The Empire Club Presents

VERN BROWNELL, CEO, D-WAVE SYSTEMS INC. & JAMES OLSON, DEAN, APPLIED SCIENCE, UBC

WITH: **FORGING PARTNERSHIPS TO SHAPE THE FUTURE: COME LEARN HOW QUANTUM COMPUTERS ARE TRANSFORMING THE FUTURE AND THE FUTURE OF ENGINEERING**

Welcome Address, by Barbara Jesson, President of Jesson + Company Communications Inc. and President of the Empire Club of Canada

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March 6, 2018

Good afternoon, ladies and gentlemen. From the Royal York Hotel in downtown Toronto, welcome, to the Empire Club of Canada. For those of you just joining us through either our webcast or our podcast, welcome, to the meeting.

Before our distinguished speakers are introduced, it gives me great pleasure to introduce our Head Table Guests. I would ask each guest to rise for a brief moment and be seated as your name is called. I would ask the audience to, please, refrain from applauding until all of the Head Table Guests have been introduced.

HEAD TABLE

Distinguished Guest Speakers:

Mr. Vern Brownell, Chief Executive Officer, D-Wave Systems Inc.
Dr. James Olson, Dean, Faculty of Applied Science, University of British Columbia

Guests:

Ms. Georgina Blanas, Executive Director, PCMA
Mr. Thomas S. Caldwell, Chairman, Caldwell Financial Ltd.; President, Urbana Corporation
Ms. Lisa Cheng, Founder and Head of R & D, Vanbex Group
Ms. Vivien Clubb, Head, Communications and Marketing, IBK Capital Corp.
Mr. Alex Graham, Managing Director, Global Investment Banking; Head, Communications, Media & Technology, RBC Capital Markets
Mr. Philip Grosch, President, Treble Victor Group
Mr. Lance Hooper, President and Chief Operating Officer, Cobalt Blockchain Inc.
Ms. Veronica Knott, 4th Year UBC Mining Engineering and Mineral Processing Student; 2017 Gold Medal Student Award Winner; Barrick Gold Corporation Intern, Hemlo Mine Site
Mr. Don Listwin, Director, D-Wave Systems Inc.; Director, POET Technologies Inc.; Director, Teradici
Mr. Rob McEwen, Chief Owner and Chairman, McEwen Mining Inc.; Founder, Goldcorp Inc.; Founder, McEwen Centre for Regenerative Medicine
Dr. Gordon McIvor, Past President, Empire Club of Canada
Mr. Thomas R. Mika, Executive Vice President and Chief Financial Officer, POET Technologies Inc.
Mr. Randall Oliphant, Director, New Gold Inc.
Mr. Ian Russell, President and Chief Executive Officer, IIAC
Dr. Jay Smith, Vice-President and Senior Portfolio Manager, CIBC Wood Gundy
Mr. Suganya Tharmalingam, Managing Director and Chief Financial Officer, Kensington Capital Partners Limited

Dr. Suresh Venkatesan, Chief Executive Officer, POET Technologies Inc.
Mr. Mike White, President and Chief Executive Officer, IBK Capital Corp.
Mr. William White, Chairman, IBK Capital Corp.; Director, Empire Club of Canada
Ms. Debbie Woo, Senior Director, Development and Alumni Engagement, Faculty of Applied Science, UBC

My name is Barbara Jesson. I am the President of Jesson + Company Communications and the President of the Empire Club of Canada. Ladies and gentlemen, your Head Table.

We are also very pleased to welcome a group of students from the University of British Columbia and Ryerson University and Centennial College. Students, please, rise and be recognized. We are so pleased to have you with us.

Many people make New Year's resolutions to lose weight, exercise more or learn a second language. My commitment this year was to learn, finally, something, at least generally, about quantum physics and quantum computing. No laughing, please. I am nothing, if not determined, and I have been reading, but so far, I have not been doing too well. I was particularly delighted to learn that I would be hosting this lunch, today, not to put too much pressure on our guests, but I am really counting on you for an aha moment.

