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These are the most influential milestones of my education and professional career.  
The portfolio is intended as a supplement to my Curriculum Vitae which is available online, too.  
If you need more in-depth information, don't hesitate to contact me. Thank you !

## Professional

### Tradegate AG, Berlin

2012 - now

- Software Engineer, stock exchange ([www.tradegate.de](http://www.tradegate.de))
- C++ backend, massively distributed system, approx. one million lines of code
  - portable framework, running on Linux and Windows
  - emphasis on reliability and throughput
  - data stored in Oracle and MySQL databases
  - some frontend coding in PHP, too
  - development tools: Eclipse, Bugzilla, in-house tools

### Project for BMW AG, Munich

2011

- Software Engineer, BMW's car head-unit ([www.bmw.com](http://www.bmw.com))
- C++ programming of the human-machine interface of upcoming BMW generations
  - close to 2 million lines of code (mainly C++)
  - cross-platform (development on Windows workstation, deployment on embedded system / QNX)
  - STL, Boost, in-house framework
  - device communication via MOST message bus
  - development tools: Visual Studio, Subversion, Jira

### Brainlab AG, Feldkirchen/Munich

2006 - 2010

- Software Engineer, Medical software ([www.brainlab.com](http://www.brainlab.com))
- ExacTrac® patient positioning software
  - system consists of approx. one million lines C++
  - Windows only, using MFC, STL, Xerces, ActiveX and in-house framework
  - software links to in-house and external hardware (linear accelerators) with TCP/IP and RS232/422
  - soft realtime requirements for certain tasks
  - Nvidia Cg shader based X-ray/CT scan image fusion implemented with OpenGL
  - development tools: Visual Studio, Bugzilla, Lint, Perforce, SourceSafe
  - documentation: many in-house tools, UML/Visio, Doxygen
  - spent about three weeks a year on customer/test sites, mostly California and Switzerland
  - patent pending on "Tracking Representations of Indicator Body Parts", (published as WO/2011/107145)

### Derdack GmbH, Potsdam (internship)

summer 2000

- Software Engineer, MessageMaster software suite ([www.derdack.com](http://www.derdack.com))
- SMTP-to-SMS forwarding server (sends email as SMS)
  - wrote converter transforming MIDI songs into Siemens and Sagem mobile phone ringtones
  - Windows, MFC, STL
  - development tools: Visual C++, SourceSafe

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## University

### Student Assistant (Hasso Plattner Institute, University of Potsdam) 2005

- Tutor for Computer Graphics I and II (courses taught at Bachelor level)
- creating and evaluating bi-weekly assignments (team of 3 tutors, I'm the only one without PhD)
- bi-weekly 45 minutes presentation in front of 120 students
- roughly 30% theory and 70% programming exercises in C++ and OpenGL
- voted best tutor in 2005 at the institute (election by students)

### Exchange Postgraduate Student (University of Technology Sydney) 2004

- (selection of the most relevant courses)*
- Advanced Image Synthesis Techniques
    - implemented a completely shader-based ray-tracer in C++
    - best student in class
  - Game Programming
    - consisted of several smaller projects (all C++/OpenGL), for example:
      - large scale data/texture handling: loading PK3 levels from id software games, e.g. Quake III
      - Artificial Intelligence: fast 2D/3D path finding
      - implemented sound, collision detection
      - best student in class
  - Building Intelligent Agents
    - wrote Java client that scans Gnutella Peer-to-Peer file sharing networks
    - deducts responsible persons (incl. Address and phone number) from their IP addresses
    - selected as one of the five best projects

### Bachelor Thesis (Hasso Plattner Institute, University of Potsdam) 2003

- Interactive Visualization of Mobile Phone Network in 3D City Models
- joint project with T-Mobile Germany
  - team of three students
  - Visual C++ with VRS scenegraph, Windows only
  - uses OpenGL, Qt3, STL
  - source control: CVS
  - documentation: UML/Visio, FMC, Doxygen, Word

