Curriculum Vitae

Personal Data

Date/Place of birth	16.05.1980 in Hamburg Germany
Nationality	German
Family status	married, with one child
Contact data	Am Remberg 36, 44263 Dortmund, Germany eike.scholz@wisstec.com, 0049-173-3678985

About Me

I am a whole-hearted applied mathematician and old-school hacker with focus on systems thinking. I have over 20 years of programming and software development experience as well as 10 years research experience with mathematical modelling of real-world problems.

Work Experience

01.2017 - present — WissTec R&D Services UG, Berlin and Dortmund

CEO & Co-Founder

- Development of a new real-time market backend software for matching supply and demand in automated scenario
- Design and implementation of high-security systems
- Development of the WissTec Finite-Element-Method simulation software for coupled multi-physical problems:
  - Highly non-linear electro-quasi-static phenomena
  - Coupled thermo-electrical phenomena
- Mathematical modelling and system analysis for real-world problems
- Business development as well as customer and investor acquisition

06.2018 - 07.2019 — Polygravity GmbH, Berlin

CTO

- Lead of a development team
- Development of a blockchain-based transaction system that delivers high-end security, massive transaction throughput in real-time without cryptocurrencies
- Development of three different protocols supporting the polygravity's transaction system:
  - PSDP: A transport and session layer protocol, providing encrypted, authorized, real-time message-based communication
  - ESDP: A session and presentation layer protocol, saving the input of the PSDP protocols clusters into locally stored and globally interlocked Merkle trees to make an alteration of input history impossible without detection
  - EADP: A modified, offline trusted party, fair exchange/non-repudiation protocol that performs double entry booking on the application layer protocol level

- Supporting business and financial team for customer and business acquisition

06.2013 - 12.2016 Technical University Munich, Chair of High Frequency Engineering
Research fellow

- Further research and development of simulation algorithms for large scale electromagnetic compatibility (EMC) simulations with focus on high-altitude (nuclear) electromagnetic pulse (HEMP) impulses and applicability to non-linear materials
- Publication and presentation of research results in national and international conferences

06.2008 - 05.2013 University of Wuppertal, Chair of Electromagnetic Theory
Student research assistant

- Algorithm development for quasi-static electromagnetic simulations with focus of applicability to non-linear materials and GPGPU implementations
- System administration for Linux based massive multi-core systems and active directory integration of Linux systems

06.2006 - 05.2008 Helmut Schmidt University, Chair of Electromagnetic Theory
Student research assistant

- Ray tracing algorithm development for wake fields in particle accelerators
- FEM-GUI development with VTK
- System administration

01.1997 - 01.2006 WissTec, Halstenbek
Security Consultant, part-time

- Security auditing of some projects
- Linux system administration
- A little bit Norsk Data mainframe administration.

Education Background

2001 - 2014 **University of Hamburg**: Diploma study in mathematics with focus on mathematical modelling and simulation
Degree: Dipl.-Math.

2001 - 2010 **University of Hamburg**: Diploma study in physics with focus on computational physics
Degree: Dipl.-Phys.

1997 - 1999 **Participation at the Mathematik-Zirkel**: Supplementary training for the mathematically highly gifted of the Wilhelm Stern Society of the University of Hamburg

1991 - 2000 **Academic High School**: Gymnasium Schenefeld, Germany

1987 - 1991 **Basic School**: Grundschule Halstenbek

Society and Party Memberships

- Chaos Computer Club – A well-known German hacker society
- Gesellschaft für kritische Philosophie Nürnberg – A society for secular, humanistic and analytic philosophy
- Humanistischer Verband Deutschland (Hamburg) – A secular humanist society
- Freie Demokratische Partei (Berlin) – A German liberal / libertarian party

Other Skills and Knowledge

Language	German, Native language English, fluent and my preferred working language
Programming Language	C, Python, C++, Java, HASKELL, PHP, HTML, Assembly x86 etc.
Computer skills	Programming language design, complier construction
EDV	Microsoft Office, Linux system administration

