

# Martin Bravenboer

## Curriculum Vitae

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### Contact

E-mail: martin.bravenboer@acm.org  
Phone: *Please request via e-mail*  
Website: <http://martin.bravenboer.name>

*Work*  
Department of Computer Science  
140 Governors Drive  
University of Massachusetts, Amherst  
Amherst, MA 01003

*Home (preferred)*  
*Please request via e-mail*

### Research Interests

#### *Extensible and Domain-Specific Languages*

Keywords: syntactic abstraction, generative programming, parsing techniques, scannerless parsing, formal and declarative syntax definition, modularity, embedding domain-specific languages, grammar engineering, compiler construction.

#### *Program Analysis*

Keywords: precise, context-sensitive pointer analysis, declarative specifications, logic programming, Datalog, recursive query optimization, scalability.

#### *Program Transformation*

Keywords: Stratego/XT program transformation system, metaprogramming, rewrite rules, strategic rewriting, program transformation tools.

### Education

*Ph.D. in Computer Science* (November 2003 - January 2008)  
Advisor: Professor Eelco Visser and Professor S. Doaitse Swierstra  
Utrecht University, The Netherlands

*M.Sc. in Computer Science, cum laude* (September 1997- February 2004)  
Advisor: Professor Eelco Visser  
Utrecht University, The Netherlands

### Employment

*Postdoctoral Researcher* (March 2008 - Present)  
University of Massachusetts Amherst, Computer Science Department (visiting since September 2008)  
University of Oregon, Computer & Information Science Department  
Project: Program Analysis with Declarative Recursive Specifications, funded by LogicBlox  
Advisor: Professor Yannis Smaragdakis

*Postdoctoral Researcher* (November 2007 - March 2008)  
Delft University of Technology, Department of Software Technology  
Project: Model-Driven Software Evolution (MoDSE), funded by NWO/Jacquard  
Advisor: Professor Eelco Visser

*Research Assistant* (February 2007 - November 2007)  
Delft University of Technology, Department of Software Technology, The Netherlands  
Project: Transparent Configuration Environments (TraCE), funded by NWO/Jacquard  
Advisor: Professor Eelco Visser

*Research Assistant* (November 2003 - February 2007)

Utrecht University, Department of Information and Computing Sciences, The Netherlands  
Project: Transparent Configuration Environments (TraCE), funded by NWO/Jacquard  
Advisor: Professor Eelco Visser

*Teaching Assistant* (January 2003 - March 2003)

Utrecht University, Department of Information and Computing Sciences, The Netherlands  
Course: Program Transformation

## Teaching Experience

### Courses

*CIS 410/510 Object Oriented Languages and Systems* (2008)

with Professor Yannis Smaragdakis  
lectured 2 classes on aspect-oriented programming

*Master Course Program Transformation* (2002, 2003, 2004)

with Professor Eelco Visser  
design, assistance, and grading of exercises and lab assignments, lectured 4 classes  
best teaching assistance award Department of Information and Computing Sciences (2003)

*Master Course Software Generation and Configuration* (2003, 2004)

with Professor Eelco Visser  
grading of student papers, lectured 4 classes

*Master Course Software Engineering* (2003, 2004)

with Professor Eelco Visser  
reviewing student papers, assistance of student projects, lectured 2 classes

### Co-supervised Master's Theses

- Lennart Kats, *Supporting Language Extension and Generative Programming by Mixing Java and Bytecode*, Utrecht University, Department of Information and Computing Sciences, 2007 (work resulted in OOPSLA 2008 publication [6])
- Koen Muilwijk, *Automated Analysis of Unit Tests to Improve Understanding of Software Systems*, Utrecht University, Department of Information and Computing Sciences, 2006
- Rene de Groot, *Design and Implementation of Embedded Domain-Specific Languages*, Utrecht University, Department of Information and Computing Sciences, 2006 (work resulted in GTTSE 2005 publication [14])

