

# Raymond Angéllil

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## CONTACT INFORMATION

Institute for Computational Science  
University of Zurich  
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## INTERESTS

signal processing, relativistic satellite tracking, machine learning, molecular simulation, gravitational waves, non-equilibrium thermodynamics, relativistic dynamics, statistical mechanics

## EDUCATION / POSITIONS

### **Institute for Computational Science, University of Zurich (UZH)**

**Postdoctoral researcher**, Theoretical Physics / Computational Science (September 2012 - present day)

- Fields: computational chemistry, signal extraction/filtering, relativistic satellite tracking, gravitational wave theory

### **Institute for Theoretical Physics, University of Zurich (UZH)**

**Doctoral Candidate**, Theoretical Astrophysics (October 2009 - August 2012)

- Thesis Topic: *Galactic Centre Clocks as Probes of Gravity*
- Supervisor: Prasenjit Saha, Uroš Seljak

### **Swiss Federal Institute of Technology Zurich (ETHZ)**

MSc in Theoretical Physics (September 2007 - January 2009)

- Thesis Topic: *Next-to-leading order antennae in LHC massive particle production*
- Supervisor: Aude Gehrmann-de Ridder

### **University of Cape Town (UCT)**

**Honours in Theoretical Physics** (2006)

- Thesis topic: *Conformal Brans-Dicke gravity via a Branelike approach*
- Supervisor: Gary Tupper

**BSc in Physics and Applied Mathematics** (2003 - 2005)

- Thesis Topic: *The Exterior Algebra of Projective geometry in motion*
- Supervisor: Henri Laurie

## SKILLS

### **Environments**

- Strong proficiency: C, python, matlab, maple, mathematica, L<sup>A</sup>T<sub>E</sub>X, Unix OSs (OSX, FreeBSD, Linux), distributed computing APIs, git
- Familiarity: java, fortran, html, C++, FORM

### **Techniques**

- monte-carlo methods, hamiltonian systems, detection statistics, fisher information, spectral methods, wavelet decomposition, matched filtering, relativistic dynamics, n-body simulation, kinematic nucleation models, optimisation techniques, supercomputer-generated data reduction pipelining and automation, interactive data animation, wave optics, tensor geometry

### **Languages**

- English, German

FIRST-AUTHORED  
PUBLICATIONS

*Homogeneous SPC/E water nucleation in large molecular dynamics simulations*, **R. Angéllil**, J. Diemand, K. Tanaka, H. Tanaka, *Journal of Chemical Physics* (2015), submitted

*Geometrical vs Wave Optics under Gravitational Waves*, **R. Angéllil**, P. Saha, *Phys. Rev. D* 91 124007, (2015)

*Bubble Evolution and Properties in Homogeneous Nucleation Simulations*, **R. Angéllil**, J. Diemand, K. Tanaka, H. Tanaka, *Phys. Rev. E* 90, 063301, (2014)

*Spacecraft Clocks and Relativity: Prospects for Future Satellite Missions*, **R. Angéllil** et. al, *Phys. Rev. D* 89, 064067 (2014)

*Clocks around Sgr A\**, **R. Angéllil**, P. Saha, *Monthly Notices of the Royal Astronomical Society*, 444, 3780-3791 (2014)

*Properties of Liquid Clusters in Large-Scale Molecular Dynamics Nucleation Simulations*, **R. Angéllil**, J. Diemand, K. Tanaka, H. Tanaka *J. Chem. Phys.* 140, 074303 (2014)

*Galactic-center S Stars as a Prospective Test of the Einstein Equivalence Principle*, **R. Angéllil**, P. Saha, *The Astrophysical Journal Letters*, Volume 734, Issue 1 (2011)

*Testing General Relativity with Galactic-centre Stars*, **R. Angéllil**, P. Saha, *The Galactic Center: a Window to the Nuclear Environment of Disk Galaxies*. *Astronomical Society of the Pacific* 439, 242 (2011)

*Towards Relativistic Orbit Fitting of Galactic Center Stars and Pulsars*, **R. Angéllil**, P. Saha, Merritt, D. *The Astrophysical Journal*, Volume 720, Issue 2 (2010)

*Relativistic Redshift Effects and the Galactic-Center Stars*, **R. Angéllil**, P. Saha, *The Astrophysical Journal*, Volume 711, Issue 1 (2010)

FURTHER  
PUBLICATIONS

*Molecular Dynamics Simulations of Bubble Nucleation in Dark Matter Detectors*, P. Denzel, J. Diemand, **R. Angéllil**, *Phys. Rev. X* (2015), submitted

*Testing General Relativity and Alternative Theories of Gravity with Space-based Atomic Clocks and Atom Interferometers*, R. Bondarescu, A. Schärer, P. Jetzer, **R. Angéllil**, P. Saha, A. Lundgren, ICNFP 2014

*Simple improvements to classical bubble nucleation models*, K. Tanaka, H. Tanaka, **R. Angéllil**, J. Diemand, *Phys. Rev. E* (2015), accepted, in print.