Hobbies

Philosophy
Programming
Fitness sport
Gaming

Dortmund, 19.04.2020

Eike Scholz

List of Projects

Software Development

- **Blockchain Technology – C, Go:** R&D of a proof of concept of a military grade, real-time, byzantine failure tolerant network protocol stack. The first application purpose has been automation of billing and accounting transactions with a security level marketable to central banks. This leads to a military grade security level requirement. The other design objectives where in conflict resolution priority order: Maximal throughput, real-time-processing, low latency, diminishing marginal costs per transaction to be able to compete in a dumping scenario and minimal energy requirements for environmental sustainability. After only 1-year R&D alone and 0.5 year of development in a team with one other engineer we were able to develop a proof of concept implementation showing that the given objectives can indeed be satisfied. **(2018 - present)**
- **Numerics – C++, FEM solver for multi-physical problems:** Development of a Finite-Element-Methods based simulation software for solving extremely ill-conditioned non-linear electro-quasi-static problems coupling with heating and thermal flux. This software has been applied to simulate high-voltage bushings and isolators featuring non-linear field-grading materials and HVDC cable systems for industrial partners. The solver is still further developed and extended to other physical problems **(2015 – present)**
- **Numerics – C++, FDTD/FEM solver:** Development of fully coupled FDTD/FEM-algorithms and several corresponding components. The objective was to design an algorithm capable to simulate the interaction of an electromagnetic pulses created by a high-altitude nuclear explosion (HEMP) with complex system. **(2013 - 2016)**
- **Numerics – C, C++, Python, parallelization with CUDA, OpenCL:** Development of a theory and a prototype implementation of an algorithm class for the massive parallel solution of extremely ill-conditioned high voltage problems as mathematics diploma thesis. **(2011-2014)**
- **Numerics – C, C++:** Development of a scientific, high-performance 2D ray tracing software to simulate a photon gas as part of electro-magnetic wake fields in particle accelerators. This has been my physics diploma thesis in cooperation with the "Deutsche Elektronen Synchrotron" in Hamburg. **(2009-2010)**
- **Numerics – Haskell:** Development of working simulation software for electronic circuits containing non-linear elements, especially transistors, written in Haskell. This has been a mathematics seminar thesis. **(2003)**
- **Numerics – C++:** Development of a C++ template meta programming-based library for linear algebra. Conceptual very similar to current eigen linear algebra library **(2001-2002)**
- **CAD – C++:** Development of small, optimized C++ constructive solid geometry library for the FDTD/FEM solver **(2015-2016)**
- **CAD – Python, Salome project:** Development of a prototype to create simulation data from CAD-models using the Salome project and python **(2014)**
- **GUI-development – Python, C++, GTK, VTK:** Development of a graphical user interface for an electro-quasi-static simulation software **(2006-2008)**

Complier Construction

- **Compiler construction – Haskell, LLVM, Rust, Idris:** Significant progress with respect to syntax and semantics of a self-developed programming languages for my needs in real-time numerics and systems programming. Development of new abstract target machine for close-to-the-metal functional programming and a LLVM based proof of concept compiler for it. This project is still ongoing and will be released as open source code. **(2016-present)**
- **Complier construction – C++, LLVM:** Implementing of a compiler prototype in C++ with LLVM, to investigate if a forth like language can efficiently translated into the LLVM meta assembly. This was and is indeed the case with properly set optimizations **(2013-2016)**

EDV and System Administration

- **Unix System Administration – Kerberos, Active Directory:** Administration of the high-performance servers at the chair of electromagnetic theory at the University Wuppertal **(2010-2013)**

IT Security

- **Writing Exploits – C, Assembler:** Direction and organization of a teaching workshop for writing buffer overflow and format string exploits at the easter-hegg 2001 which was hacker convention organized by the chaos computer clubs **(1999-2000)**
- **Writing Exploits – C, Assembler:** Development of a real-world exploits for an open source web guest book. Initially using google to search for common programming errors **(1999-2000)**
- **Security Auditing – Nessus, Nmap, Posix-Tools:** System audits, system administration and attack surface reduction for a few customers, i.e. the law office Aplers & Stenger (now Alpers.Wessel.Dorbach) **(1997-2006)**

Digital Art

- **Demo Coding – C++, Assembler, OpenGL:** PC demo development in the Haquebright demo group. Demo groups are the productive entities of the demo scene, an international computer art subculture **(2003-2006)**

UNIVERSITÄT HAMBURG

Prüfungszeugnis

Herr Eike Michael S c h o l z

geboren am 16. Mai 1980 in Hamburg

hat sich am 30. Juni 2010 der

Diplomhauptprüfung für Studierende der Physik

unterzogen und die Prüfung mit der Gesamtnote „ gut “
bestanden.

