

# Kacper Bąk, Ph.D.

*Curriculum Vitae*

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San Francisco, CA, United States

✉ [contact@kacper.me](mailto:contact@kacper.me)

🌐 <http://kacper.me>

## *Software Engineering Research and Advanced Development*

### Education

2009–2013 **Ph.D.**, *University of Waterloo*, Canada.

*Computer Science*, Adviser: Prof. Krzysztof Czarnecki, GPA: 91.38/100

Research in Software Engineering: Software Product Lines, Modeling Languages, Variability

2006–2009 **B.Sc.**, *Warsaw University of Technology*, Poland.

*Computer Science*, Adviser: Dr. Artur Krystosik, GPA: 4.75/5.00, *Summa Cum Laude*

### Experience

2018–present **Senior Research Engineer**, *Engineering*, Quantstamp, San Francisco, CA, USA.

Automating security audits for smart contracts. Technologies: Solidity, JavaScript

2013–2017 **Senior Software Engineer**, *Modeling Framework*, MathWorks, Natick, MA, USA.

Projects:

*MF0*, class-based modeling framework offering modeled services: associations management, model versioning, serialization, synchronization (between C++, MATLAB, and JavaScript implementations), transformations, traceability links, evolution, visualization, attribute maps;

*Class Modeling*, native support for associations management in MATLAB;

*Clam*, a web-based class modeling editor for MATLAB;

*Dependency Viewer*, a web-based dependency viewer for Simulink models;

*Diagram Framework*, framework for generating graph-based graphical editors.

2009–2013 **Research Assistant**, *GSD Lab*, University of Waterloo, Canada.

Projects:

*Clafar*, a unified language for modeling and analysis of variability in Software Product Lines;  
*Common Variability Language (CVL)*, OMG proposal for a standard for specifying and resolving variability;

*Example-Driven Modeling (EDM)*, an approach that systematically uses explicit examples for eliciting, modeling, verifying, and validating complex business knowledge.

**Teaching Assistant**, *GSD Lab*, University of Waterloo, Canada.

Courses:

Spring 2012, *Software Design and Architecture (SE 464)*, SE 464;

Fall 2011, *Design Project Planning (SE 390)*, SE 390;

Spring 2010, *Software Abstraction and Specification (CS 246SE)*, CS 246SE;

Winter 2010, *Compiler Construction (CS 444/644)*, CS 444/644;

Fall 2009, *Elementary Algorithm Design and Data Abstraction (CS 136)*, CS 136.

Summer **Software Developer**, *Opera Mini*, Opera Software, Linköping, Sweden.

2009 Development of mobile browser and user interface. Technologies: C++, Java and Bream (proprietary).

- Summer 2008 **Software Developer**, *Opera Mini*, Opera Software, Linköping, Sweden.  
Compiler and virtual machine performance optimizations. Technologies: Java and Bream (proprietary).
- Summer 2007 **Software Quality Engineer**, *DTV Lab*, Samsung R&D Center, Warsaw, Poland.  
Development of a database application for classifying Digital TV streams. Technologies: C# and PHP.
- Spring 2007 **Functional Programming Evangelist**, Warsaw University of Technology, Poland.  
Co-organization of *Seminar in Functional Programming*. Supervised by Dr. Andrzej Zalewski.
- 2006–2008 **Software Developer**, *SSESG*, Warsaw University of Technology, Poland.  
Constructing software for on-board computer, communications, and distributed satellite testing.  
Projects:  
*PW-Sat*, the first Polish satellite;  
*ESEO*, a micro-satellite mission within European Space Agency’s Education Satellite Program;  
*BOBAS2*, a stratospheric balloon mission.

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## Awards

- 2011–2012 Ph.D. Fellowship, IBM Canada Centers for Advanced Studies Research
- 2010–2012 International Doctoral Student Award, University of Waterloo  
David R. Cheriton Graduate Scholarship, University of Waterloo
- Winter 2010 UW Graduate Scholarship, University of Waterloo
- 2009–2010 Graduate Experience Award, University of Waterloo  
International Masters Student Award, University of Waterloo  
Graduate Entrance Scholarship, University of Waterloo
- 2007–2008 Academic Performance Award, Warsaw University of Technology

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## Publications

Michał Antkiewicz, **Kacper Bąk**, Krzysztof Czarnecki, Dina Zayan, Andrzej Wąsowski, and Zinovy Diskin. Example-Driven Modeling Using Clafer. In *MDEBE*, 2013.

