

A pioneer, on the cusp

First Graphene can produce low-cost graphene

First Graphene has built a plant in the Perth suburb of Henderson to produce graphene at commercial scale and it is now delivering product to customers in a number of different industries. In 2018, First Graphene became a Tier 1 partner in the Graphene Engineering and Innovation Centre (GEIC) in Manchester, opening up global opportunities.

The market opportunities are significant

First Graphene has been targeting industries using materials such as elastomers, polymers, thermoplastics, rubbers and glass and fibre composites. These have lower barriers to entry due to fewer government regulations and consumer product liability. Commercial sales contracts have been announced to companies that make polymer linings for mining equipment, safety work boots, fibreglass swimming pools and protective face masks, amongst others. There is a pipeline of many other products that the company is working on closely with potential customers.

The sky is the limit for graphene

Graphene's potential applications are legion. For example, you could use its flexibility and transparency to make a smart phone that rolls up like a newspaper. You could make bulletproof vests tougher than Kevlar. You could make wearables that would tattoo directly on the skin and so on. Graphene could markedly enhance lithium-ion batteries, by improving the storage capacity of such batteries, as well as their longevity and charge rate. The impediment to date on widespread graphene use is that graphene needs to be good quality. First Graphene has proved its credentials in this regard.

First Graphene is funded for the next growth phase

A recent 1-for-10 rights issue at 13 cents raised \$6.2m, positioning the company to focus on sales growth. This round saw new investors come into the company.

Valuation range of A\$0.19 – A\$0.33 per share

We value First Graphene at 19 cents per share base case and 33 cents per share optimistic case using a DCF-based valuation approach but valuing only the initial 100 tonne plant in Perth. We see First Graphene potentially re-rating towards our valuation range as new customers emerge and as existing trial customers begin to routinely include First Graphene product into their offerings. Key risks we see are: 1) timing risk; 2) funding risk; and 3) customer risk.

Share Price: A\$0.14

Valuation range: A\$0.19 – A\$0.33 ASX: FGR Sector: Materials 4 November 2020

Market Cap. (A\$ m)	71.0
# shares outstanding (m)	525.7
# share fully diluted	648.1
Market Cap Ful. Dil. (A\$ m)	87.5
Free Float	72.2%
12 months high/low (A\$)	0.21/0.06
Website	firstgraphene.net

Source: Company, Pitt Street Research



Share price (A\$) and avg. daily volume (m, r.h.s.)

Source: Thomson, Pitt Street Research

Valuation metrics	
Fair valuation (A\$)	0.19 – 0.33
WACC	14.3%
Assumed terminal growth rate	Minus 3.0%

Source: Pitt Street Research

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Table of Contents

Introducing First Graphene, ASX: FGR	3
Why First Graphene believes it is a leader in a new industry	5
The market opportunities for First Graphene are many and varied	6
How Manchester's GEIC can benefit First Graphene	7
How First Graphene is well-placed to grow in Australia	7
The competition	8
Valuing First Graphene	9
Strong leadership	11
The risks	11
Appendix VI – Analyst qualifications	12
General advice warning, Disclaimer & Disclosures	13



Introducing First Graphene, ASX: FGR

The following 1,000 words or so is all you need to know about First Graphene. The rest is the detail to back up what we're saying here.

In the film *Star Trek IV: The Voyage Home*, which was released in 1986, the crew of the USS Enterprise find themselves in contemporary (ie 1986) San Francisco in need of some materials for the Enterprise before they can go back to their own time. One of the things they need is Plexiglas, and to get it Scotty and McCoy visit a local manufacturer. To pay for the material Scotty shares his 23rd Century knowledge concerning the formula for 'transparent aluminum'. 'It would take years just to figure out the dynamics of this matrix', says the excited factory owner. 'Yes,' replies McCoy, 'but you would be rich beyond the dreams of avarice'.

34 years after Star Trek IV we still don't have transparent aluminum. However, we might just have something almost as exciting in terms of its industrial potential – graphene. Imagine a material 100 times stronger than steel, tougher than diamonds, highly conductive of heat and electricity, very flexible, and, potentially, almost transparent. That is graphene, an 'allotrope' (i.e. alternative matrix) of carbon that has had everyone in the new materials world excited since a couple of Russian guys at the University of Manchester - Andre Geim and Konstantin Novoselov - first discovered it in 2004¹. That discovery won them the Nobel Prize in Physics in 2010², which is why you've probably heard of graphene in a news article somewhere in the decade since then. Everyone agrees that there's very little you couldn't do with this hot new material once it could be manufactured at a reasonable price. The question is who has cracked that puzzle and is therefore on the path to riches beyond the dreams of avarice.