In den einzelnen Prüfungsfächern wurden folgende Noten erzielt:

Prüfungsgebiet:	Prüferin/Prüfer:	Bewertung:
Struktur der Materie mit Schwerpunkt Atom- und Molekülphysik	Prof. Dr. K. Sengstock	ausreichend
Theoretische Physik	Prof. Dr. D. Pfannkuche	sehr gut
Wahlfach physikalischer Richtung: Elektronik I und Elektronik II	Dr. T. Matsuyama	sehr gut
Wahlfach: Mathematik mit Schwerpunkt Angewandte Mathematik	*) - - -	sehr gut

*) Dieses Prüfungsgebiet wurde laut Beschluss des Prüfungsausschusses Physik/Diplom vom 31.08.2009 auf Grund der abgelegten Kerngebietsprüfung „Angewandte Mathematik“ zur Diplomhauptprüfung Mathematik an der Universität Hamburg als gleichwertig anerkannt.

Die Diplomarbeit behandelte das Thema

„ The Cryoloss 2 Project:
Simulation of High Frequency Wakefields with Geometric Optics and Raytracing Methods “

und wurde mit der Note „ sehr gut “ beurteilt.

Hamburg, 23. September 2010

Universität Hamburg
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Fakultät
Mathematik, Informatik und Naturwissenschaften

W. Hansen

(Prof. Dr. W. Hansen)
Der Vorsitzende
des Prüfungsausschusses
für den Studiengang
Physik/Diplom

Universität Hamburg
DER FORSCHUNG | DER LEHRE | DER BILDUNG

Fakultät für Mathematik, Informatik und Naturwissenschaften

Prüfungszeugnis

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hat die

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am 16. April 2013 mit der Gesamtnote „**gut**" bestanden.

In den einzelnen Prüfungsfächern wurden folgende Noten erzielt:

Prüfungsfach:	*Prüfer/in:*	*Bewertung:*
Kernbereich:		
Angewandte Mathematik		**sehr gut**
Funktionalanalysis	Prof. Dr. M. Ulbrich	(1,7)
Mathematische Modellierung und Simulation	Prof. Dr. C. P. Ortlieb	(1,0)
Partielle Differentialgleichungen	Prof. Dr. J. Struckmeier	(1,0)
Numerik partieller Differentialgleichungen	Prof. Dr. J. Struckmeier	(1,0)
Spezialgebiet:		
Mathematische Modellierung und Simulation		**sehr gut**
Mathematische Modellierung II	Prof. Dr. J. Struckmeier	(1,0)
Modellierung und Simulation	Prof. Dr. A. Iske	(2,0)
Wahlpflichtbereich:		
Reine Mathematik		**gut**
Differentialgeometrie I	Prof. Dr. V. Cortés Suárez	(1,7)
Differentialgeometrie II	Prof. Dr. V. Cortés Suárez	(2,0)
Anwendungsfach:		
Physik[*)]	Prof. Dr. D. Pfannkuche	**sehr gut**

[*)] Die zum Hauptdiplom in Physik an der Universität Hamburg abgelegte Prüfungsleistung „Theoretische Physik" wurde laut Beschluss des Prüfungsausschusses für den Diplomstudiengang Mathematik vom 30.06.2009 angerechnet.

Diplomarbeit **befriedigend**

Thema: Principles of Optimal Residual Formulations and Optimal Residual Finite Element Methods for Solving Partial Differential Equations

Gutachter: Prof. Dr. J. Struckmeier und Prof. Dr. R. Lauterbach

Hamburg, 9. Februar 2014

Universität Hamburg Scholz 61 Fakultät Mathematik, Informatik und Naturwissenschaften

Prof. Dr. H. J. Oberle
Der Vorsitzende des
Prüfungsausschusses
für den Studiengang
Mathematik Diplom