### Supervised Projects

Eric Bouwers, Google Summer of Code, *Using Static Analysis to Find Vulnerabilities*, 2006

## Grants

### *Transformations for Abstractions*

Eelco Visser (Principal Investigator) and Martin Bravenboer  
NWO/EW Open Competition, The Netherlands, February 2006  
Acceptance 23% (41 of 182)  
Amount awarded: **171,407 euro** for three year postdoctoral researcher

## Honors and Awards

- *Cum laude* honors for my M.Sc. degree in Computer Science, based on an outstanding thesis and an exceptional grade point average.
- CIVI award for exceptional results for the foundation year of my study in Computer Science, 1998 (awarded to top 20 science and engineering students in the Netherlands)
- Best teaching assistance award for the course *Program Transformation* at the Department of Information and Computing Sciences, Utrecht University, 2003
- Best paper award for *Designing Syntax Embeddings and Assimilations for Language Libraries* [16] at the 4th International Workshop on Language Engineering (ATEM 2007). Selected as 1 of 2 awarded papers among 13 accepted and 23 submitted papers.

## Professional Activities

### Program Committee Member

GPCE	2009	Conference on Generative Programming and Component Engineering
DSAL	2009	Workshop on Domain-Specific Aspect Languages
LDTA	2009	Workshop on Language Descriptions, Tools and Applications
SLE	2008	Conference on Software Language Engineering
GPCE	2008	Conference on Generative Programming and Component Engineering
DSAL	2008	Workshop on Domain-Specific Aspect Languages
PEPM	2008	Workshop on Partial Evaluation and Program Manipulation

### Reviewer (Journals)

TOPLAS	2008	ACM Transactions on Programming Languages and Systems
TSE	2008	IEEE Transactions on Software Engineering
IET Softw.	2008	IET Software Journal
IET Softw.	2007	IET Software Journal
JSME	2007	Journal of Software Maintenance and Evolution: Research and Practice
TCJ	2007	The Computer Journal

### Reviewer (Conferences and Workshops)

PLDI	2009	Conference on Programming Language Design and Implementation
CC	2009	Conference on Compiler Construction
OOPSLA	2008	Conference on Object-Oriented Programming, Systems, Languages and Applications
FSE	2008	Symposium on Foundations of Software Engineering
ECOOP	2008	European Conference on Object-Oriented Programming
OOPSLA	2007	Conference on Object-Oriented Programming, Systems, Languages and Applications
ASE	2007	Conference on Automated Software Engineering
PEPM	2007	Workshop on Partial Evaluation and Program Manipulation
RTA	2006	Conference on Rewriting Techniques and Applications
SCAM	2006	Workshop on Source Code Analysis and Manipulation
GPCE	2006	Conference on Generative Programming and Component Engineering
PEPM	2006	Workshop on Partial Evaluation and Program Manipulation
GPCE	2004	Conference on Generative Programming and Component Engineering
GPCE	2003	Conference on Generative Programming and Component Engineering

### Reviewer (Project Proposals)

Ph.D. proposal	2008	University of Chile
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## Professional Memberships

Association for Computing Machinery (ACM)

## Publications

### Journal Papers

1. Martin Bravenboer, Eelco Dolstra, and Eelco Visser. Preventing injection attacks with syntax embeddings. *Science of Computer Programming*, 2009. To appear.
2. Martin Bravenboer, Karl Trygve Kalleberg, Rob Vermaas, and Eelco Visser. Stratego/XT 0.17. A language and toolset for program transformation. *Science of Computer Programming*, 72(1-2):52–70, June 2008.
3. Martin Bravenboer, Arthur van Dam, Karina Olmos, and Eelco Visser. Program transformation with scoped dynamic rewrite rules. *Fundamenta Informaticae*, 69(1–2):123–178, 2006.

