

Daren Scot Wilson

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Electronics and Software Engineer * Troubleshooter

Energetic results-oriented engineer. Over 15 years experience in electronics, instrumentation, calibration and computing for scientific and engineering applications. Strong aptitude for outside-the-box problem solving, troubleshooting, emphasizing performance, feature functionality, and scalability.

Outstanding Accomplishments

- Created cover image for National Geographic, Dec 2006
- Saved Chrysler a quarter million dollars
- Pioneered practical 3D rendering of CT scan data

Professional Experience

Univ. of Central Florida, Orlando Software Researcher 2008-present
Key player in a cutting edge emerging planetary science group. Expert in translation of code between IDL and Python/numpy code for exoplanet research using the Spitzer infrared space telescope. Invent new ways of displaying 3D data from atmospheric simulations for analysis and public release, using VTK, Qt, Python and C++.

Space Science Institute, Boulder CO Image Analyst, 2003-2008
SSI is the home for CICLOPS, the scientists responsible for processing and archiving images from the Cassini spacecraft at Saturn. Image processing, spatial calculations using C++, IDL, Python.

- Invented a new algorithm to generate a corrective flatfield for the Cassini spacecraft's Narrow Angle Camera, allowing scientific analysis and public release of previously defective images of Saturn, its rings and its moons. In absence of any means to obtain proper calibration data, excellent results were obtained by use of bandpass filters, aggressive noise reduction, and a specially designed quasimedian calculation. Memory constraints required handling data in 16-bit fixpoint format.
- Assembled the Cassini mosaic image "In Saturn's Shadow" that appeared on the Dec. 2006 cover of National Geographic. Visit <http://ciclops.org/view.php?id=2230> for the official image release.

ARC Science, Loveland CO Software Developer 2001-2002
A small specialty company converting satellite data into spectacular cloud-free images of Earth, suitable for print and animations. Inventor of the Omniglobe display system.

- Discovered a powerful codec to allow smooth replay of a high-resolution turning Earth animation which otherwise wouldn't have been deliverable to the client.
- Sped up performance of an in-house 3D movie renderer from taking several days to several hours to create a movie, by selective use of machine code, addition of bounding boxes, and other algorithm improvements.

Chrysler Proving Grounds, Chelsea Mich.

Software Engineer 1997-2001

As a consultant with ASG Renaissance based in Southfield Michigan, helped design and build a new data acquisition system for the brake testing department.

- Saved Chrysler over a quarter million dollars by creating software in C++ to safely and reliably operate in-car data acquisition units. Wrote a device driver for the interface card, reverse engineered the GPIB protocol, and designed a full-screen large-text display suitable for test track drivers. more flexible and easier to configure than the vendor-supplied software.
- Designed and wrote an interpreter for a scripting language for desktop plotting and automatic report generation.

Experience Prior to 1997

Perceptron, Farmington Mich.

Software Developer

Wrote EE-friendly test software and device drivers for this maker of industrial machine vision products. Checking of electronics schematics, parts lists. Programming in Delphi and C++.

Essential Technology, Pontiac Mich.

Graphics Software Developer

Key player in developing the first easy to use estimation software for the metal roofing industry.

Wrote software in Pascal, C++, and VB for factory material optimization, report generation.

- Developed a salesperson-friendly CAD program for creating project estimates.
- Clobbered the competition's market at trade shows in direct comparison demos.

Tomo Medical Imaging, Southfield Mich.

Software Developer

Small entrepreneurial company dedicated to development of 3D neurosurgeon-friendly software for visualizing, measuring CT scanner data.

- Removed difficult view control based on Euler angles with an easy intuitive trackball-style interface.
- Sped up resection by factor of ten using lookup tables, profiling and well-chosen assembly code

Stanford Linear Accelerator Center, Palo Alto CA

Calibration Technician

Developed testing and calibration procedures and software for Final Focus beam position monitors.

Programmed in Turbo Pascal, Fortran.

- Uncovered in the electronics design the root cause of a long-standing calibration problem that prevented valid calibration at high beam intensities.

Other Experience

- Testing of thermoelectric generators and coolers
- Designed multipurpose waveform generator for physics student lab use
- Assistant Director of pledge drives at WTVS in Detroit
- Installed a 4kW solar PV panel system using a Zomeworks tracking mount

Education

RETS Electronics Schools, Detroit - Industrial Electronics Technician
Oakland University, Rochester MI - BS Physics
Indiana University, Bloomington IN - PhD Program Physics
Specs Howard School of Broadcast Arts Southfield MI - Radio/TV Production
WTVS-56, Detroit - TV Production Internship
Colorado State University, Fort Collins, Colorado - PhD Program Physics

Affiliations and Memberships

Boulder Digital Arts
ACM SIGGRAPH
IEEE student member, Electron Devices
Mensa - Editor of "The M Particle" newsletter

Professional Publications

"Cassini Observes the Active South Pole of Enceladus" published in Science (vol. 311, 10 March 2006, p. 1393) (co-author with C Porco et al)
"Beam Trajectory Acquisition System for the Arcs of the Stanford Linear Collider" J. L. Pellegrin, M. C. Ross, B. D. Scott and D. S. Wilson, Proceedings of the IEEE Particle Accelerator Conference

Technical Skills, Knowledge and Tools

Electronics: analog, digital, TTL, CMOS, transistors, vacuum tubes, QUCS, GSPICE, soldering, PCB design, prototyping, audio, video, small-scale solar PV with charge pump circuitry, ADCs and DACs, calibration of lab instruments, oscilloscopes, spectrum analyzers etc.

Physics: quantum mechanics, quantum field theory, high energy particle theory and experiment, nuclear theory, simulation, celestial mechanics, JPL NAIF SPICE, solid state theory, Monte Carlo computation.

Platforms and Operating Systems: Linux, Windows 95 to XP, 8-bit microprocessors

Programming and Software Development: C, C++, assembly, Haxe, Ruby, Python and Numpy, IDL (Interactive Data Language), Matlab/Octave, MySQL. Writing extensions/addons for Python, Ruby, IDL. Developing new domain-specific languages, file formats.

Graphics: POV-Ray, Radiance, Yafray, Inkscape, GIMP, VTK, JPEG, PNG, TIFF, 3D geometry, raster and vector algorithms, color theory, image processing