Michał Antkiewicz, **Kacper Bąk**, Alexander Murashkin, Rafael Olaechea, Jimmy Liang, and Krzysztof Czarnecki. Clafer tools for product line engineering. In *SPLC*, 2013.

IBM, Thales, Fraunhofer FOKUS, and TCS. *Proposal for Common Variability Language (CVL) Revised Submission*, 2012.

**Kacper Bąk**. Certificateless cryptography. BSc Thesis, Warsaw University of Technology, 2009.

**Kacper Bąk**. *Modeling and Analysis of Software Product Line Variability in Clafer*. PhD thesis, University of Waterloo, 2013.

**Kacper Bąk**, Krzysztof Czarnecki, and Andrzej Wąsowski. Feature and Class Models in Clafer: Mixed, Specialized, and Coupled. Technical Report CS-2010-10, University of Waterloo, 2010.

**Kacper Bąk**, Krzysztof Czarnecki, and Andrzej Wąsowski. Feature and Meta-Models in Clafer: Mixed, Specialized, and Coupled. In *SLE*, 2010.

**Kacper Bąk**, Zinovy Diskin, Michał Antkiewicz, Krzysztof Czarnecki, and Andrzej Wąsowski. Partial Instances via Subclassing. In *SLE*, 2013.

**Kacper Bąk**, Zinovy Diskin, Michał Antkiewicz, Krzysztof Czarnecki, and Andrzej Wąsowski. Clafer: Unifying Class and Feature Modeling. In *SOSYM*, 2014.

**Kacper Bąk**, Dina Zayan, Krzysztof Czarnecki, Michał Antkiewicz, Zinovy Diskin, Andrzej Wąsowski, and Derek Rayside. Example-Driven Modeling. Model = Abstractions + Examples. In *ICSE*, 2013.

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## Speaking

- 2017 International Summer School on Domain-Specific Modeling Theory and Practice
- 2013 Dagstuhl Seminar on Analysis, Test and Verification in The Presence of Variability
- 2011 Dagstuhl Seminar on Feature-Oriented Software Development (FOSD)

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## Academic Service

- Co-reviewer Theoretical Computer Science
- IEEE Transactions on Software Engineering
- SCP special issue on Software Evolution, Variability and Adaptability
- Applications of Graph Transformations with Industrial Relevance
- International Conference on Software Engineering
- International Conference on Software Language Engineering
- International Software Product Line Conference
- International Conference on Model Transformation
- International Conference on Generative Programming and Component Engineering
- ACM/IEEE International Conference on Model Driven Engineering Languages and Systems
- IEEE/ACM International Conference on Automated Software Engineering
- European Software Engineering Conference and the ACM SIGSOFT Symposium on the Foundations of Software Engineering
- International Workshop on Variability Modelling of Software-intensive Systems
- Workshop on Domain-Specific Modeling
- International Workshop on Modeling in Software Engineering

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## Graduate Courses

- CS 744 **Advanced Compiler Design.**  
Project: Optimized Translation of Clafer Models to Alloy
- CS 846 **Topics in Software Evolution and Empirical Studies.**  
Project: Software Product Line Evolution: the Linux Kernel
- CS 746 **Software Architecture.**  
Project: Exemplar of Automotive Architecture with Variability
- CS 889 **Open Source Usability.**  
Project: Improving Usability of the Linux Kernel Configuration Tools
- CS 886 **Persuasive Technologies.**  
Project: Modeling Variation Space of Tailored Messages
- CS 846 **Model-Based Software Engineering.**  
Project: Clafer: a Unified Language for Class and Feature Modeling

CS 798 **Interpreters for Functional Languages.**

Project: Interpreter for FSML: Detecting Framework Concepts in Source Code Through Reverse-Engineering

CS 745 **Computer-Aided Verification.**

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## Languages

Polish **Native**

English **Fluent**

Portuguese **Basic**

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## Computer Languages

Programming C, C++, Java, JavaScript, C#, Assembler, Haskell, Scheme, ML, Prolog

Modeling UML, OCL, MOF, MOFM2T, CVL, MATLAB, Alloy, Clafer

Other  $\LaTeX$ , SQL, Solidity