

REWORK

DEEP LEARNING SUMMIT



TORONTO
OCT 25 - 26, 2018

EVENT REPORT:

Highlights, attendee & speaker feedback, agenda overview,
photos, videos, interviews & more

HEADLINE SPONSORS:



DEEP LEARNING SUMMIT



2 DAYS



450 +
ATTENDEES



11
EXHIBITORS



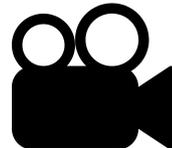
40
SPEAKERS



12+ HOURS OF
NETWORKING



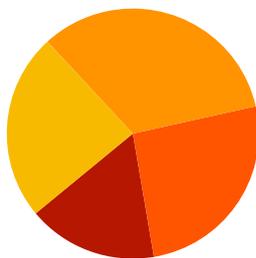
7 INTERACTIVE
WORKSHOPS



20 EXPERT
INTERVIEWS

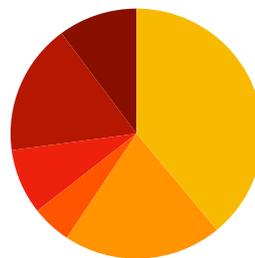


12
SPONSORS



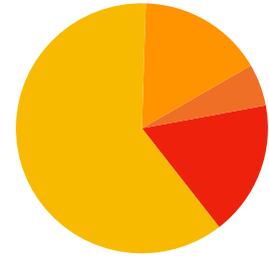
JOB ROLES

- CxOS
- AI/Data Scientists
- Engineers
- Students & Academics



COMPANY SIZE

- 1000+
- 5000+
- 51-100
- 101-500
- 2-10
- Just me!



LOCATION

- Canada
- USA
- Europe
- Other

A NOTE FROM THE FOUNDER

It was wonderful to head to Toronto for the second Canadian edition of the RE•WORK Global DL Summit Series. Building on the 2017 Montreal event, attendees from over 20 countries came together to learn from industry experts in speech & pattern recognition, neural networks, image analysis and NLP, and explored how deep learning will impact all industries through interactive workshops, interviews, presentations, networking and more.

It was an honour to, once again, have Geoffrey Hinton share his expertise in a plenary session on day one of the summit, as well as having world renowned Canadian experts join us, including Brendan Frey, Graham Taylor and Roger Grosse, as well as local emerging startups including TwentyBN, Phenomic AI and international speakers from companies including Google Brain, Snap Research and Graphcore.

Year on year, it's great to welcome back returning guests and this year we had familiar faces from the Canadian AI ecosystem such as NextAI and Vector Institute.

We also hosted the second Canadian Women in AI dinner, which was a huge success, and we're now looking forward to our third this December.

Our events continue in Houston this **Nov 29 & 30** for the [Machine Learning for DevOps Summit](#) and the [Applied AI Summit](#). We're also looking forward to the 5th edition of the [Deep Learning Summit](#) in San Francisco this **January 24 - 25**, which will be our largest event to date. We hope to see you there!

Nikita Johnson
CEO & Founder
RE•WORK

ATTENDEE FEEDBACK

Part of my team is working on qualitative interpretability so learning from Sara Hooker who's leading the way in this research was just brilliant.

Adrian Nauth, Google



I'm excited to push boundaries with general AI and hear who else is working on this. We take privacy very seriously at snap and we must continue to do so.

**William Brendel,
Snap Inc.**



I'm interested in the way AI will change. In my opinion it's too much of a hype, but I'm excited to see where those who are invested long term will see it go.

**Florian Werner-Jaeger,
infofeld GmbH**



I found the talk on interpretability from Google Brain very engaging. We're working on a processor and I'm on the software side, so networking and hearing what everyone else is working on, has been great.

**Darrick Wiebe,
Untether AI**



The standard of presentations has been really high so far. You bring together an interesting mix of academic research and industry. We've attended before, and the technical content is much higher here than last year.

Phil Brown, Graphcore



We're kicking off a Canadian expansion, and we're starting it with this RE•WORK event. It's been a great intro into the AI community in Canada.

