Benjamin Czaja

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https://benczaja.github.io

Education

Ph.D., Computational Science 2017-present
University of Amsterdam, Amsterdam, the Netherlands

Master of Science, Astronomy and Astrophysics 2016
University of Innsbruck, Innsbruck, Austria
University of Padua, Padua, Italy
University of Göttingen, Göttingen, Germany

Bachelor of Science, Physics 2012
University of Utah, Salt Lake City, Utah, USA

Professional Experience

Master's Research, University of Padua 2016
Performed N-body hydrodynamic simulations of star formation from colliding molecular clouds at the Italian National Astrophysics Foundation. Ref. Michela Mapelli
Tasks:

- Built smooth particle hydrodynamic code (C++) on parallel architecture.
- Developed star finding algorithm in Python to analyze 10^6 simulation particles.
- Visualized simulation snapshots with Python.

Astrophysics Laboratory, University of Göttingen 2015
Identified Solar prominences from the AIA 304 channel of the Solar Dynamics Observatory.
Tasks:

- Developed Python code to search ultraviolet images for prominences on the Solar limb.
- Visualized results in Python to check the accuracy of the code.

Research Assistant, University of Utah 2012-2014
Performed numerical stellar orbit determinations to search for minor merger events in Milky Way galaxy. Ref. Prof. Inese Ivans
Tasks:

- Developed C++ orbital integrator to track orbits of stars in the Milky Way.
- Gathered/Analyzed data from astronomical surveys; SDSS, HIPPARCOS.
- Visualized data with in Python.

Research Assistant, University of Utah 2011-2014
Calculated the measurable effect that the mass of the Milky Way has on observations of the Cosmic Microwave Background. Research published in the Physical Review. Ref. Prof. Benjamin Bromley
Tasks:

- Developed C++ N-body integrator to study solar system dynamics.
- Developed C++ numerical integrator to trace light rays through the Galaxy.
- Wrote/Edited published paper.

Teaching Assistant, University of Utah 2012
Taught the lab section of two Elementary Physics (PHYS 2015) courses at the University of Utah. Ref. Prof. Gernot Laicher
Tasks:
- Lectured and aided students in laboratory work
- Graded homework and exams

Skills

Computing
C/C++
Python
MPI
Super Mongo
MATLAB
HTML
CSS

Scientific Computing
Numpy
Matplotlib
Scipy
Pandas
LAPACK

Operating Systems
MAC OS X
Linux (Red Hat, Ubuntu)
Windows

Data Analysis
Least squares polynomial fitting
Noise reduction using convolution
Kolmogrov-Smirnov test
Linear regression

Software
Microsoft Office
Emacs
Sublime Text
LaTeX

Refereed Publications

Czaja, B., & Bromley, B. C. 2014, *Distortion of the cosmic microwave background by the Milky Way*, Physical Review D, 90, 047302.

Languages

Mother language: English
Basic knowledge: Italian (A2), German (A2)

Honors and Awards

Honorable Mention Poster Presentation 2016
Astrophysical Observatory of Asiago, Asiago, Italy
AstroMundus Category A Scholarship 2014
University of Innsbruck, Innsbruck, Austria
International GAIA school on Galactic Dynamics 2013
Universidad Nacional Autónoma de México, Mexico City, Mexico
Research Scholar Designation 2012
University of Utah
Martin Hiatt Outstanding Undergraduate Research Award in Physics 2012
University of Utah
Matching Undergraduate Research Opportunities Award 2012
Department of Physics and Astronomy, University of Utah
Undergraduate Research Opportunities Award (UROP) 2011
University of Utah

Presentations

Star formation from molecular cloud collisions 2016
Poster, AstroMundus retreat, Astrophysical Observatory of Asiago, Italy
Actions and angles of red clump stars in the Solar Neighborhood 2013
Oral, International GAIA School Mexico, Mexico City
Orbital parameters and Milky Way models 2012
Oral, University of Utah

Particle dynamics in the Galaxy's gravitational potential 2012
Poster, National Conference on Undergraduate Research, Ogden, Utah