

# Avraham "Abe" Bernstein | CV

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## Introduction: Cr8tive Solutions To Hard Problems

1. I have more than 40 years experience in state-of-the-art software development:
  - inventing new algorithms
  - inventing domain specific languages (DSL) which can grossly simplify many difficult problem domains, especially for non-programmers
  - using compiler tools to automatically refactor source code, and for anti-reverse engineering obfuscation
2. I am a "hands-on" master software engineer. I enjoy programming. I design prototypes and minimum viable products for CTO groups.
3. I have many inventions and some **recent patents** in a wide variety of application domains, e.g.:
  - digital automotive industry
  - Internet TV
  - cybersecurity
  - bioinformatics
  - accessibility
  - factory automation
  - VLSI CPU design
4. I am an expert generalist and an autodidact polymath<sup>1</sup>. I easily learn and become an expert in new fields.
5. In order to jump start my learning process I prefer to find a domain expert to mentor me, and I am also a good mentor myself.
6. I know many computer languages which I am able to learn easily due to my compiler background.
7. My "go to" *programming* languages in which I am quite proficient are the following:
  - C
  - Python and Beautiful Soup
  - Jinja2, the "gold standard" macro and template preprocessor
  - Pyexpander, which is simpler than *Jinja2* and just as useful except where template inheritance is needed, *but* unfortunately it is *polluted* by a GPLv3 license
  - bash, including Posix CLI commands
8. My "go to" *data* languages are *HTML*, *Markdown*, pandoc, srcML, *XML*, *YAML*, and *Excel*.
9. I thrive on undertaking new challenging projects. I am quite comfortable engaging in and leading *flexible* "brain storming" sessions.

10. I have a long history of providing considerable value added to my employers.

## Work Experience

### 2022-25: Aurora Labs Tel Aviv IL

➤ Automotive Software Updates: CTO Group: (a) I invented a patent-pending algorithm to greatly reduce RAM consumption during FLASH updates which improves compression efficiency which is the core KPI of the software update industry; and (b) I greatly improved the CPU efficiency and RAM consumption of their core product which refactors embedded C source code

### 2022 part-time: Jerusalem College Of Technology (JCT/Machon Lev) Jerusalem IL

➤ Lecturer: Introduction to Cybersecurity

### 2021: Morphisec Beer Sheva IL

➤ Server Cybersecurity: Reverse engineering and refactoring of X64 object code

### 2021: consultant to Qedit Tel Aviv IL

➤ Banking Cryptographic Algorithms: Securing C algorithms in a web browser using WASM

### 2018-20: Argus Cyber Security Tel Aviv IL (restructured as PlaxidityX IL, subsidiary of Elektrobit/Continental DE)

➤ Automotive Software Updates: Patented algorithm greatly reducing FLASH memory required to implement bsdiff

### 2016 part-time: Canary Mission Jerusalem IL

➤ Consultant: SOHO Cybersecurity "Hygiene"

### 2014-17: Viaccess-Orca Ra'anana IL (subsidiary of Orange FR)

➤ Internet TV Infrastructure: Cybersecurity obfuscation manager

### 2013-14: Discretix Netanya IL (renamed *Sansa Security*, acquired by ARM UK)

The company sold their Internet TV business unit to Viaccess-Orca (2014) above.

### 2013 part-time: NVT (defunct) US

➤ CTO Nigerian Agritech

## **2012: Telequest (stealth) Jerusalem IL**

➤ Vehicle Navigation Algorithms: VP R&D: Traffic jam reduction algorithms

## **2011: consultant to Synteza Bioscience Jerusalem IL**

➤ PCR MRSA Kit: Inventor of bioinformatic PCR algorithms using AI threshold technique, and more accurate bioassay normalization and noise reduction

## **2005-10: *NDS* Jerusalem IL (acquired by Synamedia UK)**

➤ Internet TV Infrastructure: Cybersecurity researcher

## **2004: *Vyyo* (defunct) Jerusalem IL**

➤ Broadband RF Networking: Architect of super-efficient cable modem testing laboratory

## **2002-03: *Virtouch* (defunct) Jerusalem IL**

➤ Blind Accessibility Device: VP R&D: Inventor of product that allowed the blind to see/understand images in a PC/smartphone web browser ideally combined with a consumer grade graphics tablet

## **2002: *TMT* (defunct) Jerusalem IL; Local Area RF Networking**

I did similar tasks for Vyyo. See Vyyo (2004) above and Vyyo (2000) below.

## **2002 part-time: *Jolt* Jerusalem IL (acquired by *MRV Communications* IL, and eventually by Adtran US)**

➤ Free Space Optics Networking: Consultant: Designer of SNMP NMS client and agent

## **2000-02: *Vyyo* (defunct) Jerusalem IL**

➤ Broadband RF Networking: Manager of S/W utilities group; inventor of cable modem hybrid (RF/dial-up) IP allocation protocol

## **1999: contractor to *Phasecom* Jerusalem IL (acquired by *Vyyo* above)**

Broadband RF Networking: See the tasks that I did for the successor company Vyyo (above).