Steve Kilpatrick, Logikk



EXPERT SPEAKERS INCLUDED



Geoffrey Hinton
Professor
University of Toronto



Brendan Frey
Co-Founder & CEO, Professor
Deep Genomics &
University of Toronto



Sara Hooker
AI Resident
Google Brain



David Cox
Director MIT-IBM Watson
Lab
IBM Research AI



Gosia Loj
AI Global Governance Lead
Big Innovation Centre



Roland Memisevic
Chief Scientist
Twenty Billion Neurons



Kaheer Suleman
Principal Research
Manager
Microsoft Research



Maithili Mavinkurve
Founder & COO
Sightline Innovation



Matt Taylor
Research Director
Borealis AI



Jason Cornell
Project Manager,
Machine Intelligence
CBC



Karry Lu
Data Scientist
wework



Dr. Heli Mohammadi
Sr. PhD Student
MILA



Margaret Wu
Investor
Georgian Partners



Sam Talasila
Data Science Lead
Shopify



Roger Grosse
Assistant Professor
University of Toronto



Tomi Poutanen
Chief AI Officer
TD Bank

PRESENTATION HIGHLIGHTS

We've come so far, but there are still challenges - for example, when we layer images systems get confused - something that wouldn't confuse humans. These systems are supposed to be superhuman.

David Cox, IBM



Put up your hand if you're certain if your definition of what an interpretable model is, is the same as your neighbour. It's very nuanced as a topic to see how we can be interpretable - it's hard to see what is and what isn't interpretable.

Sara Hooker, Google Brain



We believe that in the future, regularization will allow you to detect labels and errors in data. We apply this term to adversarial networks. We found the best thing is to combine adversarial training with Lipschitz regularization, and we have the best published results to date.

Adam Oberman, McGill University



We are seeing a massive drop in genome sequencing costs - in 2001 sequencing costs around \$1mi currently it is now around \$1000. By 2025 - human genomes storage would be around 40 exabytes, in comparison, YouTube's storage is set to be around 2 exabytes in 2025.

Helia Mohammadi, Microsoft



The most difficult part of fundraising for a start-up is finding that investor to put the first cheque into it.

Saroop Bharwani, Senso



We're not just trying to solve the problems that we have today, that we commonly see in the workload today. We are designing architectures that support the future of machine intelligence.

Angel Serrano, Santander



AGENDA OVERVIEW: DEEP LEARNING SUMMIT

DAY 1

THEORY & APPLICATIONS



In the 90s the rate of return on pharma research and development was 30%, in 2010 it dropped below the bank rate. It's expected to go to 0 by 2020. The next approach is AI.

Brendan Frey, Deep Genomics

DEEP LEARNING OPTIMIZATION



Training or applying deep neural nets on some resource-limited devices are not applicable if the weights take up too much storage space.

Graham Taylor, University of Toronto

REINFORCEMENT LEARNING



In the past 4/5 years, RL's had success in simulation where it can get samples cheaply and fast. We still don't see lots of applications in the real world. How can we bridge the gap?

Shane Gu, Google Brain

VIDEO UNDERSTANDING



Collecting your own data could potentially mean you already have these biases and not know it.

Tegan Maharaj, MILA

PLENARY SESSION



In distillation we train an ensemble, then we get very confident answers. In order to get a softer distribution, we train, then divide the averaged logits from the ensemble by a 'temperature' to get a softer distribution. This reveals much more information about the function on each training case. That's very good for transferring knowledge between new models.

Geoffrey Hinton, University of Toronto

DAY 2

STARTUP SESSIONS



IoT with edge based computing allows access to vast amounts of data that was simply not accessible before

David Julian, NetraDyne

We use convolutional neural networks to ingest large amounts of information to get better predictions. We are packaging this into a platform to predict losses in crop insurance.

Tzvi Aviv, AgriLogicAI

DEEP LEARNING SYSTEMS



Real world datasets are noisy and can be frustrating while artificially created datasets are often flawed and the model can learn to game this flaw.

Kaheer Suleman, Microsoft Research

DEEP LEARNING APPLICATIONS



AI will have a profound impact on society. Technology adoption has been with us forever, but it's now accelerating. Automation will displace half the jobs, and double GDP.

Tomi Poutanen, TD Bank

PANEL: What is the biggest challenge to capturing ROI with AI?



The world has not seen a more disruptive and powerful technology since the inception of the internet itself. Deep Learning is going to transform every single industry that it touches.

