

Avraham “Abe” Bernstein | CV

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Last Update: 2025-03-11

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 technology
 - Internet TV
 - cybersecurity
 - bioinformatics
 - accessibility
 - factory automation
 - VLSI CPU design
4. I am an expert generalist and an autodidact polymath¹. 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 much simpler to use than *Jinja2* and just as useful *except* where template inheritance is needed, *but* unfortunately 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. Browse the links below (typically preceded by the *right pointing triangle* symbol "►") that describe the details of my career. They will reveal a long history of "home runs". I am especially proud of my inventions in the fields of bioinformatics and accessibility (and here) even though they are not in the application domains where I usually work.

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 mathematics²**
 - 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.↵