

Haskell in industry

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Haskell has a diverse range of use commercially, from aerospace and defense, to finance, to web startups, hardware design firms and a lawnmower manufacturer. This page collects resources on the industrial use of Haskell.



In February 2009 the [Industrial Haskell Group](#) was launched to support the needs of commercial users of the Haskell programming language. Phase 2 of the effort, expanding membership to research groups and startups with smaller budgets, was [launched in November 2009](#)

The main user conference for industrial Haskell use is CUFP - the [Commercial Users of Functional Programming Workshop](#). The annual conference is coming up in October 2010.

1 Industrial Haskell: 2009 status report

1.1 Industrial Haskell Group

For the first time, in 2009, a consortium of companies came together to fund continued development of Haskell and its toolchain. The result is the [IHG](#), [launched](#) earlier in the year. The initial round of funding resulted in [several improvements to the ecosystem](#). The group is seeking to [expand membership in 2010](#) to further consolidate the commercial strength Haskell. The [Birth of the IHG](#) was presented at the "[Commercial Users of Functional Programming](#)" workshop.

1.2 CUFP

2009's [Commercial Users of Functional Programming](#) workshop was held in Edinburgh, and included talks on:

- [Real World Haskell](#);
- [Teleconferencing on maps in Haskell](#);
- [Functional Programming at Facebook](#).

Next year's CUFP will be held in Baltimore.

1.3 Industrial reports

A number of experience reports on the use of Haskell were presented in 2009:

- As part of [Galois'](#) 10th birthday, Don Stewart presented a talk at the [LondonHUG on Engineering Large Projects in Haskell](#), celebrating a decade of use of Haskell by Galois.
- [TypLAB](#), a new startup [talked about why they use Haskell](#).
- Facebook released its [lex-pass tool to automate changes to a PHP codebase, by writing abstract-syntax-tree transformers in Haskell](#); and
- [Starling Software](#) described [building a real time financial trading system in Haskell](#) :: PDF.
- Tom Hawkin's [Atom EDSL](#) for control systems [went into production use](#) in trucks and buses, and is [starting to be used](#) on a NASA runtime monitoring project.
- The [Cryptol](#) release got [slashdotted](#).
- [Tupil.com](#) talked about their experiences building commercial web apps in Haskell.

2 Haskell in Industry

Many companies have used Haskell for a range of projects, including:

- [ABN AMRO](#) Amsterdam, The Netherlands

ABN AMRO is an international bank headquartered in Amsterdam. For its investment banking activities it needs to measure the counterparty risk on portfolios of financial derivatives.

[ABN AMRO's CUFP talk](#).

- [Aetion Technologies LLC](#) Columbus, Ohio

Aetion is a defense contractor whose applications use artificial intelligence. Rapidly changing priorities make it important to minimize the code impact of changes, which suits Haskell well. Aetion has developed three main projects in Haskell, all successful. Haskell's concise code was perhaps most important for rewriting: it made it practicable to throw away old code occasionally. DSELs allowed the AI to be specified very declaratively.

[Aetion's CUFP talk](#).

- [Allston Trading](#)

Headquartered in Chicago, Illinois, Allston Trading, LLC is a premier high frequency market maker in over 40 financial exchanges, in 20 countries, and in nearly every conceivable product class. Allston makes some use of Haskell for their trading infrastructure.

- [Amgen](#) Thousand Oaks, California

Amgen is a human therapeutics company in the biotechnology industry. Amgen pioneered the development of novel products based on advances in recombinant DNA and molecular biology and launched the biotechnology industry's first blockbuster medicines. Amgen uses Haskell;

- To rapidly build software to implement mathematical models and other complex, mathematically oriented applications
- Provide a more mathematically rigorous validation of software
- To break developers out of their software development rut by giving them a new way to think about software.

[Amgen's CUFP talk](#).

- [Ansemond LLC](#)

"Find It! Keep It! is a Mac Web Browser that lets you keep the pages you visit in a database. A list of these pages is shown in the 'database view'. "

- [Antiope](#) Fair Haven, New Jersey

Antiope Associates provides custom solutions for wireless communication and networking problems. Our team has expertise in all aspects of wireless system design, from the physical and protocol layers to complex networked applications. Antiope Associates's relies on a number of advanced techniques to ensure that the communication systems we design are reliable and free from error. We use custom simulation tools developed in Haskell, to model our hardware designs..

[Antiope's CUFP talk](#).

