

Haotian Teng

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## Education

**University of Queensland**, Queensland, Australia

Feb 2016 – now

- Master of Bioinformatics.
- Current GPA: 6.6/7
- Courses: Advanced Bioinformatics (7/7), Research Project A (7/7), Concepts in Bioinformatics (7/7), Directed Study in Molecular Genetics (6/7), Advanced Protein Technology (6/7).

**Peking University(PKU)**, Beijing, China

September 2011 – July 2015

- Bachelor of Science, Physics
- Physics Major GPA: 86/100
- Graduate Thesis: 94/100  
*A neuron-muscle circuit model of C.elegans locomotion.*
- Core Courses: Topics on Nonlinear Physics (Graduate Level 84/100), System and Computational Neuroscience (Graduate Level 86/100), Introduction to Biophysics (Graduate Level 87.7/100), Quantum Mechanics(II) (Graduate Level), Quantum Theory of Many-Body Systems (Graduate Level 93/100), Group Theory(Graduate Level), Method of Mathematical Physics (89/100), Thermodynamics and Statistics (86/100), Numerical Methods (81/100), Fundamentals of Electronic Circuits and Experiments (89/100).

## Research Experience

**Research project, Institute for Molecular Bioscience**

2016.12 – Current

Advisor: **Dr.Minh Duc Cao**

- ◆ Building a base caller for MinION Sequencer (Oxford Nanopore Technologies) using Recurrent Neural Network with LSTM+CTC, achieved 5 percent accuracy improvement in 1D reads prediction. Program available in GitHub: [https://github.com/stardust-t/RNN\\_Nanopore.git](https://github.com/stardust-t/RNN_Nanopore.git)

**Research Project, Queensland Brain Institute, University of Queensland, Brisbane**

2016.3 – Current

Advisor: **Prof. Geoffrey J. Goodhill, University of Queensland**

- ◆ Constructing a program for projecting visual stimulation with conformal transformation to correctly presented image on a convex surface, used for zebrafish tectum research. The program is available online in GitHub: <https://github.com/stardust-t/ZerbrafishProject>.

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- ◆ Numerical simulation of spontaneous activity using I&F model for assembly searching in zebrafish tectum, developing algorithm for functional connectivity reconstruction using *Regularization* method under scale free network assumption.

**Internship, Center for Brain science, Harvard University, Boston**

2015.7 – 2015.12

Advisor: **Prof. Aravinthan D.T. Samuel, Harvard University**

- ◆ Participated in the research project in studying thermotaxis in *C.elegans* with tracking and multi-neuron fluorescent marked. Mainly focus on the AFD neuron and the downstream AIY, RIM neurons.
- ◆ Responsible for cross & keeping the worm, experiment using a spinning disk confocal microscope and the afterwards data acquisition & processing with combination of ImageJ (Miji) and Matlab.
- ◆ Testified and confirmed the derivation dependence between AFD neuron and temperature, and then designed and conducted the experiment to measure the parameters of the AFD-temperature relationship with using different shapes of temperature sequence.

**Research Assistant, Center for Bioinformatics, Peking University, Beijing**

2012.7. – 2015.6

Advisor: **Dr. Louis Tao, Dr. Liu Dong**

- **Project I: Locomotion and PH sensing mechanism research in *C.elegans* with tracking system.**
  - ◆ Marked GCaMP6 into the *C.elegans* ASH, AWC, ASE neurons to testify and determine the neuron responsible for PH sensing.
  - ◆ Developed a neuro-muscle model of *C.elegans* motor system and proved the theoretical prediction of gait adaptation in *C.elegans*
  - ◆ Recorded and analyzed long-term locomotion parameter of *C.elegans* by using a tracking and photographing system.
  - ◆ Developed a visualization tools with OpenGL to describe and simplify the neuron network in *C.elegans*, and enabled the tools to search the whole neural pathway through any two given neurons.
- **Project II: Building and developing the high-precision and fast reaction tracking System for *C.elegans*.**
  - ◆ Built a tracking system as one of the contributors, which could realize high-precision (accuracy below 1 micron) tracking and photographing and simultaneous data collection & processing
  - ◆ Developed a high-robust and high-precision algorithm using in *C.elegans* center line extraction with an improved “snake” model.

