

# Kiwamu Okabe - Research and Development Engineer

Phone: +81-90-3524-7064  
Email: [kiwamu@debian.or.jp](mailto:kiwamu@debian.or.jp)  
Homepage: <http://masterq.metasepi-design.com/>

## Interests

I launched my career on developing embedded devices at Ricoh Company, Ltd, and also learned application design using functional language such like Haskell. I found Metasepi project<sup>1</sup> what is trying to apply strong type to embedded programming. For my first challenging, I developed an embedded Haskell compiler named Ajhc<sup>2</sup>, and published some research papers<sup>3</sup>.

Today, I choose ATS language<sup>4</sup> as embedded functional language, and found “Japan ATS User Group<sup>5</sup>” what holds Japanese translations about the language. And I’m implementing<sup>6</sup> these technology on tiny MCU such like ARM Cortex-M series and 8bit AVR for practical use.

Metasepi is very experimental and ambitious project, however I believe that it also introduces an by-product “the technology to design real software with predictable manpower and safety” regardless of embedded domain.

## Work Experience

*November 2016 - Present: Expert Engineer (permanent employee) at SELTECH CORPORATION*

- Maintain hypervisor for Embedded market

*August 2014 - Present: Part-time researcher at RIKEN Advanced Institute for Computational Science*

- Research embedded functional programming

*July 2013 - Present: Self-employed Software Engineer at METASEPI DESIGN*

- Research and develop Ajhc Haskell Compiler
- Support to develop any embedded software
- ATS language consulting
- Manage Metasepi Project and develop the core technology

---

<sup>1</sup><http://www.metasepi.org/>

<sup>2</sup><http://ajhc.metasepi.org/>

<sup>3</sup><http://www.metasepi.org/papers.html>

<sup>4</sup><http://www.ats-lang.org/>

<sup>5</sup><http://jats-ug.metasepi.org/>

<sup>6</sup><http://fpiot.metasepi.org/>

*February 2016 - November 2016: Software Enginner (contract employee) at Life Robotics Inc.*

- Design GUI application running on Linux OS
- Design network protocol for Robotics application

*March 2015 - February 2016: System Enginner (contract employee) at Centillion Japan Co., Ltd.*

- Software engineering for cloud computing

*September 2014 - December 2014: Software engineer (trustee agreement) at Axsh co., LTD.*

- Develop an OpenFlow application named “OpenVNet” <sup>7</sup>

*March 2012 - July 2013: Software Engineer (permanent employee) at MIRACLE LINUX CORPORATION*

- Verify PowerPC Linux and debug/fix SMP Race Condition
- Debug and fix PowerPC crash command's virtual memory paging BUG
- Design new Windows installer using NSIS
- Introduce and maintain new git server for internal use
- Verify and tune performance of Digital Signage on new hardware

*April 2001 - February 2012: Software Development Engineer (permanent employee) at Ricoh Company, Ltd.*

#### **April 2010: Port OS to new x86 hardware**

I ported NetBSD-2.0 to new x86 hardware, and calculated boot time before porting OS.

#### **April 2008: Develop and technical support NetBSD OS**

I became technical leader to maintain and support Ricoh's multifunction printer. Also I debugged and fix many kernel level BUGs. I designed power down process by software trigger.

#### **April 2006: Develop POSIX thread library**

I replaced user level POSIX thread library with NetBSD-2.0 m:n thread. My efforts are following.

- Research the presence of thread-safe and cancel-safe in kernel, libc and libpthread.
- Write test code to get thread-safe and cancel-safe.
- Add API into the m:n thread library. Because printer application depend on the missing API.
- Debug and fix signal BUGs in the m:n thread library.

---

<sup>7</sup><https://github.com/axsh/openvnet>

**June 2004: Tune multifunction printer boot time as 10 seconds**

Before my tune, the printer boot time is 30 seconds. Ricoh's multifunction printer "imagio"<sup>8</sup> use the method and tool, ever now. Develop a tool analyze log dumped by bootloader, kernel, init process and application. Analyze IPC network, and advice how to get speed to application developer. Split application as groups for pre-boot and post-boot.

**October 2003: Develop new BIOS for multifunction printer**

Develop new custom BIOS together at the United States.

