Tom H. Rafferty

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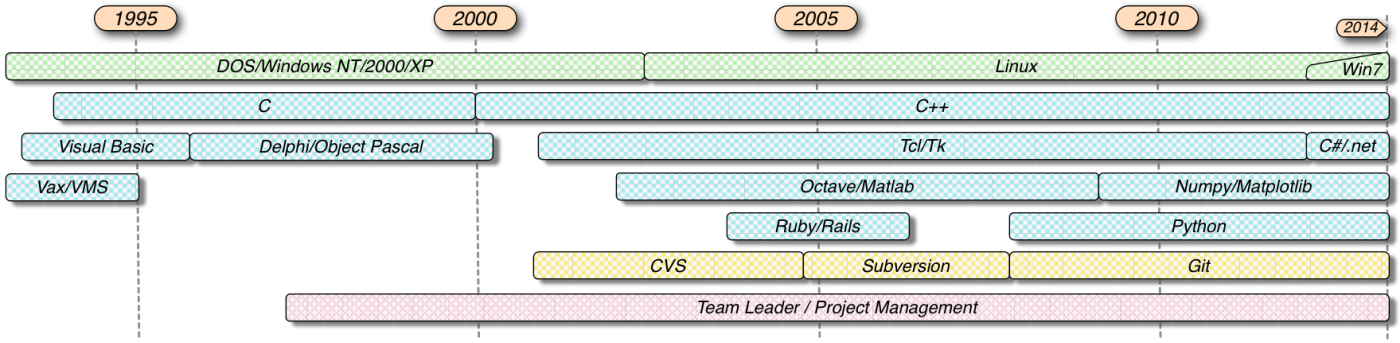
Technical leader for start-up technology companies with extensive experience in complex hardware and software products. Expertise in large system architectures, control/motion systems and image processing systems. Solid skills in the areas of problem solving, team/project management and logistics. Demonstrated ability to quickly adapt to new technologies and disciplines with ease. *Serious love for learning new things.*



Skills Overview

Development: C/C++, STL, Boost, Python, C#/.net, Tcl/Tk, Git, JSON, numpy, matplotlib, Octave/Matlab, Jenkins, CORBA/OmniORB, SQLite, CAN/CANopen/MilCAN, zeromq, ARM7 Cortex, SWIG, Geolocation, SDR (software define radio), Image Processing/Machine Vision, Matrox MIL, Cognex Vision, PowerPC/AltiVec, DSP.

Operating Systems: Linux (RHEL 5/6, Ubuntu/Mint), Windows NT/2000/XP/7, Mac OS X

Professional Experience

Briggo Coffee Haus, Austin, TX — July 2013 to Present

Senior Software Engineer/Automation Team Lead – Kiosk Operations

Briggo develops the Coffee Haus Kiosk. Marketed as a fully-automated "Robotic Barista", the system provides customers with barista-quality drinks ordered on-demand from the web and mobile devices.

- Software team lead of coffee kiosk system which had multi-axis robotics, CAN network of embedded modules (i.e., espresso, frothing, additives, etc), rules engine-based scheduling and task optimization, and queue time estimation. Led multiple refactor efforts which increased reliability and throughput, and improved overall user-experience. Added new features and optimizations as necessary.
- Debugging and tuning of the motion control system and optimized motion profiles for increased throughput.
- Led the adoption, deployment and training of Redmine issue tracker, wiki, and Git workflows.
- Architected next-generation software for kiosk control and management.

Ticom Geomatics, Austin, TX — Jun 2012 to July 2013

Senior Software Engineer – Sensor Group

Worked in the sensor design group on RF-based geolocation systems used for COMINT, SIGINT and ELINT applications. *Cleared for Top Secret Information based on a Single Scope Background Investigation completed on April 9, 2013 by Office of Personnel Management (OPM).*

- Designed and implemented a client-server system which utilized a drone-based RF scanning system (software defined radio) used to obtain a PSD (power spectrum density) of a specified frequency range. Written in C/C++ (with heavy use of STL/Boost libs), and involved kernel-level drivers on the client side and a server which had a socket-based Google Protocol Buffer interface.
- Built a GUI system using python and matplotlib for displaying real-time PSD (power spectrum density) data and control of system.
- Wrote utilities using python/numpy for data analysis of FFT integrity, data flow/throughput, and network testing.

McDonald Observatory (The University of Texas), Austin, TX Sep 2008 to Oct 2012

Software Team Lead (Project Coordinator) – HETDEX Project (Hobby-Eberly Telescope Dark Energy Experiment)

The HETDEX project involved a major upgrade to the Hobby-Eberly telescope (4th largest in world), including rewriting the control system and instrumentation software using modern software engineering technologies.

- Designed component-based architecture for a distributed Observatory Control System, using object-oriented techniques throughout and utilizing modern (and proven) design patterns. System is used for full control of the telescope and execution of observations using embedded Python interpreter. Low-level hardware connectivity built on top of standard OS device drivers. Written in C++ under RHEL6 x64.
- Distributed nature of system involved implementing a highly reliable network communication system using a JSON document-based messaging scheme, utilizing standard POSIX sockets as well as CORBA.
- Developed the core routines for trajectory generation, telescope mount model, metrology control loops, pointing and tracking (used SLALIB), FITS file archival, image processing, CCD data de-interlacing.
- Embedded system to connect to remote USB cameras and provide a socket-based communication channel to control cameras and transfer image data to client system.
- Led team of four software engineers using (some) agile project management techniques. Put together development tool chain and utilities including use of Git, Jenkins (CI), Bugzilla, and a wiki.