You may be asking what brought me to this rather ambitious undertaking. It probably started with a feature article I read about a year ago in the Economist. The editorial suggested that after years of theoretical discussion, mind-bending quantum effects are about to power mainstream innovation.

They talked about a bathing cap that can watch individual neurons, allowing others to monitor the wearer's mind; a sensor that can spot hidden nuclear submarines; computers that can discover new drugs, revolutionize securities trading and design new materials; a global network of communication links whose security is underwritten by unbreakable physical laws. All of this is, apparently, the promise of quantum technology, and it is just around the corner.

I suspect that if you are in the room, today, you are more informed than I am, but, for the lay reader, at least until recently, quantum physics has been weirdly confusing. We have been asked to give up our ideas of time and embrace a universe based on probabilities rather than certainties. Again, I am possibly the only one here, today, struggling to understand how the act of measuring something changes the measurement or to comprehend that particles are neither here nor there, but, until pinned down, they are in both places at once.

I am noodling around notions of entanglement in qubits, not that I expect I am ever going to have to be an expert on this—good luck with that—but I do think that a basic grasp of the theory is going to be critical to living and working in the 21st century.

The article in the Economist that fostered this curiosity, for me, also talked about a Canadian company called D-Wave that began selling the first commercially available quantum computer in 2011.

With us, today, is Vern Brownell who joined D-Wave as CEO in 2009, leading the company through its transition from research into the leader in the development and delivery of quantum computing systems and software. During his tenure, D-Wave secured its first customers, including Lockheed Martin, a former client of mine, Google, NASA, and Los Alamos National Laboratory, and raised over $170 million in venture funding. Mr. Brownell joined D-Wave from Egenera, a pioneer of infrastructure virtualization, the company he founded after serving as the Chief Technology Officer at Goldman Sachs.

Joining him is Dr. James Olson, Dean of the Faculty of Applied Science and a professor of mechanical engineering at the University of British Columbia. Dean Olson spearheaded a number of initiatives aimed at transforming engineering education in the 21st century, including efforts to enrich diversity, student work experience, and business leadership and entrepreneurship programs. A Fellow of the Canadian Academy of Engineering and the recipient of multiple research awards, Dean Olson also served as Interim Director of the Institute for Computing, Information and Cognitive Systems at UBC.

Gentlemen, we are delighted to welcome you to our podium. I am counting on you for enlightenment. First to come forward will be Vern Brownell.

Vern Brownell

Thank you, Barbara. Thanks to the Empire Club and the organizing committee. It is a pleasure to be here. I have 12 minutes to describe quantum mechanics, quantum physics to you, so I am going to go really fast and dive in.

Something really interesting happened at the beginning of the 20th century. Physicists and scientists recognized that the theories that they had regarding how the universe worked were completely wrong. They had thought that everything worked on a very deliberate, so-called classical set of mechanics and, actually, what great scientists like Schrödinger and Max Planck have found is that the world really operates on something called quantum physics. It really is the set of laws that govern the universe at this point and forever.

First, Max Planck, German scientist, discovered this back in the late 20th century. Then, the next step was Erwin Schrödinger developed a really rich set of equations to describe how quantum mechanics worked. Then, Einstein, who was actually a little bit skeptical in the beginning signed on and became a real contributor to the field of quantum mechanics.

Then, if we fast forward to 1981, a gentleman named Richard Feynman, Nobel Prize winner from the States, conjectured that if you could build a computer that could use directly the properties of quantum mechanics, that it could provide you with unprecedented performance and be able to solve problems that you could not with a plain old computer that used classical physics. It was really this intuition, it was at a talk that he gave in 1981, that started the race to build the theory and the implementation around quantum computing.

If we fast forward 37 years, here we are: Quantum computing is in the news. It is all over the place. You have probably seen a lot of it. We have got Morgan Stanley, the big investment bank, covering it as one of the most important technology innovations. It is on the front page of the Economist. Google, IBM, Intel, all have robust quantum computing efforts. This news is blossoming all over the place. Some of it is even fake news. China has built the world's first quantum computer, and it is 24,000 times their competitors'. That is not true at all, but that is the way the media works. Sometimes there are falsehoods in there.