### Conference Papers

4. Martin Bravenboer and Yannis Smaragdakis. Strictly declarative specification of sophisticated points-to analyses. In *OOPSLA '09: Proceedings of the 24th annual ACM SIGPLAN conference on Object Oriented Programming, Systems, Languages, and Applications*, New York, NY, USA, 2009. ACM. Acceptance 17% (25 of 144). To appear.

5. Martin Bravenboer and Yannis Smaragdakis. Exception analysis and points-to analysis: Better together. In Laura Dillon, editor, *ISSTA '09: Proceedings of the 2009 International Symposium on Software Testing and Analysis*. ACM Press, July 2009. To appear.
6. Lennart C. L. Kats, Martin Bravenboer, and Eelco Visser. Mixing source and bytecode – a case for compilation by normalization. In Gail E. Harris, editor, *Proceedings of the 23th ACM SIGPLAN Conference on Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA 2008)*, pages 91–108. ACM Press, October 2008. Acceptance **28%** (33 of 117).
7. Martin Bravenboer and Eelco Visser. Parse table composition – separate compilation and binary extensibility of grammars. In Dragan Gašević, Ralf Lämmel, and Eric Van Wyk, editors, *1st International Conference on Software Language Engineering (SLE 2008)*, Lecture Notes in Computer Science (LNCS). Springer-Verlag, September 2008. To appear. Acceptance **20%** (18 of 90).
8. Martin Bravenboer, Eelco Dolstra, and Eelco Visser. Preventing injection attacks with syntax embedding – a host and guest language independent approach. In Julia Lawall, editor, *Generative Programming and Component Engineering: Sixth International Conference (GPCE 2007)*, pages 3–12. ACM Press, October 2007. Acceptance **31%** (19 of 62).
9. Martin Bravenboer, Éric Tanter, and Eelco Visser. Declarative, formal, and extensible syntax definition for AspectJ – A case for scannerless generalized-LR parsing. In Peri L. Tarr and William R. Cook, editors, *Proceedings of the 21st ACM SIGPLAN Conference on Object-Oriented Programming Systems, Languages, and Applications (OOPSLA 2006)*, pages 209–228. ACM Press, 2006. Acceptance **17%** (26 of 157).
10. Martin Bravenboer, Rob Vermaas, Jurgen J. Vinju, and Eelco Visser. Generalized type-based disambiguation of meta programs with concrete object syntax. In Robert Glück and Mike Lowry, editors, *Generative Programming and Component Engineering: 4th International Conference (GPCE 2005)*, volume 3676 of *Lecture Notes in Computer Science (LNCS)*, pages 157–172. Springer-Verlag, September/October 2005. Acceptance **29%** (25 of 86).
11. Martin Bravenboer and Eelco Visser. Concrete syntax for objects. Domain-specific language embedding and assimilation without restrictions. In Douglas C. Schmidt, editor, *Proceedings of the 19th ACM SIGPLAN Conference on Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA 2004)*, pages 365–383. ACM Press, October 2004. Acceptance **16%** (27 of 173).
12. Martin Bravenboer and Eelco Visser. Rewriting strategies for instruction selection. In S. Tison, editor, *Rewriting Techniques and Applications (RTA 2002)*, volume 2378 of *Lecture Notes in Computer Science (LNCS)*, pages 237–251. Springer-Verlag, July 2002. Acceptance **40%**.

### Book Chapters

13. Martin Bravenboer and Eelco Visser. Designing syntax embeddings and assimilations for language libraries. In Holger Giese, editor, *Models in Software Engineering: Workshops and Symposia at MoDELS 2007*, volume 5002 of *Lecture Notes in Computer Science (LNCS)*, pages 34–46. Springer-Verlag, 2008. Selected paper from the Workshop on Language Engineering (ATEM 2007).
14. Martin Bravenboer, René de Groot, and Eelco Visser. MetaBorg in action: Examples of domain-specific language embedding and assimilation using Stratego/XT. In R. Lämmel and J. Saraiva, editors, *Generative and Transformational Techniques in Software Engineering (GTTSE 2005)*, volume 4143 of *Lecture Notes in Computer Science (LNCS)*, pages 297–311. Springer-Verlag, 2006.