### Student Assistant (Hasso Plattner Institute, University of Potsdam) 2001 - 2002

- (Computer Graphics) implementing features for VRS scenegraph
  - input file parser
  - generate Pixar Renderman compatible scene file output
- (Software Engineering) implementing a database for in-house administrative use
  - Java, SQL

### Cited Papers

- "The OpenGL Shading Language", cited by NVIDIA Corp. patent #8,044,951 ("Integer-based functionality in a graphics shading language") 2005
- "Bildbasiertes Constructive Solid Geometry" on Goldfeather algorithm used by Mr. Jack Goldfeather himself in his course CS311 at Carleton College 2002

## High School

### Friedrichgymnasium Luckenwalde 1991 - 1998

- Abitur (equivalent to International Baccalaureate)
- final mark/grade: 1.1 (scale 1 – 6, lower means better), top 5% student
  - specialized in Maths, English, Computer Science and Politics
  - class representative for several years

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## Hobby Projects

**Bundeswettbewerb Informatik (National Computer Science Contest in Germany)** 1996 - 1999  
Best rank: 43 in 1997/98 (out of about 1000 participants)

### Publication

“Als die Bilder laufen lernten“

- German computer magazine “PC Intern”, issue December 1995
- 4 page article about my own x86 assembler-optimized FLI-movie playing library (predecessor of AVI)

### Internet

[www.stephan-brumme.com](http://www.stephan-brumme.com) / [brum.me](http://brum.me) since 1999

- the following is true for all my internet projects:

- running on an Apache web server (Debian Linux)
- backend consists of PHP, XML and MySQL / SQLite, front-end: HTML, CSS, Javascript
- more than 95% of the code was designed and written by me
- about 1000 visitors per day, on average 200 MByte traffic per day
- over 40 million hits (~2 million visitors) since 1999

### most relevant projects

[create.stephan-brumme.com](http://create.stephan-brumme.com) since 2011

- a blog covering programming related topics
- usually about C++, PHP, Javascript and OpenCL
- often includes code samples, live demos or downloadable executables

[photos.stephan-brumme.com](http://photos.stephan-brumme.com) since 2011

- pictures and videos I took while travelling the world
- intended to be a personal show-case for HTML5, CSS and Javascript
- automatic creation of image database (PHP, SQLite) by extraction meta-data from pictures / videos
- visual effects rely on jQuery/Fancybox library

[bits.stephan-brumme.com](http://bits.stephan-brumme.com) since 2008

- analysis of high-performance code snippets on x86 CPUs
- C and generated assembler output
- all HTML pages dynamically created on-the-fly from C code
- invokes my own syntax-highlighting processor and chart-generator
- long and detailed explanation of the ideas behind all these bit-twiddling tricks

[sunshine.stephan-brumme.com](http://sunshine.stephan-brumme.com) and [moon.stephan-brumme.com](http://moon.stephan-brumme.com) since 2004

- instant 2D and 3D computation of current day/night view of the earth respectively moon phases
- shades about 300k pixels/second with ray-tracing algorithm – just with a scripting language (PHP)

[wm2010.stephan-brumme.com](http://wm2010.stephan-brumme.com) 2010

- betting on soccer games of the world cup 2010
- intended to be much faster than anything available:
  - front page handles a total of 304 SQL queries in less than 100ms
  - using NoSQL techniques to buffer database results
  - with warm caches, front page is created in ~34ms
- live update of tables and graphics (progress bars, bet distribution etc.)

[oz.stephan-brumme.com](http://oz.stephan-brumme.com) 2004

- blog written in 2004 about my exchange study in Sydney
- my own template-based content management system, driven by PHP and XML
- automatic handling of images and videos (resizing, caching, extracting meta-data)
- including user comments

[status.stephan-brumme.com](http://status.stephan-brumme.com) since 2010

- live analysis of my Apache logfiles
- emphasis on Ajax/JSON for interactive page updates

**Note:** This document was updated on February 26, 2013. The most recent version can always be found online ([www.stephan-brumme.com/aboutme/vitae.html](http://www.stephan-brumme.com/aboutme/vitae.html))