## **1998: contractor to *Fourfold* (defunct) Jerusalem IL**

➤ Fabless VLSI CPU Design: Novel GCC compiler port for a FORTH-like CPU

## **1996-97: CEO *Pitkha* (defunct) Jerusalem IL, contractor to *Optimet* Jerusalem IL, subsidiary of Ophir Optronics IL**

➤ Conoscopic Laser Interferometry: S/W architect of a DSL for a 2D measurement robot

**1996: CEO *Pitkha* (defunct) Jerusalem IL, contractor to Elop/Elbit Rehovot IL**

➤ Military Optical Devices: S/W architect of a DSL to implement a mil-spec automated testing laboratory for the BlackHawk helicopter weapons targeting system

**1992-95: CEO *Pitkha* (defunct) Jerusalem IL, contractor to DSP Group Ramat Gan IL**

➤ Fabless DSP CPU Design Center: Inventor and S/W architect of a DSL to implement the software tool chain for the PINE CPU

**1990-91: contractor to Digital Equipment Corp (DEC) Herzliya IL (eventually acquired by Hewlett-Packard IL), contractor to Iscar Metalworking**

➤ Metal Blade Production Factory: Co-inventor and S/W architect of a DSL to implement a shop floor production control system that orchestrated a completely automated factory

**1988-89: contractor to *Cubital* (defunct) Herzliya IL, subsidiary of *Scitex IL* (acquired by Hewlett-Packard IL)**

➤ One Of The Original 3D Printers: S/W R&D

**1989: contractor to *Cubital* (defunct) Herzliya IL, subsidiary of *Scitex IL* (acquired by Hewlett-Packard IL)**

➤ PC Accessibility Device For Quadriplegics: Inventor and S/W architect

**1987: *Orisol* (defunct) Lod IL**

➤ High Speed Sewing Robot For Leather Goods: S/W architect of a DSL used to control the robot

**1980-86: Junior Programmer and Economist Positions in the US and Israel**

**1977: Ontario Energy Board Toronto Ontario**

➤ Public Utility Commission: Public interest intervenor-economist at the ECAP77 hearings on marginal cost pricing for electricity

## **Unpatented Personal Inventions**

➤ Inventions

## **Education**

1. **1978-79: York Univ Graduate School Toronto Ontario: **masters degree in economics with a minor in applied mathematics**<sup>2</sup>**
  - My major project was an economic-engineering simulation of a hydro electric dam in *FORTRAN*.
2. **1976-77: Univ Of Toronto Rotman Graduate School Of Management Toronto Ontario: **no degree, applied credits to York Univ (above)****
3. **1973-76: Univ Of Toronto, Undergraduate School Of Arts & Sciences Toronto Ontario: **BA economics****
4. **1969-73: Vincent Massey Secondary School Windsor Ontario: **"Honours" (grade 13) high school diploma****
  - I took my first course in computer science in *FORTRAN* on an IBM 1130 mini-computer with 16 KB RAM. My first serious program was a *perfect* game of *Qubic*, 3D tic-tac-toe, using 4 levels of boards each of which has 4x4 squares. Subsequently I became "addicted" to programming for life.

## Personal

➤ Personal

## Colophon

➤ Colophon

## Footnotes

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1. **Autodidact Polymath:** There is a common misconception that only geniuses like *Leonardo da Vinci* deserve the appellation autodidact polymath, and therefore by referring to myself as one then I am making the bombastic claim to be a genius in the same category as Leonardo. There is an outstanding TED talk showing how children from Indian slums with the appropriate mentoring can become *autodidact polymaths*. And there was a similarly successful project done with children from Mexican slums. Many very intelligent people, especially as they get older, don't like moving outside of their intellectual comfort zone, whereas I revel in taking on intellectual challenges in new fields outside of my comfort zone. Note my "grand slams" in a wide range of application domains, where the only way to quickly achieve expertise was self-learning admittedly with the help of highly qualified mentors. I feel that I still maintain a high degree of child-like mental plasticity. Part of this skill I retain by regular interaction with my own young grandchildren, where my play with them is much more analytical than I used to exhibit with my own children.↵
2. **York Univ:** Exceptionally I passed my comprehensive examinations before I took any of the required economics courses! Therefore the school allowed me to take any accredited courses from any Canadian university. I had initially wanted to take a graduate degree in engineering from the Univ of Toronto but they refused to accept me as a

*regular* student, but they allowed me to enroll as a *special* student. In fact most of my courses for the York degree were from the Univ of Toronto graduate school of engineering.↵