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 especially inventing new algorithms. I provide considerable value added to my clients.
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[1]. 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*
   - Jinaj2, 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.

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 "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); 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 Syntezza 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**[2]
    - 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

This document was designed in *pandoc* (*FOSS*) *Markdown* under *Ubuntu*. *Pyexpander* (*FOSS*) was used for macro preprocessing. Two formats were automatically generated at the same time, (1) PDF (using the *wkhtmltopdf* plugin), and (2) HTML. As is standard in the hi-tech industry, the mandatory PDF format incorporates a single line for the employer name, and usually a two line headline about the details of the task. Superficially the HTML version mimics the same format. The PDF task description is a link into the HTML version, where the HTML version uses the HTML `<details>` tag to optionally allow viewing the full description of the task. This design is similar to a web news site with a short description of headlines that enables clicking to access details. The advantage of this scheme is that most HR departments do not allow their readers to contact the candidate for further details without first having an official interview which is a major process. This scheme short circuits this dilemna to the advantage of both the reader and the candidate. For my source code see: https://github.com/avraham-bernstein/avraham-bernstein.github.io/tree/master/cv.

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.↩