**November 2002: Design secure boot for multifunction printer on x86**

I re-designed bootloader to support public key algorithm authentication, and designed the format include secure key in SD card

**July 2001: Develop BIOS and bootloader for multifunction printer on x86 architecture**

My first work at Ricoh. Ricoh's multifunction printer "imagio"<sup>9</sup> use my bootloader design, ever now. Also I designed hardware dependent data structure to configure bootloader and kernel, and Option BIOS to boot on SD card

## Education

- March 2001: Master of Engineering from Department of Electrical and Electronic Engineering, Tokyo Metropolitan University.  
The thesis: "Multimode Quartz Crystal Microbalance"<sup>10</sup>

## Publications and Reports

- Kiwamu Okabe and Hongwei Xi. "Arduino programing of ML-style in ATS"<sup>11</sup>. ML workshop, 2015.
- Kiwamu Okabe and Takayuki Muranushi. "Systems Demonstration: Writing NetBSD Sound Drivers in Haskell"<sup>12</sup>. Haskell Symposium, 2014.
- Kiwamu Okabe. "ATS 言語を使って不変条件を API に強制する".<sup>13</sup> 夏のプログラミング・シンポジウム 2014, 2014.
- Kiwamu Okabe, Hiroki MIZUNO and Hidekazu SEGAWA. "強い型による OS の開発手法の提案"<sup>14</sup>. 第 55 回プログラミング・シンポジウム, 2014.

---

<sup>8</sup><http://www.ricoh.co.jp/imagio/>

<sup>9</sup><http://www.ricoh.co.jp/imagio/>

<sup>10</sup><http://ci.nii.ac.jp/naid/110004076869>

<sup>11</sup><http://www.metasepi.org/doc/metasepi-icfp2015-arduino-ats.pdf>

<sup>12</sup><http://metasepi.org/doc/metasepi-icfp2014-demo.pdf>

<sup>13</sup>[http://www.metasepi.org/doc/20141101\\_prosym\\_summer2014.pdf](http://www.metasepi.org/doc/20141101_prosym_summer2014.pdf)

<sup>14</sup>[http://metasepi.org/doc/20140110\\_prosym55.pdf](http://metasepi.org/doc/20140110_prosym55.pdf)

## Activities

### *Open-source projects*

#### **Metasepi Project** <sup>15</sup>

- Challenge to create an open-source Unix-like operating system designed with strong type such as ML or Haskell.
- Rewriting NetBSD kernel using Ajhc Haskell compiler. <https://github.com/metasepi/netbsd-arafura-s1>

#### **Ajhc Haskell compiler** <sup>16</sup>

- Extend and add embedded features to Jhc Haskell Compiler <http://repetae.net/computer/jhc/>.
- Ajhc has thread-safe and reentrant runtime. Also has Erlang style GC. It means Ajhc's Haskell context has own GC heap. GC can run on tiny CPU such as Cortex-M3 with 32kB RAM.

#### **Japan ATS User Group** <sup>17</sup>

- An user group for ATS language <http://www.ats-lang.org/> promotion of utilization. Translating ATS documents into Japanese.

#### **Debian Maintainer** <sup>18</sup>

- Maintained uim package at Debian squeeze, and packages using Haskell at sid.

#### **Carettah** <sup>19</sup>

- A presentation tool written with Haskell. My slides [http://www.slideshare.net/master\\_q/](http://www.slideshare.net/master_q/) are created by the tool.

## Computer Skills

- Languages: Haskell, C, ATS, Intel assembler, Ruby
- Platforms: Linux, NetBSD, Android NDK, MinGW

## Reference available upon request

- Hiroyasu Fukuyama CTO - SELTECH CORPORATION
- Woo-Keun Yoon CEO - Life Robotics Inc.
- Kentaro Kuroiwa Research Chief - Centillion Japan Co., Ltd.
- Yasuhiro Yamazaki CEO - Axsh Co., Ltd.
- Takayuki Muranushi - RIKEN Advanced Institute for Computational Science

---

<sup>15</sup><http://metasepi.org/>

<sup>16</sup><http://ajhc.metasepi.org/>

<sup>17</sup><http://jats-ug.metasepi.org/>

<sup>18</sup><http://qa.debian.org/developer.php?login=kiwamu@debian.or.jp>

<sup>19</sup><http://carettah.masterq.net/>

- Takashi KODAMA CEO - MIRACLE LINUX CORPORATION
- Shigeya SENDA - Ricoh Company, Ltd.
- Hitoshi Sekimoto Professor - Tokyo Metropolitan University, Department of Electrical and Electronic Engineering

Last updated: December 8, 2016