

## Robert Ackermann

Computer Engineer | Technical Manager | Scientific Programmer and Researcher  
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### Summary

Outstanding accomplishments in software development, analog and digital hardware design, technical management, and scientific research during a career split primarily between radio astronomy and financial transaction processing. Consistent on-time delivery of high-quality managed and individual projects meeting specifications and budget. Performance is attributed to hard work, planning, research, and a penchant for risk mitigation achieved by early testing of modules, components, and ideas through simulation and prototyping. An avid learner of new technologies combined with wide-ranging experience in current technologies:

#### Radio Astronomy

- C, C++, Java, Python, and MATLAB (Octave) programming and analysis
- C, assembly language, and HDL firmware development
- distributed systems and TCP/IP network programming
- digital signal processing
- control systems
- terrestrial and celestial reference frames; and time standards
- signal detection and image processing
- microwave RF engineering
- Linux, database, and network administration
- HTML5/CSS3/JavaScript, jQuery, LAMP, NoSQL, and Amazon Cloud
- electronics lab equipment: oscilloscopes; logic, spectrum and network analyzers
- analog and digital electronics design, SPICE analysis
- PCB CAD, manufacture, and fine-pitch assembly

#### Transaction Processing

- ATM/POS control and networking
- message formats and comms. protocols
- encryption and security
- redundancy and high-availability
- accounts reconciliation
- COBOL, C, and Pick/BASIC programming
- relational databases and SQL

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### Education

#### M.S. Computer Science

##### University of Massachusetts - Amherst, 2003

Distributed systems, machine learning, and A.I.

#### B.S. Computer Engineering

##### University of Massachusetts - Amherst, 1996

The realization of a PC-based videophone was the subject of an undergraduate thesis project which involved mounting CMOS image sensors in the film plane of cameras, designing digitizers, implementing DCT-based and wavelet video and audio codecs, and developing communications code.

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### Experience

#### Consulting Computer Engineer (2013 - 2015)

##### SETI Institute - Mountain View, CA

Developed embedded microcontroller electronics, firmware, test scripts, and control software for managing cryogenics, vacuum, power, ventilation, and sensors that support high-sensitivity feeds for a radio telescope array.<sup>1</sup>

#### Senior Software Scientist/Engineer (2000 - 2011)

##### SETI Institute - Mountain View, CA

Lead architect and developer of a radio telescope array control system. Wrote functional descriptions, requirements specifications, technical memos, and held design reviews in an academic R&D project environment that was a joint venture between U.C. Berkeley and the SETI Institute.

Proposed and implemented, as a CORBA alternative, a remote procedure call over message queue distributed system based on Java serialization, reflection, TCP/IP sockets, and JNI that glued servers representing telescope resources and legacy astrometric libraries with modern scripts and GUIs.<sup>2</sup>

Developed antenna embedded microcontroller electronics, networked with central control room servers and workstations, for remote monitor and control of azimuth and elevation tracking motors, position encoders, Dewar temperature, LNA bias voltages, signal-chain gain, and sensors.<sup>3</sup>

Built telescope back-end instruments such as an experimental beamformer and packet-switched dig-

ital correlator which met critical funding milestones through the demonstration of interferometry and was used to verify antenna surface accuracy using holography.<sup>4</sup>

Established a big data store, multi-host processing, and LAMP stack in the Amazon Cloud for delivery of raw and Fourier-transformed telescope data to SETI citizen scientists.

Performed advanced digital signal processing research searching for artificial signals of extraterrestrial origin in a high-performance computing environment.

**Systems Engineer (1998 - 2000)**  
**Bank of America - San Francisco, CA**

Full-stack technical consultant and developer for an online system that provided commercial customers secure browser-based access to financial data.

**Senior Programmer/Analyst (1996 - 1998)**  
**Ultradata - Pleasanton, CA**

Developed and maintained user interface, accounting, database, communications, and reconciliation software that operated financial institutions throughout the United States.

**Technical Manager (1986 - 1995)**  
**GFS Financial Services - Landover, MD**

Managed equipment, software, vendors, and technical staff of a high-availability data center that interfaced hundreds of automated teller machines located throughout the Mid-Atlantic states with regional banks and international financial networks. Served as lead systems and communications programmer.

Evolved a mediocre-quality vendor-delivered software system into a profitable venture by carefully implementing improvements to increase transaction throughput, maximize availability, stamp out transaction errors, and streamline accounts reconciliation.

Built a comprehensive automated teller machine and bank host simulation test environment which resulted in error-free implementations.

Contributed hardware and software innovations such as the construction of a modem clock synchronization circuit that facilitated the smooth transfer of automated teller machines from dedicated leased

lines to a less expensive consolidated corporate network.

Developed and marketed a data communications monitor for inspection of data packets framed by asynchronous, binary synchronous, and bit-oriented protocols.<sup>5</sup>

**Programmer (1984 - 1986)**  
**IBM Entry Systems Division - Boca Raton, FL**

Created hardware and software tools for testing and assessing backwards compatibility (e.g., address bus, I/O, interrupts, and system calls) of prototype personal computer models with prevalent peripheral hardware and applications.<sup>6</sup>

————— **Research** —————

**Selective Harmonic Elimination in PWM**

Research into optimal pulse sequences applicable to efficient solar power DC-to-AC synthesis and AC motor control.<sup>7</sup>

————— **Publications** —————

**The Allen Telescope Array: The First Widefield, Panchromatic, Snapshot Radio Camera for Radio Astronomy and SETI**, IEEE, 2008, co-author<sup>8</sup>

**Communications with Extraterrestrial Intelligence**, State University of New York Press, Albany, 2011, Chapter 4, "A New Class of SETI Beacons that Contain Information," contributing author<sup>9</sup>

————— **References** —————

1. <http://acknode.net/dokuwiki/doku.php?id=rfa:antonio>
2. <http://ackrman.net/seti/jsda>
3. <http://ackrman.net/seti/antenna-boards>
4. <http://ackrman.net/seti/beamformer>
5. <http://ackrman.net/nordack>
6. <http://priorart.ip.com/IPCOM/000062653>
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8. <http://arxiv.org/pdf/0904.0762.pdf>
9. <http://www.sunypress.edu/p-5256-communication-with-extraterrest.aspx>