

Dmitry Bagaev, PhD — Short CV

Senior Software Engineer & Scientist

bvdmitri.me

bvdmitri@gmail.com
linkedin.com/in/bvdmitri
github.com/bvdmitri
English · Dutch · Russian

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Software engineer and scientist in Eindhoven with a PhD in Bayesian inference and a background in computational mathematics. I founded and maintain ReactiveBayes (RxInfer.jl and 35+ Julia packages), was CTO of the startup Lazy Dynamics, and earlier built the web platform of VDJdb, an immunology database published in Nature Methods. Currently a postdoc at TU/e, working on Bayesian inference for Dutch road traffic.

> This is a condensed version of the CV — only titles and key highlights are included. For the full version with detailed descriptions, bullet points, and skills per role, please visit bvdmitri.me/export.

TECHNICAL SKILLS

Domains & Fields: Machine Learning · Data Science · Software Development · HPC · Cloud Infrastructure · Full-stack Development · API Development · System Design · Signal Processing · Probabilistic Programming · Bayesian Inference · Reactive Programming · Applied AI · Academic Research · Mobility & Transport

Technical Skills & Tools: Software Architecture · API Architecture · API Design · Architect · Parallel Computing · MPI · Slurm · GitHub · Git · Linux · Docker · CI/CD · Google Cloud Platform · SQL · Observability · UI/UX · WebGPU · Video Processing · Open Source Maintenance · Code Review · Release Management

Soft Skills & Management: Team Leadership · Technical Leadership · Student Supervision · Mentorship · Time Management · Community Building · Community Management · Developer Relations · Event Organization · Public Speaking · Project Management · Presentation Skills · Technical Writing · Documentation

Programming Languages: Julia · Python · C · C++ · Fortran · JavaScript · TypeScript · Java · Scala · Groovy

WORK EXPERIENCE

Postdoc Researcher — TU/e, BIASlab · 2026 – Present · Eindhoven, the Netherlands

Research on fast and scalable Bayesian inference at Eindhoven University of Technology.

Open-Source Maintainer — Open Source · 2023 – Present · GitHub

I founded and lead ReactiveBayes, a GitHub organization for reactive Bayesian inference and probabilistic programming in Julia.

Chief Technology Officer — Lazy Dynamics · 2023 – December 2025 · Eindhoven, the Netherlands

Co-founded Lazy Dynamics, a startup building probabilistic AI solutions for enterprise applications.

Eindhoven Events Co-Organizer — JuliaLang & PyData Eindhoven · August 2022 – Present · Eindhoven, the Netherlands

I co-organize public events and meetups for the Julia and Python communities in Eindhoven.

Postdoc Researcher — TU/e, BIASlab · 2024 – 2025 · Eindhoven, the Netherlands

Stayed at BIASlab as a postdoc for 18 months after my PhD, continuing the research on reactive message passing and the development of RxInfer.jl.

PhD Researcher — TU/e, BIASlab · October 2019 – December 2023 · Eindhoven, the Netherlands

Research on reactive message-passing frameworks for Bayesian inference.

Software Engineering Intern — ExxonMobil · 2017 – 2018 · Houston, Texas, USA

Two one-month summer internships at ExxonMobil's headquarters, in 2017 and 2018, integrating advanced numerical linear solvers into large-scale simulation software.

Software Engineer — Shemyakin and Ovchinnikov Institute of Bioorganic Chemistry RAS · 2015 – 2019 · Moscow, Russia

Developed VDJdb, a curated database of T-cell receptor (TCR) sequences with known antigen specificities, which researchers use to look up which epitopes a TCR recognizes in an MHC context.

EDUCATION

PhD in Electrical Engineering — Eindhoven University of Technology (TU/e) · October 2019 – December 2023 · Eindhoven, the Netherlands

PhD on message-passing based Bayesian inference for large-scale signal processing problems, completed in December 2023.

Nordic Probabilistic AI School 2022

— The University of Helsinki, Finnish Center for Artificial Intelligence (FCAI) · June 13, 2022 – June 17, 2022 · Helsinki, Finland

ProbAI 2022 was the third Nordic Probabilistic AI School, held June 13–17, 2022, at the University of Helsinki, Finland, bringing together 150+ participants for in-person training in probabilistic machine learning.

Master of Science — Moscow State University · 2017 – 2019 · Moscow, Russia

Master's in computational mathematics.