**Internship, Biodynamics Optical Imaging Center (BIOPIC)**

2014.3-2014.10

Advisor: **Prof. Huang Yanyi, Peking University**

- ◆ Participating in designed, fabricated and tested a micro-fluid chip for fast generating stable linear gradient field.
- ◆ Participating in designed, fabricated and tested a micro-fluid chip to achieve temporal change separately in 6 rooms, realizing record the temporal responses of C.elegans up to 6 worms at the same time.
- ◆ Developed a Computational Fluid Dynamics (CFD) module for the micro fluid chips fluid field calculation in Fluent, which could draw the flow field from the CAD design sketch.

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## Honors and Awards

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- The 1<sup>st</sup> Prize at 27th Chinese Physics Olympiad, Zhejiang Province (rank 1/1232 in theory part, rank 5/1232 overall) (2011)
  - The Silver Medal at 27<sup>th</sup> Chinese Physics Olympiad, Finals (2011)
  - The 1<sup>st</sup> Prize at 29<sup>th</sup> Parts of the national college students physics competition (2012)
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## Skills

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### Wet lab work

- Adept in molecule cloning for fluorescence marking (from Primer design to microinjection).
- Adept in doing microscope experiment, including confocal and 2-photon microscope.
- Adept in crossing and keeping worm.

### Programming

- Adept in Matlab, well trained in numerical simulation, imaging processing & analyzing, optimization, hybrid programming with C/C++.
- Adept in C++, acquainted in GPU programing with openGL (visualization).
- Adept in Python, acquainted in deep-learning framework Tensorflow and Caffe.
- OS experience: Linux (Ubuntu) and MS-Windows.
- Occasional user of Fortran95, Mathematics.

### Software used

- Matlab, Anaconda, LabVIEW, Latex, PyMOL, Fluent (ANSYS), Auto CAD, Origin, Office, Primer Premier, DNA Man.

### Language ability

- Chinese (Mother Language), English (Fluent), Spanish (basic), German (In progress)

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## Course Projects

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### Group Leader, Full Mark, Workshop in *Concepts in Bioinformatics BINF6000*

- *Python programming for sequence analysis and phylogenetic analysis*

- ◆ Access database with python and sequences alignment.
- ◆ Phylogenetic tree construction using **Unweighted Pair Group Method with Arithmetic Mean (UPGMA)** and protein family determination.
- ◆ Ancestral protein sequences reconstructed based on ancestral sequence reconstruction (ASR) methods and evolutionary models, protein weighting matrix constructed based on DNA codons and a modified **Sankoff algorithm** of ASR.

**Group Leader, Ranking Top 1 in final project contest in *Methods of Mathematical Physics***

2012.10.-2013.1

- *Numerical simulation and theoretical analysis of energy level in hydrogen atom*
  - ◆ Solved the asymptotic behavior of radial equation (confluent hypergeometric) and verified it with the numerical simulation.
  - ◆ Derived the analytical solution of the confluent hypergeometric which truncated by certain quantum number.
  - ◆ Studied the ionization state, solved asymptotic behavior and the phase shifting analytic expression.

**Group Leader, Ranking Top 1 in winter project contest in *Introduction of Biophysics***

2013.11.-2014.3

- *Multi-scale Neuron network models' derivation and numerical simulation*
  - ◆ Deduced and conducted the numerical simulation of H-H, Integrate-and-Fire models, Firing-Rate models.
  - ◆ Applied LIF model in studying completely random connection neuron network.

## **Hobbies**

- Proficient in Piano playing, accomplished the Piano grade 9 in 2005, Certificate from Central Conservatory of Music, China(CCOM), learned since 6 years old.
- Skillful in saxophone, learned since middle school
- A not-so-bad tennis player, learned since college.