We are very excited to be in the middle of this storm. We, as a small Canadian company, we believe we are actually the leader, worldwide, in quantum computing. We are the first company, as Barbara mentioned, that has built commercial quantum computers, and we believe we have a significant lead over any of the competition. It is also fun for us to be here with the folks from UBC. We actually were formed at UBC. We were not quite technically a spinout of UBC, but we have had a long heritage with them and many of our folks have come from there back in 1999. We have been at this for almost 20 years. I think the fruits of that labour are starting to show.

The reason why quantum computing gets so much attention, I think, is fairly simple. Classical computing that we have all enjoyed, that has dramatically improved our lives and brought us this amazing power that we enjoy every day, is running out of gas, because of Moore's Law. Gordon Moore put together this set of laws, really, an observation on how the semiconductor industry grows and how the power of computing would grow over time. We are now approaching the end of that, largely because the line widths in these semi-conductors are getting so small, and the power consumption of these semiconductors that drive our data centres today are just completely overwhelming our ability to use that much power. You see data centres being put next to hydro-electric plants, for instance.

Quantum computing has the promise of providing a radically different approach. It is not focused on all of the problems in computing, but problems that are very, very complex. Computer scientists know these as NP-hard problems. If you look at the graph on the right-hand side here, classical computing performance, I think, will grow at a modest rate over time, but you are about to see this inflection point in quantum computing where it is going to surpass the capability of classical computing for these types of very hard problems.

I characterize it as we are very close to that crossover point, today. In fact, D-Wave has demonstrated—and our customers have demonstrated—that we can outperform the best of what classical computing does in what are called synthetic problems or benchmark problems. We are about to show that same advantage in real problems that show real return on investment for customers. Once that happens, quantum being more powerful than classical computing in a domain of applications, is going to be one of the most exciting things to happen in the computing industry for a very long time.

Let me talk briefly about what a quantum computer is. Barbara touched upon a little of this. Every quantum computer uses something called a qubit, a quantum bit. A quantum bit can be in 0 or 1, like a digital bit, the building block of classical computers, but it can also be in the superposition of 0 and 1 at the same time. This is a very hard concept for us to grasp, but it is an object, a bit in this case, that is in two states at the same time. That is a powerful capability that allows us to build these quantum computers that tap into the nature at this fundamental level.

The problem with quantum computing and why it is difficult to build is it requires a fairly extreme environment. To protect these chips that we build, you have to have a very exotic environment, with a very, very low temperature, 180 times colder than interstellar space. This is shielded with dozens of shields around it to create this magnetic vacuum in a very low-pressure environment. These environments that our system has inside of it are among the rarest, coldest, most pure environments in the universe, unless there is other intelligent life in the universe that we do not know about. That is why it has been hard to develop these quantum computers, and you are just starting to see them today.

This is our quantum processor. It looks like a chip. It is about the size of your fingernail, very similar in the way it is built as all semiconductor chips are, but it is a superconductor.

It runs down at these incredibly low temperatures. Really, what this is all about and the most important part of quantum computing is its capability to solve these very hard problems. These problems exist in every business in every industry. The way we sort of characterize the problems is broken down here. The impact for quantum computing will be in machine learning and something called 'sampling', which is drawing samples from a probability distribution, optimization, optimizing routes and logistics and things like that, and in material science, so in those four categories.

The three first categories, machine learning, sampling and optimization, are applicable to almost any vertical. Let me go through a couple of examples of applications that might help illustrate some of this. The first one is some work that we did with Volkswagen. This was done in Germany with a team from Volkswagen Research. The challenge there was to develop an optimization technology that would allow Volkswagen to optimize the routes for taxi cabs in Beijing.

