

# Martin Beneš

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## Experience

Since 09 2021

### Research Assistant, Security and Privacy Lab, Rainer Böhme

Research in steganalysis, machine learning and forensics.

**UNCOVER**: development of steganalysis framework, funded by EU.

• *End users are the law enforcement agencies. Working with confidential information.*

**jpeglib** [Python, C]: Python envelope for C library libjpeg for handling JPEG files.

**stegolab2** [Python, C++]: implementation of cutting-edge steganographic algorithms and primitives.

**steganographic demo** [C++]: prototype of real-time steganography in video stream, presented at events InDay Students and LNDF.

06 – 09 2020

### Data Engineer, M/F Ratio of current excess mortality, Krzysztof Bartoszek

Data engineering on death data for research project.

**covid19sweden**, **covid19czechia**, **covid19poland**, **eurostat\_deaths** [Python]: Automated Data On-line Collection and Cleansing.

**waybackmachine** [Python]: fetching historical snapshots of a page from archive.org

04 – 05 2020

08 – 09 2020

### Core team contributor, COVID-19 Data Hub [10.21105/joss.02376], Emanuele Guidotti

Data collection of COVID-19 data for research purposes.

**Data Hub** [R]: Data Cleansing and Collection. Unification into Hub.

**covid19dh** [Python]: Envelope of the Data Hub for Python.

09 2019 – 03 2020

11 2020 – 06 2021

### Software Developer, AB TaxiCaller Nordic

QA engineer. Web backend development.

**Driver app** [React.js]: Tester, iterative development.

**Scrum master** [Jira]: Sprint planning.

**QA engineer** [Node.js, Jenkins]: Integration and deployment testing.

**Revenu Quebec Certification** [Java/Android]: Certification of sales-recording system for mandatory billing.

**BloodHub Integration** [Node.js]: Integration of blood delivery system.

**API definition** [OpenAPI]: JSON schema for API - Jackson, TypeScript middleware request checker, documentation.

**Maps** [Python, MariaDB, Node.js]: OpenStreetMap solution: Map tiles server, geocoding (Pelias), address interpolation.

01 2017 – 01 2019

### Software developer, Artisys s.r.o.

Real-time air traffic control systems development. Deployed worldwide on civil/military airports.

**Air Traffic Control Display Panel** [C++/Qt5]: Display panel for air-traffic controllers, visualizing the radar targets.

## Education

Since 10 2021

### PhD., Computer Science

University of Innsbruck

2022

Beneš, Hofer, Böhme: Know Your Library: How the libjpeg Version Affects Compression and Decompression Results.

Beneš, Hofer, Böhme: The Effect of the JPEG Implementation on the Cover-Source Mismatch Error in Image Steganalysis.

• *Presented as a poster at EUSIPCO 2022, Belgrade, Serbia.*

Reviewer for IEEE Transactions on Information Forensics and Security (IEEE TIFS).

2023

Beneš, Lorch, Böhme: JPEG Steganalysis Using Leaked Cover Thumbnail. (*In progress*)

• *Experiments carried out on Vienna Scientific Cluster (#301 worldwide).*

06 2021

### MSc., Statistics and Machine Learning

Linköping University

**Master thesis** [Python]: HMM modelling of the spread of the SARS-CoV-2. [A]

• *Presented at NordicMathCovid Oslo Workshop 2023 (by the thesis supervisor).*

**Research project** [Python]: Covid-19 regional comparison. [A]

**Teacher Assistant** [R]: Courses Advanced R Programming, Computational Statistics, Machine Learning.

08 2019

### Bc., Information Technology [GPA 1.51]

Brno University of Technology

**Bachelor thesis Counting People Using PIR Sensor** [Arduino/C++, Python]: HW / SW solution. Cooperate research of FHV / FIT BUT.

**Erasmus Computer Science**, FH Vorarlberg. [GPA 1.31]

06 2016

**Gymnázium Brno – Řečkovice**. High school, final *maturita* exam: Czech, Math, IT.

## Skills

Machine Learning  
(R, Python)

Statistical modelling · Deep learning · Predictive analysis/Forecasting · Data mining/Clustering · Computer vision

Model selection and regularization · Model deployment · High-performance computing/Slurm · ML/Ops

Big data/Distributed computation · Web scraping · Data engineering · Data Analysis and Visualization

Probabilistic and Bayesian inference · Statistical testing · Stochastic optimization · Continuous and Discrete simulation

Programming

**Python** (PyTorch, TensorFlow, NumPy, Scikit-Learn, Pandas, Flask) · **R**

**Node.js** · **React.js** · **jQuery**

**C/C++** · Parallel programming · GPU and multi-GPU acceleration (CUDA) · JIT acceleration · Networking · **Java** · **PHP**

**MySQL/MariaDb** · **Oracle SQL** · **PostgreSQL** · **MongoDB** · **SQLite** · **Redis** · Conceptual modelling

**Arduino** · **Raspberry Pi** · **FPGA/VHDL** · **Assembly x86** · **SSE/AVX**

**Git** · **Linux/GNU** · Instrumentation · **AWS** · **Scrum/Jira** · **DevOps**

Specific skills

**Steganography** · **Steganalysis** · **Digital forensics** · **Cryptography**

**Signal and image processing** · **Coding theory**

**Academical and technical writing** · **R&D** · **TeX/Tikz**

**Video editing** (Vegas) · **Sound processing** (Cubase, Audacity) · **Graphics** (CorelDraw/Inkscape, Adobe Photoshop)

Languages

**Czech/Slovak/Polish** (mother tongue/intelligible) · **English** (C1/CAE) · **Russian** (~B2) · **German** (~B1) · **Swedish** (B1) · **French** (~A2)

Other skills

**Presentation skills** · **Teaching and mentoring** · **Teamwork** · **Intercultural communication and social skills**

**Responsibility** · **Problem solving** · **Adaptivity** · **Creativity** · **Time management**

**Driving license B** (car) · **Hitchhiking** · **Ukulele**

## Miscellaneous projects and work

01 2023

**Meeting organization**: Organization of a major EU project meeting with 50 attendants.

08 2022

**Jura jede** [D3.js/jQuery]: Data dashboard.

03 2021, 10 2021

**Externist**, University of Neuchâtel: Database merging.

11 2020

**Externist**, CEVRE Consultants, s.r.o.: Facility documentation for BREEAM certification.

09 2018 – 12 2019

**Lecturer**, Top Learning s.r.o.: Individual teaching – math, physics. Preparing study materials.

09 2013 – 03 2018

**Sound Engineer**, ZveOzvuceni.cz: Installation and configuration of sound systems on various live events.

06 – 09 2018

**Manager**, I Love Sugar: Work & Travel J1 program in USA. Management of stock and organization of employees.

08 2016/17/18

**ViceManager**, Camping Transit, GenAgro a.s.: Management of temporary camping for grand prix event. Organization of employees.