

Cristián Maureira-Fredes

M.Sc. Computer Science
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Education

2013 to present **Doctoral Student**, *Max-Planck-Institut für Gravitationsphysik (Albert-Einstein-Institut)*, Potsdam-Golm.
Germany

2011 to 2013 **M.Sc. Computer Science**, *Universidad Técnica Federico Santa María (UTFSM)*, Valparaíso.
Chile

2006 to 2013 **Informatics Engineering**, *Universidad Técnica Federico Santa María (UTFSM)*, Valparaíso.
Chile

Experience

Vocational

Current **Doctoral studies**, Working in the numerical modelling of *Dense Stellar systems* and *Super Massive Black Hole* binaries.
My research consist mainly in astrophysical simulations using *HPC* techniques and facilities, to analyse the evolution and properties of different systems.
Most of the *analysis* is done processing large simulation data sets, from which a proper extraction of useful astrophysical and statistical information is crucial. , Max-Planck-Institut für Gravitationsphysik (Albert-Einstein-Institut), Germany.
<http://aei.mpg.de>

- May 2012 to Nov 2012 **Master Student (Visitor)**, *Thesis development, “A modular, GPU-based, direct-summation N -body integrator”*, Max-Planck-Institut für Gravitationsphysik (Albert-Einstein-Institut), Germany.
<http://aei.mpg.de>
- 2011 to 2012 **CTI-HPC Research Assistant**, *Researching Astronomical simulations using GPU technologies, High Frequency Trading using HPC in Neural Networks evaluation and Image processing and analysis, among others HPC-related projects. Officially named a CUDA Teaching Center by NVIDIA (<https://blogs.nvidia.com/blog/2011/09/16/new-cuda-research-and-teaching-centers-announced/>)*, Center for Technological Innovation in High Performance Computing (CTI-HPC), UTFSM, Chile.
- 2011 to 2012 **ALMA-UTFSM Representative and developer**, *In charge of the national and international representation of the group, coordinating projects in collaboration with the ALMA observatory (including ESO and the NRAO) at the UTFSM.*, Computer Systems Research Group (CSRG), UTFSM, Chile.
<http://www.csrg.cl/portal/alma-utfsm/>
- 2010 to 2011 **ARM Research Group Member**, *Research ARM architecture systems for the development of micro computers with low energy consumption*, Computer Systems Research Group (CSRG), UTFSM, Chile.
<http://www.csrg.cl/portal/arm/>
- 2010 to 2011 **Assistantship**, *Courses: Scientific Computing I and II*, Informatics Department, UTFSM, Chile.
- Jul 2009 to Dec 2012 **ALMA-UTFSM Research (Project leader)**, *Project Leader of “Software development, Analysis and Testing (SWAT)” Team, in charge of the development of the software at the ALMA-UTFSM group. Maintenance and development of the “Sampling System GUI” project, build upon the ALMA Common Software framework (ACS). Member of “Alarms Configuration GUI”, with the propose of develop a Graphic User Interface to configure the ACS Alarms System.*, Computer Systems Research Group (CSRG), UTFSM, Chile.
<http://www.csrg.cl/portal/alma-utfsm/>
- 2008 to 2009 **Project Leader**, *μ Bot Interface, A Generic Graphic User Interface to robotic platform control, a “Vortex Labs” project, PIE>A Sponsored Project. Application written in Python/C++ using Qt as graphical library. The software included a procedure editor, and a embedded python console to test the routines, XML profiles of each robotic system, etc.*, Computer Systems Research Group (CSRG), UTFSM, Chile.
<http://www.piea.usm.cl>

- Aug 2008 to Jul 2009 **ALMA-UTFSM Research (Assistantship)**, Member of “Software development, Analysis and Testing” (SWAT) Team, in charge of the development of the software at the ALMA-UTFSM group. Maintenance and development of the “Sampling System GUI” project, build upon the ALMA Common Software framework (ACS). Member of the “Repackaging ACS for Embedded Systems project” (RAES), with the purpose of separate the runtime and development proper of this build environment, Computer Systems Research Group (CSRG), UTFSM, Chile.
<http://www.csrg.cl/portal/alma-utfsm/>
- 2008 to 2009 **Project Member**, Rescue Live CD, A Fedora official Spin release, PIE>A, Sponsored Project, Computer Systems Research Group (CSRG), UTFSM, Chile.
<http://www.piea.usm.cl>
- Mar 2008 to Dec 2008 **Assistantship**, Courses: Informatics Fundamentals I and II, Informatics Department, UTFSM, Chile.
- 2007 to 2008 **Computer Laboratory Assistantship**, Member of the “Computer Laboratory” (LabComp), laboratory in charge of all the Informatics Student services, performing the tasks of system administrator (networking, scripting and teaching Linux courses), UTFSM, Chile, <http://labcomp.inf.utfsm.cl>.
- Jul 2007 to Dec 2007 **Programming Laboratory Assistantship**, C language, Informatics Department, UTFSM, Chile.