Those of you who have been to Beijing know that this is a problem. They basically had this public domain data from taxicabs in Beijing and they built, together with us, an algorithm to run on the quantum computer to basically tell an individual taxicab driver to take a different route to smooth out all this traffic. They did this on the D-Wave computer, and the results are shown here. This is kind of a heat map of what the traffic typically looks like. On the right-hand side, you will see a flattened-out map where the heat map shows that the traffic routes are much less, or the traffic is much less. This

was a test of whether this kind of technology could be of use in a production setting into the future. I believe Volkswagen has the intent of offering this as a service down the road, but this was a successful proof of concept, and it outperformed the techniques that they used to do this kind of optimization typically with Volkswagen. That is one example.

Another example, which is a bit fun, is with a partner of ours called QxBranch, and they used our quantum computer to simulate election modelling to do statistical analysis of an election. They picked an interesting election that just finished, which was the 2016 presidential election in the States. You know that most of the models were wrong. In fact, some of them had 99% chance of Hillary Clinton winning over Donald Trump.

The question is Where did these models go wrong? And could you build a model that would outperform the best of what these experts had built? This company, QxBranch, which is a partner of ours, set about building a machine-learning application using our quantum computer, to train a model to understand the dynamics of the election results in the U.S. Of course, they had the data that they could train these models.

They built this, and the result is they found that they were able to learn structure in the polls at least as well as FiveThirtyEight—this is Nate Silver's company, which is among the best in this sort of polling analysis, so they built this model. They found that it performed quite well, and it gave Trump a much higher likelihood of winning the election overall. Of course, the proof is in the pudding in whether this will be useful in future elections, but it was a very promising result. The company, QxBranch, really felt good about their model.

Those are just two very brief examples. There are hundreds of others that I would love to talk to you about. Quantum computing is going to change the world. It is not necessarily going to replace all of classical computing, and I think it is really going to be used in conjunction with classical computing, so classical computing and quantum computing, in a hybrid approach. Most of those resources today, from a classical point of view, are put in the cloud. The cloud is a very logical place to put quantum computing resources, and our goal is to provide these quantum computing resources to the world through the cloud, just like classical computing resources as well.

What that will bring is, I believe, better answers and faster answers, more accurate answers, and a better return on investment for companies that eventually wind up using quantum computers. But the exciting thing is, if you think about it, there will be a class of applications that you could not address any other way, unless you have a quantum computer, because there are computing problems out there that are very significant that are only addressable by quantum computers.

These could be things like modelling climate change into the future or developing better cancer drugs, things like that, things that are very impactful in human-scale problems.

Down on the bottom, you probably saw some applications that we have already worked on and for which we have early

results. We call them ‘proto applications’, applications that are using this kind of capability.

To finish up, I really like this quote from Max Planck. He says, “When you change the way you look at things, the things you look at change.” I think this is really true of quantum computing. It is a completely different tool. We want to put this in the hands of researchers, developers and business people around the world, so they can take advantage of this computational capability and improve their businesses and find the problem sets that are going to take them to the next level. Again, these are human-scale problems that I think are very important.

I am looking forward to the upcoming years when we are able to demonstrate this technology to the world and we continue to make progress in our business and find these applications that have wide-scale impact and big success. As a small, Canadian company, we are very proud of what we have done. D Wave, I believe, is one of the most important technologies in the world. It has just been a real honour of mine to be part of this company and see the progress that we have made, as a company. We have got a lot more to do and look forward to telling you about that another time.

Thank you.

James Olson

Thank you. Well, I have to say, I am absolutely thrilled to be here. Thank you so much to the organizing staff. Thank you, Bill and Wayne, for inviting me to give this presentation.

I am the new Dean of the Faculty of Applied Science at the University of British Columbia. This is actually only my sixth day in that role. I am absolutely thrilled that this is part of that sixth day.

I have to also say that following a presentation on quantum computing is a pretty tough gig to follow, but I thought maybe I would just start this presentation on the future of engineering education and talk a little bit, as a segue, about the story of Geordie Rose, who was a PhD student at UBC, who also was the founder of D Wave.

