Marc Jakobi

Curriculum Vitae

Winterthur, CH
marc@jakobi.dev
github.com/mrcjkb
mrcjkb.dev

«Insanity is running the same build over and over again and getting different results»

Experienced software engineer and open source advocate with a strong background in distributed systems, renewable energy, and FOSS community leadership. Proven track record in backend architecture, CI/CD automation, and impactful open source contributions. Passionate about functional programming, test-driven development, reproducible builds, and bringing innovation to sustainable technologies.

Professional career

2022–current **Backend developer**, *tiko Energy Solutions AG*

Architected and developed distributed systems primarily in Haskell, leveraging Nix for reproducible builds. (80 % workload since 2023)

Virtual Power Plant and IoT devices

- Microservices written in Haskell for high-throughput, low-latency device management and ancillary services (FCR + aFRR)
- Legacy monolith written in Java 21 + Scala 2.13
- Redis/Valkey, Kafka, CBOR, MQTT, PostgreSQL, Hazelcast, GraphQL

Data pipelines

- Resilient event-driven pipelines written in Haskell
- MQTT, Kafka, Thrift, Protobuf, Avro, rocksDB-cloud, TimescaleDB, RabbitMQ

Web services

- Built and maintained scalable Haskell APIs (servant, wai/warp)

Quality & test automation

- Propagated behaviour driven development practices, increasing integration test coverage.
- Designed KVM-based integration tests of distributed systems using the `nixosTest` framework, enabling zero rollbacks in VPP service deployments.
- Led efforts to improve the build system, organise and unify the codebase, write and update documentation, and keep dependencies up to date.

Continuous integration, deployment

- Hydra, Morph, Colmena, GitLab, k8s, ArgoCD, Kustomize, Terraform, AWS, SOPS, Dhall
- Release management, regular system deployments

API architecture and collaboration

- Worked with Data Science, Full Stack and Firmware teams to design cross-system APIs.
- Mentored, supported and pair-programmed with junior backend team members.

Monitoring, Alerting

- Implemented OpenTelemetry instrumentation, enabling observability across services.
- Prometheus, Grafana, Zabbix, PagerDuty, Elasticsearch, Kibana
- On-call rotation, incident response, root cause analysis

2023–current **Open source volunteer**, *20 %*

Reduced workload to 80 % in 2023 to dedicate time to maintaining and contributing to FOSS. Selected projects:

Lumen Labs

- Lead maintainer of the `Lux` package manager for Lua (written in Rust)

NixOS

- Maintainer of various packages and NixOS modules
- Member of the Neovim and Lua maintainer teams

Neovim

- Core contributions
- Maintainer of various popular plugins and GitHub actions workflows, for example:
  - rustaceanvim (Rust)
  - haskell-tools.nvim
  - neotest-haskell
  - rocks.nvim
  - kickstart-nix.nvim
  - luarocks-tag-release

2017–2022 **Software engineer**, *Vela Solaris AG*

Java 17, Kotlin, Docker Swarm, Gradle

Polysun Simulation Software *(desktop app written in Java)*

- Simulation models: Batteries, PV/PVT, controllers, thermal components (heat pumps, storage tanks, co-generators, etc.), eMobility.
  Examples: Implementation of a new battery model;
  control algorithms for PV, batteries and heat pumps.
  Improvement of existing models.
- Plugins (e.g. for co-simulations with Python/Matlab/Simulink/PLC).
- Charting, reporting.
- UI.
- Code reviews (Bitbucket).
- Publications/Presentations/Advanced workshops (e.g. at conferences).

Polysun BIM *Description: Automation of engineering workflows in the building sector; data exchange with other applications.*

- Customer interviews / requirement analysis.
- Rapid prototyping (interactive mock-ups) + concept validation with pilot customers.
- Roadmap planning.
- Software engineering/development:
  - *Desktop app with a modular bundle architecture*
    (Java, Kotlin, Hibernate (H2), Vavr, ReactiveX, Protobuf, ArchUnit).
  - *Cloud platform (backend), microservice architecture*
    (Spring Boot 2, Kafka Streams, MongoDB, Graphwalker).

Infrastructure

- CI/CD: Jenkins, Docker Swarm on AWS, e2e testing, release automation
- Internal cloud infrastructure (e.g., licensing, sales automation, ...)
  Apache Camel.
- Developer tooling (CLI applications in Haskell, Python).

2014–2017 **Research assistant**, *Projects: PVstore, TwinPower* , HTW Berlin

Optimisation of PV systems with batteries and heat pumps.
Implementation of simulation models in Matlab.