*Testing scalar-tensor theories and parametrized post-Newtonian parameters in Earth orbit*, A. Schärer, **R. Angéllil**, R. Bondarescu, P. Jetzer, A. Lundgren, *Phys. Rev. D* 90, 123005 (2014),

*Direct Simulations of Homogeneous Bubble Nucleation: Agreement with CNT and no Local Hot Spots*, J. Diemand, **R. Angéllil**, K. Tanaka, H. Tanaka, *Phys. Rev. E* 90, 052407 (2014)

*Free energy of cluster formation and a new scaling relation for the nucleation rate*, K. Tanaka, J. Diemand, **R. Angéllil**, H. Tanaka, *J. Chem. Phys.* 140, 194310 (2014)

*Large Scale Molecular Dynamics Simulations of Homogeneous Nucleation*, J. Diemand, **R. Angéllil**, K. Tanaka, H. Tanaka, J. Chem. Phys. 139, 074309 (2013)

TALKS

*Simulating Vapour-to-Liquid Nucleation in Large Systems*, Institute for Low Temperature Science, Hokkaido University, Sapporo (February 2014)

*Large Scale Molecular Dynamics Simulations of Nucleation*, Particle-Based Methods III: Fundamentals and Applications, Stuttgart (September 2013)

*Large Scale Molecular Dynamics Simulations of Nucleation*, Thermodynamics, Manchester (September 2013)

*The Physics of Nucleated Droplets in Lennard-Jones Molecular Dynamics Simulations*, International Conference on Nucleation and Atmospheric Aerosols, Fort Collins, Colorado (June 2013)

*Spacecraft Clocks and General Relativity*, Space-time Explorer Quest Workshop, European Space Research and Technology Centre, ESA, Noordwijk (May 2013)

*Clocks around Sgr A\**, Société Suisse d'Astrophysique et d'Astronomie, General Assembly, ETH Zürich (October 2012)

*Clocks around Sgr A\**, Thirteenth Marcel Grossman Meeting on Recent Developments in Theoretical and Experimental General Relativity, Astrophysics, and Relativistic Field Theories, Stockholm (July 2012)

*Motion of the Galactic LSR*, James Binney Astrophysics *Problematik* Workshop, Magdalen College, Oxford (August 2010)

*Towards relativistic orbit fitting of Galactic center stars and pulsars*, 19th International Conference on General Relativity and Gravitation, Mexico City (July 2010)

*Detecting GR effects via galactic center S-star redshifts*, Conference on Probing Strong Gravity near Black Holes, Charles University, Prague (February 2010)

*Testing General Relativity with Galactic-Centre Stars*, Galactic Center Workshop, Shanghai (October 2009)

FURTHER  
ATTENDED  
MEETINGS

Swiss National Supercomputing Centre (CSCS) User Community meeting, ETH Zurich (June 2014)

Swiss National Supercomputing Centre (CSCS) hybrid Cray XC30 Piz Daint Introduction, Lugano (March 2014)

Bridging electromagnetic astrophysics and cosmology with gravitational waves, University of Milano Bicocca (March 2011)

Stars and Supernovae in Galaxies, St. Luc, Vaud (September 2010)

Workshop on LISA Massive Black Hole Binaries in the Cosmic Landscape, University of Zürich (February 2010)

SPEEDUP Workshop on High-Performance Computing, EPFL Lausanne (September

2009)

HONOURS AND  
AWARDS

2014 CSCS award, 51 million CPU hours on supercomputer Piz Daint  
2012 PRACE award, 35.3 million CPU hours on supercomputer Hermit  
2009–2012 Forschungskredit scholarship - 100% External Ph.D Funding  
2006 UCT Physics dept. scholarship  
2005 UCT faculty scholarship  
2004 UCT entrance scholarship, Dean's Merit List  
2003 UCT entrance scholarship, Dean's Merit List

REFERENCES

Prof. Dr. Jürg Diemand	diemand@physik.uzh.ch	Group leader
Prof. Dr. George Lake	lake@physik.uzh.ch	Director of Institute for Computational Science
PD Dr. Prasenjit Saha	psaha@physik.uzh.ch	Doctorate Supervisor
Prof. Dr. Philippe Jetzer	jetzer@physik.uzh.ch	Prof. for General Rela- tivity