Rome-Moscow School— Moscow State University & Tor Vergata University · July 28, 2018 – September 23, 2018 · Moscow, Russia & Rome, Italy

A school on matrix methods and applied linear algebra, run jointly by Moscow State University and Tor Vergata University of Rome, with parts in Moscow and in Rome.

Institute of Numerical Mathematics RAS— Institute of Numerical Mathematics · 2015 – 2019 · Moscow, Russia

Conducted concurrent research at the Institute of Numerical Mathematics of the Russian Academy of Sciences, overlapping with both bachelor's and master's studies at Moscow State University.

Rome-Moscow School— MSU & Tor Vergata University · August 20, 2016 – September 3, 2016 · Rome, Italy

My first time at the Rome-Moscow school on matrix methods and applied linear algebra, run jointly by Moscow State University and Tor Vergata University of Rome.

Bachelor of Science— Moscow State University · 2013 – 2017 · Moscow, Russia

Bachelor's in computational mathematics at the Faculty of Computational Mathematics and Cybernetics of Moscow State University.

AESC MSU (Kolmogorov Boarding School)— AESC MSU · 2011 – 2013 · Moscow, Russia

Specialized physics and mathematics boarding school of Moscow State University, founded by Andrey Kolmogorov.

TEACHING & SUPERVISION

Teaching Assistant — Bayesian Machine Learning & Information Processing— TU/e · 2026 – Present · Eindhoven, the Netherlands

From Q2 2026 I support this MSc course, helping students master probabilistic modelling and message-passing inference.

Teaching Assistant — Software Engineering for Artificial Intelligence— TU/e · 2020 – 2023 · Eindhoven, the Netherlands

Supported students at the intersection of software practice and AI during my PhD, as the course scaled to its current size.

Teaching professionalization — University Teaching Qualification (UTQ/BKO)— TU/e · 2026 – Present · Eindhoven, the Netherlands

I am pursuing the University Teaching Qualification (UTQ/BKO) at TU/e to formalize my teaching practice on the path to a lecturer role.

Open educational resources at scale— ReactiveBayes · 2019 – Present · Open source

I treat my open-source work as teaching at scale: the documentation, tutorials, and 40+ worked examples I wrote for the RxInfer ecosystem are used by students, researchers, and practitioners worldwide to learn Bayesian inference.

PhD & MSc project supervision— TU/e · ReactiveBayes · 2021 – Present · Eindhoven, the Netherlands

I co-supervise PhD students and have supervised MSc projects on a day-to-day basis (formal promotorship sits with senior staff).

SOFTWARE PROJECTS

RxInfer.jl— Initially Personal Project, now under ReactiveBayes Organization

A Julia package for automatic Bayesian inference on factor graphs with reactive message passing.

Rocket.jl— Initially Personal Project, now under ReactiveBayes Organization

Reactive programming for Julia: fast reactive streams and operators.

VDJdb— VDJdb Project

A web application for browsing and querying a database of T-cell receptor (TCR) sequences with known antigen specificities.

VDJviz— VDJviz Project

A web application for browsing, analyzing and visualizing immune repertoire sequencing (RepSeq) data.

Other— GitHub

Small packages I built when I needed them and shared on GitHub.

HOBBY PROJECTS

Cutaway— Personal Project (closed source)

A personal project I'm quite proud of: a self-hosted, Dropbox-like video hub I built with Claude on bad-weather weekends when there was no jumping to be done.

web360— Personal Project (open source)

An open-source TypeScript library that stitches and stabilizes raw 360 camera recordings entirely in the browser, on WebGPU and WebCodecs.

PetoiBittle.jl— Personal Project (open source)

An open-source Julia library to connect to and control a Petoi Bittle / OpenCat robot dog over a serial port.

OPEN SOURCE CONTRIBUTIONS

Julia Programming Language— JuliaLang Organization

Bug fixes, small features and issue reports for the Julia language and its ecosystem.

vdjtools— vdjtools Project

Contributions to an analysis framework for T-cell and B-cell repertoire sequencing data.

Angular Framework— Angular Team

Issue reports and feature requests for the Angular framework.

Neovim— Neovim Project

Issue reports for Neovim and pull requests to Neovim plugins.

INMOST— INMOST Development

Co-developed INMOST, a C++ library for large-scale numerical simulation, including reservoir simulation.

