



# Shalev Lifshitz

AI Researcher & Entrepreneur

19 years old, Canadian, and striving to develop the future of technology. My goal is to spark the next wave of human innovation and help humanity reach a new evolutionary step.



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Toronto, Canada



shalev.ca

## SKILLS

Leadership

AI & Deep Learning

Entrepreneurship

Creativity

Writing

Programming

Communication and  
Public Speaking

Critical Thinking and  
Problem Solving

## INTERESTS

AI

Neuroscience

Neurosymbolism

Multi-Agent RL

Cellular Automata

Physics, Sound, and  
Light Transport  
Simulations

Graphics & 3D

General Relativity

Causality

Latin

Mathematical Proofs

LOTR

Piano

## EDUCATION

### Specializing in Computer Science, Minor in Math and Psychology University of Toronto

09/2020 - Present

## WORK/RESEARCH EXPERIENCE

### Researcher

University of Toronto, Prof. Sheila McIlraith's Group

09/2021 - Present

Toronto, Ontario

Conducting Reinforcement Learning research with Prof. Sheila McIlraith at the University of Toronto.

### ML Engineer - AI algorithms to automatically understand CT scans

Claronav

01/2020 - Present

Toronto, Ontario

I have been creating AI algorithms to improve surgical navigation at Claronav, an industry leader in surgical navigation which developed the first FDA-cleared image-guided surgical navigation system. Instead of a human having to locate and annotate various structures in CT scans, I teach machines to figure out the location of these structures on their own. The algorithms I created are now being used in surgical navigation systems around the world to understand patient CT scans in less than half a second.

### Researcher - Histopathology image search for cancer diagnosis

University of Waterloo, Kimia Lab

06/2019 - 01/2021

Waterloo, Ontario

Created a new histopathology image search technique to speed up and improve the diagnosis of cancer and other diseases. I performed this research at the University of Waterloo KIMIA Lab (a global leader in histopathology image search). Paper is available at <https://arxiv.org/abs/2111.15519>.

### Researcher - Creating neural networks to behave more like the brain

University of Waterloo, Kimia Lab

09/2018 - 09/2019

Waterloo, Ontario

While in high school, I worked with the Prof. Hamid Tizhoosh to design a new type of neural network that aims to rethink the basic perceptron structure and move away from a feed-forward approach. We aimed to develop networks that can be easily embedded in larger graphs (inspired by the more organic structure of biological neural networks). I implemented and developed our neural architecture from scratch, without the use of existing DL libraries since they were not able to perform our experiments. I spent over 400 hours implementing our novel neural network from scratch while maintaining academic excellence (95+ GPA). The neural architecture research is published in our paper "Subtractive Perceptrons for Learning Images: A Preliminary Report" (listed below).

### Researcher - Computer vision for faster and better diagnosis

The Hospital for Sick Children

06/2018 - 09/2019

Toronto, Ontario

I researched AI and Computer Vision methods that analyze cell images to expedite the diagnostic and drug discovery processes at The Hospital for Sick Children in Toronto.

## RESEARCH PAPERS

### Subtractive Perceptrons for Learning Images: A Preliminary Report (09/2019)

In this preliminary work, we define the subtractive Perceptron (s-Perceptron), a graph-based neural network that delivers a more compact topology to learn one specific task. <https://arxiv.org/abs/1909.12933>

### Gram Barcodes for Histopathology Tissue Texture Retrieval (12/2021)

We propose Gram barcodes, a new metric of similarity for Histopathology Image Search (HIR) systems that can help pathologists diagnose cancer and other diseases. Unlike most feature generation schemes, Gram barcodes are based on high-order statistics that describe tissue texture by summarizing the correlations between different feature maps in layers of convolutional neural networks. <https://arxiv.org/abs/2111.15519>

## INTERESTS

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Ancient Greek and  
Roman Civilization

Ensuring a Positive  
Future for Humanity

## SPEAKING ENGAGEMENTS

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Some of my speaking engagements:

- ▣ Talk at IFA (Berlin, Germany)
- ▣ Talk at Future Port Prague (Prague, Czech Republic)
- ▣ Talk at meConvention (Frankfurt, Germany)
- ▣ Talk at ReWork Responsible AI Summit (Montreal, Canada)
- ▣ Talk at SXSW: South by Southwest (Austin, Texas)
- ▣ Panel at FiRe: Future in Review (San Diego, United States)
- ▣ Talk at KPMG Executive Look (Toronto, Canada)

Please visit my website at [shalev.ca](https://shalev.ca) for videos of my speaking engagements and my portfolio. [!\[\]\(a870788d6ed9b8fd294b7654a8c8526b\_img.jpg\)](#)

## AWARDS & ACHIEVEMENTS

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C. David Naylor Scholarship from the University of Toronto (\$20 000)

University of Toronto Scholar (2021)

University of Toronto, Trinity Collage Award (2021)

Winning Pitch at the McMaster University Fall 2018 Innovation Sprint