- [AT&T](#)

Haskell is being used in the Network Security division to automate processing of internet abuse complaints. Haskell has allowed us to easily meet very tight deadlines with reliable results.

- [Anygma](#) Antwerp, Belgium

Anygma is a startup company focusing on generating easy-to-use tools for creating audio-visual 2D/3D content, in the area of entertainment, media, corporate communication and the internet. The company is closely related to [Nazooka](#), a niche player in the media industry, specialized in creating cross media concepts and communication solutions. Anygma is using Haskell to quickly build a prototype of its new content creation platform, targeted towards artists and designers.

- [Bank of America Merrill Lynch](#)

Haskell is being used for backend data transformation and loading.

- [Barclays Capital Quantitative Analytics Group](#)

Barclays Capital's Quantitative Analytics group is using Haskell to develop an embedded domain-specific functional language (called FPF) which is used to specify exotic equity derivatives. These derivatives, which are naturally best described in terms of mathematical functions, and constructed compositionally, map well to being expressed in an embedded functional language. This language is now regularly being used by people who had no previous functional language experience.

[Simon Frankau et al's JFP paper on their use of Haskell](#)

- [bCODE Pty Ltd](#) Sydney Australia

bCode Pty Ltd is a small venture capital-funded startup using OCaml and a bit of Haskell in Sydney Australia.

- [Bluespec, Inc.](#) Waltham, Massachusetts

Developing a modern integrated circuit (ASIC or FPGA) is an enormously expensive process involving specification, modeling (to choose and fix the architecture), design (to describe what will become silicon) and verification (to ensure that it meets the specs), all before actually committing anything to silicon (where the cost of a failure can be tens of millions of dollars). Bluespec, Inc. is a three year-old company that provides language facilities, methodologies, and tools for this purpose, within the framework of the IEEE standard languages SystemVerilog and SystemC, but borrowing ideas heavily from Tern Rewriting Systems and functional programming languages like Haskell. In this talk, after a brief technical overview to set the context, we will describe our tactics and strategies, and the challenges we face, in introducing declarative programming ideas into this field, both externally (convincing customers about the value of these ideas) and internally (using Haskell for our tool implementation).

[Bluespec's CUFP talk](#).

- [Bump](#)

Bump use a Haskell-based server, [Angel](#), for process supervisor for all their backend systems, and for other infrastructure tasks.

- [Circos Brand Karma](#) Singapore

Brand Karma provides services to brand owners to measure online sentiments towards their brands. Haskell is used in building parts of the product, specifically for back-end job scheduling and brand matching.

- [Credit Suisse Global Modelling and Analytics Group](#) London, UK; New York City, New York

GMAG, the quantitative modelling group at Credit Suisse, has been using Haskell for various projects since the beginning of 2006, with the twin aims of improving the productivity of modellers and making it easier for other people within the bank to use GMAG models. Current projects include: Further work on tools for checking, manipulating and transforming spreadsheets; a domain-specific language embedded in Haskell for implementing reusable components that can be compiled into various target forms (see the video presentation: [Paradise, a DSEL for Derivatives Pricing](#)).

[Credit Suisse's CUFP talk](#).

- [Detexify](#)

Detexify is an online handwriting recognition system, whose backend is written in Haskell.

- [Deutsche Bank Equity Proprietary Trading, Directional Credit Trading](#)

The Directional Credit Trading group uses Haskell as the primary implementation language for all its software infrastructure.

[Deutsche Bank's CUFP talk](#).

- [Eaton](#) Cleveland, Ohio

Design and verification of hydraulic hybrid vehicle systems

[Eaton's CUFP talk](#)

[Eaton's experiences using a Haskell DSL](#)

- [Ericsson AB](#)

Ericsson uses Haskell for the implementation of Feldspar, an EDSL for digital signal processing algorithms.

[Ericsson's Feldspar compiler](#)

- [Facebook](#)

Facebook uses some Haskell internally for tools. [lex-pass](#) is a tool for programmatically manipulating a PHP code base via Haskell.

[Facebook's CUFP talk](#)

- [Factis Research](#)

Factis research, located in Freiburg, Germany, develops reliable and user-friendly mobile solutions. Our client software runs under J2ME, Symbian, iPhone OS, Android, and BlackBerry. The server components are implemented in Python and Haskell. We are actively using Haskell for a number of projects, most of which are released under an open-source license.

