FRONTIER TECH INVESTOR

ISSUE NO. 20 DECEMBER 2017

In this issue:

Why 2018 will be a tech investors' paradise

Eoin Treacy, Investment Director

"It is better to anticipate than to react."

Multi championship-winning basketball coach Bobby Knight

2017 has been an incredible year in the technology sector.

We have seen everything from genetic sequencing to immune-oncology, self-driving cars to wearable technology. We've gone from exploring space to venturing into the bowels of the earth for geothermal energy.

Of course, one market above all others has captured the imagination of investors: bitcoin and cryptocurrencies. They came from relative obscurity in 2016 to dominate headlines in every country in the world at the time of writing. To say that an 8,000% increase is impressive is an understatement and my friend and colleague Sam Volkering has been all over it. More about this exponential boom in just a moment.

Now, it's time to look ahead.

In the next 12 months, there are going to be a lot of exciting developments in our portfolio that are predictable in advance and we can put in the calendar right away. We can anticipate these moves and be sure we are in a position to capture the potential profits.

These are big events in the trajectory of development I've been expecting and importantly they could have major consequences for a number of positions in the portfolio. You are going to see a number of opportunities coming to the boil.

As a *Frontier Tech Investor* reader, you have the measurable edge of anticipation. Remember, you're not part of the herd. You have the advantage of investing early in breakthrough technology with world-changing potential.

So let's get right to it and look at what 2018 could have in store for us...

High times for the green rush

The US presidential election in November 2016 ushered in the controversial Donald Trump.

What a lot of people do not realise is that he shared the ballot with decisions on reducing or eliminating the prohibition on cannabis use. This is a hugely influential development that will last longer than Trump's four-year term.

California, Nevada, Maine and Massachusetts voted to legalise recreational cannabis use. On 1 January 2018 the ribbon will be cut on California's green rush with residential growing permitted and recreational use due to spike as stores open.

California has had medical marijuana laws for decades but the opening up of the market to recreational use is a major development. In January this year some students, in a moment of high jinx, draped some sheets over the Hollywood sign in strategic areas so it read *Hollyweed*. That set the tone for the rest of the year and it is now quite common to be driving down the street with the window open and to smell cannabis smoke.

For Terra Tech the opening up of recreational use in its home state could be transformational. The company is vertically integrated within the cannabis sector. It has its own growing operation, produces a line of edible products as well as the ubiquitous cigarettes and additionally specialises in selling the horticultural products necessary so you can grow your own cannabis.

The company has been expanding in Nevada following full legalisation there and will be rolling out a similar strategy in California come 1 January.

I'm on the board of a trust company in Nevada where we manage $600 million and right now we are talking with a number of groups trying to decide what to do with all the money they are making from the cannabis business. This is a still virgin territory and has room to become an industry as big as tobacco or alcohol.

This is a still virgin territory and has room to become an industry as big as tobacco or alcohol.

Think about that. This has the extreme growth potential of a frontier market – but in a mature, consumer economy. The sky is the limit.

Curing the US's biggest killer

Now let's look at the second investment in our portfolio, this time in the pharmaceuticals sector. Zynerba Pharmaceuticals has a number of key development releases scheduled for 2018. The share collapsed in July on disappointing results from a focal seizures study. It has been recovering over the last few months as further investigation has revealed the results were not as negative as originally believed.

And here's where the outlook gets far more exciting...

Addiction to painkillers is a major problem in the US. More than half of people who died from overdoses between 2001 and 2007 were chronic pain sufferers. If that is not surprising enough, one in six emergency room visits is opioid related. NBC have even referred to the situation as a "plague". To say that a new approach to pain treatment is needed is an understatement.

That is why we are still invested in Zynerba Pharmaceuticals – it is in prime position to surge on the back of this pain killer revolution. It has already seen encouraging results in its ZYN002 drug for osteoarthritis – an ailment that affects 30 million Americans. In a recent five-week phase one trial, ZYN002 beat the placebo.

The company is meeting with the Food and Drug Administration (FDA) in the first quarter of 2018 to discuss a phase 2/3 trial. On 3 December the company made very promising disclosures about its treatment of focal epilepsy for adults. Following that, in the first half of 2018, the company also expects to share information with investors about the open-label extension of the epilepsy trial where greater than 50% reductions in seizures were observed.