PUBLICATIONS

2,933+	13	14	30+
Citations	h-index	i10-index	Publications

Reactive Probabilistic Programming for Scalable Bayesian Inference — 2023

VDJdb in the pandemic era: a compendium of T cell receptors specific for SARS-CoV-2 — 2022 · 290+ citations

VDJtools: unifying post-analysis of T cell receptor repertoires — 2015 · 723+ citations

VDJdb: a curated database of T-cell receptor sequences with known antigen specificity — 2018 · 755+ citations

VDJdb in 2019: database extension, new analysis infrastructure and a T-cell receptor motif compendium — 2020 · 502+ citations

SARS-CoV-2 epitopes are recognized by a public and diverse repertoire of human T cell receptors — 2020 · 303+ citations

MAGERI: Computational pipeline for molecular-barcoded targeted resequencing — 2017 · 65+ citations

Exploring the pre-immune landscape of antigen-specific T cells — 2018 · 53+ citations

VDJviz: a versatile browser for immunogenomics data — 2016 · 51+ citations

Variational message passing and local constraint manipulation in factor graphs — 2021 · 42+ citations

RxInfer: A Julia package for reactive real-time Bayesian inference — 2023 · 39+ citations

Improving parallel efficiency of a complex hydrogeological problem simulation in GeRa — 2019 · 16+ citations

Reactive message passing for scalable Bayesian inference — 2023 · 20+ citations

Dynamic optimization of linear solver parameters in mathematical modelling of unsteady processes — 2017 · 10+ citations

Multi-agent trajectory planning with NUV priors — 2024 · 7+ citations

ReactiveMP.jl: A Julia package for reactive variational Bayesian inference — 2022 · 6+ citations

Message passing-based inference in the Gamma mixture model — 2021 · 6+ citations

Expected free energy-based planning as variational inference — 2025 · 7+ citations

Gaussian Variational Inference with Non-Gaussian Factors for State Estimation: A UWB Localization Case Study — 2026 · 3+ citations

ExponentialFamilyManifolds.jl: Representing exponential families as Riemannian manifolds — 2025 · 2+ citations

GraphPPL.jl: A Probabilistic Programming Language for Graphical Models — 2024 · 2+ citations

Riemannian black box variational inference — 2024 · 1+ citations

Message passing-based inference in switching autoregressive models — 2022 · 1+ citations

Composing Non-Conjugate Factor Graphs with Closed-Form Variational Inference — 2026 · 0+ citations

PRESENTATIONS & TALKS

Embedding Julia on Petoi Bittle and Raspberry Pi — JuliaCon Global 2026 · YouTube

PyData Eindhoven @ BrightCape — PyData Eindhoven @ BrightCape · YouTube

PyData 2025 Opening — PyData Eindhoven 2025 · YouTube

What's Wrong with Active Inference and How Lazy Dynamics Is Set to Solve It — ActInf ModelStream 017.1 · YouTube

Learning Bayesian Statistics Podcast - Guest Appearance — Learning Bayesian Statistics Podcast · YouTube

RxInfer.jl updates and development — 4th Applied Active Inference Symposium · YouTube

RxInfer.jl: A Package for Real-Time Bayesian Inference — JuliaCon 2023 · YouTube

Enacting Ecosystems of Shared Intelligence — 3rd Applied Active Inference Symposium · YouTube

Building Smarter AI: Active Inference & Nested Models — Active Inference Conference · YouTube

GraphPPL.jl: A Package for Specification of Probabilistic Models — JuliaCon 2022 · YouTube

Fast Bayesian Inference with RxInfer.jl — Julia User Group Munich · YouTube

Implementing Active Inference by Message Passing in a Factor Graph — ActInf ModelStream #004.1 · YouTube

ReactiveMP.jl: Reactive Message Passing-based Bayesian Inference — JuliaCon 2021 · YouTube

Rocket.jl: A Julia package for reactive programming — JuliaCon 2020 · YouTube

HOBBIES & INTERESTS

Skydiving

I started skydiving in 2020.

Drumming

When the weather keeps me on the ground, I play drums.

Snowboarding/Skiing

I started snowboarding at 14 in Russia and picked up skiing at 25.

Wakeboarding

In summer I swap skis for a wakeboard.

Ship Modeling

I started building wooden ship models during the COVID lockdowns.

Video Editing

I edit videos of conferences, of my research lab and of my own jumps.