Experience

Internships

- 2011 **Professional Internship**, *Universidad Técnica Federico Santa María (UTFSM)*, Center for Technological Innovation in High Performance Computing (CTI-HPC), Working on the implementation of a gravitational N -body simulations, using different parallel computing approaches, as POSIX threads, OpenMP and GPU Computing.
UTFSM, Chile
- 2010 **Professional Internship**, *Universidad Técnica Federico Santa María (UTFSM)*, Working on the implementation of an alternative to the ALMA Common Software (ACS) Notification Channel using OpenDDS, <http://www.opendds.org/>, UTFSM, Chile.
<http://csrg.cl>
- 2009 **Professional Internship**, *Associated Universities Incorporated (AUI)*, *Joint ALMA Observatory*, Working on the Java implementation of the ACS Basic Control Interface Specification; Developing a GUI tool to perform test in the Antenna Bus Master (ABM) and Teaching a Python Course to engineers and scientific people working on the ALMA project., Operations Support Facility (OSF), Atacama, Chile.
<http://www.almaobservatory.cl>

Computer Science skills

Main Languages	C/C++, Python, Bash	Secondary Languages	Fortran, Java, Octave/Matlab, R
Parallel Computing	CUDA, OpenMPI, OpenMP, POSIX threads	Libraries	SciPy, ZeroMQ, cuBLAS, Intel MKL, Cython, Boost, SWIG
SysAdmin	LAMP, Git, SVN, Jenkins	WebDev	PHP, CSS, HTML, JavaScript, MySQL, Jekyll
Scripting	Python, Bash, awk, sed	Learning	Scala, Go, Haskell

Languages

Spanish	Native	-
English	Fluent	<i>Speaks, Reads, Writes, Technical and Colloquial</i>
German	Competent (A2)	<i>Speaks, Reads, Writes</i>
Catalan	Competent (A1)	<i>Speaks, Reads, Writes</i>

Events attendance

- 2016 **Astro-GR, What can we learn from the first GW detection? (Invited talk)**, Centro de Ciencias de Benasque Pedro Pascual, Benasque, Spain, <http://astro-gr.org/astro-gr-benasque-2016-what-can-we-learn-from-first-gw-detection/>.
- 2014 **IAU Symposium #312 (Poster presentation)**, GraviDy, a modular, GPU-based, direct-summation N -body integrator, Star Clusters and Black Holes in Galaxies across Cosmic Time, Beijing, China.
<http://silkroad.bao.ac.cn/iaus312>
- 2014 **Astro-GR, Gravitational waves and electromagnetic observations of dense stellar systems. (Invited talk)**, INAF- Osservatorio Astronomico di Roma, Frascati, Italy, <http://members.aei.mpg.de/amaro-seoane/astro-gr-rome/>.
- 2013 **3rd Aarseth Meeting, on stellar dynamics.**, Argelander-Institut für Astronomie (University of Bonn), Bonn, Germany.
- 2012 **Astro-GR, Black Hole Growth in the Universe (Invited talk)**, GraviDy: A modular direct N -body GPU integrator, National Astronomical Observatories (NAOC) of Chinese Academy of Sciences (CAS), Beijing, China.
<http://astro-gr.aei.mpg.de/Astro-GR@Beijing-2012>
- 2011 **First Argentine GPGPU Computing School for Scientific Applications**, Facultad de Matemáticas, Astronomía y Física, Universidad Nacional de Córdoba, Argentina, <http://www.famaf.unc.edu.ar/grupos/GPGPU/EscuelaGPGPU2011/>.
- 2011 **High Performance Computing School, (HPC School)**, CMCC, Universidad de la Frontera (UFRO), Temuco, Chile.
<http://www.cmcc.ufro.cl/hpc2011/>
- 2010 **Pan-American Advanced Studies Institute, (PASI)**, Scientific Computing in the Americas: the challenge of massive parallelism, UTFSM, Valparaíso, Chile.
<http://www.bu.edu/pasi/>
- 2009 **EVIC, VI Latin-american summer school in Computational Intelligence, III Latin-american Robotics summer meeting**, Universidad de Chile, Santiago.
<http://www.uchile.cl>
- 2008, 2009 **ALMA Common Software Workshop**, Attendance to the general meeting and final course (Advanced) of the ALMA Common Software workshop, developed in joint with the Atacama Large Millimeter/Submillimeter Array project., UTFSM, Valparaíso.
- 2009 **Scientific Computing Advanced Training, (SCAT)**, Final SCAT Meeting & Satellite School, UTFSM, Chile.

