

Gerhard Wesp's Curriculum Vitæ

gwesp@gmx.net

Holderenweg 2, CH-8134 Adliswil, Switzerland

mobile: +41 (0)78 620 42 40

office: +41 (0)44 668 1878

<http://gwesp.tx0.org/>

Portfolio

This is a reverse chronological list of projects to which I made key contributions:

- Design of modern Computer Vision techniques in order to detect man-made and natural structures in aerial and satellite imagery. Large-scale application of these algorithms on Google's imagery database.
- The Google Earth Flight Simulator. I initiated and led the project and developed the core simulation model.
- The ISO C++ standard currently lacks networking functionality. I wrote a proposal (N1925) to fill the gap. It will hopefully be part of a future version of the standard.
- The Diamond-ELITE DA42 trainer. I developed the physical model, integrated the G1000 and the control loading system. A DA42 trainer is worth about EUR 100k.
- For the ELITE PC-9M flight training device, I integrated the aircraft manufacturer's physical model and avionics components. Currently, ELITE builds a second identical copy of the device worth about EUR 1m.
- I contributed the fractal cover image for Benoît Mandelbrot's book *The Misbehaviour of Markets*.
- I developed the control algorithm for the electrical motors of a 5.2 megawatts Human Centrifuge (EUR 100m).
- Random number generators and tests to the pLab test suite at Salzburg's mathematics department.

Employment History

2005–present Member of Engineering Staff, Google, Zürich, Switzerland.

Besides being the leading search engine, Google also offers products for communication, web analytics and geographic information.

My greatest achievement at Google is the flight simulator. I initiated the project and ran it over a year until its successful launch in August 2007, taking care of product management as well as the technical side of things. I led 3 full-time engineers.

Other projects at Google I worked on:

- An archive of a world-wide network (handling several terabytes of data per day).
- Search quality improvement by analysis of WWW connectivity graph.
- C++ standardization.
- Computer Vision techniques applied to satellite and aerial imagery.

2003–2005 Director Research & Development (from 2004; before: engineering), ELITE Simulation Solutions, Zürich, Switzerland.

ELITE is a small manufacturer of training devices for professional pilots sold throughout the world.

My contributions were essential to the success of the PC9 simulator project (a flight training device for the Pilatus PC-9M two-seater aircraft) and many smaller projects. Specifically, I worked on:

- Integration of the sophisticated physical model into the PC9 simulator.
- Integration of 3rd party avionics devices into the simulators (Garmin G430 and G1000, Honeywell KLN900).
- Designing a new type of electromechanical control loading systems.
- Preparation and realization of flight tests (Beech King Air).
- Development from scratch of the core physical model for light aircraft simulators.
- Requirements specification and liaising with external partners like aircraft manufacturers, hard- and software suppliers, aircraft parts manufacturers.

I started as an engineer in 2003 and was subsequently promoted to Director of Research and Development.

The company continues to use and develop the technologies I created, e.g. my G430 and G1000 implementation and the physical model are used in an ever increasing number of simulators for the Diamond series of aircraft.

2001–2003 Engineering, AMST Systemtechnik GmbH, Ranshofen, Austria.

AMST is a medium-sized company focusing in highly realistic flight simulators and artificial gravity devices for training and aeromedical purposes.

I developed the optimal control algorithm that smoothly turns the electrical motors of the 5.2 megawatts Human Centrifuge for the Beijing Institute of Aviation Medicine. The algorithm is a beautiful example of state-of-the-art mathematical research applied to a nontrivial real-world problem.

1996–2003 Lecturer, Salzburg University.

I taught courses for mathematics and CS students, including Programming in C, Computer Graphics, Mathematical Software, Calculus, Topology, Discrete Mathematics, Number Theory, etc.

1998–2001 Researcher, Salzburg University (externally funded).

Funded by the Austrian Science Fund, I wrote my PhD thesis in Combinatorial Geometry. After the thesis was completed, I switched into Random Number Generation (RNG) and Cryptography. I implemented parts of the pLab's RNG test suite, wrote an open source AES implementation in C++ and gave talks at international conferences.

1996–1997 Systems Engineer, Dept. of Computer Sciences, Salzburg University (50%).

After finishing my Master's degree, I spent a year administering the department's heterogeneous UNIX network on a part-time basis beside my PhD studies.

Academic History

1996–2000 Salzburg University; PhD in Mathematics. Thesis completed in 1999, PhD awarded “sub auspiciis praesidentis” (comparable to *summa cum laude*), 2001.

1991–1996 Salzburg University; Mathematics and Computer Sciences. MSc in Mathematics, July 1996

Skill profile

Technical

- Mathematical modeling of complex systems.
- Electro-mechanical engineering and control.
- Technical and user documentation.
- Requirements specification.
- Software development.
- Realtime systems and buses.

Organizational

- Development processes.
- Coordination with external partners.

Leadership

- Task assignment, resource distribution.
- Dissemination of know-how.
- Conflict resolution.

Languages

I have a distinct interest in learning languages. Besides my native German, I fluently speak English and French. I can communicate reasonably well in Spanish and currently I'm learning Russian.

Honors and Awards

My PhD from Salzburg University was awarded under the auspices of the President of the Austrian Republic in 2001 (*sub auspiciis praesidentis*), an honor bestowed on far less than 1% of Austrian PhD students. In 1994 I received an award by the mathematics department for outstanding students.

Publications

Refereed papers

- *A note on the spectra of certain skew-symmetric $\{1, 0, -1\}$ -matrices.* Disc. Mathematics **258/1–3** (2002), 339–346.
- *The upper bound conjecture for arrangements of halfspaces.* Beiträge Algebra Geom. **42** (2001), no. 2, 431–437.

Working papers

- *Networking proposal for TR2.* ISO/IEC JTC1/SC22/WG21 (C++ Standards Committee) mailing (December 2005).

Theses

- *On the Upper Bound theorem for convex polytopes.* MSc thesis, Salzburg University (1996).
- *Counting certain covectors in oriented matroids.* PhD thesis, Salzburg University (1999).

Professional Membership

- ISO/IEC JTC1/SC22/WG21—The C++ Standards Committee.

Interests

I enjoy music, cinema, reading good books and various sports (jogging, bicycle, mountaineering). I wrote a program to create beautiful fractal images. I'm a private pilot (gliders and power planes) and spend much of my spare time working as a voluntary gliding instructor.