# KAIWEN SHENG

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## EDUCATION

**University College of London** **London, UK**
MRes in Biosciences Expected Nov 2022

**Peking University** **Beijing, CN**
BS in Computer Science Jun 2020

## PROJECTS

**Automatic Parameter Tuning for Detailed Neuron Models** **Jun 2020 - Present**

- Created a deep-learning-based algorithm to estimate parameters of neuron models.
- Achieved performances 3-10 times more accurate than state-of-the-art algorithms.
- Proved theoretically limitations of deep learning on automatic parameter tuning task.
- Presented a Bayesian-based estimation algorithm overcoming limitations of deep learning.

**A General-Purpose Tracker for Animal Behavior Analysis** **Aug 2019 - Present**

- Built a deep-learning-based tracker to automatically generate labels for raw video streams.
- Improved accuracy 2-100 times higher than state-of-the-art algorithms.
- Utilized pre-trained DNN as feature extractor and Siamese tracker to perform tracking procedure.
- Developed a GUI-based toolkit to facilitatenon-computer-experts for animal behavior analysis.

**Automatic Scheduler for Tensor Operations on Heterogeneous Systems** **Apr 2019 - Aug 2019**

- Scheduled tensor operations under TVM achieving speed 1.83-2.21 times faster than CuDNN and MKL-DNN.
- Hand-crafted tensor operators on GPUs and CPUs to promote performance.
- Performed experiments on heterogeneous systems and analyzed results.
- Published code available on GitHub: https://github.com/KnowingNothing/FlexTensor.

**MiniJava Compiler Design** **Feb 2019 - Jun 2019**

- Developed a compiler for MiniJava programming language, including: symbol table construction, type check, intermediate representation generation, register allocation.
- Published code available on GitHub: https://github.com/holmosaint/CompilerLab.

## PUBLICATIONS

- **Sheng, K.**, Qu, P., Yang, L., Liu, X., He, L., Ma, L., & Du, K. (2021). A General LSTM-based Deep Learning Method for Estimating Neuronal Models and Inferring Neural Circuitry. *bioRxiv*.
- Zheng, S., Liang, Y., Wang, S., Chen, R., & **Sheng, K.**. (2020, March). FlexTensor: An Automatic Schedule Exploration and Optimization Framework for Tensor Computation on Heterogeneous System. In *Proceedings of the Twenty-Fifth International Conference on Architectural Support for Programming Languages and Operating Systems* (pp. 859-873).

## WORKING EXPERIENCE

**Software Development Engineer** **Beijing Academy of Artificial Intelligence**
Life Simulation Research Center Jun 2020 - Sept 2021

- Developed an automatic tool for parameter estimation and optimization for computational neural models.
- Published a preprint paper of the tool on bioRxiv.

## TEACHING EXPERIENCE

**Compiler Practice** **Peking University**
Teaching Assistant Feb 2020 - Jun 2020

- Guided students to work through each stage of compiler design, including symbol table construction, type check, intermediate representation generation, register allocation.

**Algorithm Design and Analysis Seminar** **Peking University**
Teaching Assistant Feb 2019 - Jun 2019

- Provided references on reinforcement learning as supplementary material, and designed exam papers.

## LEADERSHIPS

**Badminton Association in Peking University** **Peking University**
President Sept 2019 - Jun 2020
- Organized badminton competitions at Peking University and scheduled friendly matches among colleges.
- Popularized badminton through social media at Peking University.

**Badminton Team of Peking University** **Peking University**
Captain Sept 2019 - Jun 2020
- Led weekly training and participated in competitions.

## AWARDS

Yanhong Li Scholarship of Peking University Sept 2019

Excellent Research of Peking University Sept 2019

Ke Chuanglong Scholarship of Peking University Sept 2018

Merited Student of Peking University Sept 2018 & Sept 2017

May Fourth Scholarship of Peking University Sept 2017

## SKILLS

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|---|---|
| **Languages** | Python, C, C++, Java, MATLAB |
| **Simulator** | NEURON, NEST |
| **Other** | LaTex, Git |