Christian Blume, PhD

Software Developer & Data Science Enthusiast

NZ Permanent Resident
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bloomen
christian-blume

Summary

Experienced software developer with a demonstrated history of creating software for a variety of applications. Skilled in C++, Python, Rust, Linux, audio, graphics, physics, machine learning and data science. Strong engineering professional with degrees in physics and geoscience. Website: `https://bloomen.github.io`

Work Experience

Since Apr 19 **Senior Software Developer** at **MEGA The Privacy Company** in Auckland, New Zealand.
- Develop 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.
- Real-time applications (DJ, Studio) for the audio industry on Mac and Windows
- Object-oriented, multi-threaded, high-performance software in C++
- Develop and improve graphical user interfaces using Qt
- 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.
- Server-based Distributed Acoustic Sensing (DAS) applications on Linux
- Lead a team of four to five developers within an agile environment
- High-throughput, multi-threaded, high-performance software in C++ and CUDA
- Algorithms for data analysis, signal processing, and machine learning
- 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.
- Automated cloud-based prediction service on Linux
- Object-oriented, highly-available software in Python and C++
- 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, forecasting 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

Languages	English (fluent), German (native), Spanish (basic), Mandarin (elementary)
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, Monte Carlo, Unit Testing, Solid Presentation Skills
Mach. Learning	Support Vector Machines, Neural Networks, Linear Models, Decision Trees, Clustering

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`

May 2010 **Blume**, C., K. Matthes, I. Horenko, U. Langematz, 2010: *Investigating the Occurrence of Sudden Stratospheric Warmings with Non-linear Statistical Methods*. Talk, EGU General Assembly, Vienna. `https://www.researchgate.net/publication/252267695_Investigating_the_Occurrence_of_Sudden_Stratospheric_Warmings_with_Non-linear_Statistical_Methods`

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.