The race for life, the universe and everything

2018 is when the internecine warfare that has been making

headlines in the CRISPR community will finally be put to bed.

To summarise, it's east coast versus west coast, MIT/Broad Institute against University of California Berkeley and therefore Editas Medicine versus Intellia Therapeutics. What's at stake is ownership of the intellectual property behind one of the biggest advances in genetic editing in its short history. This is technology that has the power to unlock and redefine the building blocks of life itself.

The stakes – and the opportunity – could not be greater.

CRISPR-Cas9 removes massive obstacles to genetic editing, speeds up the process and reduces the cost. It has come from nowhere only a few years ago... to being used in just about every biotechnology lab in the world. That's exactly what researchers at MIT related to me when I visited their labs last year.

Early this year the US Patent Office gave the Broad Institute ownership of CRISPR-Cas9 for eukaryotic cells – which are all plants and animals. While the Berkeley Lab got ownership rights for all cells. That's a confusing difference in definition, which virtually ensured there would be additional court battles to iron out exactly who owns what.

This confusion may have kept some people away. But if you see through the short-term chaos, you can anticipate the outcome.

There is no doubt that CRISPR-Cas9 is going to be instrumental in delivering next-generation innovation in healthcare, and whoever owns the patents is going to be entitled to a slice of the revenues from whatever is developed. Therefore the stakes in this case are very high indeed.

Berkeley had until 22 November to file its response to the Broad Institute's brief. It usually takes about two months for oral hearings to be scheduled, so that takes us up to the end of January. And then it will be between four and six months before we get a clear written decision from the three-judge panel.

CRISPR-Cas9 has come from nowhere only a few years ago... to being used in just about every biotechnology lab in the world.

Considering the potential impact this technology could have on the world around us, I believe it is well worth your patience.

SolarWindow set to shine in 2018

Like many small-cap companies with a great idea and a development-stage product, SolarWindow has had to go to the market for additional capital in order to fund research and now commercialisation.

The biggest risk next year is likely to be an additional follow-on capital raise the company has telegraphed for Q2 or Q3 2018, which will be used to build out technical and production personnel, to purchase and install additional manufacturing equipment, and to buy raw materials and supplies.

That all points to a product launch sometime late in 2018 or early 2019.

This could be a huge year for the company as the solar revolution goes from strength to strength. As deals get closer and announcements of raised capital hit the financial newswires, SolarWindow could have a fantastic year.

Orocobre could double in 2018 as lithium continues to boom

The company has big expansion plans in 2018 with a stated ambition to double lithium production at the Olaroz facility in Argentina to 35,000 tonnes. The record high price of lithium carbonate is helping to fatten the balance sheet so that the company should have ample capital to fund that expansion from operations without having to go to the market.

The company is also set to construct a lithium hydroxide plant in Japan in partnership with Toyota Tsusho for the manufacture of lithium batteries. What that will achieve is to give the company both upstream and

downstream assets in the lithium sector representing one of the only pure-plays in the world already in production.

A "power-up" for AMD

The continued dominance of bitcoin in the cryptocurrency markets is not great news for Advanced Micro Devices (AMD). Why? Because its chips are used in Ethereum and related currency mining. However, the company has got a lot planned for 2018.

First off, the fourth quarter is by far the best for chip sales with the easy-to-anticipate Christmas rush well and truly in full flow. This is also when demand for gaming rigs is predictably on the rise. Its Ryzen chips offer competitive speeds compared to competitors and it is teaming up with Intel for the first time since 1980 to release a first-of-its-kind dual processor graphics card. It will be the first chip to boast the small intelligent bridge technology which allows the two chips to communicate faster, with less complication and therefore achieves smaller size.

The big upshot of this design will be to achieve thin, light, cool, quiet laptops with the power to rival any gaming PC. Because these chips consume way less power they will also have longer battery lives, which is a major issue for today's gaming rigs. The chips will begin shipping in Q1 2018 and could provide a lot of excitement around the company.