Molecular Imprints, Inc., Austin, TX Apr 2002 to Dec 2008

MII develops Imprint Lithography tools for the semiconductor and hard-disc drive markets.

Senior Image Processing Engineer

- Developed the Interferometric Alignment System, an embedded system with Linux-based host used to control high precision alignment on next-generation Imprint Lithography tool. Worked with patent lawyer to obtain intellectual property rights to system novelties (US Patents 20100038827, 20090147237, 20090148032, 20090169662).
- Created the Image Processing Control System, an object-oriented system which uses machine vision and image processing to control alignment system on Imprint Lithography tool.
- Team Lead for Alignment Productization project, which involved taking prototype components and fast-tracking their development into a reliable, customer-friendly system.
- Developed the Automated Dispense Calibration System, a Windows-based utility used to automatically calibrate signal characteristics of sub-nanoliter dispenser.
- Led team through the design and integration of a robotic front-end (EFEM) to facilitate factory automation for a high-throughput Imprint Lithography tool.
- Leader for all image processing hardware selection, setup and calibration.

Interactive Silicon, Austin, TX Feb 2000 to Feb 2002

Created technologies used to easily add real-time compression capabilities to servers and PC systems.

Senior Software Engineer/Team Lead

- Developed user mode applications that served as diagnostic and configuration tools for a set of kernel mode device drivers under linux and WinNT.
- Developed device drivers for WinNT used to monitor and characterize IOCTL traffic, then produce a summary of metrics which helped determine if a system would be a good candidate for our technology.
- Managed team that created next generation suite of applications including Control Panel Applet and Performance Monitor Counters extending capabilities to make products Windows-friendly. Included porting to Linux.

Performance Engineering Group Manager

- Spearheaded new performance group to ensure products adhered to industry benchmarks. Grew team to three performance engineers. Worked closely with engineering teams from Compaq, Intel, and Dell.
- Managed growth of testing capacity from 8 clients to over 120, with a variety of server technologies and operating systems. Managed a 24/7 “crunch-time” of testing to facilitate the rapid development of critical device drivers.

Asyst Technologies (formally Progressive System Technologies), Austin, TX May 1994 to Feb 2000

Asyst develops semiconductor fab automation and containment solutions.

Team Leader and Software Engineer

- Led multidiscipline "A-team" through development of next generation product, from design conception to fully qualified system. Final product was on time and exceeded original performance goals.
- Created the Lot Verification System, which utilized multiple CIM interfaces, including SECS I/II.
- Developed flat panel cassette indexer, which integrated with multiple process tools.

Special Projects and Component Technology

- Developed OCR/Vision application which utilized a PCI vision card to detect and decode scribe IDs, barcodes, and 2D matrix symbols.
- Evaluation and selection of current and future automation components, such as robots, substrate aligners, and motion control technology used on various products.

The Dow Chemical Company, Houston, TX Jan 1989 to May 1994

System Analyst

- Created the Global Drawing Production system. Co-developed core API functions for Drawing Creation system.
- Learned a lot about the VAX/VMS environment.
- *Other Position Held:* Mechanical Engineer, HVAC design group.

Education

Texas A&M University, College Station, TX Sep1983 to May 1988

Obtained BS degree in Mechanical Engineering, with a specialty in Automation/Robotics. Courses included FORTRAN programming, CAD/CAM, Robotics Design, Microprocessors, Thermo and Fluid Dynamics.

Professional Development Center, University of Texas, Austin, TX Jan, 2008

Successfully completed courses required for certificate in *Leadership Skills for Managers Certificate Program*. Courses included *Building Personal Leadership Skills, Managing Projects, Team Leadership Skills, Emotional Intelligence, Strategic Planning,* and *Nineteen Strategies for Successful Leaders.*

Publications

New Control System Software for the Hobby-Eberly Telescope
Astronomical Data Analysis Software and Systems (ADASS) XX (http://trafferty.github.io/ADASS_2010_PublishedPaper.pdf)

Shared Patents

Interferometric Analysis Method for the Manufacture of Nano-Scale Devices; Alignment Using Moire Patterns
United States 20100038827; 20090148032

Spatial Phase Feature Location; Enhanced Multi Channel Alignment
United States 20090147237; 20090169662

Selected Home Projects (https://github.com/trafferty)

- ***Google Calendar Combiner:*** GoogleAppEngine-based application used to combine events from multiple google calendars into a simple color-coded JPEG image that ultimately would get published on a Chumby system.
- ***Garage Door Monitor:*** A RaspberryPi-based system used to monitor the state of my garage door and trigger appropriate events/alarms based on inputs and/or time of day. Recently added motion sensing to the mix.

Interests

Mountain biking/cycling, DIY projects, automation, Astronomy, snowboarding, brewing beer, family time.