

# Benedikt Becker

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<https://github.com/benozol>

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## History

- 2018–2019 **Postdoctoral researcher**, *Inria Saclay*, France.  
Topic: Formally verified, symbolic interpretation of Shell programs
- 2013–2017 **Scientific researcher**, *Erasmus University Medical Center*, Netherlands.  
Topic: Representation, retrieval, and integration of vaccine information
- 2011–2012 **Scientific programmer**, *CNRS/IRILL*, France.  
Topic: Contributions to the Ocsigen/Eliom web application framework
- 2007– **Freelance software engineer**, *France & Germany*.  
Topics: 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.  
Graduated with diploma

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## Theses

### PhD thesis

- Title *Vaccine semantics: Automatic methods for recognizing, representing, and reasoning about vaccine-related information*
- Website <http://benozol.mo00.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

### Diploma thesis

- 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 thesis

- 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

### **A Formally Verified Symbolic Interpreter.**

Benedikt Becker, Claude Marché.

*In progress.*

### **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.*

### **Alignment of vaccine codes using the VaccO ontology of vaccine descriptions.**

Benedikt Becker, Jan Kors, Erik Mulligen, Miriam Sturkenboom.

*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 on Twitter.**

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

Vaccine, 2016.

### **Evaluating social media networks in medicines safety surveillance: two case studies.**

Preciosa Coloma, Benedikt Becker, Miriam Sturkenboom, Erik van Mulligen, Jan Kors.

Drug safety, 2015.

### **Preferences in Cardinal Direction.**

Marco Ragni, Benedikt Becker.

Proceedings of the Cognitive Science Society, 2010.

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## Software

- 2019 **CoLiS language**, *Target language for the verification 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://biosemantics.org/software/codemapper>

- 2011–2012 **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: intermediate – Spanish: beginner

### Programming language

Completed projects using OCaml, Java, JavaScript, Python, Scala, C++

### Scientific interest

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