David Huber, PhD

Senior Software Engineer

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Tech savvy computational physicist turned software engineer with strong theoretical and practical skills and a passion for complex problems.

Received a PhD in high-energy astroparticle physics working on relativistic fluid models for HPC infrastructure.

Now working in web3 developing custom smart-contract and backend solutions with a passion for in-chain genart.

Skills

I already know

Espresso 5/5	Solidity 5/5	Golang 4/5	Mathematica 4/5	C++ 4/5

Python 3/5	PostgreSQL 3/5

I want to learn

Rust   Noir   Circom

I speak

German Native	English Full professional proficiency	Italian Limited working proficiency

Work experience

Senior blockchain engineer
PROOF

August 2022 - now

- Lead smart-contract engineer:
  - Internal consulting on blockchain related decisions for various projects
  - Design and implement a modular contract infrastructure to facilitate the company's and third-party NFT projects supporting a broad variety of sales mechanisms.
- Open source projects:
  - Solidify: A golang + solidity library aimed to make storing arbitrary data on EVM blockchains as easy and efficient as possible.

- Moonbirds in-chain: Develop a smart-contract rendering suite to generate the Moonbirds artwork from compressed image layers stored on-chain (using solidify). This involved on-chain alpha-blending, image resizing, decompressing, encoding, etc, and was heavily optimized through gas profiling and low-level assembly.
- Research:
  - EIP-6464: Extending ERC-721 to allow multiple operator approval on a per-token basis
  - EIP-7526: A mechanism design approach to on-chain NFT royalty enforcement

Technologies: Ethereum, Solidity, Golang, Python, Docker

Blockchain and Research Engineer January 2022 - now
Freelance

- Collaborate with clients to define project requirements and design secure and efficient smart-contract solutions and related backends.
- Write clean, well-documented Solidity and golang code for applications on Ethereum.
- Conduct thorough code reviews and security audits to identify and rectify vulnerabilities, ensuring the safety of smart contracts.
- Optimize gas efficiency and reduce transaction costs through code optimizations and gas fee analysis.
- Perform numerical simulations and analyses to inform technical design decisions.
- Collaborate with UI/UX designers, and product managers to deliver end-to-end blockchain solutions.

Technologies: Ethereum, Solidity, Golang, Mathematica, Python, Docker

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University Assistant September 2017 - December 2021
University of Innsbruck

- Research within the scope of my PhD project: "Relativistic Fluid Modelling of Gamma-Ray Binary Emission"
- Development of numerical models for relativistic hydrodynamics integrated within CRONOS aimed for high-performance computing infrastructure (C++)
- Development of visualisation tools (Python, Mathematica)
- Development and management of courses in various areas of physics and programming (C, Python, Mathematica)
- Supervision of Bachelor theses

Technologies: C++, C, Python, Mathematica, OpenMPI, Golang

Software Engineer January 2016 - October 2016
University of Innsbruck, Department of Microbiology

- Research and development of automated microscope image analysis for sewage purification plants
- 4th Place CAST Technology Award

Technologies: Python, Mathematica

Projects

Mantle Liquid Staking Protocol May 2023 - October 2023

Upcoming Ethereum liquid staking protocol operated by Mantle DAO.
The system was designed to be extremely durable and to live for many years, aiming to handle $1B+ in assets in its final form.

Team size: 5 person

My role: Architect, Smart-Contract Engineer

Company: TwoFiftySix Labs

Category: Web 3, Liquid Staking

Technologies: Solidity, Golang, Docker, Prometheus

gm. studio December 2021 - now

The on-chain generative art platform by artists, for artists.
The studio was built from the ground up based on gmDAO's experience working with existing artistic platforms and the challenges they present to artists. All submissions received by the studio are presented blindly to the curation panel, meaning artists are selected purely on merit, not reputation.

Team size: 4 person

My role: Architect, Smart-contract Engineer, Backend Engineer, Curator

Company: gm DAO

Category: Web 3, Generative Art Platform

Technologies: Solidity, Golang, PostgreSQL, Docker, React.js, Tailwind CSS

Strange Attractors August 2021 - October 2021

Strange Attractors is an interactive, generative art project that simulates multi-dimensional, chaotic systems using nothing but an Ethereum smart contract.

- Every step in the generation of the artworks, from numerically solving multidimensional differential equations to the rendering the images, is performed exclusively by smart-contracts without the need for external dependencies.

- Collectors can greatly influence this process via an extensive UI, allowing them to freely customize various parameters of their pieces such as the viewing angle, color grading and distortions, giving the project a unique participatory element.

Team size: 1 person

My role: Full-stack Engineer, Manager

Company: None

Category: Web 3, In-chain Generative Art

Technologies: Solidity, Next.js, TypeScript, SASS

PRACE Project RA5453   `October 2020 - October 2021`

- High-resolution simulation of the dynamic fluid interaction, turbulence, particle acceleration and gamma-ray emission in the LS5039 system over multiple using a relativistic hydrodynamic model
- Project grant for 27.2M CPUh on the JoliotCurie Rome HPC infrastructure
- Parallel code execution of the CRONOS code on >12k cores

Team size: 3 person

My role: Principal Researcher

Company: Univeristy Innsbruck

Category: Astrophysics, Hydrodynamics, HPC

Technologies: C++, OpenMPI

Education

Computational High-Energy Astroparticle Physics   `October 2017 - January 2022`
Leopold-Franzens-Universität Innsbruck, Austria

- Numerical models in C++ for HPC-applications
- Turbulent fluid simulations in 3D
- Dynamically coupled particle transport models
- Non-thermal emission processes
- Focus: Gamma-ray binaries

MSc in Computational Physics   `October 2015 - October 2017`
Leopold-Franzens-Universität Innsbruck, Austria

- Implementation of relativistic hydrodynamics in CRONOS
- Visualisation tools

- Application to study the wind interaction in gamma-ray binaries.

BSc in Physics October 2012 - August 2015

Leopold-Franzens-Universität Innsbruck, Austria

- Development of a C++ tool to calculate synchrotron emission
- Application to simulated data of Colliding-Wind-Binaries