Peter Goldsborough

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WORK EXPERIENCE

- **Bloomberg**, London, United Kingdom   11/2016 — 04/2017
  Intern

  ○ Working on message tracing in highly distributed chat systems.

- **Google**, London, United Kingdom   08/2016 — 11/2016
  Intern, gTech Team

  ○ Developed a web platform to showcase Google's ad technologies.
  ○ Worked on a chatbot system that makes remote procedure calls to an internal issue tracker to allow natural language bug queries.
  ○ Open-sourced an integration of the Google Publisher Tags (GPT) library with Angular under an official Google GitHub organization.
  ○ Learnt JavaScript, AngularJS, Go, RPC and Protobuf from scratch.

- **Technische Universität München**, Germany   04/2016 — 09/2016
  Research Assistant, Chair for Database Systems

  ○ Investigated the efficiency of various interprocess communication techniques for low-latency transmission of database queries.
  ○ Implemented a software library that transparently replaces domain sockets by injecting a custom shared memory transmission channel.
  ○ This can speed up a variety of applications by an order of magnitude.
  ○ Wrote more than 10,000 lines of low level C code.

- **Institute of Networked and Embedded Systems**, Klagenfurt University, Austria   10/2014 — 07/2016
  Research Intern

  ○ Applied machine-learning and data-science techniques to make NILM algorithms unsupervised.
  ○ Invented custom $O(N \log N)$ clustering algorithm to replace existing $O(N^2)$ solution.
  ○ Wrote 8363 lines of C++ code (working 5-10 hours/week)

- **Institute of Networked and Embedded Systems**, Klagenfurt University, Austria   07/2014
  Summer Intern

  ○ Ported Non-Intrusive-Appliance-Monitoring (NIALM) algorithms from MATLAB to Python, C++ and SQL.
  ○ Visualized real-time appliance energy data in a Heroku cloud app using Python, Flask, PostgreSQL, HTML, CSS and Javascript; still live at nilm.herokuapp.com.

EDUCATION

- **BG | BRG St. Martin High School**, Villach, Austria   09/2011 — 06/2015

  ○ Graduated as valedictorian with straight A's across all subjects and my thesis.
  ○ 120-page diploma thesis on *Developing a Digital Synthesizer in C++*, investigating the mathematics, digital signal processing and software engineering behind digital music synthesizers.
  ○ School president 2013/2014; long-time involvement in student representation.
  ○ 3rd place in state rhetoric competition.
  ○ 4th place in state philosophy contest.
  ○ Participated in the Atlas Shrugged essay competition organized by the Ayn Rand Institute, writing on the topic of laissez-faire capitalism and objectivist philosophy.

- **Technical University of Munich (TUM)**, Germany   10/2015 — Present

  B.Sc. in Computer Science

  - ○ Highlights:
    - ⋆ Admitted with a score of 100/100.
    - ⋆ Top 5% in every course.
    - ⋆ Leading a team of 12 fellow student developers in the *Computer Architecture* practicum (*Großpraktikum*). We are developing an architecture-independent assembly simulator. At most 20 out of almost 1000 students are selected for this practicum. Next to regular development tasks I am responsible for the (agile) coordination of the team's workflow and time schedule. Also, I support all teams with technical expertise in C++ and general software development.
    - ⋆ Awarded German National Scholarship (Deutschlandstipendium).
  - ○ First Semester:
    - ⋆ Discrete Mathematics; 95th percentile.
    - ⋆ Introduction to Database Systems; 99th percentile.
    - ⋆ Introduction to Computer Architecture; 97th percentile.
    - ⋆ Introduction to Computer Science; 98th percentile.
    - ⋆ Fundamentals of Programming: 99th percentile (291.5/292 points).
  - ○ Second Semester:
    - ⋆ Linear Algebra; 99th percentile.
    - ⋆ Introduction to Computer Networks and Distributed Systems: 99th percentile.
    - ⋆ Introduction to Algorithms and Data Structures; 90th percentile, 96% on assignments.
    - ⋆ Machine Learning Seminar; Topic: "Deep Learning with TensorFlow"; Grade: A.
    - ⋆ Computer Architecture Practicum (Top 20 of "Intro. to Computer Architecture" are selected); spans 2 semesters.

- **Online Education**   07/2013 — Present

  - ○ I have taken a number of online courses on Coursera, Udacity, MIT OpenCourseWare next to my regular education to further my horizon and dive deeper into topics that interest me.
  - ○ Coursera:
    - ⋆ Algorithms I (Princeton University)
    - ⋆ Algorithms II (Princeton University)
    - ⋆ Machine Learning (Stanford University)
    - ⋆ Learning How To Learn (University of California, San Diego)
  - ○ Udacity:
    - ⋆ Machine Learning nano-degree (organized by Google)
    - ⋆ Deep Learning (organized by Google)
  - ○ MIT OpenCourseWare:
    - ⋆ Various lectures on efficient algorithms and data structures on undergraduate and graduate level.