A Perth-based ASX-listed company called First Graphene believes that it will win this prize. Not long ago, pure graphene was being sold for the equivalent of US\$720m a tonne. First Graphene believes that within a year or two at a plant at Henderson, 30 km southwest of Perth near the industrial suburb of Kwinana, it can make it for perhaps US\$50,000 a tonne and sell it for US\$200,000 a tonne.

First Graphene in its current form originated from an effort to develop graphite mines in Sri Lanka between 2013 and 2015. Graphite is a mineral that world is going to need a lot more of in the years ahead because of the carbon in the anodes of lithium-ion batteries. Most would-be graphite project developers in recent years have been going after 'flake' graphite, so called because when you break it up it tends to come away from the original rock in flakes. In Sri Lanka they have a special type of graphite called vein graphite whose graphitic content is so high there's virtually nothing else in the ore except graphite. First Graphite, as First Graphene was called from 2015 to 2017, originally just wanted to develop new vein graphite mines in historic mining areas of Sri Lanka that had been active in the 19th Century but had lain idle for decades thanks to Sri Lanka being mining-unfriendly for most of its post-independence history. The attraction of the vein graphite was rising demand for battery-grade graphite.

About 2015 First Graphite had a bright idea – why not use the graphite to make graphene, the material everyone was talking about, and sell a truly value-added product.

To determine if this crazy graphene-from-graphite idea was possible, First Graphite went to the University of Adelaide where Professor Dusan Losic was

¹ Novoselov et. al. (2004), *Electric Field Effect in Atomically Thin Carbon Films*, Science 22 Oct 2004: Vol. 306, Issue 5696, pp. 666-669.

² And got them knighthoods in 2012.

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First Graphene may be on track to make graphene at just US\$50,000 a tonne

becoming an authority on graphene production processes. One the Losic laboratory had established that the vein graphite could easily yield graphene, the Perth company took his ideas and started scaling them up, to the point where the First Graphene plant at Henderson had a 100 tonnes p.a. production capability by 2018. The graphene isn't the ultra-pure single-atom thick graphene that is the Holy Grail of the graphene community, but, at 5-10 atoms thick, it is actually better suited for commercialisation. More importantly, it has been designed to have enough of an oxygen edge on the product so that it disperses easily when It is added to someone else's formulations. As First Graphene got better at making graphene, it eventually decided it didn't even need to mine its own graphite, and simply agreed to buy the material from a state-owned mine in Sri Lanka called Kahatagaha³.

Over the last couple of years, the main focus at First Graphene has been fourfold:

- It has worked with a range of potential customers of the Henderson plant on uses of its graphene, which it is marketing as PureGRAPH[®].
- It has worked on ways to drive down its own production costs.
- It has made sure that the graphene has the requisite approvals to allow it to be sold in all the important markets
- It has joined various graphene 'clubs' basically academic-industry consortiums in order to be able to be at the technological cutting edge of the science of graphene and be seen by all the potential users. In 2018, First Graphene became a Tier 1 partner in the Graphene Engineering and Innovation Centre (GEIC) in Manchester, opening up opportunities for sales in the UK and Europe, as well as gaining access to some of the best graphene brains in the world.

First Graphene has yet to secure the breakthrough volume commercial relationship that suddenly makes Henderson economic, but believes that it is not far off it, because every time a small amount of its graphene is added to someone else's product it tends to improve a particular property in that product by 30-50%.

Currently First Graphene has collaborations ongoing with makers and users of polymers, elastomers, glass fibre and carbon fibre composite, fire retardants and concrete. The potential applications are as diverse as industrial safety boots and reclaimer buckets for iron ore miners. Hardly a month goes by without some product breakthrough being announced to ASX, and these usually show the upside for the customers. For example, the reclaimer buckets now last twice as long as they are supposed to, suggesting a big commercial upside both for the makers as well as the buyers like Rio Tinto. However, it hasn't mattered what the announcement was – the market has been relatively unimpressed, having consistently marking down the First Graphene share price since June 2019. Currently you can acquire First Graphene for under A\$80m.

