

Personal Details

Name	Timothy Brown
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Key Skills	Scientific Programming, HPC Architect, C, Fortran, MPI, HDF, UNIX systems

Education

Masters of Science (Physics)

UNIVERSITY OF WESTERN AUSTRALIA, WESTERN AUSTRALIA 1999
My Masters of Science was conducted via research. The research and thesis describes the development and operation of cryogenic optical frequency cavities. The reference is used in a stabilized laser system to produce laser light with very high frequency stability. The design of the reference encompasses optical, mechanical, electronic and cryogenic considerations.

Bachelor of Science with Honours

UNIVERSITY OF WESTERN AUSTRALIA, WESTERN AUSTRALIA 1996
My honours thesis was entitled "Laser Frequency Stabilization". It was shown that a reference cavity controlled to temperatures near the point at which the coefficient of thermal expansion crosses zero could improve laser frequency stability. This involved practical experimentation and development of computer simulations on Solaris platforms using finite element modeling software.

Tertiary Entrance Examination

AQUINAS COLLEGE, WESTERN AUSTRALIA 1992
The subjects studied: physics, calculus, applicable mathematics, chemistry, geography and English.

General Cambridge Examination 'O' Level

ASSUMPTION ENGLISH SCHOOL, SINGAPORE 1991
The subjects studied: physics, additional mathematics, mathematics, biology, chemistry, geography, English literature, English and German.

Professional Employment

Senior Research Application Specialist

RESEARCH COMPUTING, UNIVERSITY OF COLORADO AT BOULDER 2014 – Present
The High Performance Computing Center at the University of Colorado

Provide support and work with academics and researchers to meet research goals through utilization of CU's High Performance Computing (HPC) resources. This includes HPC software design, performance analysis, modeling and optimization, and novel and emerging architectures. Other duties involve teaching courses and tutorials in HPC.

Software Engineer

DEVELOPMENTAL TESTBED CENTER 2010 – 2014
A collaboration between NOAA, NCAR and CIRES at University of Colorado Boulder.

The lead software engineer for community support of the Hurricane Weather Research and Forecasting (HWRF) model. In this role I wrote parallel (MPI, OpenMP) applications in Fortran and C to address operational Numerical Weather Predictions (NWP), specifically endian binary interoperability and the parallelization of the Space and Time Multiscale Analysis System (STMAS) within the Local Analysis and Prediction System (LAPS). I was pivotal in implementing a common repository for research and operations to facilitate accelerated development, rigorous testing and scientific interoperability.

Senior Software Engineer

ONTARIO INSTITUTE FOR CANCER RESEARCH 2008 – 2010
A centre of excellence in cancer research with a focus on prevention, early detection, diagnosis and treatment of cancer.

Developed and implemented applications for the post processing analysis of Cancer Genomic data from next generation high throughput sequencing machines. Strongly interacted with researchers in Genomic laboratories and Bioinformaticans. The data analysis was implemented primarily in C using OpenMP, MPI and HDF to leverage the clustered environment with a web application front end.

IT Architect/Sr Unix System Administrator

ONTARIO INSTITUTE FOR CANCER RESEARCH 2007 – 2008
A centre of excellence in cancer research with a focus on prevention, early detection, diagnosis and treatment of cancer.

Involved in the creation of a High Performance Computing (HPC) environment consisting of over 1500 nodes and 2 petabytes of storage. The compute hardware consists of multi-core Intel Xeon CPUs with 16 to 256 gigabytes of RAM interconnected with 10 gigabit ethernet. Storage access is provided over NFS by multiple BlueArc and NetApp systems.

Software Engineer

CENTRE FOR WATER RESEARCH, PERTH, AUSTRALIA 2005 – 2007
A world leader in the sustainable future of natural aquatic systems.

Developed software to manage aquatic systems in real time. This development included research, design and production of a distributed computational architecture. This development included all stages in the product life cycle – consultation with key stakeholders through to the online commissioning.

Optical Physicist

AUSTRALIAN ANTARCTIC DIVISION, DAVIS, ANTARCTICA 2003 – 2004
The Australian government division controlling all Antarctic research and operations.