2007-2009 **Encuentro Linux**, National gathering of Linux users, Chile.
<http://encuentrolinux.cl>

Honour and Awards

- Master studies scholarship in Chile (2012) given by the “Comisión Nacional de Investigación Científica y Tecnológica (CONICYT)” to students with a good academic performance and participation in academic research projects (www.conicyt.cl).
- Initiation in Scientific Research Scholarship (PIIC) given by “Dirección General de Investigación y Postgrado UTFSM”, to students with academic research interest during Master studies. (<http://www.dgip.utfsm.cl/>)
- Master studies scholarship, financial help, and 100% fee payment exemption due to good academic performance. “Dirección General de Investigación y Postgrado UTFSM” (<http://www.dgip.utfsm.cl/>)
- Be a part of the *Honour List*, to the best academic performance among all the students in the Universidad Técnica Federico Santa María (UTFSM). Years 2007, 2008, 2009, 2010, 2011 and 2012.

Publications

C. Maureira-Fredes and P. Amaro-Seoane. [GraviDy: a GPU modular, parallel \$N\$ -body integrator](#). (*submitted*), February 2017.

P. Amaro-Seoane, **C. Maureira-Fredes**, M. Dotti, and M. Colpi. [Retrograde binaries of massive black holes in circum-binary accretion discs](#). *A&A*, April 2016.

L. del Valle, A. Escala, **C. Maureira-Fredes**, J. Molina, J. Cuadra, and P. Amaro-Seoane. [Supermassive Black Holes in a Star-forming Gaseous Circumnuclear Disk](#). *apj*, 811:59, September 2015.

Paola Arce, **Cristián Maureira**, Roberto Bonvallet, and César Fernández. [Forecasting high frequency financial time series using parallel FFN with CUDA and ZeroMQ](#). In *Information and Telecommunication Technologies (APSITT), 2012 9th Asia-Pacific Symposium on*, pages 1–5. IEEE, 2012.

Roberto Bonvallet, **Cristián Maureira**, Paola Arce, Cesar Fernández, and Alejandro Cañete. [A Feed Forward Neural Network in CUDA for a Financial Application](#). In *WCCM2012 Tenth World Conference on Computational Mechanics*, 2012.

Cristián Maureira, Arturo Hoffstadt, Joao López, Nicolás Troncoso, Rodrigo Tobar, and Horst von Brand. [High performance graphical data](#)

trending in a distributed system. In *Proceedings Vol. 7740 Software and Cyberinfrastructure for Astronomy*, 2010.

Jorge Avarias, Joao López, **Cristián Maureira**, Heiko Sommer, and Gianluca Chiozzi. [Introducing high performance distributed logging service for ACS](#). In *Proceedings Vol. 7740 Software and Cyberinfrastructure for Astronomy*, 2010.

Cristián Maureira, Rodrigo Fernández, Gabriel Zamora, Jaime Peldoza, Esteban Bombal, and Jaime Martínez. [Desarrollo de una interfaz genérica para la investigación y desarrollo de plataformas robóticas](#). In *Proceedings del XXI Encuentro Chileno de Computación, Jornadas Chilenas de Computación*, 2009.

Arturo Hoffstadt, **Cristián Maureira**, Sergio Morales, Gabriel Zamora, Ignacio Villacura, and Horst von Brand. [Construcción de un Sistema Operativo Auto-Arrancable para Rescate de Sistemas Dañados](#). In *Proceedings del XX Encuentro Chileno de Computación, Jornadas Chilenas de Computación*, 2008.