Bitcoin's year of truth

On 1 December the Chicago Mercantile Exchange and the Chicago Board of Trade both received permission to list bitcoin futures. This is a huge move towards the asset going mainstream. There has been speculation that this decision was forthcoming since the summer and that has been at least part of the reason behind the explosive rally in prices since then.

When I have traded bitcoin via spread-bets over the last couple of years, the minimum margin requirement has been somewhere in the region of 20% and increases to over 30% depending on the size of the position. For futures contracts where the positions are generally larger, the margin requirement of 35-40% is in line with bitcoin's volatility since 30% drawdowns are not at all uncommon. What that also means is that the return on investment (ROI) of trading bitcoin is quite high; in other words, the quantity required in the pay-to-play environment is quite high relative to other assets.

Nevertheless, introducing leverage to a cash market like bitcoin represents a pivotal event where the only recent analogue we have is the introduction of options to the Chinese stockmarket in 2015. Until then the majority of trades were dominated by retail investors and were cash settled, so there are some very clear parallels with bitcoin.

You can see what happened on the chart at the bottom of this page.

Addressing the chart: at the time there was also speculation that the arbitrage between the mainland listings and Hong Kong listings of the same company would disappear with the opening of the Shanghai-Hong Kong Stock Connect programme. That represented a reason for people to begin to buy shares, but the opening up of the options market introduced leverage to Chinese consumers for the first time. They jumped at the chance to make even more money. Additionally, the loose regulatory environment that prevails in China meant that there were some gross examples of misconduct at the corporate level where CEOs were engaging in pump and dump strategies at the expense of gullible investors.

The stockmarket index almost doubled in a few months of wild speculation and individual shares

did even better. That is until the crash when the government waded into combat some of largest abuses that were running the risk of damaging investor confidence irreparably.

Bitcoin has been surging higher on the expectation that a wall of fresh investment capital is about to hit the market when futures begin trading. That is probably going to be true and could contribute to significant additional upside where some of the most fantastic predictions are realised.

However, it is also worth considering that the cryptocurrency market is completely unregulated and no circuit breakers exist. There is no "fail-safe" for cryptos. The potential for profound volatility as a result of the introduction of hedging and shorting to the market is a very real prospect particularly following an accelerated move.

The higher bitcoin rises and the more people that are drawn into owning cryptocurrencies, the greater the call for regulation will be when we get the next big "correction". After all, we have seen bitcoin fall by more than 50% in the last couple of years alone and it could do so again.

The three broad consistency characteristics of the market are:

1. Bitcoin is prone to outsized upside surges.

2. These are usually followed by short, sharp reactions.

3. The pullbacks have tended to find support in the region of the upper side of the most recent significant trading range. The most recent important prior peak at the time of writing is at $8,000.

As long as bitcoin is following this rhythm of breakout, pullback and consolidation with ranges one above another there will be nothing to worry about. When it diverges from that pattern it will be time to watch out for signs of deterioration.

New themes for 2018! Exploring the micro-universe

The one thing I've wanted to write most about in 2017 but regrettably have just not got around to, what with so many exciting stories competing for my attention, is the microbiome.

It's a story that's all about inner space but unfolds into an epiphany for how we perceive the world and what's going on in it. We spend our whole lives wondering, thinking and trying to make sense of the outside world and where we fit into it. We look around at people, plants animals and everything we as a species have created, from the wonderous to sometimes disastrous ways in which we have moulded the world around us. I marvel at the ingenuity of humanity and our ability to survive in myriad environments. We are now even talking about leaving this planet to explore deep space.

However, there is another world we hardly spare a moment to think about until something goes wrong with it. The human body is home to trillions of bacteria, fungi and viruses and without them we would be unable to function. In fact, each of us carries around 2.5lbs of them. That's a lot of bacteria when you consider they are microorganisms. The human race is expected to hit peak population of around 12 billion people sometime this century but our bodies are home to trillions of microorganisms. A handy way to think about the role they play in our lives is they have much the same effect on their environment that we do on ours.

The human microbiota consists of 10-100 trillion of symbiotic microorganisms (including bacteria, fungi and viruses) that reside in every person and mostly hang out in our guts. Here's where it really gets to be fun. We share about 8% of our microorganisms with other people. The other 92% are individual to us in one regard or another which means our individual microbiomes are as unique as we are.