Conducted research aimed at monitoring the middle to upper atmosphere. This was an over-winter position. In this position I was responsible for the operation of a wide variety of instruments, from laboratory spectrometers, radiometers to computers servers and databases. My role was to collect, reduce and analyse data focusing on the mechanisms related to global climate change.

Research Officer

UNIVERSITY OF MELBOURNE, MELBOURNE, AUSTRALIA 2003
One of Australia's most prestigious Universities with an international reputation for high quality research and teaching.

Involved in advanced imaging, post processing and data analysis of Magnetic Resonance Images (MRI) and Magnetic Resonance Spectroscopy (MRS). Research and teaching areas span physics, computer science and neurology.

Unix System Architect

TUCOWS INC., TORONTO, CANADA 2001
Second largest domain name registrar with www content and advertising.

Researched the application of new technologies to current business processes and assessed any implications this may have on existing architectural infrastructure. Migrated current infrastructure toward an integrated, zero-maintenance architecture using "best-of-breed" solutions which leveraged previous investments.

Senior Unix System Administrator

TUCOWS INC., TORONTO, CANADA 2000
Second largest domain name registrar with www content and advertising.

In this role I managed the Sun systems of Tucows Inc. and Opensrs. I was employed to administer the servers in the e-commerce section of domain name registration and the WWW advertising and content.

Unix System Administrator

ALCATEL TELECOMMUNICATIONS, ZÜRICH, SWITZERLAND 1999 – 2000
A world leader in telecommunications and the Internet.

In this role I maintained the Sun systems of Alcatel Schweiz and Wavetek Wandel Goltermann. I gained experience in Veritas and expanded my knowledge in Oracle and SAP.

Programming Experience

Employed in Research and the Information Technology sector for over 10 years I have worked in a variety of environments. During my university studies I completed courses in Physics and Computing. Computational physics courses concentrated on high level languages and programs, such as Mathematica, Matlab and LabView.

I have experience in the following languages and programs:

C Over ten years experience concentrating on scientific applications, HPC parallelization, magnetic resonance imaging, mathematical, statistical analysis. Low level I/O, real-time tasks (on a RealTime Linux machine) for data acquisition, interfacing systems and laboratory equipment, such as digital servo loops, digital voltmeters, PID controllers, PLLs.

Fortran Numerical Weather Predictions (NWP) and Computational Fluid Dynamics (CFD) using MPI and OpenMP for numerical methods and algorithms on massively parallel HPC systems.

Java Writing programs for field data acquisition, management and visualization. Employing a Model View Controller (MVC) architecture, using J2EE, Swing, Java Server Pages, XML and JDBC.

Matlab Building front ends for visualization and imaging programs, data acquisition and CFD programs including database access and networking interfaces (TCP/IP and UUCP). The networking interfaces allowed the remote access to experimental data.

Python Over ten years experience writing scientific applications, addressing weather prediction, bioinformatics, magnetic resonance imaging and optical systems. Interfacing data acquisition programs with databases and XML/HTML to enable web based control of programs (CGI), also used in system administration scripts for automation.

Shell Scripting Writing scripts for the automation of general and administrative tasks and numerical weather prediction workflows in bash, ksh, sed and awk.

Batch Systems SLURM, Moab/TORQUE, IBM/Platform Load Sharing Facility (LSF), LoadLeveler, Sun Grid Engine (SGE).

Operating Systems Linux (Debian, RedHat, CentOS, SuSe), AIX, Solaris/SunOS, OS X, UNIX, BSD.

Personal Interests

I have been actively involved in photography, hiking, randonee and cross country skiing, rafting and travel.

I have been trekking extensively in North America, following my experiences in Antarctica, Europe, South-East Asia, New Zealand and Australia.

I have a comprehensive computing background: including a knowledge of various languages and packages, such as C, FORTRAN, Matlab, Python, Perl, JAVA, HDF5, netCDF, Tcl/Tk, IDL, LabView and many others. These skills have been developed through my natural interest in programming in Linux, a UNIX environment.