[Factis' HCAR submission](#)

- [Funktionale Programmierung Dr. Heinrich Hördegen](#), Munich, Germany

We develop software prototypes according to the Pareto principle: After spending only 20 percent of budget, we aim to provide already 80 percent of the software's functionality. We can realize this by constructing a 2080-software-prototype that we can further develop into a full-fledged solution...

- [Gamr7](#) <http://gamr7.com/> Lyon, France

Gamr7 is a startup focused on procedural city generation for the game and simulation market.

- [Galois, Inc](#) Portland, Oregon

Galois designs and develops high confidence software for critical applications. Our innovative approach to software development provides high levels of assurance, yet its scalability enables us to address the most complex problems. We have successfully engineered projects under contract for corporations and government clients in the demanding application areas of security, information assurance and cryptography.

[Galois' CUFP talk](#)

[Galois' retrospective on 10 years of industrial Haskell use](#)

- [Google](#)

Haskell is used on a small number of internal projects in Google, for internal IT infrastructure support.

[Google's ICFP 2010 experience report on Haskell](#)

- [Glyde](#)

Glyde uses OCaml and Haskell for a few projects. Glyde uses Haskell for our client-side template source-to-source translator, which converts HAML-like view templates into JS code.

- [HAppS LLC](#)

Open web development company. Now merged with [happstack](#)

- [Hustler Turf Equipment](#) Hesston, Kansas

Designs, builds, and sells lawn mowers. We use quite a bit of Haskell, especially as a "glue language" for tying together data from different manufacturing-related systems. We also use it for some web apps that are deployed to our dealer network. There are also some uses for it doing sysadmin automation, such as adding/removing people from LDAP servers and the like

- [iba Consulting Gesellschaft](#) - Intelligent business architecture for you. Leipzig, Germany

iba CG develops software for large companies:

- risk analysis and reporting solution for power supply company;
- contract management, asset management, booking and budgeting software for one of the worldwide leading accounting firm.
- [Informatik Consulting Systems AG](#)

ICS AG developed a simulation and testing tool which based on a DSL (Domain Specific Language). The DSL is used for the description of architecture and behavior of distributed system components (event/message based, reactive). The compiler was written in Haskell (with target language Ada). The test system is used in some industrial projects.

- [iPwn Studios](#)

ipwn studios is a video game studio founded in 2009 and based in the greater Boston area. They're developing a game engine in Haskell, and a number of games built on that engine, including an action-rpg for touchscreen devices called bloodknight.

- [IVU Traffic Technologies AG](#)

The rostering group at IVU Traffic Technologies AG has been using Haskell to check rosters for compliance with EC regulations. Our implementation is based on an embedded DSL to combine the regulation's single rules into a solver that not only decides on instances but, in the case of a faulty roster, finds an interpretation of the roster that is "favorable" in the sense that the error messages it entails are "helpful" in leading the dispatcher to the resolution of the issue at hand. The solver is both reliable (due to strong static typing and referential transparency — we have not experienced a failure in three years) and efficient (due to constraint propagation, a custom search strategy, and lazy evaluation). Our EC 561/2006 component is part of the IVU.crew software suite and as such is in wide-spread use all over Europe, both in planning and dispatch. So the next time you enter a regional bus, chances are that the driver's roster was checked by Haskell.

- [JanRain](#)

JanRain uses Haskell for network and web software. Read more about [Haskell at JanRain](#) and in their [tech talk at Galois](#). JanRain's "Capture" user API product is built on Haskell's Snap webframework.

See Janrain's [technical talk about their use of Snap](#)

- [Joyride Laboratories](#)

Joyride Laboratories is an independent game development studio, founded in 2009 by Florian Hofer and Sönke Hahn. Their first game, "Nikki and the Robots" was released in 2011.

- [Linspire](#)

Linspire, Inc. has used functional programming since its inception in 2001, beginning with extensive use of OCaml, with a steady shift to Haskell as its implementations and libraries have matured. Hardware detection, software packaging and CGI web page generation are all areas where we have used functional programming extensively. Haskell's feature set lets us replace much of our use of little languages (e.g., bash or awk) and two-level languages (C or C++ bound to an interpreted language), allowing for faster development, better code sharing and ultimately faster implementations. Above all, we value static type checking for minimizing runtime errors in applications that run in unknown environments and for wrapping legacy programs in strongly typed functions to ensure that we pass valid arguments.

[Linspire's CUFP talk](#)

[Linspire's experience report on using functional programming to manage a Linux distribution](#)

- [MITRE](#)

MITRE uses Haskell for, amongst other things, the [analysis of cryptographic protocols](#).

