# Christian Blume, PhD

*Software Developer & Data Science Enthusiast*

*NZ Permanent Resident*
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🌐 *bloomen*
in *christian-blume*

## Summary

Experienced software developer and data science specialist with a demonstrated history of creating software for a variety of applications. Skilled in C++, Python, Rust, Linux, machine learning, data mining, and digital signal processing. Strong engineering professional with degrees in physics and geoscience. Author of popular open-source libraries. Website: `https://bloomen.github.io`

## Work Experience

Apr 19 - Mar 20 **Senior Software Developer** at **Mega Limited** in Auckland, New Zealand.
- Develop cross-platform software in C++ for Mega's desktop and mobile applications
- Implement new features and fix bugs in Mega's open-source SDK
- Improve the core engine that keeps files in sync between client and cloud
- Focus on highly efficient and scalable solutions
- Continuous integration, unit testing
- Tech: Linux, Windows, Mac, C++, C, Crypto, Qt, SQLite, gtest, inotify

Jul 16 - Mar 19 **Senior Software Engineer** at **Serato Limited** in Auckland, New Zealand.
- Build real-time applications (Serato DJ, Serato Studio) for the audio industry on Mac/Windows
- Develop object-oriented, multi-threaded, low-latency software in C++
- Improve graphical user interfaces using Qt and in-house GUI technology
- Develop new modules and frameworks along with maintaining existing software
- In-depth work with MIDI and audio interfaces and hardware
- Unit testing, mentor fellow developers, sharing knowledge in seminars
- Tech: Mac, Windows, C++, Python, Bash, SQL, SQLite, Qt, Boost, Juce, gtest, XCode, Visual Studio, LLDB, QML, Curl

Mar 14 - Jun 16 **Senior Software Developer, Team Lead** at **Fotech Solutions Ltd** in Calgary, Canada.
- Develop server-based Distributed Acoustic Sensing (DAS) applications on Linux
- Lead a team of four to five developers within an agile environment
- Build high-throughput, multi-threaded, high-performance software in C++ and CUDA
- Develop algorithms for data analysis, signal processing, and machine learning
- Design and implement novel noise floor estimation using support vector machines
- Real-time data processing, graph-based data flow, HDF5 data storage
- Unit testing, system testing in Python, and continuous integration
- Tech: Linux, C++, C, CUDA, Python, Ruby, Bash, SQL, SQLite, Qt, Boost, libunittest, Armadillo, NetCDF4, HDF5, LIBSVM, Eclipse, GDB, REST, Websockets, Curl

Jun 12 - Feb 14 **Software Developer** at **Blue Yonder GmbH** in Karlsruhe, Germany.
- Develop an automated cloud-based prediction service on Linux
- Object-oriented, highly-available software in Python and C++
- Build software for data analysis, web services, machine learning, user interaction
- Work with data scientists on improving predictions and feature understanding
- Build and test REST interfaces, in-depth work with relational databases
- Unit testing, system testing, and continuous integration
- Tech: Linux, Python, C++, Bash, SQL, Redis, PostgreSQL, EXASOL, Boost, CppUnit, NumPy, Pandas, Scikit, SciPy, Flask, GDB, REST, Nginx

Feb 09 - Apr 12 **Research Scientist** at **Freie Universität Berlin**, Germany.
- Predict stratospheric phenomena using machine learning and pattern recognition
- Compare methods such as neural networks and support vector machines including ensemble techniques
- Apply clustering techniques to gain insights and manage the feature space
- Develop high-performance applications to model high-dimensional, geophysical data
- Publish several peer-reviewed papers and present results at conferences
- Hold seminars in statistics and data analysis
- Tech: Linux, C++, Python, Matlab, Bash, NetCDF3, ROOT, TMVA, LIBSVM, FFTW, GDB, LaTeX

Sep 08 - Jan 09 **Intern** at **Siemens** in Munich, Germany.
- Build the prototype of a web interface for internal business processes using PHP and MySQL

Oct 07 - Jan 08 **Intern** at **IBM Research and Development** in Böblingen, Germany.
- Evaluate the Linux I/O Stack on an IBM Mainframe using C and C++

## Education

Feb 09 - Apr 12 **Doctorate degree** in **geoscience** from Freie Universität Berlin, Germany.
Areas of research: Atmospheric interactions, stratospheric weather and climate patterns, prediction and pattern recognition, machine learning. Develop software in C++, Python, and Matlab for machine learning, signal processing, and data analysis.
Thesis: *Statistical Learning to Model Stratospheric Variability*.
`https://refubium.fu-berlin.de/handle/fub188/13901`

Oct 05 - Jan 09 **Master's degree** in **physics** from Technical University Munich, Germany.
Specialized in particle and computational physics. Develop software in C++ for simulations and data analysis.
Thesis: *Simulation of Frictional Cooling*.
`https://bloomen.github.io/pub/simulation_of_frictional_cooling.pdf`

Feb 05 - Aug 05 **Study abroad** at Universitat de València, Spain. Majoring in physics.