SKILLS

- Very Good: C++, Python, Java, C
- Good: LaTeX[1], HTML, CSS/SASS, Machine Learning
- Intermediate: Git, Assembly, JavaScript, SQL, Qt

- Prior Experience: VHDL, Arduino, AVR C
- (Operating) Systems: **OS X, Linux**, Windows, Arduino, ATMEL μ-controllers

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PROJECTS

- Various projects found at github.com/goldsborough; snippets and scripts at gist.github.com/goldsborough
- Personal blog & website, old at thecodeinn.blogspot.com, new at goldsborough.me.

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[1]See CV. *Beware*: recursion.

- From February 5th to 6th 2015 I head organized a two-day session of the European Youth Parliament (EYP) in Villach, Austria. I managed a team of five organizers, together with whom I raised over €1300 in public and private funding, negotiated deals with McDonalds and Subway to supply us with food and beverages for our coffee and lunch breaks – in exchange for various forms of advertisement – and raised enough interest to get our session on <u>national television</u> and into various regional newspapers.

- I'm leading a team to develop <u>an architecture-independent assembly simulator</u> in C++14 and Qt5 for educational and scientific purposes. We are primarily focusing on RISC-V as an open-source Instruction Set Architecture (ISA), while keeping all technical doors open to support other architectures such as x86 or ARMv7. Next to development, I am responsible for coordination and management of the team.

- <u>Mavrchester</u> is a C library implementing the Manchester Encoding protocol for embedded AVR microcontrollers. Manchester Encoding is a physical-layer communication protocol used for Ethernet and wireless radio frequency transmission. I used this library to build a small wireless weather station on an Atmel microcontroller.

- <u>latexpp</u> is a first-of-its kind C++ library for generating LaTeX equations via C++. It supports conversion of LaTeX equations like \frac{1}{2} to HTML as well as JPG, PNG and SVG images. I made it using Google's V8 JavaScript engine to write JavaScript from C++.

- <u>dispy</u> is a tiny Python bytecode disassembler that can take any piece of Python code (function, method, class etc.) and prints out the underlying cPython bytecode instructions and arguments making up each line of code.

- <u>lru-cache</u> is a feature-complete least-recently-used (LRU) cache implementation in modern C++ that allows for efficient function memoization while avoiding a memory blowup. I additionally implemented a timed LRU cache with a *time to live* for elements, ideal for server-side resource caching

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ORGANIZATIONS

- <u>European Youth Parliament</u>   07/2013 — Present

  - The European Youth Parliament (EYP), is politically-motivated, non-governmental organization attempting to spread political awareness among youths.
  - There are regular meetings all over Europe concerning current EU-related political topics, such as environmental sustainability, regional development or fiscal policy.
  - These topics are discussed and debated in a simulation of European Parliament.
  - I have participated in more than ten such sessions as delegate, chairperson and head organizer.
  - For two years I held the position of Regional Coordinator for the Austrian state of Carinthia.

- <u>Model United Nations</u>   07/2013 — Present

  - Model United Nations is an international association dedicated to simulating the United Nations and allowing youths to directly participate in topics of diplomacy and international relations.
  - In May of 2016, I represented Spain as part of the NATO committee in Maastricht, The Netherlands, discussing subjects such as cyber-warfare and the militarization of the Arctic.

- <u>TU Investment Club</u>   10/2015 — Present
  Algorithmic Trading Team

  - The TU Investment Club is a non-profit student organization at Technical University of Munich dedicated to the education of students with a distinct interest in financial markets.
  - I am part of the algorithmic trading team, bringing together computer science and financial knowledge to explore what impact we can have on the financial market.
  - I have been a member of the interviewing committee for applicants with a technical background.

- <u>ACM Student Chapter</u>   07/2016 — Present

  - The Association for Computing Machinery (ACM) Student Chapter at TUM is a group of bachelor's and master's students passionate about computer science, scientific computing and machine learning.
  - We organize regular events with more than 200 attendees with rockstar speakers from the field of artificial intelligence and general computer science.
  - I have managed the invitation and organization of our speakers twice, once Prof. Dr. Sepp Hochreiter and once an engineer from Google DeepMind.

SPEAKING

- Introduction to Machine Learning with TensorFlow @ Python Meetup Munich.   07/2016
- Deep Learning with TensorFlow @ PyCon UK.   09/2016
- Deep Learning with TensorFlow @ Cambridge Coding Academy.   11/2016
- Deep Learning with TensorFlow @ PyData London.   12/2016

PUBLICATIONS

- Christoph Klemenjak, Peter Goldsborough, Non Intrusive Load Monitoring: A Review and Outlook, Sep. 2016. Preprint: arXiv:1610.01191

- *A Tour of TensorFlow* (2016), published as part of the Data Mining Seminar at TUM. Available: arxiv:1610.01178

LANGUAGES

- German: Native
- English: Native
- Nerd: Native
- French: Limited working proficiency

CERTIFICATIONS

- Cisco CCNA Discovery: Networking for Home and Small Businesses
- Cisco CCNA Discovery: Working at a Small-to-Medium Business or ISP
- Certificate in Advanced English (CAE)
- Diplôme d'études en langue française (DELF)

INTERESTS

- International politics and diplomacy
- Philosophy and differing schools of thought
- Entrepreneurship and startup culture
- 20th century British and US literature
- Self development and learning something new every day
- Leadership and inspiring people to maximize their potential
- Artificial intelligence and machine, especially deep, learning
- Beautiful, expressive, well formatted and human readable code