Geordie, for a long time, came back, and he always taught the first lecture in our Technology Entrepreneurship course, which he took when he was a PhD physics student. He came back and he taught that course, time and again, really to give the message that of all the courses he took—and of course, he took a lot of deep, technology courses in a PhD program in physics—this course on technology entrepreneurship was really the most important and most transformative course and event that he had taken in his life.

At that time, it was taught by a gentleman named Haig Farris. Haig was not only the instructor of the course, but also one of the first investors into D-Wave. I think the lesson there is that it is the courses outside of your main discipline that are really maybe the most important part of an educational experience in terms of creating exceptional people and extraordinary companies.

Before I go on with my talk, I did just want to spend a second to celebrate the Alumni UBC's 100th birthday with a little bit of video. I will play this video for you.

[VIDEO]

I love that video. There is a scene there of the students sitting on the grassy knoll outside of the student union building. I do not know if many of you are UBC alumni, but it does take me back to kind of the early- or mid-'80s, let us say, when I was a student there. I do invite you to come back to UBC: See our new student union building; see our new Alumni Centre. Please, feel free to contact me if you want to learn more about what we are doing in terms of engineering education. I would appreciate it if you would reach out.

What I want to talk about today or how I want to start is with the question of what is the discipline of engineering. The discipline of engineering is really around integrating a design thinking and the natural and formal sciences. When I talk about 'design thinking', the definition is really the creative strategies that designers employ in the development of products and processes, and, of course, science being chemistry, physics, math. Engineering, as a discipline, is an old discipline. At UBC, it is 100 years old. We are a founding faculty of the university. If we think back to what engineering looked like maybe 50 years ago, we would think of something stereotypical that looks like this. What do we see?

We see white shirts, black ties, pocket protectors, a male-dominated field. This era of engineering really had a strong focus on the sciences and mathematics and would have had much less focus on design, teamwork and creativity.

If we look at where engineering has gone, we see something: They are still having fun, but it is a little more colourful, a lot more diverse. What we have really done in terms of the changes in the engineering educational experience is we have really worked, over the last two decades, to integrate much more design thinking, much more creativity, much more partnership. And we have done so not by just adding courses on projects and adding things, but by really, fundamentally, weaving that through the entire educational experience. I think we have done that very well over the last year or the last almost two decades.

Now, it is a time to think of what the future of engineering is. If we look to what the future of engineering is, one of the things we know is that technology is going to be increasingly pervasive through every sector, whether that is the healthcare sector, whether that is the advanced manufacturing sector, whether that is resource extraction. We know that technology is going to continue to be pervasive. In fact, we hear and talk about every job being a tech job in the future. What we do not really appreciate is that the pace of technological revolution is only accelerating. If we look at where we are right now, we are in the middle of a robotics, additive manufacturing industry 4.0 revolution that will see the complete automation of

manufacturing over the next ten years or two decades.

We are also in the midst of an artificial intelligence revolution powered by big data, powered by quantum computers that is going to change everything from the service industry to the retail industry, to the transportation of goods and people, and we are also in the midst of a huge genomics revolution. Technologies like CRISPR-Cas9 are going to change everything from healthcare and medicine to aging, but even to agriculture and to the production of chemicals and materials.

If you looked at any one of these areas, you could say each one of these areas would be world changing, job destroying, job creating, but when you look at them all together, you realize that right now we are in midst of an unprecedented rate of technological change like no other time in history.

What that has resulted in is just incredible demand increase in engineering as a discipline. If we look at here, here is the demand for engineering over other disciplines at UBC, but this is true in Canada and across the world. There is a tremendous increasingly demand for engineering. I would put it to you that if the future is every job is going to be a tech job, then the future of engineering really needs to look much more like the liberal arts degree of the 21st century. I guess what I mean by that when I talk about a 'liberal arts degree' is that 'liberal arts', as defined by Wikipedia, would really be the subjects and skills required by a free person to fully participate in civic life. With pervasive technology, the modern engineering degree may be just that discipline to provide that.