Apr 03 - Feb 05 **Intermediate diploma** in physics from the University of Bonn, Germany.

## Technical Profile

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| Languages | English (fluent), German (native), Spanish (basic), Mandarin (elementary) |
| Mach. Learning | Linear Models, Neural Networks, Support Vector Machines, Decision Trees, Clustering, Model Selection, Ensemble Techniques, Feature Engineering |
| Operat. Systems | Linux/Unix, MacOSX, Windows |
| Programming | C++, C, Python, Rust, JavaScript, Java, Go, CUDA, Bash, UML, SQL, QML, Matlab |
| Libraries | BOOST, Armadillo, NetCDF4, HDF5, Qt, Juce, React, OpenMP, NumPy, Scikit, SciPy, Pandas, TensorFlow, Keras, IntelMKL, ROOT, TMVA, LIBSVM, OpenCV, FFTW, etc. |
| Databases | PostgreSQL, SQLite, EXASOL, MySQL, Redis |
| Networking | HTTP, Sockets, REST, SSH, XML |
| Tools | Eclipse, Xcode, Visual Studio, GDB, LLDB, Emacs, GCC, Clang, GIT, SVN, LaTeX |
| Miscellaneous | Low-Latency, High Performance, Unit Testing, Solid Presentation Skills |

## Recent Talks

Dec 2019 **A quick intro to Mega's open-source SDK** at Auckland C++ Meetup
`https://github.com/bloomen/talks`

Oct 2017 **Using tasks to simplify concurrency in modern C++** at Pacific++ conference
`https://youtu.be/xuL7rfkcWus`

May 2017 **transwarp - a header-only C++ library for task concurrency** at Auckland C++ Meetup
`https://github.com/bloomen/talks`

## Selected Authored Open-Source Projects

Hosted at `https://github.com/bloomen`

○ **cxxpool** - A header-only thread pool for C++
○ **densitas** - A C++ library for density estimation of regression problems
○ **featureimpact** - A Python package for estimating the impact of features on machine learning models
○ **libpca** - A C++ library for principal component analysis
○ **libunittest** - A portable C++ library for unit testing
○ **rsgrep** - A simple version of *grep* implemented in Rust
○ **transwarp** - A header-only C++ library for task concurrency

## Publications

Jul 2012    **Blume**, C., 2012: *Statistical Learning To Model Stratospheric Variability*. Doctoral thesis, Institute for Meteorology, Freie Universität Berlin. `https://refubium.fu-berlin.de/handle/fub188/13901`

Jul 2012    **Blume**, C. and K. Matthes, 2012: *Understanding and forecasting polar stratospheric variability with statistical models*. Atmos. Chem. Phys., 12, 5691–5701. `https://www.atmos-chem-phys.net/12/5691/2012`

Jun 2012    **Blume**, C., K. Matthes and I. Horenko, 2012: *Supervised Learning Approaches to Classify Sudden Stratospheric Warming Events*. J. Atmos. Sci., 69 (9), 1824–1840. `https://journals.ametsoc.org/doi/full/10.1175/JAS-D-11-0194.1`

Jul 2010    SPARC CCMVal, *SPARC CCMVal Report on the Evaluation of Chemistry-Climate Models*. V. Eyring, T. G. Shepherd, D. W. Waugh (Eds.), SPARC Report No. 5, WCRP-X, WMO/TD-No. X, 2010, C. **Blume** contributed to chapter 8. `https://www.sparc-climate.org/activities/previous-activities/ccmval`

Aug 2009    Bao, Y., A. Caldwell, D. Greenwald and C. **Blume**, 2009: *Frictional Cooling Demonstration at MPP*. Proceedings of COOL 2009, TUM1MCCO03, Lanzhou, China. `http://epaper.kek.jp/COOL2009/papers/tum1mcco03.pdf`

Feb 2009    **Blume**, C., 2009: *Simulation of Frictional Cooling*. Master's thesis, Max-Planck-Institute for Physics, Technical University of Munich. `https://bloomen.github.io/pub/simulation_of_frictional_cooling.pdf`

## Hobbies

○ Working out and hiking
○ Surfing, currently riding a 6'3 fish
○ Volleyball, in particular beach volleyball
○ Data science and open-source projects
○ Learning Mandarin

*Please contact me for any further information or references.*