

Hugh Merz

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Education

B.Sc. Co-operative Honors Physics, University of Waterloo, 2002

Honors and Awards

- Graduated with Deans List Honors
- Appointed to the Deans Honor List during 6 consecutive terms
- G.A. Bakos Book Prize for astronomy, 2002
- Sir Isaac Newton Upper Year Scholarship, 2001
- Sir Isaac Newton Physics Entrance Scholarship, 1997, 78th out of over 5000

Work Experience

Lead High Performance and Technical Computing Consultant	SHARCNET, Laurentian University
Sudbury, Ontario	August 2010 – Present

- In addition to duties described in the *HPC Programming Specialist* Position (*below*), I am responsible for:
 - facilitating communication between management and staff
 - mentoring and assisting consortium consultant staff
 - chairing group meetings and conducting regular one-on-one meetings with staff
 - serving on the steering committee of the technical staff of Compute Canada
 - assessing and evaluating organizational performance and initiatives

HPC Programming Specialist	SHARCNET, Laurentian University
Sudbury, Ontario	August 2007 – August 2010

- Provide programming and system utilization support to diverse HPC research projects spanning a wide range of technical and scientific computing fields
- Assist and educate local, consortium and national HPC users through a multitude of support mechanisms and training initiatives, including seminars, workshops, symposiums, direct consultation and dedicated long term project support
- Assist in the evaluation and procurement of new HPC equipment and software
- Provide consultation to all levels of the SHARCNET organization and it's national counterpart, Compute Canada, including participation in technical advisory committees and working groups
- Lead consortium efforts to identify, profile and optimize resource intensive projects, as well as provide technical assessments for dedicated resource allocation competitions

Scientific Parallel Programmer / System Administrator	Canadian Institute for Theoretical Astrophysics, University of Toronto
Toronto, Ontario	May 2002 - July 2007

- Simultaneously operated in multiple roles within the institution, including dedicated research programmer and primary HPC system administrator
- Responsible for developing astrophysical simulations, data-analysis programs and systems software, for use on a variety of HPC computing platforms, using MPI and OpenMP, C/C++, Fortran, Python, SQL and shell scripting
- Additionally responsible for the administration and maintenance of Beowulf computing clusters and other HPC equipment, including software and hardware installation, configuration, troubleshooting, repairs, and optimization
- Frequently assisted members of the institute, collaborators and students with programming and facility usage , including occasional seminars and workshops

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Antenna Engineering Assistant	Antenna Engineering Group, <u>Research In Motion Limited</u>
Waterloo, Ontario	May 2001 – September 2001

- Work involved analytical and numerical theoretical research as well as laboratory research and development in the area of antenna engineering and electromagnetics
- Acquired a basis for radio-frequency laboratory work, including laboratory device operation and techniques in electronics
- Projects completed had a direct impact on final product

Scientific Programmer	<u>Canadian Institute for Theoretical Astrophysics,</u> University of Toronto
Toronto, Ontario	September 2000 – April 2001

- Completed work term and part-time work during a school term as a scientific programmer
- Responsible for porting astrophysical simulations to parallel processing environments utilizing MPI, OpenMP, Fortran 77/90 and C
- Required self teaching of Message Passing Interface, as well as learning high performance / parallel computation techniques and underlying theory
- Worked independently with little supervision

Research Assistant, Laboratory Technician	<u>Department of Physics and Astronomy</u> University of Waterloo
Waterloo, Ontario	January 2000 – August 2000

- Completed work term as a Research Assistant, worked part-time during a school term as a Laboratory Technician in the Dr. Idziak's X-Ray Diffraction Laboratory
- Main tasks included experimental design and device manufacturing
- Thorough knowledge of the experiments to be performed, different disciplines of physics, and engineering processes were all crucial in the designing of equipment
- Frequent use of machine shop facilities as well as electronics skills in order to build devices and assemble apparatuses
- Met and coordinated projects with the staff and faculty of the Physics Department

Research Assistant	<u>Fuel Channel Thermalhydraulics Branch,</u> <u>Atomic Energy of Canada, Ltd.</u>
Chalk River, Ontario	September 1999 – December 1999

- Main tasks were computer programming, data analysis and modeling of data
- Heavy usage of Fortran, curve-fitting programs (TableCurve 2D/3D)
- Improvements were made to existing nuclear reactor thermalhydraulics models

Flight Dynamics Analyst	<u>Flight Dynamics Operations,</u> <u>Telesat Canada</u>
Gloucester, Ontario	May 1998 - August 1998, January 1999 - April 1999

- Main tasks were computer programming and data analysis
- Primary tools included Fortran, C, Facemaker, MS Office, Telesat's Flight Dynamics System and Lockheed Martin's Dynamic Spacecraft Simulator
- Authored reports that directly influenced satellite operations and planning
- Created software for use in satellite operations and analysis
- Presented information on a new satellite to the space systems division

Computer Proficiency

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- Expert Fortran, MPI and OpenMP programmer with 10 years of parallel programming experience on HPC systems, including world-class systems such as the BlueGene/L supercomputer and the Ranger Sun Constellation Linux Cluster at the University of Texas
- Avid Linux user with more than 6 years of professional administration experience
- Experience with a wide range of HPC programming, debugging and optimization tools
- Experience with contemporary HPC architectures and programming methods including GPGPU, Cell, FPGAs and their use in heterogeneous cluster environments
- Working knowledge and professional experience with Bash, C, SQL, Python, Perl, HTML
- Experienced in commercial Unixes as well as Microsoft/Apple operating systems

Teaching

Fall 2009: [The UNIX Operating System](#)

Department of Mathematics and Computer Science, Laurentian University

Publications

The Theory and Simulation of the 21-cm Background from the Epoch of Reionization

Shapiro, P.R., Iliev, I., Mellema, G., Pen, U.L., Merz, H., 2008

The Evolution of Galaxies through the Neutral Hydrogen Window AIP Conference Proceedings

Simulating cosmic reionization

Iliev, I., Shapiro, P.R., Mellema, G., Merz, H., Pen, U.L., 2008

Teragrid '08 Proceedings

Scaling Performance of CubePM and TVD MHD on Blue Gene

Merz, H., 2006

[Blue Gene Applications White Paper](#)

Simulating cosmic reionization at large scales -I. The geometry of reionization

Iliev, I., Mellema G., Pen, U.L., Merz, H., Shapiro, P.R., Alvarez, M.A., 2006

Monthly Notices of the Royal Astronomical Society, Volume 369, Issue 4, pp. 1625-1638

Towards optimal parallel PM N-body codes: PMFAST

Merz, H., Pen, U.L., Trac, H., 2005

New Astronomy, Volume 10, Issue 5, pp. 393-407

An in situ method for observing wax crystallization under pipe flow

Guthrie, S.E., Mazzanti, G., Steer, T.N., Stetzer, M.R., Kautsky, S.P., Merz, H., Idziak, S.H.J., Sirota, E. 2004

Review of Scientific Instruments, Volume 75, Issue 4, pp. 873-877

References

References, academic transcript and work placement transcript provided on demand