### Workshop Papers (Refereed)

15. Eric Bouwers, Martin Bravenboer, and Eelco Visser. Grammar engineering support for precedence rule recovery and compatibility checking. In Anthony Sloane and Adrian Johnstone, editors, *Proceedings of the Seventh Workshop on Language Descriptions, Tools and Applications (LDTA 2007)*, volume 203 of *Electronic Notes in Theoretical Computer Science*, pages 85–101. Elsevier, April 2008. Acceptance **44%** (11 of 25).
16. Martin Bravenboer and Eelco Visser. Designing syntax embeddings and assimilations for language libraries. In *Proceedings of the 4th International Workshop on Language Engineering (ATEM 2007)*, October 2007. Acceptance **57%** (13 of 23), **selected as best paper (1 of 2)**.

17. Martin Bravenboer, Karl Trygve Kalleberg, Rob Vermaas, and Eelco Visser. Stratego/XT 0.16: Components for transformation systems. In John Hatcliff and Frank Tip, editors, *Proceedings of the 2006 ACM SIGPLAN Workshop on Partial Evaluation and Semantics-Based Program Manipulation (PEPM 2006)*, pages 95–99. ACM Press, January 2006. Acceptance **59%** (17 of 29).
18. Eelco Dolstra, Martin Bravenboer, and Eelco Visser. Service configuration management. In Jr. E. James Whitehead and Annita Persson Dahlqvist, editors, *Proceedings of the 12th International Workshop on Software Configuration Management (SCM 2005)*, pages 83–98. ACM Press, September 2005.

#### Workshop Position Papers (Refereed)

19. Martin Bravenboer. Impact of software transformation systems on language workbenches and domain-specific language tools. In *Proceedings of the Software Transformation Systems Workshop 2006 (STS 2006)*, Portland, Oregon, USA, October 2006.
20. Martin Bravenboer and Eelco Visser. Reusable and adaptable strategies for generative programming. In *Proceedings of the Software Transformation Systems Workshop 2004 (STS 2004)*, Vancouver, Canada, October 2004.

#### Theses

21. Martin Bravenboer. *Exercises in Free Syntax. Syntax Definition, Parsing, and Assimilation of Language Conglomerates*. PhD thesis, Utrecht University, Utrecht, The Netherlands, January 2008.
22. Martin Bravenboer. Connecting XML processing and term rewriting with tree grammars. Master's thesis, Utrecht University, Utrecht, The Netherlands, November 2003.

#### Technical Reports

23. Anya Helene Bagge, Martin Bravenboer, Karl Trygve Kalleberg, Koen Muilwijk, and Eelco Visser. Adaptive code reuse by aspects, cloning and renaming. Technical Report UU-CS-2005-031, Department of Information and Computing Sciences, Utrecht University, Utrecht, The Netherlands, August 2005.
24. Martin Bravenboer and Eelco Visser. Guiding visitors: Separating navigation from computation. Technical Report UU-CS-2001-42, Department of Information and Computing Sciences, Utrecht University, 2001.

#### Documentation

25. Martin Bravenboer, Karl Trygve Kalleberg, Rob Vermaas, and Eelco Visser. *Stratego/XT Manual: Tutorial, Examples, and Reference Manual*, 2008.  
<http://releases.strategoxt.org/strategoxt-manual/unstable/manual/>.