2013–2014 **Research assistant & intern**, *Project: PVprog*, HTW Berlin

Development of forecast-based operational strategies for PV storage systems.

Education

2016–2017 **Master of Science - Renewable Energy Systems**, *Hochschule für Technik und Wirtschaft*, HTW Berlin
GPA: A (with honours), HTW Berlin.

2012–2016 **Bachelor of Science - Renewable Energy Systems**, *Hochschule für Technik und Wirtschaft*, HTW Berlin
GPA: A (with honours), HTW Berlin.

Master's Thesis

Title *Development of model-based control applications compliant with IEC 61499 for building energy systems with a focus on photovoltaics*

Supervision Prof. Dr.-Ing. Volker Quaschning, M. Sc. Tjarko Tjaden

Grade Thesis and oral examination: 1.0 / studies: 1.2
(GPA: A)

Short summary Development of intelligent control applications for PV, battery and heat pump systems in compliance with IEC 61499. Development of communication interfaces for simulation tools such as Polysun and Matlab. Validation via co-simulations. Extension of the runtime environment (4diac-RTE) with a REST communication interface and set-up of a field test.

Bachelor's Thesis

Title *Optimierung der Netzeinspeisung von deutschlandweit verteilten PV-Speichersystemen mit prognosebasierten Betriebsstrategien*

Supervision Prof. Dr.-Ing. Volker Quaschning, M. Sc. Johannes Weniger

Grade Thesis and oral examination: 1.0 / studies: 1.3
(GPA: A)

Short summary Modelling and CUDA-simulation of 46126 Germany-wide distributed PV storage systems. Examination of the cumulated influence of various operational strategies and optimisation of forecasting- and control algorithms regarding self-sufficiency and grid integration.

Languages

English Mother tongue

German Mother tongue

Swiss German Good comprehension (not spoken)

French B1

Professional skills

Programming languages	`Haskell`, `Nix`, `Rust`, `Elixir`, `C`, `Scala`, `Kotlin`, `Java`, `Lua`, `Python`, `C++`, `TypeScript`, `MATLAB`
Software engineering	Functional software architecture, test-driven development, behaviour-driven development, pair programming, distributed systems, CI/CD pipelines, release automation
Development environment	Neovim, NixOS, tmux, Nushell, jj-vcs *UNIX is my IDE*
Simulation	Polysun, Simulink, TRNSYS
Scientific documentation	LaTeX, pandoc

Professional interests

Renewable energy	Photovoltaics, batteries, thermal systems, eMobility, sector coupling, energy management
Software development	FOSS/Linux development, Trade literature, Hackathons, SoCraTes unconferences, Ensemble programming,

Leisure-time activities

Sports	Running, cycling, hiking
Cooking	
Gardening	

Publications

Conference paper	Jakobi, M.; Kunath, L.; Witzig, A. *BIM use-case: Model-based performance optimization.* EuroSun international conference on solar energy for buildings and industry, Rapperswil, 2018.
Conference paper	Jakobi, M.; Stöckli, U.; Tjaden, T.; Quaschning, Q. *From simulation to reality: IEC 61499 compliant control applications for solar energy systems.* EuroSun international conference on solar energy for buildings and industry, Rapperswil, 2018.
Conference paper	Jakobi, M.; Stöckli, U.; Tjaden, T.; Quaschning, Q. *Von der Simulation zur Realität: IEC 61499 konforme Regelanwendungen für Solare Energiesysteme.* Symposium photovoltaische Solarenergie, Bad Staffelstein, 2018.
Thesis	Jakobi, M.: *Development of model-based control applications compliant with IEC 61499 for building energy systems with a focus on photovoltaics.* Master's thesis, Hochschule für Technik und Wirtschaft, Berlin, 2017.
Thesis	Jakobi, M.: *Optimierung des Netzeinspeiseverhaltens von deutschlandweit verteilten PV-Speichersystemen mit prognosebasierten Betriebsstrategien.* Bachelor's thesis, Hochschule für Technik und Wirtschaft, Berlin, 2016.
Data & code	Jakobi, M.; Schmidt, M.; Anyangbe, F. *Cell resolved Matlab OOP model of a lithium iron phosphate battery pack*, TU Berlin, 2017.
Co-author	Weniger, J.; Bergner, J.; Beier, D.; Jakobi, M.; Tjaden, T.; Quaschning, Q.: *Grid Feed-in Behavior of Distributed PV Battery Systems*. 30th European Photovoltaic Solar Energy Conference and Exhibition, Hamburg, 2015.