- [NICTA](#)

NICTA has used Haskell as part of a project to verify the L4 microkernel.

[Read the Dr. Dobbs article on using Haskell and formal methods to verify a kernel](#)

- [Openomy](#)

Openomy's API v2.0 is developed in Haskell, using the [HAppS](#) web platform.

- [Oblomov](#)

Oblomov Systems is a one-person software company based in Utrecht, The Netherlands. Founded in 2009, Oblomov has since then been working on a number of Haskell-related projects. The main focus lies on web-applications and (web-based) editors. Haskell has turned out to be extremely useful for implementing web servers that communicate with JavaScript clients or iPhone apps.

[Oblomov's HCAR submission](#).

- [Patch-Tag: hosting for darcs](#)

Need somewhere to put your darcs code? Try us. Patch-Tag is built with [happstack](#), the continuation of the project formerly known as HAppS.

- [Peerium, Inc](#) Cambridge, Massachusetts

At Peerium, we're striving to bring a new level of quality and efficiency to online communication and collaboration within virtual communities, social networks, and business environments. We believe that a new environment that supports the effortless sharing of both information and software will enable a level of online cooperation far beyond current Web-based technologies -- modern programming techniques will enable the creation of more robust and more powerful programs within these environments. To this end, we're building a new software platform for direct, real-time communication and collaboration within graphically rich environments. Peerium is located in the heart of Harvard Square in Cambridge, Massachusetts.

- [Qualcomm, Inc](#)

Qualcomm uses Haskell to generate Lua bindings to the BREW platform

- [Renaissance Computing Institute](#), Chapel Hill, North Carolina

The Renaissance Computing Institute (RENCI), a multi-institutional organization, brings together multidisciplinary experts and advanced technological capabilities to address pressing research issues and to find solutions to complex problems that affect the quality of life in North Carolina, our nation and the world. Research scientists at RENCI have used Haskell for a number of projects, including [The Big Board](#).

[RENCI's CUFP talk](#).

- [SignalI](#) Portland, Oregon

SignalI Corp is a new custom hardware design company. Our chief products are custom IP cores targeted for embedded DSP and cryptographic applications. Our specialty is the design and implementation of computationally intensive, complex algorithms. The interfaces to each core are modular and can be very efficiently modified for your specific application. System-level integration and validation is crucial and is the majority of investment in a product.

- [Standard Chartered](#)

Standard Chartered has a large group using Haskell in finance.

- [Starling Software](#) Tokyo, Japan

Starling Software are developing a commercial automated options trading system in Haskell, and are migrating other parts of their software suite to Haskell.

[Starling Software's experience building real time trading systems in Haskell](#)

- [Tabula.com](#)

Tabula is a privately held fabless semiconductor company developing 3-D Programmable Logic Devices. Haskell is used for internal compiler toolchains related to hardware design.

- [Tsuru Capital](#) Tokyo, Japan

Tsuru Capital is operating an automated options trading system written in Haskell.

[Tsuru Capital's HCAR submission](#)

- [Tupil](#) Utrecht, The Netherlands

Tupil is a Dutch company that built software for clients, written in Haskell. Tupil used Haskell for the speed in development and resulting software quality. The company is founded by Chris Eidhof and Eelco Lemsink. Currently they build iPhone/iPad applications in Objective-C.

[Tupil's experience building commercial web apps in Haskell](#)

- [TypLAB](#) Amsterdam, The Netherlands

TypLAB investigates and develops new ways of creating and consuming online content. Their [Silk](#) application makes it easy to filter and visualize large amounts of information.

[TypLAB's blog on why they use Haskell](#)

[A review of Silk](#)

- [Sensor Sense](#) Nijmegen, The Netherlands

Sensor Sense is offering high technology systems for gas measurements in the *ppbv* down to *pptv* range. We use Haskell for the embedded control software of our trace gas detectors.

If you're using Haskell commercially, please add your details here.

3 The Industrial Haskell Group

The [Industrial Haskell Group \(IHG\)](#) is an organisation to support the needs of commercial users of the Haskell programming language.

4 Jobs and recruitment

[Haskell jobs](#).

5 Consultants

[Consultants](#)

6 Commercial Users of Functional Programming Workshop

[Commercial Users of Functional Programming](#)

The goal of [CUFP](#) is to build a community for users of functional programming languages and technology, be they using functional languages in their professional lives, in an open source project (other than implementation of functional languages), as a hobby, or any combination thereof. In short: anyone who uses functional programming as a means, but not an end.

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