

Curriculum Vitae

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Name: Han-Wen Nienhuys

Sex: Male

Nationality: Dutch

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Objective

- To take on new challenges.
- To simplify complex problems.
- To share knowledge.

Professional interests

Software design and implementation, mathematical modeling techniques, numerical algorithms, linear algebra, music representation, digital typography.

Education

Formal education

PhD, Institute for Information and Computing Sciences, Utrecht University. 2003.

Engineering degree in applied mathematics (MSc equivalent, cum laude). Technical University Eindhoven, 1998. Graduation topic: analysis.

Courses

ASCI Course on Visualization and Virtual Reality, 2001. (ASCI is a Dutch graduate school)

Skills

Expert in: program design, coding and software engineering.

Programming language experience: C (1991–now), C++ (1996–now), Python (1998–now), Scheme (2000–now), Java (2000–2002) years, Quill (2004; Certified Quintiq Specialist).

Working knowledge of: Unix programming, Emacs, OpenGL, Java3D, Autoconf, Make, HTML, (Fedora) Linux, CVS, darcs, \LaTeX , METAFONT, Cocoa development, PostScript, Pango, SVG, PDF, LISP, Unicode.

Proficient at: giving presentations, scientific writing, and technical writing.

Languages: Dutch (native), English (fluent, reading and writing), Portuguese (speaking fluently, reasonable reading) German (reasonable reading), French (basic reading).

Work experience

March 2007–present Software Engineer, at Google Engineering Brazil.

March 2005–August 2006 Freelance consultant, owner of LilyPond Software Design (<http://lilypond-design.com>)

April 2004–February 2005 Consultant Advanced Planning & Scheduling and Software Engineer, at Quintiq Applications B.V.

Mar–Jun, 2003 Junior researcher at Utrecht University, Institute of Information and Computing Sciences.

1998–2003 Research assistant/PhD. student at Utrecht University, Institute of Information and Computing Sciences.

1996 Intern at the R&D department of Océ-Nederland B.V., writing software to simulate heat diffusion.

Teaching assistant for undergraduate courses in imperative programming and data structures (1998–2001).

Co-supervised MSc. student thesis-work. (2002 and 2005/2006)

Refereed for *Algorithmica*, special issue on shape algorithmics (2002), *IEEE Transactions on Visualization and Computer Graphics* (2004).

Software written

Open source:

1996–now *LilyPond*, <http://lilypond.org>: automated professional music typography. Design, implementation (80kloc C++, 23kloc Scheme, Python, METAFONT), cooperative development, automated testing, quality assurance, user support, documentation, web-site design, and scientific dissemination.

I am the main author in this team project.

2006 GUB, a cross-compilation environment under Unix for creating and distributing binaries for MacOS, Windows and Unix. Design, implementation, cooperative development, quality assurance. (Python, autotools, darcs, git).

I am one of the two authors.

1999–2002 *Salmon*, *Bazzoen*, *Artisjokke*: interactive finite element simulations for tetrahedral meshes using non-linear elasticity. Design, implementation (C++, OpenGL), and validation. Sole author.

2002 A rewrite of a mark & sweep garbage collector for a Scheme interpreter (C). Accepted into *GNU GUILE* distribution. Sole author.

2002 *Meshugge*: cutting in Delaunay triangulations. Design, implementation (C++, OpenGL) and scientific dissemination. Sole author.

1999 Reimplementing Makefile function-calls (C), adding support for \$(call) and \$(if) functions. Accepted into *GNU Make* distribution. Sole author.

1993–1995 *Rayce*: a ray tracer. Design, implementation (C and C++) and documentation. Sole author.

Miscellaneous tools and patches: darcs2git (convert Darcs to git repositories), mftrace (trace Metafont bitmaps into scalable fonts).

Proprietary software:

2004 Quintiq Logistics Planner Industry Solution. (Quill, Quintiq Application Suite)

Adapting a prototype OO model for road-transport to a real world situation, and successful roll-out with a customer. OO Design, performance troubleshooting, customer contact, UI design. Work in cooperation with a Business Consultant.

1996 *Waddif*: simulation of heat-diffusion in layered media. Design, implementation (C and LINPACK) and validation. Sole author.

Miscellaneous

Hobbies: French horn, dancing, drawing, cooking, rock climbing,

Extracurricular activities: Fundraiser of the *VU-Orkest* (Orchestra of the Free University, Amsterdam) 2005/2006. Treasurer (administration and fundraising) of *Utrechts Blazers Ensemble* (1999–2001).

References available on request.

Past activities

- Quintiq (<http://www.quintiq.com>) develops, licenses and rolls out software for to help businesses make optimal scheduling decisions in production planning. Their application is a high-level object oriented development environment for their proprietary *Quill* language. The heart of the system is a forward chaining server, which tracks dependencies between object attributes, and automatically updates them in response to planning changes or workshop-floor feedback.

During my stay there, I was responsible for the coding side of the first rollout of Quintiq's Industry Solution for road-transport. I was involved in the design, coding, identifying performance problems and development of legacy interfaces.

- A bottleneck in developing computerized training tools for surgical procedures is on-line simulation of tissue elasticity. I have applied various mathematical approaches to this problem. I have proposed, implemented and validated approaches from 3D meshing, continuum mechanics, nonlinear Finite Element Methods, and distributed (non)linear iterative algorithms.

This research has led to my PhD. thesis, "Cutting in Deformable Objects." (June 2003). More information is available from <http://www.cs.uu.nl/groups/AA/virtual/surgery/>.

- Common music notation, the authoritative format for analyzing and performing Western music, is riddled with obscure rules and conventions, making it unsuitable for computer processing. I have designed and implemented a system that typesets beautiful notation from a compact music representation.

This software, the only serious open source music notation package, is widely used (10,000 downloads per month), and available for different platforms. See also <http://lilypond.org>.

Publications

Refereed publications

Han-Wen Nienhuys and Jan Nieuwenhuizen. LilyPond, a system for automated music engraving. *Proceedings of XIV Colloquium on Musical Informatics*. Firenze, Italy, 2003.

Han-Wen Nienhuys and A. Frank van der Stappen. A Delaunay approach to interactive cutting in triangulated surfaces. *Proceedings Workshop on Algorithmic Foundations of Robotics (WAFR)*. 2002.

Han-Wen Nienhuys and A. Frank van der Stappen. A surgery simulation supporting cuts and finite element deformation. *Proceedings Medical Image Computing and Computer Assisted Intervention (MICCAI)* 2001.

Han-Wen Nienhuys and A. A computational technique for interactive needle insertions in 3D nonlinear material. *Proceedings International Conference on Robotics and Automation (ICRA)* 2004.

Other

Han-Wen Nienhuys. Cutting in deformable objects. PhD Thesis, *Utrecht University*, 2003.

Han-Wen Nienhuys. Convoluties van signalen uit meerdimensionale domeinen. (Convolutions of signals from higher-dimensional domains). Master's thesis, *Technical University Eindhoven*, 1998.

Presentations

- XIV Colloquium on Musical Informatics, Firenze, Italy, 2003. “LilyPond, a system for automated music engraving.” (May 2003)
- Contemporary Digital Music Publishing, workshop by Centro Tempo Reale, Firenze. “LilyPond—The free music typesetting system.” (invited talk, November 2001)
- Conference on Medical Image Computing and Computer Assisted Intervention (Utrecht). “A surgery simulation supporting cuts and Finite Element Deformation.” (October 2001)