

# Chang Liu

SOFTWARE DEVELOPMENT · EMBEDDED SYSTEMS · DATA SCIENCE

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## Education

### KTH Royal Institute of Technology (KTH)

Stockholm, Sweden

M.Sc. IN EMBEDDED SYSTEMS, MINOR: INNOVATION & ENTREPRENEURSHIP

2015 - PRESENT

- Machine Learning, Data Analysis, Software Development, Internet of Things, ASIC Design and FPGA, System Modeling

### Eindhoven University of Technology (TU/e)

Eindhoven, The Netherlands

M.Sc. IN EMBEDDED SYSTEMS, MINOR: INNOVATION & ENTREPRENEURSHIP

2014 - 2015

- Computer Architecture, Embedded Software and Hardware, Multiprocessors, Network-on-Chip, Wireless Networks, Digital Design

### University of Electronic Science and Technology of China (UESTC)

Chengdu, China

B.Sc. IN ELECTRONICS AND COMPUTER SCIENCE, GPA: 88%

2010 - 2014

- Excellent Graduation Thesis:** "Modeling, Control Algorithm Design and Experiments based on Euler-Bernoulli Beam."

## Skills

**Programming** Python, C, C++, Apache Spark, Scala, Java, Shell Script, VHDL, Verilog, CUDA, SystemC (and TLM)

**Tools** Linux Environment,  $\LaTeX$ , Git, Eclipse, Microsoft Office

**Languages** English, Chinese

**Business** Innovation & Entrepreneurship, Business Plan, Marketing, Financial Analysis, Product Development

## Experience

### RESEARCH

#### Ericsson AB

Stockholm, Sweden

INTERNSHIP AND MASTER THESIS

Dec. 2015 - PRESENT

- Machine Learning and Data Analysis.** Deep Learning and Recurrent Neural Network (RNN). Python.
- Continuous Integration** and **Lean & Agile** Software Development. Java.
- Scrum Team.

#### Robotics Institute, UESTC

Chengdu, China

RESEARCH ASSISTANT

Jul. 2012 - Jun. 2014

- Design and development of **intelligent controlling algorithms** and solutions for robot manipulators and marine risers.
- Implementation of the algorithms on real robots. Accomplishment of several papers published.

### PROJECTS

#### Personal Projects based on Machine Learning

Stockholm, Sweden

KTH ROYAL INSTITUTE OF TECHNOLOGY (KTH)

Jun. 2015 - PRESENT

- Machine Learning (ML) algorithms analysis and programming using **Python**.
- Advanced Machine Learning Course in KTH.
- Study and practice **Apache Spark** and **Scala** language.

#### System Design using SystemC (C++) and Transaction Level Modeling (TLM)

Stockholm, Sweden

KTH ROYAL INSTITUTE OF TECHNOLOGY (KTH)

Sep. 2015 - Nov. 2015

- System design and implementation using SystemC: Bus, RAM and ROM, Channel and Interface, Transaction Level Modeling, Concurrency and Time, Process and Thread, Simulation, Debugging, Signal and Data Type.

#### Digital Design using VHDL based on Altera Cyclone-V FPGA

Stockholm, Sweden

KTH ROYAL INSTITUTE OF TECHNOLOGY (KTH)

Sep. 2015 - Nov. 2015

- Sequential Logic, Resolution Function and Databus. Latch, Flip-flop, and FSM. RTL and Synthesis. Datapath and Microcontroller.
- Tools: **Quartus II** and **ModelSim**.

### Audio processing based on Xilinx's Spartan FPGA using Verilog

EINDHOVEN UNIVERSITY OF TECHNOLOGY (TU/E)

Eindhoven, The Netherlands

Apr. 2015 - Jun. 2015

- Design & optimization: pipelining, re-timing, folding, unfolding, strength reduction, re-use of partial results, vectorization, etc.
- Implementation media: VLSI, FPGA, Digital Signal Processors. ISE Design Suite.

