitz was offered access to key City officials to obtain as much information about city administration as he needed.



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- Councillor Peduto is very interested in exploring collaborative arrangements with the City of Newcastle and is forwarding three options for consideration by NCC. City collaboration will greatly assist the sustainability of collaborations in the research and manufacturing spaces and more broadly between the two cities.