

## Curriculum Vitae for Pia Zacharias

### Personal information

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### Summary

I am a physicist with more than ten years of experience in scientific computing. I obtained a PhD in astrophysics on numerical simulations of the Sun in 2010. My areas of expertise include statistical data analysis, signal processing, and the development of various feature recognition algorithms and visualization tools for big data. My analytical mindset and a solid background in physics provide me with a good foundation for finding solutions to complex problems. I am an experienced project leader, thriving to continuously develop my skills, while working either alone or in a team.

### Technical skills

Frameworks	NumPy, SciPy, Astropy, Pandas, Matplotlib, MPI, OpenMPI
Languages	Python, IDL/GDL, Fortran, C++, Matlab
Tools	Git, Mac OS X, Linux, Jupyter Notebook, Microsoft Office, LaTeX

### Education

2006 – 2010	PhD (Dr. rer. nat.) in physics from University of Freiburg, Germany. Thesis titled "Analysis of 3D MHD simulations of the solar corona"
2005 – 2006	Diploma degree in physics (Dipl. Phys.) from University of Freiburg with specialization in astrophysics and plasma physics. Thesis titled "Investigating stellar coronae using models of stellar structure"

## Professional experience

2006 – 2010	PhD student, Kiepenheuer Institute for Solar Physics, Freiburg, Germany. A 4-year appointment including 75% research training and 25% teaching/administration
2011 – 2013	Researcher (postdoc), International Space Science Institute, Bern, Switzerland with 25% administration/teaching responsibility
2013 – 2018	Researcher (postdoc), Institute of Theoretical Astrophysics, University of Oslo. A 4-year appointment including 15% course lecturing and 10% student supervision/mentoring
2018 –	Consultant, Expert Analytics

## Languages

English	Fluent
French	Basic
German	Mother tongue
Norwegian	Working knowledge

## Personal skills

Analytical skills	Ability to collect and analyze information and find solutions in a timely-efficient manner. Skilled in physics, math, programming and statistics
Communication	Condensing difficult material into a comprehensive language and grasp the bigger picture behind things
Creative problem solving	Breaking down problems into small, manageable parts. Solving problems by combining methods across disciplines
Flexibility	Adapt quickly and successfully to changing situations and environments
Project leadership and teamwork	Experience as project leader with both national and international collaborators. As a team member, I am open-minded and responsible, while working structured and result-oriented.

## Some interests and hobbies

Scientific outreach	Astronomy On Tap (astronomy for the public)
Sports and nature	Running, biking, skiing, track and field coach (national level)

## Extended descriptions of selected projects

Activity	Anomaly detection in a plant production process at Aker BioMarine
Role	Data Scientist/Consultant
Staffing	Team of 2
Description	The goal of this project was to obtain a better understanding of the sensor data to enable the business side to take steps to avoid slow-downs in the production process. We created an asset hierarchy and data model for the production process by interpreting the available Human Machine Interface (HMI) screens from the factory. Data access is obtained through wrapper functions for queries to a GoogleCloud database. I ran time-series analyses of sensor data to monitor data quality, product flow, correlations, anomalies, etc. to get insights on the various processes in the production line, such as filling rates, predictive maintenance and downtimes. All computations were performed using Python. The code is shared using GIT, enabling cooperation and versioning. Documentation in the form of Jupyter notebooks.
Tools	Git, GoogleCloud Database Platform, MySQL, Python, Excel, Jupyter Notebook
Activity	Analysis of magnetohydrodynamic models of the solar atmosphere
Role	Project leader
Staffing	Core team of 5, extended team of 10 collaborators
Description	This project on three-dimensional MHD models of the solar atmosphere aims at a detailed understanding of the underlying mechanisms, which lead to the high temperatures of the outer atmosphere of the Sun and other stars. I was leading the analysis part of the project, which includes carrying out numerical simulations on high-performance computing facilities and implementing new physics modules, as well as the analysis of synthetic spectra and their comparison with ground- and space-based solar observations.
Tools	Numerical modeling, statistical data analysis, image analysis, scientific writing (documentation, scientific reports), Python, Fortran, Git
Activity	Multi-wavelength analysis of magnetic bright points
Role	Project leader
Staffing	team of 4
Description	This project aimed at studying the structure of magnetic bright points (MBPs), small-scale, magnetic elements in various layers of the solar atmosphere. The study is based on the analysis of high spatial- and temporal-resolution image-sequences from the Swedish Solar Telescope on La Palma. MBPs were identified and tracked in the time-series of images, and various physical properties of MBPs were determined by means of statistical data analysis.
Tools	Image analysis, feature recognition algorithms, Python, scientific writing (documentation, scientific reports, master thesis), student supervision

Activity	Analysis of different wave-modes in MHD models
Role	Project leader
Staffing	team of 4
Description	In this study, we applied a wavelet power analysis to determine the frequency and power of various kind of waves that are present in the time-series of MHD simulations of the solar atmosphere. I developed unique analysis and visualization tools to investigate the power spectra of individual parcels of plasma, which has led to new insights on how and where energy is dissipated in various layers of the solar atmosphere.
Tools	Signal processing, numerical modelling, scientific writing (documentation, scientific reports)
Activity	International team leader at International Space Science Institute
Role	team leader (co-leadership)
Staffing	team of 12
Description	I was leading an international team of experts in a series of 3 one-week workshops on the coronal mass cycle at the International Space Science Institute (ISSI), Bern, Switzerland. This two-year project included proposal writing, assembly of the team, invitation of speakers, organization of scientific programme, leadership of the workshop, and writing of publications.
Tools	Project management, organization, scientific writing
Activity	European Solar Physics meeting and other scientific conferences and workshops
Role	Head/member of organizing committee
Staffing	8 committee members
Description	I was in charge of and member of several local and scientific organizing committees, such as the European Solar Physics Meeting, which is Europe's biggest solar physics community meeting with approximately 350 participants. I was responsible for organizing the programme, the planning of social activities, and providing information for participants. Between 2011 and 2014, I was supporting the organization of several workshops in the fields of Solar Physics, Earth Science and Cosmology. I was the scientific contact person for workshop attendees at the International Space Science Institute.
Tools	Project leadership, organisation and management