What is this stock worth once it has significant offtake from Henderson and it can talk confidently about achieving its goal of a US\$50,000 a tonne production price? We place an early, tentative valuation on First Graphene in this note but, with future demand in the billions, we believe that McCoy's advice to the Plexiglas maker three decades ago holds true today – riches maybe not beyond the dreams of avarice, but way beyond the current share price.

Currently First Graphene has multiple collaborations ongoing

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³ Kahatagaha Graphite Mine is located in the village of Kahatagaha in Sri Lanka's North Western Province.



Why First Graphene believes it is a leader in a new industry

First Graphene has established itself as a leader in the graphene industry, which means having the best product at the lowest cost⁴. The company believes it has made a lot of progress towards that goal in the last five years.

First Graphene makes graphene using a simple process. The company applies electricity to the graphite in a solution of dilute sulphuric acid and the graphene peels off, not unlike a pack of cards with individual cards peeling off from it 5 . First Graphene reckons it has the most straightforward flowsheets in the emerging graphene industry⁶. This simplicity makes for low capital costs.

First Graphene believes that PureGRAPH[®] is a high-quality graphene product. A graphene product is regarded as high quality if the aspect ratio⁷ and the carbon purity level are both high, the particle size is well controlled, there are minimal defects, and the product disperses easily in the target materials. PureGRAPH[®], available in 5 μ m, 10 μ m, and 20 μ m lateral sizes, passes all these tests. In particular, the PureGRAPH[®] platelets have an oxygen 'edge' for better and easier disbursement. As a result, the product generates results in just about any application in which it is tried. Typically, a very small amount of PureGRAPH[®] by weight gives a marked improvement in desired parameters, if only by allowing less of the original product to be used to get the same outcome. First Graphene's benchmark for PureGRAPH[®] is to be able to improve a quality of the product in which it is used by 30-50% through the addition of a small amount of the product.

The product is not only high quality but it's low cost. Graphene can be made synthetically but that is expensive. Synthetic graphene was being sold at something like US\$720m a tonne in late 2016⁸, but that is not a commercially derived figure. First Graphene is aiming to bring down its cost price to more like US\$50,000 a tonne. The evidence from the Henderson plant suggests that this is possible.

Graphene at US\$50,000 may sound expensive, but most applications won't need much. The thing about graphene is that just a small addition to a product can bring large benefits, as we noted earlier. That means that while First Graphene is selling in tonnes on an annual basis, it is often shipping its product in 1-100 kilogram-sized parcels. First Graphene believes that the use of its products in most applications will be more than offset by gains in performance of the end product, and more.

A very small amount of PureGRAPH® by weight gives a marked improvement in desired parameters

⁴ See the company's Capability Statement, filed with the ASX on 16 August 2017.

⁵ See ACS Appl. Mater. Interfaces 2016, 8, 25, 16521–16532 for a description of a similar process by the Dusan Losic laboratory in Adelaide that uses ammonium sulphate.

⁶ Other process includes chemical vapour deposition; mechanical shearing in stabilising liquids; and plasma arc reaction.

⁷ That is, the ratio of surface to thickness.

⁸ See First Graphite's 18 November 2016 corporate presentation, slide 4.



First Graphene has manufactured very robust elastomers using its technology

The market opportunities for First Graphene are many and varied

Composites for light-weighting and water resistance. First Graphene has talked about composites where a small amount of PureGRAPH[®] in a composite increases strength by 30%, allowing less material to be used⁹.

Mining equipment. An obvious use of graphene is in elastomers because that could allow such materials to be made thinner but retain the elastic properties. In June 2018, First Graphene announced that it was working on graphene-augmented polyurethane liners to protect mining equipment from abrasion. Its partner in this venture is newGen, a Perth-based maker of wear protection and lining solutions for heavy-duty industries¹⁰. In November 2018, First Graphene reported that a reclaimer bucket, its first mining product, had generated strong results. Field trials have confirmed that the liners in the bucket worked as expected over a 12-month period.

Fire retardants. First Graphene has been working for some years now with the University of Adelaide¹¹ on graphene-based coatings to fireproof materials. Test work in January 2018 showed that First Graphene's coating works much better than competitor products in terms of more heat resistant per micron of thickness. There were good results disclosed from testwork in June 2019.

Concrete. In January 2018, First Graphene discussed an experiment by the ARC Graphene Research Hub showing that the addition of a small amount of graphene could improve the compressive and tensile strength of concrete by 22-23%. In November 2018, the company reported a 27-34% increase in the compressive and tensile strength for a concrete additive while in August 2020 another study showed that the benefits of graphene additives extended to Recycled Aggregate Concrete which, as the name suggests, is concrete made out of construction debris.