### JPEG Decoding based on Xilinx's MicroBlaze multiprocessor embedded platform

EINDHOVEN UNIVERSITY OF TECHNOLOGY (TU/E)

Eindhoven, The Netherlands

Feb. 2015 - Jun. 2015

- JPEG Decoding algorithm and Image Processing.
- Focused on the impact of multiple processors, accelerators, distributed shared heterogeneous memory hierarchy.
- Various parallel strategies. DMAs and Network-on-Chip Communication with limited bandwidth.

### Dynamic Memory Management for high performance and low power cost

EINDHOVEN UNIVERSITY OF TECHNOLOGY (TU/E)

Eindhoven, The Netherlands

Dec. 2014 - Jan. 2015

- Use smaller memories/buffers: Scratch Pad Memory (faster and less energy consuming)
- Reduce the number of memory accesses by optimizing C code: Loop Transformation, Temporal and Local Data Reuse, etc.

### Bitcoin mining based on NVIDIA's GPUs using CUDA

EINDHOVEN UNIVERSITY OF TECHNOLOGY (TU/E)

Eindhoven, The Netherlands

Oct. 2014 - Dec. 2014

- Solve the hash algorithm for mining "fake" bitcoins by utilizing GPU's powerful data parallelism and multi-thread features.
- GPU architecture, multi-thread computing, shared memory. **CUDA C and OpenCL.**

### Intel: Processor design space exploration based on the Silicon Hive Architecture

EINDHOVEN UNIVERSITY OF TECHNOLOGY (TU/E)

Eindhoven, The Netherlands

Sep. 2014 - Oct. 2014

- Design and optimize a low power VLIW processor for the ECG application using Intel's TIM language.
- In particular focus on the trade-off between performance and energy consumption.

### Wireless Sensor Network (WSN): Automatic Agricultural Monitor and Control

EINDHOVEN UNIVERSITY OF TECHNOLOGY (TU/E)

Eindhoven, The Netherlands

Sep. 2014 - Dec. 2014

- Design and evaluate a WSN based on a bunch of Atmel's low-power MCUs using C.
- Implement Beacon-enabled CSMA-based MAC protocol (IEEE 802.15.4) and hierarchy routing layer.

### Virtual Environment: Panum's Fusional Area Approximation

EINDHOVEN UNIVERSITY OF TECHNOLOGY (TU/E)

Eindhoven, The Netherlands

Sep. 2014 - Dec. 2014

- Design and conduct an experiment to measure the shape of a fusion area.
- Based on Fontys' VR-Cave laboratory and WorldViz Vizard (**Python**).

## Honors & Awards

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### SCHOLARSHIPS

2014 **Scholarship of Excellent Graduate** Outstanding performance during entire undergraduate time

UESTC, China

2013 **Jiuzhou Scholarship** Only two students were honored

Jiuzhou Group, China

2012 **Suzhou Industrial Park Scholarship** Top 5%

Suzhou Industrial Park, China

2011 **The People's Scholarship** Great grades in the first year

UESTC, China

## Publications

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### Vibration Control of a Timoshenko Beam System with Input Backlash.

WEI HE AND CHANG LIU

*IET Control Theory & Applications* (IF: 2.048)

vol. 9, no. 12, pp. 1802-1809, 2015.

### Boundary Control for Flexible Mechanical Systems with Input Dead-Zone.

SHUANG ZHANG, WEI HE, SHUANGXI NIE AND CHANG LIU

*Nonlinear Dynamics* (IF: 2.849)

vol. 82, no. 4, pp. 1763-1774, 2015.

### Adaptive Boundary Control for a Class of Inhomogeneous Timoshenko Beam Equations with Constraints.

WEI HE, SHUANG ZHANG, SHUZHONG SAM GE AND CHANG LIU

*IET Control Theory & Applications* (IF: 2.048)

vol. 8, no. 14, pp. 1285-1292, 2014.

### Boundary Control Design and Stability Analysis of an Euler-Bernoulli Beam System with Input Backlash.

XIUYU HE, WEI HE, HUI QIN AND CHANG LIU

*34th Chinese Control Conference (CCC)*

pp. 1389-1394, 28-30 July 2015