If you want to think about

> The number of neurons in the gut is greater than in the spinal column at about 100,000,000 so it is often referred to as the second brain.

overpopulation the number of bacterial cells alone are thought to outnumber the body's own cells by a ratio of ~3 to 1.

The number of neurons in the gut is greater than in the spinal column at about 100,000,000 so it is often referred to as the second brain. The 1,000 different species of microbe in the gut, lung and other areas, (including skin and hair), with close to 7,000 different strains, or subtypes, found in the gut alone means that the second brain is dealing with a political balancing act that makes Theresa May's negotiations at home and abroad look like child's play. The colonies of inhabitants that call our gut home have an inordinate effect on our everyday health.

Many of those colonies are responsible for key biological processes, most notably digestion and immune function. The gut microbiome is especially important in efficiently digesting complex carbohydrates in the diet. Many polysaccharides and oligosaccharides are broken down by enzymes produced by the microbiome rather than those produced in gut tissues.

Here is a brief section from a report from Cowen and Co I read recently:

> *The gut microbiome is also key in producing certain vitamins such as some of the B complex vitamins and vitamin K. It also important in the conversion of primary bile acids to secondary bile acids, which are key in lipid digestion as well as metabolic regulation.*

> *Given the surface area of the gut is approximately 3x that of the lung and 150x times that of the skin, it is unsurprising that the gastrointestinal tract is a key organ in immune regulation.*

> *The interaction between the immune system and the microbiome is thought to be key in the development, regulation and overall function of the immune system and immune-mediated inflammation, especially locally. When the human microbiota are dysbiotic, the body can be left more susceptible to infections, metabolic disorders, allergies, autoimmune disease, inflammation and other conditions.*

I've got a couple of different microbiome investments lined up that are ripening but not yet ready. When they are I will be writing to you in more detail about the microbiome and how understanding and harnessing its potential will be vital for all of us.

The automation revolution sets sail

A year from now Norwegian firm Yara in conjunction with Kongsberg are due to launch the first fully electric and autonomous container ship on its maiden voyage. The news is regularly filled with stories about how soon we are likely to see the fully autonomous electric vehicles on our roads, but the reality is land-based travel is complicated.

There are a lot of moving bodies that a vehicle could bump into and they are all travelling at different speeds. It makes the job of trying to figure out how to negotiate a path around them quite challenging.

Sailing and flying are infinitely easier to develop autonomous vehicles for because quite simply there are fewer things to bump into. Once a ship is out at sea there are potential obstacles such as other ships, icebergs and islands but they are few and far between while ships tend to move considerably slower than cars or trucks. For planes, once sufficient altitude has been reached, and airspace apportioned there isn't much to bump into other than other aircraft and mountains. The smaller number of potential obstacles and the relatively predictable trajectory of the known issues makes it simply easier to develop autonomous systems for ships and planes.

Autonomous ships are likely to be the first sector we see true autonomy delivered and it will give us an immediate perspective on what will happen to the workforces, primarily Filipino sailors, who will be impacted.

Autonomous ships are likely to be the first sector we see true autonomy delivered

We read constantly about the conundrum of what all the truckers and drivers are going to do when their jobs are automated away, but in 2018 we will get a real-world view of how that might play out in the shipping sector.

Of course, there are also going to be the lower costs that come along with getting rid of the workforce. Goods will be transported more cost effectively and that will help to contain inflationary pressures and to lower consumer prices generally.

However while drones and ships are already in large part autonomous, 2018 is also going to be big year for autonomous vehicles. California is about to allow fully autonomous vehicles to navigate the state's roads. I expect to be writing to you about it in June when I'll have a phone at the ready to snap a picture of the first one I see.

California is often regarded as a testing ground for new laws especially in the technology sector so the success of the autonomous vehicle experiment here in 2018 is likely to have far reaching effects for how the law will be shaped for the entire country and possibly even the world.