Safety boots. In February 2019, First Graphene announced that it was working with Steel Blue¹², a Perth-based maker of safety boots, on a new boot for the oil and gas industry where the spark-eliminating toe cap is stronger thanks to graphene. Prototype boots were available by August 2019. First Graphene envisages being able to supply safety boots that have graphene not just in the composite toe cap but in the thermoplastic soles, giving longer life and comfort. We understand that some optimisation work is being done regarding the amount of graphene being added to the toe cap.

Supercapacitors. In September 2019 First Graphene started working on a graphene-based supercapacitor developed at the University of Manchester by Professors Robert Dryfe and Ian Kinloch. A pilot-scale process is in development at the GEIC.

Oyster baskets. In May 2020 First Graphene announced that it is working with a company called Hexcyl¹³ to make baskets for oyster harvesting where the high-density polyethylene in the baskets is augmented with graphene for greater wear resistance. These baskets performed well in initial field trials¹⁴.

Boats. In September 2020 First Graphene was able to show a 59% increase in 'ultimate flexural strength'¹⁵ in the material used in fibreglass boats when the material incorporated 1% PureGRAPH[®].

⁹ See the company's 4 March 2019 presentation to the Graphene Automotive 2019 meeting in Detroit, Slide 13.

¹⁰ newgengroup.com.au.

¹¹ As part of ARC Research Hub for Graphene Enabled Industry Transformation.

¹² steelblue.com.

¹³ hexcylsystems.com.au.

¹⁴ See the First Graphene market release dated 3 August 2020 and headlined 'Successful trials with High Density Polyethylene for oceanic farming'.

¹⁵ Flexural strength is the maximum stress that can be placed at the outermost fibre from the point of compression or tension.



Supercapacitors. In the energy world a 'supercapacitor' is device to store and release electricity. It's like a battery, but rather than storing energy in the form of chemicals, as batteries do, supercapacitors store electricity in a static state, making them better at rapidly charging and discharging. Many see supercapacitors as the Next Big Thing that will power Electric Vehicles, in conjunction with the lithium-ion battery. First Graphene announced in October 2020 that it is collaborating with researchers at the University of Warwick in the UK on a graphene-based supercapacitor, which would increase the speed of charge and recharge due to its superior electrical conductivity properties.

How Manchester's GEIC can benefit First Graphene

First Graphene is part of Manchester's Graphene Engineering and Innovation Centre (GEIC). The GEIC was set up to overcome issues that naturally come about when you get a gathering of scientists. Its charter involves the employment of commercial industrial engineers to work alongside of university-based scientists to accelerate the commercial uptake of graphene in industry.

First Graphene was invited to become a Tier 1 member of GEIC, in recognition of its leadership in the field of high-quality powdered graphene products. It is now a stated priority supplier of such materials for use by the GEIC facility and its associates. Having the imprimatur of the University is also a great door-opener to the best of British business, as UK companies venture down the path of introducing graphene to their product lines. Additionally, First Graphene is able to access IP being developed by the University. The worldwide patent on graphene-enhanced supercapacitors from the University of Manchester has been licensed to First Graphene¹⁶.

First Graphene has a fully functional research laboratory staffed by company scientists at the GEIC, as well as accesses to advanced, expensive testing equipment in a common area that would normally be beyond the budget of most junior companies. The company has saved significant amounts of money in establishing a UK base at GEIC, rather than starting from scratch in a separate, stand-alone facility somewhere else.

How First Graphene is well-placed to grow in Australia

First Graphene was delayed last year in launching its products in Australia. First Graphene received NICNAS approval to sell its graphene in May 2019. NICNAS is the National Industrial Chemicals Notification and Assessment Scheme, the Australian government's regulatory body for industrial chemicals. NICNAS approval of First Graphene's product makes the company the only party legally able to supply graphene in Australia. Before 2018, NICNAS had accepted graphene as a material that came under the CAS number for graphite¹⁷. However, NICNAS decided that graphene was sufficiently unique that it required a graphene-specific CAS number and companies that wanted to deal in graphene in Australia had to lodge a submission before they could legally sell graphene materials. This was a setback for First Graphene because the change in authorisation required delayed sales by six months, such that the company wasn't in the position of

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First Graphene has now launched in Australia

¹⁶ See First Graphene's market release dated 23 September 2019 and headlined '*First Graphene announces collaboration in energy storage materials.*

¹⁷ A chemical substance's CAS Number is the unique numerical identifier assigned to it by America's Chemical Abstracts Service (cas.org). Every chemical substance described in the open scientific literature since 1957 has a CAS number.



being compliant until mid-2019. It then had to reactivate the interest of the customers who had been waiting for the approvals and reschedule sales and deliveries.