Manthili Mavinkurve, Sigmoid Innovation

PLENARY SESSION



Geoffrey Hinton

Professor

University of Toronto

If I had an advisor I'd have to test and re-test things. But I don't have an advisor, so I can get away with doing it once and saying 'that's just about right!'

Geoffrey Hinton designs machine learning algorithms. His aim is to discover a learning procedure that is efficient at finding complex structure in large, high-dimensional datasets and to show that this is how the brain learns to see. He was one of the researchers who introduced the back-propagation algorithm and the first to use back-propagation for learning word embeddings. His other contributions to neural network research include Boltzmann machines, distributed representations, time-delay neural nets, mixtures of experts, variational learning, products of experts and deep belief nets. His research group in Toronto made major breakthroughs in deep learning that have revolutionized speech recognition and object classification.

Geoffrey shared his work in distillation, explaining the processes behind his research, and what happened when his methods didn't quite work out.

[To watch the full presentation, register here.](#)

*"I'm going to make an analogy with insects - insects have 2 problems - they have to get nutrients from the environment, and also have to travel around the environment. An insect uses two different bodily forms for that. A caterpillar eats the environment, it then turns that 'goo' into what it needs to become a butterfly to travel around. Similarly, we take training data and in order to suck the information out of the data, we take the knowledge and convert the 'big bottle' into a small one. **That's the idea of distillation.**"*

*In distillation, we train an ensemble, then we get very confident answers. In order to get a softer distribution, we train, then divide the averaged logits from the ensemble by a 'temperature' to get a much softer distribution. This reveals much more information about the function on each training case. **That's very good for transferring knowledge between new models.** Softened outputs reveal the dark knowledge in the ensemble."*

Hinton demonstrated with real data that ensembles, trained on a soft model, learn something every time. When 10 models were trained separately on, they achieved 59.9% correct frame classification, "then we try an ensemble and get 61.1%. We can close 86% of the gap by training the ensemble into a single model of the same size using both hard and soft targets."

I took smaller nets so I could train them on my Mac. I trained 10 small 784 - 500 - 300 - 10 nets independently and they averaged at 158. I then distilled them and they did much better which got me very excited.

Embarrassingly, later I found there was a problem: you can get the same results with label smoothing. But what if you use ensembles and distilling with label smoothing? Something really embarrassing happens - it doesn't work! I get more errors. It was a really effective method of training models, but now you can't use distillation.

WORKSHOPS

CBC - BUILDING SCALABLE ML ARCHITECTURES

The CBC has the 3rd most traffic on mobile and 8th on web in Canada. In the event of a major news story, in a matter of seconds traffic can spike 10x. Jason shared CBC's approach to deploying scalable ML models, from the ingestion API, ETL, storage, training of models, to surfacing recommendations to millions of Canadians: *For the actual application, we look at specific use cases. In the social media user context, we look at our audience but we don't actually factor that in our model per se.*



Jason Cornell
Product Manager
CBC



Gosia Loj
AI Global
Governance Lead
Big Innovation
Centre

BIG INNOVATION CENTRE - DATA & TRUST

This 2 part workshop focused on open data and personal data ownership platforms, looking specifically at the social and legal implications. Questions covered included:

- Should personal data be open and accessible for public purposes or for all commercial purposes too? Should we enable individuals to own their data and be able to sell it?
- Should we tax companies for selling our own data? In what way?

Day 1 focused on speakers' presentations and day 2 featured interactive group work.

CHALLENGES & OPPORTUNITIES OF INVESTING IN AI

This session gave startups the opportunity to discover the eligibility criteria used by VCs for investing in AI startups. The panel was followed by open floor Q&A. Topics covered included: the recent surge in investing in AI startups, product fit & development, KPIs, value creation, hype vs reality, and founders.

Margaret Wu
Georgian Partners

Russell Samuels
Whitecap Venture
Partners

Christian Lassonde
Impression
Ventures

Jon French
Next Canada

Jim Orlando
OMERS
Ventures



Helia Mohammadi
Chief Data Scientist



Amir Kermany
Solutions Architect

FROM RAW DATA TO ACTIONABLE CLINICAL INSIGHTS

High-throughput analysis with Microsoft, and Databricks Unified Analytics Platform for Genomics (UAP4Genomics)

Helia walked through how Microsoft and the Databricks UAP4Genomics simplifies the end-to-end process of turning raw sequencing data into actionable insights. She demonstrated how to call variants in a single sample using the accelerated GATK4 pipeline, as well as using tools like Hail to characterize the association of variants in a population with clinical phenotypes.