Cleaning up the ocean is going to get serious in 2018

I decided when I finished university that I was going to dive all the world's major sites before the coral was bleached and the big pelagics, like sharks and swordfish, had been fished into extinction. I also knew that if I didn't do it before I got married, my ambitions would be curtailed for a couple of decades whenever I had a family. So, every time I had holidays built up I'd head off to explore the waters of South Africa, Mozambique, Sudan, Egypt, Thailand, Myanmar, Australia, Costa Rica, Ecuador, Colombia and Mexico.

They've been some of the best trips I've ever had and I've met countless interesting people and seen truly inspiring natural events. I've snorkeled with scores of manta rays. I've hung out with oceanic white tip sharks at a cleaning station. I've dived with so many hammerheads that they blocked out the sun. I got out of breath trying to keep up with a giant whale shark as it cruised past. And I've hunted with a pack of white tips as they ambush food at night. I've collected the teeth of ragged-tooth sharks as they fell out of their mouths in real time. I've watched harlequin shrimps feast on the leg of a starfish. I've watched capelin use a turtle's shell as a scratching post and I've searched for nudibranchs in the hulk of World War II wrecks. One of the most memorable events I have seen was in Myanmar when I witnessed a group of cuttlefish mating. I've never seen a colour display like it before or since.

In all that travel I can personally attest that when you arrive in the waters of just about any ocean, what you see is trash. No matter how remote, there it is. It's everywhere and it's a menace for sea life. The ocean is the bread basket of the world. We depend on it for sustenance and fertiliser for our crops, as well as being a rich source of biodiversity.

Filling it with trash, chemicals and carbon dioxide is not exactly a smart idea but it is all but irreversible, considering the relentless pace of human development. Some steps are being made and at least trash is both visible and understandable.

You will probably have heard of the microscopic garbage patches that have formed in the world's oceans. This has happened because plastic eventually degrades in ocean water and the microscopic particles left over are swept up in the ocean's currents. The patches are invisible to satellite imagery and were discovered by taking water samples. If the patch were one physical cohesive mass it would be relatively easy to eradicate, but it isn't. The patches of concentrate plastic particles are thousands of miles wide and will required massive filtration to clear up.

The Ocean Cleanup tested its first

When you arrive in the waters of just about any ocean, what you see is trash. No matter how remote, there it is.

filtration arm in the North Sea and it failed because it used anchors to attach it to the seafloor. Its newest version, which is designed to float with the currents, is expected to be deployed into the Great Pacific Garbage Patch in early 2018. That will mark the beginning of a global venture to get serious about cleaning up out oceans that we can all get behind.

As an aside, I think diving with sharks gave be firsthand experience of the difference between the perception of risk and the reality. Personally, I consider mountain biking much riskier than shark diving because the risk is harder to quantify. I would encourage you to also look into your own experience with risk and how you approach it as a way of discerning where risk is truly present and where you perceive it to be present.

The dawn of the holo-lens

Watch out for Red's Hydrogen in 2018. Don't worry if you've never heard of Red, you probably have no reason to be familiar with its work. Red is not a traditional phone company; it is better known for cameras, but not just any cameras. Specifically, the kind of cameras it makes are used in producing movies like *Transformers*, *The Martian* or *The Hobbit*. It is at the cutting edge of video cameras, and through modular designs it has enabled filmmakers to produce 3-D movies which you've probably seen in the cinema. The 6K, for example, costs in the region of $49,500 so it's not exactly for hobbyists.

In 2018 Red will be entering the market with a phone of its own and the pre-purchase price cost is around $1,600.

What's so special about the new Red Hydrogen? Well, it's been pretty hush hush with the details. It will be available in titanium. It will have the same modular design so expect to see a snap-on lens etc. It will have a 5.7-inch screen, front and back cameras, run Android, have a micro SD slot, headphone jack and will be able to serve as a touchscreen control for its other cameras. However, the big claim to fame is not what it has in common with other phones but that the Hydrogen phone will have holographic capabilities which it is naming 4-View.

That name comes from the fact the halographic effect the phone is capable of rendering is derived by using four different cameras which aim light at different eyes like we have with 3-D today. With four cameras you will be able to look around the images and they will be able to move. You won't even need glasses.

