Chris Beck

CONTACT
INFORMATION

mobile: +1 (626) 639 9293
e-mail: beck.ct@gmail.com

EDUCATION

Princeton University, Princeton, New Jersey, USA

Doctor of Philosophy: Computer Science   **2009 − 2014**

- Advisors: Professor Sanjeev Arora and Professor Russell Impagliazzo
- GPA: 3.940/4.0

California Institute of Technology, Pasadena, California, USA

Bachelors of Science with Honor: Mathematics   **2005 − 2009**
Bachelors of Science with Honor: Computer Science   **2005 − 2009**

- GPA: 3.7/4.0

Selected course titles: Algorithms and Data structures, Information security, Machine Learning
Algebra, Geometry, Topology, Analysis, Probability, Combinatorics, Algebraic Geometry

SELECTED
PUBLICATIONS

P. Beame, C. Beck, R. Impagliazzo. Time-Space Tradeoffs in Resolution: Superpolynomial Lower
Bounds for Superlinear Space. *Proceedings of the 44th Annual ACM Symposium on Theory of
Computing* (STOC 2012). **Also in special issue of SIAM Journal on Computing 2016 45:4,
1612-1645 .**

C. Beck, R. Impagliazzo, S. Lovett. Large Deviation Bounds for Decision Trees and Sampling Lower
Bounds for AC0-circuits. *Proceedings of the 53rd Annual IEEE Symposium on Foundations of
Computer Science* (FOCS 2012).

C. Beck, J. Nordström, B. Tang. Some Tradeoffs in Polynomial Calculus. *Proceedings of the 45th
Annual ACM Symposium on Theory of Computing* (STOC 2013).

C. Beck, R. Impagliazzo. Strong ETH Holds for Regular Resolution. *Proceedings of the 45th Annual
ACM Symposium on Theory of Computing* (STOC 2013).

HONORS AND
AWARDS

Wu Prize for Excellence, 2013
Simons Award for Graduate Students in Theoretical Computer Science, 2012-2014
NSF GRFP Honorable Mention, 2009
The G. Wallace Ruckert '30 Fellowship, 2009
SURF Fellow, 2006 and 2008

PROFESSIONAL
EXPERIENCE

Institute for Advanced Study, Princeton, New Jersey, USA

Postdoctoral Scholar   **Sept 2014 − August 2016**

Research in computational complexity theory, especially time space tradeoffs and pseudorandomness.

Princeton University, Princeton, New Jersey, USA

Teaching Assistant   **Sept 2011 − May 2012**

Teaching assistant for undergraduate courses in theory of computation, computational geometry.

California Institute of Technology, Pasadena, California, USA

Teaching Assistant   **Mar 2009 − June 2009**

Teaching assistant for undergraduate course in approximation algorithms.

SURF Research Fellow   **June 2008 − September 2008**

Investigated Polynomial Calculus proofs of Graph Nonisomorphism, and related issues in algebraic
graph theory. Mentored by Professor Richard Wilson.

PROGRAMMING	C, C++, Python, Lua, Matlab, Bash scripting, Git

OPEN SOURCE
CONTRIBUTIONS

visit_struct (Lead developer)   https://github.com/cbeck88/visit_struct
A tiny library that provides for struct-field reflection in C++11. It is portable to many versions of gcc, clang, and msvc, and I'm told in github issue comments that it has been used in production.

strict_variant (Lead developer)   https://github.com/cbeck88/strict_variant
A simple and efficient type-safe union for C++11.

spirit_po (Lead developer)   https://github.com/cbeck88/spirit_po
A library that parses the gettext po format, and reproduces parts of the interface of libintl. It can be used in C++ projects that use the GNU gettext system for internationalization and localization of software. spirit_po is written using the boost::spirit high-level parser framework, it is in total about 900 lines of code. spirit_po has been used for about a year by the Battle for Wesnoth project.

CEGUI   https://cegui.org.uk
CEGUI is a GUI framework written in C++ and distributed under a permissive license. It is highly performant, flexible, and configurable, with minimal dependencies. The project is at least ten years old and has been used in hundreds of projects, including AAA game titles like Torchlight.
Porting to WebGL   https://github.com/cbeck88/cegui-emscripten
I ported the CEGUI samples framework to javascript using the emscripten cross compiler. This means the user can view the samples in their webbrowser, rendered using WebGL. This uncovered some bugs in the CEGUI OpenGL renderer, and I submitted a patch upstream to fix these problems.

wesnoth   https://github.com/wesnoth/wesnoth
The Battle for Wesnoth is a turn-based strategy game developed as a community project since about 2004. I made patches to this project in the years 2014-2015, and I have commit access to it.
WML API Unit tests
I created a unit testing framework for the WML API. WML is a data language that is used to make wesnoth scenarios. Previously there were no automated tests of this API. I created a framework for unattended test scenarios, and a framework to run them as part of continuous integration. The intial tests I created have been extended by many developers and the framework is still used today. These tests also permitted aggressive refactoring of the project which resulted in about 10,000 lines of code being removed.
xBRZ scaling engine
Wesnoth graphics are based on software rendered sprites, drawn in a pixel art style. In several patches, I fixed some bugs in scaling algorithms that had been used, and merged a new patch which allowed the use of a modern scaling algorithm called xBRZ. xBRZ attempts to scale pixel art in a way that preserves edges and angles.

INVITED TALKS
- **John Templeton Foundation Workshop**: "Limits of Theorem Proving". Rome, Sept 2012.
- **China Theory Week** Aarhus, August 2012.
- **Symposium on Theory of Computing** New York City, May 2012.
- **University of Toronto** Theory Group Seminar. May 2012.
- **KTH Royal Institute of Technology** Theory Group Seminar. January 2012.
- **Institute for Advanced Study** Computer Science Discrete Math Seminar. December 2011.
- **University of Chicago** Theory Group Seminar. November 2011.
- **BIRS Workshop**: "Proof Complexity". Banff, October 2011.
- **University of Chicago** Theory Group Seminar. December 2012.
- **Symposium on Foundations of Computer Science** New Brunswick, September 2012.
- **Symposium on Theory of Computing** Palo Alto, May 2013.
- **University of California, San Diego** Theory Group Seminar, August 2013.
- **Insitute for Advanced Study** Computer Science Discrete Math Seminar. March 2015.