

# Benedikt Becker

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## Experience

- 2021- **Figly Inc., Compiler engineer**, Remote  
Compiler optimizations, runtimes, Wasm
- 2021- **VAC4EU, Software consultant**, Remote  
Code harmonization for pharmacoepidemiological studies
- 2020-2021 **Scientific engineer**, *Inria Saclay*, France  
Verification of Ada/SPARK using Why3; runtime assertion checking for validation of counter-examples
- 2019 **Scientific engineer**, *Université Paris Sud*, France  
Verification of Java JML contracts using Why3; application to Parcoursup
- 2018-2019 **Postdoctoral researcher**, *Inria Saclay*, France  
CoLiS project: Formally verified, symbolic execution of Shell programs
- 2013-2017 **Scientific researcher**, *Erasmus University Medical Center*, Netherlands  
Representation, retrieval, and integration of vaccine information
- 2011-2012 **Scientific programmer**, *CNRS/IRILL*, France  
Contributions to the Ocsigen/Eliom web application framework
- 2007-2011 **Freelance software engineer**, *France & Germany*  
Web application development, tools for medical inference, and cognitive science research
- 2005-2008 **Teaching assistant**, *Albert-Ludwig-University*, Germany  
Lectures: Computer science I, Cognitive modelling, Formal methods and programming
- 2004-2011 **Studies of computer science and cognitive science**, *Albert-Ludwig-University*, Freiburg, Germany

## Prize

- 2020 **BAZIS Prize**, *BAZIS Foundation*, Netherlands

## Theses

### PhD

Title *Vaccine semantics*: Automatic methods for recognizing, representing, and reasoning about vaccine-related information

Website <http://benozol.mooo.com/pages/phd>

Description Information about vaccines is spread over different resources: Products and product information are available in product databases; electronic health records document the use of vaccines in coded representation; scientific studies assess the safety and efficiency; and public news and social media reflect and shape the public's opinion. This thesis proposes techniques for the automatic retrieval and integrating of vaccine information from these resources.

Supervisors Miriam Sturkenboom & Jan Kors  
 Date 2019  
 Master  
 Title *Bayesian rationality and spatial reasoning*  
 Description Bayesian rationality, a cognitive paradigm centering on the uncertainty of knowledge in human reasoning, is applied on two spatial inference tasks: cardinal directions and Allen's interval calculus.

Supervisors Bernhard Nebel & Marco Ragni  
 Date 2011  
 Bachelor  
 Title *EasyOCaml – More descriptive type error messages for OCaml*  
 Description A constrained-based type checker for a subset of the OCaml language.  
 Date 2008  
 Supervisors Peter Thiemann & Stefan Wehr  
 Funding OCaml Summer Project, Jane St. Capital, New York, US

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## Publications

### **Explaining counterexamples with giant-steps assertion checking**

Benedikt Becker, Cláudio Belo Lourenço and Claude Marché.  
 F-IDE, 2021

### **Analysing installation scenarios of Debian packages**

Benedikt Becker, Nicolas Jeannerod, Claude Marché, Yann Régis-Gianas, Mihaela Sighireanu and Ralf Treinen.  
 TACAS, 2020

### **Ghost Code in Action: Automated Verification of a Symbolic Interpreter**

Benedikt Becker, Claude Marché.  
 VSTTE 2019

### **Alignment of vaccine codes using an ontology of vaccine descriptions**

Benedikt Becker, Jan Kors, Erik Mulligen, Miriam Sturkenboom.  
 Journal of Biomedical Semantics, 2022.

### **Identification and normalization of vaccine descriptions in scientific literature: A comparison between ontology-based and machine learning approaches.**

Benedikt Becker, Miriam Sturkenboom, Jan Kors.  
*Submitted.*

### **CodeMapper: semi-automatic coding of medical case definitions**

Benedikt Becker, Paul Avillach, Silvana Romio, Erik Mulligen, Daniel Weibel, Miriam Sturkenboom, Jan Kors.  
 Pharmacoepidemiology and drug safety, 2017

### **Extraction of chemical-induced diseases using prior knowledge and textual information**

Ewoud Pons + Benedikt Becker, Saber Akhondi, Zubair Afzal, Erik Van Mulligen, Jan Kors.  
 Database, 2016.

### **Evaluation of a multinational, multilingual vaccine debate**

Benedikt Becker, Heidi Larson, Jan Bonhoeffer, Erik Van Mulligen, Jan Kors, Miriam Sturkenboom.  
 Vaccine, 2016.

## Preferences in Cardinal Direction

Marco Ragni, Benedikt Becker.

Proceedings of the Cognitive Science Society, 2010.

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## Open-source software/contributions

- 2019 **Why3**, *Deductive program verification platform*  
Runtime assertion checking, validation of counter-examples (OCaml/Why3).  
<https://www.why3.org/>
- 2019 **CoLiS language**, *Target language for the symbolic execution of Shell scripts*  
Language design, concrete and symbolic execution, verification (OCaml/Why3).  
<https://github.com/colis-anr/colis-language/>
- 2017 **VaccO**, *An ontology of vaccines and two applications*  
Design and implementation (Java/OWL2).  
<https://biosemantics.org/software/vacco>
- 2016 **CodeMapper**, *Semiautomatic coding of case definitions*  
Design and implementation (Java/Javascript).  
<https://github.com/VAC4EU/Codemapper>
- 2012 **Ocsigen/Eliom**, *Ocsigen: Language extensions and libraries for client/server web-applications in OCaml*  
Contributions (OCaml).  
<http://ocsigen.org/>
- 2008 **ABC Tool**, *Automatic classification of adverse events*  
Design and implementation (Java).  
<https://www.brightoncollaboration.org/>
- 2008 **EasyOCaml**, *More descriptive error messages for OCaml*  
Design and implementation (OCaml).  
<https://github.com/benozol/easyocaml>

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## Skills & interests

### Natural language

German: native, English: proficient, French and Spanish: intermediate.

### Programming language

Completed projects using Rust, OCaml, TypeScript, Ada, Why3, Java, Python, JavaScript, Scala, C++.

### Scientific interest

Software verification, runtime-assertion checking, symbolic execution, constraint-based type inference, natural language processing, ontologies and reasoning, machine learning, compiler construction, cognitive modelling, syntax theory.