Ning Zhang

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Education

MASc in ECE, University of British Columbia **Sep 2019 – Current**
GPA: 94.4/100 *Vancouver, Canada*

Thesis: Attributed graph alignment–information theoretic limits and efficient algorithms

BSc in Physics, Nankai University **Sep 2015 – Jun 2019**
GPA: 90.8/100 Ranking: 3/92 (3/15 in Poling class) *Tianjin, China*

Research Interest

graph theory, probability theory, algorithms, spectral methods, statistical learning theory, combinatorial optimization, statistical physics

Research Experience

Attributed graph alignment | *Advisor: Lele Wang, ECE department, UBC* **Sep 2020 – Current**

- Studied both the sufficient and necessary conditions for perfectly recovering vertex correspondence between two correlatedly generated attributed graphs.
- Design polynomial time algorithms for aligning correlated graph pairs with attributes. Prove the feasible regimes where our algorithms achieve perfect alignment with high probability.

Biophotonics | *Advisor: Shuo Tang, ECE department, UBC* **Sep 2019 – Aug 2020**

- Performed wavelength calibration in the spectral-domain optical coherence tomography system. Explored image analysis and enhancement methods for , e.g., spackle variance, image registration...

Undergraduate research projects (funded by Poling program) **Jun 2016 – Jun 2019**

Deep learning | *Advisor: Xin Chen, CS department, University of Nottingham* Oct 2018 – June 2019

- Designed a new convolutional neural network model based on U-Net for semi-supervised semantic segmentation tasks. Proposed a dynamic kernel to combine information from the spatial neighbours and thus imposed a local smoothness constraint on output to improve the segmentation quality of the vasculature structure.

He-Ne laser stabilization |*Advisor: Ben Sauer, Physics, Imperial College London* Jun 2017 – Sep 2017

- Implemented a feedback control circuit to automatically adjust the length of He-Ne laser cavity and stabilize its output frequency.

Topological photonics | Poling class research project Mar 2017 – Mar 2018

- Implemented beam propagation method and simulated the propagation properties of Gaussian beam in photonic lattices.

Two-dimensional material| Poling class research project Jun 2016 – Dec 2016

- Worked on nano fabrication for graphene, $MoSe_2$, black phosphorus and testing their photon-electron reaction.

Selected Publications

1 Ning Zhang, Weina Wang, and Lele Wang. Attributed graph alignment. *arXiv preprint arXiv:2102.00665*, 2021

2 Ning Zhang, Susan Francis, Rayaz A Malik, and Xin Chen. A spatially constrained deep convolutional neural network for nerve fiber segmentation in corneal confocal microscopic images using inaccurate annotations. In *2020 IEEE 17th International Symposium on Biomedical Imaging (ISBI)*, pages 456–460. IEEE, 2020 [Code]

Awards

2021	NASIT Best Poster Award (second prize, **2/50**)
2020	Honorable Mention in Graph Attack and Defence Track of KDD Cup (Rank **14/106**)
2019	Outstanding Graduate in Nankai University (**3%**)
2018	The First Prize Scholarship for Outstanding Student (**5%**)
2017	Gong Neng Award
2016	The Second Prize Scholarship for Outstanding Student (**10%**)
2015-2019	Poling Scholarship

Teaching

Fall 2021	TA for STAT321 Stochastic Signals and Systems
Spring 2021	Tutorial for STAT321 Stochastic Signals and Systems
Fall 2020	TA for STAT321 Stochastic Signals and Systems
Spring 2020	Lab TA for ELEC291 Electrical Engineering Design Studio I

Talks and Activities

2021	International Symposium on Information Theory (ISIT) [Slides] North American School of Information Theory (NASIT) [Poster] UBC ECE 3MT [Slides] Statistical learning theory reading group in UBC [Note1][Note2] Existing graph alignment algorithm demos [Slides]
2020	International Symposium on Biomedical Imaging (ISBI)[Slides] Mathematical data science reading group in UBC [Note]
2018	Poling class project [Poster]
2017	Poling class project [Poster]

Relavent Skills

Language: English, Mandarin

Coding languages: MATLAB, Python, Mathematica, C++

Technologies/Frameworks: Linux, Github