#### Tutorials

1. Martin Bravenboer and Eelco Visser. Program transformation with Stratego/XT. Half-day tutorial at *European Joint Conferences on Theory and Practice of Software (ETAPS 2007)*, March 2007.
2. Martin Bravenboer and Eelco Visser. Program transformation with Stratego/XT. Full-day tutorial at *Delft University of Technology*, The Netherlands, November 2007.
3. Martin Bravenboer, Karl Trygve Kalleberg, and Eelco Visser. Building Java transformations with Stratego/XT. Half-day tutorial at *Generative Programming and Component Engineering, Fifth International Conference (GPCE 2006)*, October 2006.
4. Martin Bravenboer and Eelco Visser. Strategic programming. Full-day tutorial at the Basic Course Software Technology, organized by the *Institute for Programming research and Algorithmics*. Eindhoven, The Netherlands, September 2006.
5. Martin Bravenboer and Eelco Visser. Program transformation with Stratego/XT. Full-day tutorial at the Sixth Stratego User Days (*SUD 2005*), May 2005.
6. Martin Bravenboer, Rob Vermaas, and Eelco Visser. Program transformation with Stratego/XT. Full-day tutorial at *Philips Research*. Eindhoven, The Netherlands, January 2005.

## Software

### Stratego/XT (2003 - Present)

Core developer of the Stratego/XT program transformation system. Contributed to the design and implementation of the Stratego transformation language and the various transformation tools of Stratego/XT. In particular, introduced various tools to assist with the implementation of a transformation system, such as generation of *regular tree grammars* from context-free grammars (based on work for master's thesis), reliable pretty-printing tools, an *interactive shell* for the Stratego language (used for learning the Stratego language in the Program Transformation course), and *parse-unit*, a novel unit testing tool for syntax definitions. Also, drastically improved the *deployment and portability* of Stratego/XT. Configured a buildfarm running continuous builds of numerous Stratego/XT projects.

### Java-front and Dryad (2002 - Present)

Implemented support for the transformation, analysis, and generation of Java programs with Stratego/XT. Java-front provides an extensible syntax definition and pretty-printer for Java 5, which is used for the prototypes of several publications. Dryad provides name analysis, reflection, and type-checking for Java. Both Java-front and Dryad are used for the lab assignments of the *Master Course Program Transformation*. This project has also resulted in various improvements of the Java Language Specification.

## References

Professor Yannis Smaragdakis  
University of Massachusetts, Amherst  
Department of Computer Science  
140 Governors Drive  
Amherst, MA 01003  
USA

E-mail: [yannis@cs.umass.edu](mailto:yannis@cs.umass.edu)  
Phone: +1 (413) 577 - 0233

Professor Eelco Visser  
Delft University of Technology  
Department of Software Technology  
Mekelweg 4  
2628 CD, Delft  
The Netherlands

E-mail: [visser@acm.org](mailto:visser@acm.org)  
Phone: +31 (15) 27 87088

Molham Aref, CEO  
LogicBlox  
Two Midtown Plaza, Suite 1880  
1349 West Peachtree Street, N.W.  
Atlanta, GA 30309  
USA

E-mail: [molham.aref@logicblox.com](mailto:molham.aref@logicblox.com)  
Phone: +1 (404) 602 - 5100

Professor Krzysztof Czarnecki  
University of Waterloo  
Department of Electrical and Computer Engineering  
200 University Avenue West  
Waterloo, ON N2L 3G1  
Canada

E-mail: [czarnecki@acm.org](mailto:czarnecki@acm.org)  
Phone: +1 (519) 888 - 4567 extension 37137

Professor Oege de Moor  
Oxford University  
Computing Laboratory  
Wolfson Building, Parks Road  
Oxford OX1 3QD  
United Kingdom

E-mail: [oege@comlab.ox.ac.uk](mailto:oege@comlab.ox.ac.uk)  
Phone: +44 1865 273878

Professor Eric Van Wyk  
University of Minnesota  
Department of Computer Science and Engineering  
4-192 EE/CSci Bldg, 200 SE Union Street  
Minneapolis, MN 55455  
USA

E-mail: [evw@cs.umn.edu](mailto:evw@cs.umn.edu)  
Phone: +1 (612) 625 - 0329

## Personal Data

*Citizenship*: The Netherlands

*Status in USA*: Permanent Resident

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