Congchao Wang

Virginia Tech Research Center, 900 N. Glebe Road, Arlington, VA 22203

• ccwang@vt.edu • +1(571)-296-6278

RESEARCH INTEREST

Machine learning, optimization, applied statistics, signal and image processing.

EDUCATION

Virginia Polytechnic Institute and State University (Virginia Tech) Sep 2015 - Present
Ph.D. in Computer Engineering
Advisor: Prof. Guoqiang Yu
Thesis (proposed): Automated Tracking of Mouse Embryogenesis from Large-scale Fluorescence Microscopy Data

Nankai University, Tianjin, China Sep 2014 - Jun 2015
M.Sc. in Computer Science

National Tsing Hua University, Hsinchu, Taiwan, ROC Sep 2013 - Jul 2014
M.Sc. in Computer Science

Nankai University, Tianjin, China Sep 2009 - Jun 2013
B.S. in Computer Science

RESEARCH EXPERIENCE

Fully Automatic Cell Tracking of Mouse Embryogenesis ($10TB$ data).
- Built an efficient global-optimal circulation-based data association framework. ([1], C code)
- Designed the fastest ever min-cost flow algorithm for solving data association problem in object tracking. ([2], C++ code)
- Build a 3D+time cell segmentation/tracking, visualization and data curation platform. (on going, C++ with OpenGL)

Whole Brain Image Analysis for Drosophila larvae ($100GB$ data).
- Built a novel functional brain region identification pipeline. ([4], Matlab code)
- Designed a new brain signal transferring model for the pattern explanation observed from 2000+ larvae brains.

Probability Principled Synapse/Spot Quantification.
- Designed a bias-controlled method for synapse/spot detection with order statistics.([3], Java code)

Functional Unit Identification on Time-Lapse Calcium Imaging Data.
- Designed a conditional inhomogeneous Poisson process for functional unit identification on calcium imaging data.

PUBLICATIONS

[1] **C Wang**, Y Wang, and G Yu. Efficient Global Multi-object Tracking Under Minimum-cost Circulation Framework. **IEEE Trans. on PAMI**, 2020.

[2] **C Wang**, Y Wang, Y Wang, C Wu and G Yu. muSSP: Efficient Min-cost Flow Algorithm for Multi-object Tracking. **NeurIPS**, 2019.

[3] Y Wang*, **C Wang***, P Ranefall, G Broussard, Y Wang, G Shi, B Lyu, C Wu, W Wang, L Tian, G Yu. SynQuant: An Automatic Tool to Quantify Synapses from Microscopy Images. **Bioinformatics**, 2020.

[4] Y Hu*, **C Wang***, G Pan, H Liu, G Yu and B Ye. A Neural Basis for Converting Graded Sensory Evidence to Discrete Decisions. **Current Biology**, 2020.

[5] Y Wang, G Shi, DJ Miller, Y Wang, **C Wang**, G Broussard, Y Wang, L Tian, and G Yu. Automated Functional Analysis of Astrocytes from Chronic Time-Lapse Calcium Imaging Data. **Frontiers in Neuroinformatics**, 2017.

[6] **C Wang**, J Yang, K Wang, and SH Lai. Multi-scale Energy Optimization for Object Proposal Generation. **Multimedia Tools and Applications**, 2015.

[7] J Yang, J Xu, M Li, D Zhang, and **C Wang**. A Real-time Command System based on Hand Gesture Recognition. **ICNC**, 2011.

AWARDS & SCHOLARSHIP

Student travel awards to NeurIPS.	2019
Hong-Hai scholarship, National Tsing Hua University.	2013-2014
First prize, National Challenge Cup Scientific Competition, Tianjin, China.	2013
First class scholarship, Nankai University.	2010, 2011, 2012