We know that if engineering is to become this liberal arts degree of the 21st century, it is going to have to change; it is going to have to grow, and it is going to have to transform. But it will still have, I think, at the core of its discipline, design thinking and science integrated together, which are kind of represented by our happy students in the centre of this circle.

Some of the things that we do really need to focus on are diversity and inclusivity. It is amazing, to me, that it is 2018, and we are still having a discussion on gender parity in engineering, given its importance in society. Engineering is unlike law, unlike medicine, which were all male dominated decades ago but have met gender parity and exceeded gender parity. But in engineering, currently, we have 13% participation in the profession from women. If we look at some of the data coming out of the World Economic Forum, at the current rate of change, we are going to see it is going to take another 100 years to reach gender parity.

At UBC, what we have done, and what we have championed, is a whole number of programs aimed at increasing the attraction and retention of women into the university, and we have set a goal of 50/50 by 2020. I am thrilled to say we have made tremendous progress. If we went back to 2010, we would have had 16% of our first-year class being women. In 2015, just five years later, we have reached 33%. One-third of the class is women coming into our program. I am also sad to say that we are going to fail to meet our goal of 50/50 by 2020. In the last couple of years, we have been flat

at 33%, 32%, 31%. What we have done is we have invested in a national network of researchers, a $9 million research project over the next six years to identify and develop strategies to remove the barriers for women, not only being attracted into the university system, but being retained through the university system across the STEM disciplines and being attracted and retained into the profession.

We have also made investments into what is a fabulous outreach program to K–12, because we know that that is important. We call that program Gearing Up. It provides summer camps. It provides teacher education. It provides in-classroom activities. Last year, we had 17,000 K–12 students engaged in that program in 43 communities. Two thousand of those students were Indigenous students. It is a fantastic program. We would love to see that go national.

We have made tremendous progress inside our own house. I am proud to say that over the last three years, we have had 40% of our new assistant professors coming in who are women, who are going to be the role models of and the mentors for the next generation of women coming into the university and into the profession.

In addition to gender equality, we also know that engineering needs to include more business, more management, more leadership skills. One of the first projects we did a couple of years back was the development of a one-year, course-based Masters of Engineering Leadership Program in partnership with our good friends at the Sauder School of Business. The program brings deep technological pillars across nine different disciplines—important areas to society like clean energy, like software design, like advanced manufacturing, and it brings that with a platform of business management and leadership skills.

We also know that we need to really include more policy, more community engagement, more decision-making skills into that program. We are working with our policy school, with our school of community in regional planning, to integrate that. That is under development. I would be happy to talk about that as we build out that programming.

We also recognized that cultural fluency amongst our students is increasingly important.

All markets, all companies, colleagues, are increasingly highly internationalized, so we have created a new program that we call the Coordinated International Exchange, which allows every student in third year to seamlessly take a term abroad in any one of our 17 partner universities, and we are growing those in three different continents across Europe, Asia and Australia.

We are also working on an increased experiential learning platform, and so we are going beyond the traditional engineering co-op to provide opportunities for our students to have an entrepreneurial experience during their summer terms or perhaps be involved in an infrastructure project with an NGO in Africa. They may also do a community engagement project with a nonprofit association in their own community.

We are also bringing more innovation and more entrepreneurship right into the curriculum. It is important to understand that whether you are going to go off and create a new company, or if you are just going to bring that spirit of innovation into a larger organization, UBC has created a whole host of support mechanisms for innovation and venture creation, which includes things like HATCH, our new technology incubator. But it includes as well our entrepreneurship program with things like Lean Launchpad, Venture Builder, and a host of entrepreneurs and residents. We have created a philanthropic seed fund to make early investments into our communities. We have created a partnership with the University of Toronto to bring a Creative Destruction Lab to the west coast, which provides a stage gate process for securing venture capital for some of these very early stage companies.

We have also, just this year, started an entrepreneurship minor, again in partnership with our friends in the Sauder School of Business, available to all engineering students.