2018 is going to be the year of holographic displays and the programming world will never be the same again. The modern era is all about user engagement. Emoticons, emojis and animojis are all designed to grab our attention and add novelty to the texting experience. Holograms will take that to another level but the technology has real potential to scale so the future of a computer screen will be a lot closer to what Tom Cruise used in *Minority Report* than we might imagine.

Right now, we are confined to a 2-D online experience but with holograms we will have new ways of engaging with one another and perhaps more importantly, new ways of shopping. It's all well and good to go to a site and see a rotating photo of a product. It's quite another to see a realistic 3-D rendering or a picture of your avatar wearing the item.

A big debate in the upfront display sector over the last few years is whether holograms or virtual reality would eventually win out. At present HTC/Vive, Sony and Oculus all have virtual reality systems in the market and they are all working on even better iterations for 2nd generation systems. However, the problem they have in growing is the system requirements to play the games. The consoles/ PCs together with the headsets and controllers are not cheap, and output of games has been less than stunning. The cost obstacles should come down with scaling but it is still a problem today.

2018 is going to be the year of holographic displays and the programming world will never be the same again.

At the same time, Microsoft has pioneered the HoloLens and

expects it to be a useful tool for industry and design teams, but it is still tethered to a headset which has been an obstacle to wide uptake. The problem for both virtual reality and HaloLens is that they have so far not discovered the killer product they are perfect for. There is no burning need to own either right now even though the potential for future innovation is pretty incredible.

I love visiting London, walking the city streets, meeting the people and sampling the foods, not least the steak and short ribs at Hawksmoor, but I find as I get older the jetlag is really taking a toll. I'm looking forward to the when we can do our first virtual reality or holographic conference or seminar in real time. That will also remove the expense for subscribers of coming up from Devon or down from Sheffield. It's not difficult to see how mixed reality is going to be transformative for the events sector. It will be equally transformative for the retail and entertainment sectors.

Holograms on your phone have the potential to capture the public's imagination in a way that has not yet successfully been achieved with virtual reality so this is going to be a space to watch closely.

The Gene Genie

Half of all people diagnosed with heart failure die within five years. A lot of the reason for that is because of a lack of suitable donor hearts. Traditionally only hearts from braindead donors were used for heart transplants. However now hearts that would have been declared unusable by the Donation after Cardiac Death (DCD) system are being revitalised by a new system called the Organ Care System, produced by privately held TransMedics.

The NHS has adopted the machine and has had such success that other countries are now looking at following course. Here is a section from a recent article:

> *"We're delighted. It's a phenomenal program and such a fantastic operation, because you've got people with complete, end stage heart failure, and it can bring them back to their normal form," Papworth Hospital cardiothoracic transplant registrar Simon Messer told The Independent. "The rest of the world is interested because they've seen our results, and the patients with us who have survived."*

Waiting times for heart transplants are expected to by 40% as a result.

However, while this is certainly encouraging, transplants are not an ideal solution. The process will always be reliant on tragedy for an organ and the drugs required to ensure it is not rejected come with significant side-effects. That is why gene therapy is promising.

Roger J Hajjar and his team at Mount Sinai hospital in New York treated 13 pigs with severe heart failure with a gene therapy that saw improvements of between 20% and 25% in heart function. The size of the hearts also shrank by 10%. The treatment focuses on reducing phosphatase-1 in the heart (when present in abundance it restricts the ability of the muscle to contract).

The good news is that these results are positive enough for human trials to begin in 2018. The ultimate aim of the research, is to significantly improve heart function with a single shot. That means no need for donors, surgeons or transplant drugs. Of course, that shot will be expensive to begin with but the cost should decrease over time.

This is yet another example of the accelerating pace of innovation in the biotechnology field which might have taken decades to get to this point but is now increasingly of commercial utility. 2018 is almost certainly going to throw up a number of new investments in the healthcare sector.

As investors, we're always anticipating. We're always looking ahead. I think you can see that the next 12 months promises to very exciting time to be on the tech frontier. And I'm looking forward to sharing these opportunities as we go along.

A chart-busting 2018

Sam Volkering

2017 was a monumental year for cryptocurrencies. It will mark the moment in history when cryptos made the journey from relative obscurity to breaching public consciousness.

We have seen some outrageous climbs. Can 2018 possibly be any bigger? Well, the most important lesson I have learned in the seven years I've been investing in cryptos is this: there are no upper limits.