We are seeing a massive drop in genome sequencing costs - in 2001 sequencing costs were at around \$1 million, and we're now looking at costs as low as around \$100.

INTERVIEWS & PODCASTS

As well as hosting events, RE•WORK has a catalogue of online resources with White Papers, video interviews, our blog, and the Women in AI podcast. At each event, we chat with speakers and industry experts who share their expertise.



Sara Hooker, AI Resident,
Google Brain

For the first time, Sara Hooker and Natacha Maniville (Google Brain) came together in a fireside chat interview with a live audience who were encouraged to ask questions after the discussion. The interview will also be available as a podcast.



Maithili Mavinkurve, Co-Founder
& COO, **Sightline Innovation**

Since the first episode in September 2017, Mai was the first repeat guest on the Women in AI Podcast. We were thrilled to have her back and to hear about Sightline Innovation's journey over the past 12 months, as well hearing about their most recent expansions.



William Brendel, Sr. Research Scientist,
Snap Inc.

"I'm excited to push boundaries with general AI. We take privacy very seriously at snap and we must continue to do so. Global policies would be great, but infused with best practices applicable to individual cases. If models are created without privacy in mind they can blow up in your face."

We're always open to new collaborations and love hearing from attendees and speakers alike. If you are working on something you think would be valuable to our content hub, don't hesitate to get in touch with Yaz: yhow@re-work.co



Roland Memisevic, **TwentyBN** &
Samir Kumar, **M12**

TwentyBN, which works towards solving video through computer vision, has recently joined the M12 investor portfolio. Samir and Roland shared their experiences in their AI endeavours both separately, and since they have started working together.



Shane Gu, Research Scientist,
Google Brain

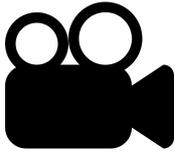
Shane, who's thesis was supervised by Geoffrey Hinton, joined Oshoma Momoh from MaRS to answer some in depth questions on his current work in deep reinforcement learning towards robotics. Shane shared the practical challenges, as well as some exciting models he's currently working with.



Tomi Poutanen, Chief AI Officer,
TD Bank

Tomi is cofounder and co-CEO of Layer 6 AI (layer6.ai) which was recently acquired by TD Bank. Tomi shared how Layer 6 AI was the first company to offer clients a prediction engine powered by a real-time deep learning framework.

WHAT'S NEXT?



Video presentations will soon be available online and you can [register here](#), or to upgrade to access the AI for Government Summit. On our video hub we also have extensive playlists from our past events.



Subscribe to the [Women in AI Podcast](#) to hear the latest episodes and learn from influential women working in AI.

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UPCOMING EVENTS

HOUSTON, NOVEMBER 27 - 30, '18

Women in AI Dinner, 27
Applied AI Summit, 29 - 30
Machine Learning for DevOps Summit, 29 - 30

MONTREAL, DECEMBER 4, '18

Women in AI Dinner

SAN FRANCISCO, JANUARY 22 - 25, '19

Women in AI Dinner, 22
Deep Learning Summit (multi-track), 24 - 25

LONDON, MARCH 19 - 20, '19

Women in AI Dinner, 19
Deep Learning in Finance Summit, 19 - 20

BOSTON, MAY 22 - 23, '19

Deep Learning for Robotics Summit
Deep Learning for Healthcare Summit
Deep Learning Summit

SAN FRANCISCO, JUNE 20 - 21, '19

Deep Reinforcement Learning Summit
Applied AI Summit

NEW YORK, SEPT 5 - 6, '19

AI in Finance Summit

LONDON, SEPT 19 - 20, '19

AI in Retail & Advertising Summit
Deep Learning Summit
AI Assistant Summit
Machine Learning for DevOps Summit

MONTREAL, OCT 22 - 15, '19

Women in AI Dinner, 22
Deep Learning Summit, 24 - 25

View our complete calendar of events, and register now for upcoming summits [here](#). For ticket enquiries, contact John: john@re-work.co

Want to contribute to our online or live event content? Email Yaz: yhow@re-work.co