We are also looking at gateway programs because we know that, in the future, your doctor is going to start life as an engineer; your teacher is going to start life as an engineer; your lawyer, your politician will all start life as engineers with the liberal arts of the 21st century. Things like our School of Biomedical Engineering provide opportunity for the students who go through this engineering degree and ensure they are prepared and meet all of the prerequisites for every Canadian medical school across Canada. Again, that is in partnership with our Faculty of Medicine. If we look, now, at engineering as the liberal arts degree of the 21st century, we really see, again, at the core, design and science as the core discipline, but, really, with all of these other attributes that are really aimed at future-proofing the current generation of students and the next generation of students against a rapidly evolving technology landscape.

We are also working to export this core discipline to export engineering skills across other disciplines of commerce, law, medicine, education. And we are working on new delivery methods to get those fundamental skills into those other disciplines.

I think I would just like to just leave you with one thought, and that thought is that engineering is evolving into the liberal arts degree of the 21st century.

It is really aimed at future-proofing this generation of students and the next generation of students against a backdrop of unprecedented technological change. I would just like to thank you for your attention. I will leave it at that.

BJ: When I spoke earlier about what a wonderful Director Bill White has been to the Empire Club of Canada, I was not saying those words lightly. He put together for us last year, for Canada's 150th birthday, a sesquicentennial series of events. This is the 10th and the last in those events. I would like our series sponsor, represented by Mike White from IBK Capital, as well as our two guests of honour to join me below and blow out the birthday candles in this final sesquicentennial event.

[CANADA'S 150TH BIRTHDAY CANDLE-BLOWING CEREMONY]

Note of Appreciation, by William White, Chairman, IBK Capital Corp. and Director, Empire Club of Canada

Madam President, distinguished Head Table Guests, fellow members and guests of the Empire

Club of Canada, I have the pleasure to express our formal thanks to our two key speakers.

Vern, as Chief Executive Officer of D-Wave, we believe your company is the most important technology company in the world. The digital world is changing rapidly. With significant change comes great opportunity. D-Wave is positioned to benefit from a huge untapped market immediately ahead. With the leadership of Vern and his team, we expect D-Wave to enjoy significant growth and revenue and accelerated growth at scale.

Fifty years ago, my wife and I, Gail, my brother, Wayne, and his wife, Barb, graduated from UBC in engineering. Last year, we celebrated 50th Alumni in terms of our schooling. We are absolutely delighted that Dean James Olson is in charge now of the Faculty of Applied Science at the University of British Columbia.

We got to know James due to his initiatives in transforming engineering education with the entrepreneurship programs. James has successfully managed significant change over the last few years in working with applied science students, faculty members and alumni. He has also reached out recently to companies in the U.S.—like Tesla, and, in China, Huawei, and many other corporations in China.

Today, we see how forging partnerships with institutions, companies, communities and individuals, especially, and those that involve high-tech and quantum computers, is transforming the future of computer systems and software as well as the future of education and engineering, especially. We are proud of the role that D-Wave Systems is playing now in the global development of quantum computers, and I would ask that each of you now join me in a special thank you to Vern and James.

Concluding Remarks, by Barbara Jesson

Without wonderful sponsors, like IBK Capital, these lunches that the Empire Club holds, would simply not be possible. Once again, I want to express a sincere thank you IBK as well as to our presenting sponsor, POET Technologies; gold sponsors Urbana Corporation, Peat Resources Limited, Cobalt Blockchain Inc. and UBC. Without sponsors like these, we simply would not be here, and we are so grateful to all of you.

I would also like to thank mediaevents.ca, Canada's online event space for webcasting today's event for thousands of viewers around the world. Also, thank you to the National Post, as our print sponsor.

Although our club has been around since 1903, we have moved into the 21st century and we are active on social media. Please, follow us on Twitter at @Empire_Club and visit us online at www.empireclub.org. You can also follow us on Facebook, LinkedIn and on Instagram.

Finally, please, join us, again, at our next event tomorrow, March 7th, featuring our Women's Leadership Panel, at One King West Hotel. Thank you so much for your attendance, today.

This meeting is now adjourned.