I'm not kidding. NXT is currently sitting on a gain of 2,605233% since its initial coin offering (ICO) in September 2013. Imposing any limit to growth in this market serves no purpose. I'm simply looking ahead at where the surges could be coming from.

Here's what I'm anticipating...

1. Ethereum builds its Metropolis

This is possibly the biggest advance in crypto we've ever seen. To give it some context it would be like the jump from hammered coinage in the 17th century to tap & go technology through your mobile banking app today.

Except rather than taking around 400 years, this development is likely coming in just one.

Ethereum's roadmap has always been a four-stage process. The first stage, Frontier, is what we got on the launch of the Ethereum main net. Then the development would move to Homestead. And this is the Ethereum that most people know of today as it's the stage we've been in through most of 2017.

But the next step is one of the biggest. And it calls it Metropolis. Within the Metropolis release it will come in two stages, Byzantine and Constantinople.

Right now we're in the midst of the Byzantine implementation. And then with Constantinople we will have Ethereum Metropolis.

But why is this so significant?

The biggest upgrade is what's known as zk-SNARKs. This stands for "Zero-Knowledge Succinct Non-Interactive Arguments of Knowledge".

But what it really means is a massive privacy upgrade to the Ethereum blockchain thanks to tech from privacy-focused crypto, ZCash.

This will enable someone to verify (prove) to someone else they posses certain knowledge without actually having to tell them what that knowledge is. It's an incredibly complex update but one which could see the Ethereum blockchain explode as commercial giants of industry migrate to the Ethereum blockchain main net.

They would do this because they can then transact and operate on the Ethereum blockchain without having to divulge sensitive information like suppliers, clients, trade secrets and other intellectual property.

Also, Metropolis will include early stages of the switch from proof-of-work (PoW) to proof-of-stake (PoS). This early release will show whether or not Ethereum can actually operate as a PoS crypto.

That would mean no more "miners" but "stakers" on the network. This alone has the potential to create a huge supply-and-demand opportunity as the value of stakers on the network is based on their holdings of ether (ETH) not their ability to run millions of pounds' worth of mining equipment.

Shifting to PoS alone could see the price of ETH and a whole host of Ethereum-based crypto skyrocket.

Metropolis could be the single biggest catalyst for the cryptoconomy to take off even higher and harder than we've seen in 2017.

2. Bitcoin + Ethereum = BOOM

Whatever you can do, I can do better.

We all now know that one of the benefits of the Ethereum blockchain is the ability to run "smart contracts". These are effectively automated programs that deliver a certain outcome when certain conditions are met.

For example, you say that result A is going to happen. I say it will be results B. We use a smart contract to pay out an amount of ETH we contribute into it on the outcome

of A, B or even possibly, C, D, E, F and G. Smart contracts can be programmed to enable extremely complex decisions – and have it fully automated, transparent and immutable.

Well what if we could do smart contracts on bitcoin's blockchain?

Well it's quite possible that we will be able to. There are a number of projects developing smart contract technology for the bitcoin blockchain. One of the leaders in this field is Rootstock (RSK).

This creates a complimentary blockchain pegged to bitcoin that is secure and can scale while retaining the decentralised nature of bitcoin. As crypto pioneer and one of the original developers of crypto technology Nick Szabo puts it,

> *Best of Bitcoin (currency and settlement system) + best of Ethereum (smart contract programming environment)*

Rootstock and the development of smart contracts with bitcoin could open up the potential of bitcoin multiple times over. And it could also see another crypto ICO boom. What we saw happen with ERC20 (Ethereum compliant) ICOs in 2017 we could see with bitcoin in 2018.

3. China and the world unwind

The headwinds against the major cryptocurrencies like bitcoin have been strong. And when it comes to smaller cryptos and ICOs the headwinds have been like a hurricane.

Most major governments and central banks around the world have come out to warn investors of the danger. Wall Street heavyweights are in on the condemnation too.

It's a bubble. Tulip mania. Wild West. Fraud. Scam.

These are what you'll often hear from the global elites. It's what you'll read about in the papers. It's what you'll see on the nightly news.

