

# Avraham "Abe" Bernstein | CV

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Secure<sup>1</sup> photo of the author from 2025

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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 especially inventing new algorithms.
2. I have many inventions and some **recent patents** in a wide variety of application domains, e.g.:
  - digital automotive industry
  - Internet TV
  - cybersecurity and anti-reverse engineering
  - bioinformatics
  - accessibility
  - factory automation
  - VLSI CPU design
  - etc.
3. I am an expert generalist and an autodidact polymath<sup>2</sup>. I easily learn and become an expert in new fields.
4. 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.
5. I am a "hands-on" master software engineer. I enjoy programming. I design prototypes and minimum viable products for *CTO* groups.
6. I know many computer languages which I am able to learn easily due to

my compiler background; and my compiler background allows me to design domain specific languages (DSL) and to engage in automated code refactoring.

7. My "go to" *programming* languages in which I am quite proficient are the following:
  - *C*
  - *Python* and *BeautifulSoup*
  - Jinja2, the "gold standard" macro and template preprocessor
  - Pyexpander, which is simpler than *Jinja2* and just as useful except where 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 provide considerable value added to my clients.

## Work Experience

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

➤ Automotive Software Updates: CTO Group: Patent-pending algorithm greatly reducing RAM consumption during FLASH updates; and greatly improved CPU efficiency and RAM consumption required for automated refactoring of 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

### 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); Internet TV Cybersecurity**

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

**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 for *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>3</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

## Footnotes

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1. **Secure Photo:** This secure photo was built using GIMP blurring filters (e.g. Gaussian, clothify, and oilify) along with a prominent distorted visible email address watermark. This digital "camouflage" will defeat almost all face matching algorithms - in spite of the fact that my 3 year old grandson has no problem identifying me from this photo. It protects my privacy in two ways. (1) Harvesting it from the Internet, and adding it to a database of photos that will be digitally compared with CCTV surveillance photos will not work. (2) The photo has built-in two factor authentication (2FA). The prominent email address watermark prevents a web site from maliciously displaying my photo while attempting to associate it with any other person besides me. Similarly if a site were to maliciously display my photo without my permission in order to imply my association with them then it would be trivial for anyone who may be suspicious of their claim to challenge the site by asking me for a verification email. And it would be interesting to consider adding an Eurion currency watermark that would fool Photoshop software along with high quality printers and scanners into believing that the watermarked photo is a banknote in order to prevent it from being manipulated or printed. The general field of obscuring personal information is referred to as de-identification. There was an Israeli

company, *D-ID* now defunct, that specialized in obscuring high quality images without using any blurring filters which could not be used in automated password verification scanners!↵

2. **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.↵
3. **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.↵