First Graphene is the only company that has received authorisation to sell graphene in Australia. This is an important point as there are a number of other companies claiming to be doing so, with expansive web sites sprouting their merits., but none of them are compliant. They risk fines of up to \$300,000 for each purported sale. One can speculate why they haven't complied. Is it the cost of the extensive due diligence process that NICNAS imposes on companies, or is it that the product is not really graphene at all, being some sort of micronised graphite instead, even though they call it graphene?

The competition

Graphene has attracted many new companies such as Applied Graphene Materials (LSE:AGM), Archer Materials (ASX:AXE), Comet Resources (ASX:COI) and Directa Plus (LSE:DCTA), Haydale Graphene Industries (LSE:HAYD), NanoXplore (TSX-V:GRA), Versarien (LSE:VRS) and ZEN Graphene Solutions (TSX-V:ZEN). In many instances these companies are making claims based on limited laboratory work without reference to potential scale. Thus, there has little ability for analysts and investors to make commercial assessments. Similarly, there has been a paucity of technical information about a range of parameters that need to be considered, so that the investment community is being given promotional sales pitches as opposed to meaningful information. There has been too much 'sizzle' and not enough 'sausage'.

First Graphene believes that it is a superior to the competition. Often when telling its story First Graphene is asked to compare itself to another ASX-listed company called Talga Resources (ASX: TLG)¹⁸. That Perth-based company is being built around a number of natural graphite deposits in Norrbotten County in northern Sweden. Talga has talked for a number of years about becoming a graphene company and has manufactured graphene product from its amorphous graphite, however we believe that the lower graphitic content (ie 25% versus >95% for First Graphene) of Talga's raw material means that its graphene cost will be much higher and unlikely to be commercially competitive. Talga is really a graphite company.

First Graphene believes that it is a superior to the competition

¹⁸ talgagroup.com.



Valuing First Graphene

Based on a DCF analysis of the Henderson graphene project, we value FGR at A\$0.19 per share base case and A\$0.33 bull case. Figure 1 shows our base case operational assumptions.

Figure 1: Base case assumptions for First Graphene

Henderson Graphene Project	Base Case	Bull Case
Henderson plant capacity (tpa)	100	100
Price of PureGRAPH (US\$/t)	200,000	300,000
Operating cost (US\$/t)	50,000	45,000
Capex (A\$M)	3.0	3.0
Depreciation (% Revenue)	3.1%	3.1%
Tax rate (%)	30%	30%
Exchange rate (USD/AUD)	1.4	1.4
Expected Inflation (%)	3.2%	3.2%

Source: Pitt Street Research

- Discount rate. A discount rate of 14.3% is assumed, as the Henderson plant is yet to achieve its nameplate production capacity of 100 tonne of graphene per annum. As FGR ramps up its graphene production, we will look to reduce our discount rate accordingly.
- Graphene pricing. Our base case conservatively assumes US\$20,000 per tonne (inflating at 3.2% per annum) for converted graphene, with our bull case attracting a significantly larger premium. As discussed in the market section of this report, we see a robust outlook for graphene pricing underpinned by its potential applications as diverse as industrial safety boots and reclaimer buckets for iron ore miners.
- **Operating costs.** Due to the simplicity in its vein graphite-to-graphene conversion process, FGR believes it can realise cost at US\$50,000 per tonne of graphene produced, which we have utilised for our base case modelling. As the Henderson plant ramps up towards its 100 tonne per annum nameplate capacity, we price in a gradual reduction in operating cost on a per tonne basis due to scale benefit.
- Raw graphite. We estimate FGR has c.500 tonnes of raw vein graphite stored in inventory, which we expect will be fully utilised for graphene conversion by FY26. Thereafter, we expect FGR will continue to source vein graphite from Sri Lanka's state-owned Kahatagaha Graphite Mine. For the sake of conservatism, we apply a negative terminal growth rate of -3% to price in the depletive nature of the graphite minerals.
- **Funding.** We expect FGR will have adequate reserves to ride out any cash expenditures including capex for FY20 and FY21. From FY22, we expect FGR will generate positive operating cashflows and thereby self-fund its operations sustainably.
- **Tax rate.** We have assumed a corporate tax rate of 30%. As FGR has a significant amount of tax losses to carry forward, our base case modelling expects the company to pay its first cash tax in FY25.