But it's really just a gross misunderstanding of what cryptocurrencies are and what they stand for. But already towards the end of 2017 we're seeing a shift in the global mentality of the opportunity that's in play.

The focus in the mainstream is almost solely on bitcoin. The huge "price" climbs make for tasty headlines. It's easy for a central banker or Wall St. "fundie" to get comment on bitcoin.

But they never really take the time to understand the mechanics behind it. They haven't yet taken the time to investigate the deeper movement happening. They don't see the immense innovation and development in the broader cryptoconomy.

However, they will. They'll get there. And they'll fast understand this is no fraud. There's nothing happening other than a rebuilding of the global financial system in a better, fairer, safer way.

And they'll want to capitalise on these developments and innovation. Even central banks will figure out a way which they can leverage cryptocurrencies for themselves to perhaps operate in a better way.

In our view it's going to come via major central banks relaxing their tough stance on crypto as they figure out it's not a danger. But in fact it's an opportunity for their citizens.

And we think China's got the capability to make a move in this direction first. We've seen the resilience of crypto in the current environment with all the headwinds against it.

Imagine what's going to happen when those headwinds, become tailwinds.

When the minds of central banks, government and Wall St. support the development of the cryptoconomy. Think about what's going to happen across the whole cryptoconomy when it has the backing and support of those who once condemned it.

We think that crypto will gain global legitimacy in 2018 and see a boom that will leave 2017 for dust. 2018 will be the year that sees it all really take off. And it's going to be right now that you'll want your slice of the action. If you wait till the end of 2018, then you may very well miss the boat.

It's not too late now. In fact it's perfect time to get involved if you've been waiting on the sidelines. But wait too long... well that's your decision to make. But whether you're in or out, you better make that call fast.

2017 was big. 2018 is going to be a chart-buster.

Data as of 06/11/2017

Energy

Company	Ticker	Rec Date	Price Then	Price Now	Gain/ loss %
Orocobre Ltd	ORE. AX	07/04/16	A$ 2.92	A$ 6.18	111.64
Ormat Technologies	ORA on NYSE	06/06/17	$58.79	$63.39	7.82
Smart Meter-ing Systems	SMS LN	03/10/17	735.5p	775p	5.37

Technology

Company	Ticker	Rec Date	Price Then	Price Now	Gain/ loss %
Cyberdyne	7779	30/05/16	JPY 2,353	JPY 1,544	-34.38
IBM	IBM LN	07/06/16	$153.33	$156.46	2.04
SAIC	SAIC US	05/07/16	$58.20	$72.23	25.82
Garmin	GRMN US	02/08/16	$55.75	$60.85	9.15
2U INC	TWOU: US	06/02/17	$33.25	$58.58	76.18
Cisco Systems Inc.	CSCO: US	03/04/17	$33.80	$37.72	11.60
Advanced Micro Devices	AMD US	26/07/17	$14.76	$10.03	-32.49
Microsoft	MSFT	31/07/17	$73.04	$81.08	11.01
Northrup Grumman	NOC US	06/07/17	$301.66	$300.56	-0.43

Medical

Company	Ticker	Rec Date	Price Then	Price Now	Gain/ loss %
Terra Tech Corp	TRTC	11/10/16	$0.41	$0.23	-43.86
Autodesk	ADSK	19/07/17	$108.83	$107.95	-0.81
Abcam	ABC	07/03/17	907.5p	986p	8.65
Zynerba Phar-maceuticals Inc	ZYNE: US	03/04/17	$20.10	$13.37	-33.48
Illumina	ILMN	04/09/17	$207.15	$213.45	3.01

Moonshot

Company	Ticker	Rec Date	Price Then	Price Now	Gain/ loss %
SolarWindow	WNDW	07/04/16	$3.96	$5.05	27.53
Alkane Resources Ltd	ALK: AU	05/09/16	AU$ 0.31	AU$ 0.34	11.48
Editas	EDIT: US	07/03/17	$21.02	$27.76	30.45
Haydale Graphene Industries	HAYD	02/5/17	178.5p	120.50p	-32.49

For the full portfolio including live prices, please visit the *Frontier Tech Investor* subscriber area. **You can view that by following this link.**