Zhaoqing Li

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EDUCATION

Vanderbilt University, Nashville, the U.S.

- Expected Ph.D. candidate in Computer Science — Aug 2021
- Dean's Graduate Fellowship

Northwestern Polytechnical University (NWPU), Xi'an, China

- M.E. in Control Science and Engineering — Sep 2018 – Apr 2021
- Advisor: Prof. Zhen Wang (zhenwang0@gmail.com)
- Affiliation: School of Artificial Intelligence, OPtics and ElectroNics (iOPEN)
- Weighed Average Mark: 88.83 / 100
- **National Scholarship**

Northwestern Polytechnical University (NWPU), Xi'an, China

- B.E. in Automation — Sep 2014 – Jun 2018
- Weighed Average Mark: 86.52 / 100

RESEARCH INTERESTS

My research lies in machine learning and network science. My current studies focus on spectral clustering algorithms and spreading dynamics on networks. I am also passionate about using developed algorithms to solve practical problems (e.g., suppressing epidemic spreading processes). Besides, I am also interested in some interdisciplinary methods like probabilistic graphic model, which are also important tools for machine learning problems.

PUBLICATIONS

- *Contagion in simplicial complexes*, **Zhaoqing Li**, Zhenghong Deng, Zhen Han, Karin Alfaro-Bittner, Baruch Barzel, and Stefano Boccaletti, *Chaos, Solitons and Fractals*, (2021) [Link]
- *Delay-induced Patterns in a Reaction-diffusion System on Complex Networks*, Xinyu Wang, Zhao Song, **Zhaoqing Li**, Lili Chang, and Zhen Wang, *New Journal of Physics* (2021) [Link]
- *Large graph clustering with simultaneous spectral embedding and discretization*, Zhen Wang†, **Zhaoqing Li**†, Rong Wang, Feiping Nie, and Xuelong Li, *IEEE Trans. Pattern Anal. Mach. Intell.* (**T-PAMI** Early Access) († Co-first authors) (2020) [Link]
- *Suppression of epidemic spreading process on multiplex networks via active immunization*, **Zhaoqing Li**, Peican Zhu, Dawei Zhao, Zhenghong Deng, and Zhen Wang, *Chaos: An Interdisciplinary Journal of Nonlinear Science*, 29, 7, 073111 (2019) [Link]

ACADEMIC ACTIVITIES

- **Oral Presentation**
  15th Chinese Conference of Complex Networks, Zhenjiang, October, 2019
  "Large graph clustering with simultaneous spectral embedding and spectral rotation".
- **Paper Reviewing**
  Journal: International Journal of Bifurcation and Chaos, CHAOS, IEEE-TKDE.
  Conference: NeurIPS, CIKM

RESEARCH EXPERIENCE

- **Exploring new graph embedding algorithms.**
  I am now considering using label propagation and low-rank approximation to develop graph embedding algorithms. We can obtain more globally information of a graph through label propagation. Based on this, the further embedding may be contain more information among nodes. (2021)

- **Studying higher-order interactions of epidemic with message-passing algorithm.**
  Higher-order interactions (interactions within a group of more than 2 individuals) of epidemic process were considered. We utilized the message-passing algorithm to reveal the dynamical mechanism of the higher-order process. The predicted outbreak threshold of epidemic was well consistent with the result of Monte Carlo simulations. (2020-2021)
- **A globally optimal spectral clustering algorithm for clustering.**
  The new algorithm integrated the embedding and discretization process into one procedure with only one objective, which we then developed an iterative method to optimize. Furthermore, we used the label propagation method and properties of graphs to greatly accelerate the proposed algorithm and also improve the performance. (2019 – 2020)
- **A new model for suppression epidemic spreading on multiplex networks.**
  The model took into consideration spreading dynamics of both epidemic and information, which would influence each other. We introduced observer nodes into networks, which indeed existed in the network. The immunization strategies developed based on this model appear more viable. (2019)
- **Network reconstruction**
  We modeled the network reconstruction problem from rich data using compressed sensing methods. The LASSO regression was considered to optimize the objective function. We used clustering algorithms to obtain the final discrete result. (2018)

AWARDS & HONORS

- **Dean's Graduate Fellowship** of Vanderbilt University 2021
- **Outstanding Graduate** of NWPU 2021
- **National Scholarship** (2% awarded) 2020
- The First Prize Scholarship of NWPU (ranking 2 out of 261 students) 2020
- **National Scholarship** (2% awarded) 2019
- The First Prize Scholarship of NWPU (ranking 4 out of 261 students) 2019
- The First Prize Scholarship on Social Activities, NWPU 2019
- The Second Prize Scholarship of NWPU in three consecutive years 2015 – 2017
- The First Prize in The Circuit Experiment Skill Competition, NWPU 2016
- The Third Prize of May Day Mathematical Modeling in two consecutive years 2015 – 2016

SELECTED COURSES

- Master

Optimal Estimation Theory	90	Numerical Analysis	96
Intelligent Image and Graphics processing	93	System Identification	94
OPENGL-Computer Graphics Programming	94	Mathematical Statistics	91

- Bachelor

Principle of Automatic Control	92	Computational Methods	94
Reliability Theory and Engineering Application	88	Morden Control Theory	94
Artificial Intelligence & Expert System	90	Linear Algebra	96
Computer Control System	88	Bachelor Thesis	97

LANGUAGES & SKILLS

- TOEFL: 102 (R29, L29, S23, W21).
- Skills: C, C++, Python, MATLAB, LaTeX.

LEADERSHIP & SOCIAL ACTIVITIES

- **President** | "Jiuxianyin" Art Association of NWPU 2016 – 2017
- **Vice Director** | Entertainment Department of the College Student Union 2015 – 2016
- **Social Practice** | "Water Resource Investigation" in Ningxia 2016
- **Social Practice** | "Bring Scientific and Literacy Knowledge to Rural Areas" in Guiyang 2015