Figure 2 illustrates our base case production outlook for converted graphene, which assumes a production volume of 20 tonne for FY21, sequentially ramping up towards the plant's 100 tonne per annum nameplate capacity by FY24.

Figure 3 shows that based on our base case modelling, we expect FGR to achieve free cashflow breakeven at a graphene production level of >40 tonne.



Figure 2: Base case production assumptions for First Graphene

Source: Pitt Street Research





Source: Pitt Street Research



Figure 4 shows our valuation summary for FGR's Henderson graphene project. The midpoint of our valuation range A\$0.26 per share, which applied on a share base of 526M, points to an equity value of A\$138M.

Figure 4: Our valuation range for First Graphene

FGR Valuation	Base	Bull
NPV of Henderson project	92.5	168.9
Net debt	(7.0)	(7.0)
Equity value (A\$M)	99.5	175.9
Diluted shares	525.7	525.7
Implied price (A\$)	0.19	0.33
Current price (A\$)	0.14	0.14
Upside (%)	35.1%	139.0%

Source: Pitt Street Research

Strong leadership

We believe that First Graphene has the leadership smarts to be able to grow into a major force in the emerging graphene industry:

- Non-Executive Chairman Warwick Grigor brings considerable insights from his years as a top-rated securities analyst focused on the resources sector.
- Executive Director Peter Youd brings financial skills
- Non-Executive Director **Dr Andy Goodwin** brings deep technical insights on the properties of graphite and processes to obtain it.
- Chief Technology Officer **Paul Ladislaus** brings chemical engineering smarts gained at the UK company Thomas Swan and the US company Huntsman prior to his joining First Graphene in 2018.

First Graphene is currently looking for a placement for outgoing Managing Director **Craig McGuckin**, whose considerable engineering and process skills allowed the company to take the original graphene processing knowhow from the University of Adelaide and reduce it to commercial practice.

The risks

We see four major risks for First Graphene as a company and as an investment:

- Timing risk. There is the risk that First Graphene may take longer to develop and commercially launch products than the time we have postulated in this note.
- Customer risk. There is the risk that customers may evaluate First Graphene's product but then decline to establish commercial products with it.
- **Funding risk**. There is the risk that First Graphene may require more funding before its Henderson plant becomes profitable.
- **Commercial risk**. There is the risk that First Graphene's products may fail to be taken up by industry in the kind of penetrations we have postulated in this note.



Appendix VI – Analyst qualifications

Stuart Roberts, lead analyst on this report, has been covering the Life Sciences sector as an analyst since 2002.

- Stuart obtained a Master of Applied Finance and Investment from the Securities Institute of Australia in 2002. Previously, from the Securities Institute of Australia, he obtained a Certificate of Financial Markets (1994) and a Graduate Diploma in Finance and Investment (1999).
- Stuart joined Southern Cross Equities as an equities analyst in April 2001. From February 2002 to July 2013, his research specialty at Southern Cross Equities and its acquirer, Bell Potter Securities, was Healthcare and Biotechnology. During this time, he covered a variety of established healthcare companies such as CSL, Cochlear and Resmed, as well as numerous emerging companies. Stuart was a Healthcare and Biotechnology analyst at Baillieu Holst from October 2013 to January 2015.
- After 15 months in 2015 and 2016 doing Investor Relations for two ASXlisted cancer drug developers, Stuart founded NDF Research in May 2016 to provide issuer-sponsored equity research on ASX-listed Life Science companies.
- In July 2016 with Marc Kennis, Stuart co-founded Pitt Street Research Pty Ltd, which provides issuer-sponsored research on ASX-listed companies across the entire market, including Life Science companies.

Cheng Ge is an equities research analyst at Pitt Street Research.

- Cheng obtained a B.Com in Finance and LL.B from University of New South Wales, in 2013, and has passed all three levels of the CFA Program.
- Prior to joining Pitt Street Research, he has worked for several financial services firms in Sydney, where his focus was on financial advice.
- He joined Pitt Street Research in January 2020.

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