

Chia-Hung Yang

NETWORK SCIENTIST, NEWLY GRADUATED PHD AND MACHINE/DEEP LEARNING AMATEUR

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Education

Northeastern University

PH.D. IN NETWORK SCIENCE

Advisor: Prof. Samuel V. Scarpino

Boston, MA, United States

Sep. 2016 - May 2021

National Tsing Hua University

B.S. IN PHYSICS

Thesis Advisor: Prof. Kuo-An wu

Hsinchu, Taiwan

Sep. 2011 - Jun. 2015

Experience

Emergent Epidemic Lab, Northeastern University

RESEARCH ASSISTANT

- Formulated a population-genetics modeling approach for the evolution of gene regulatory networks
- Investigated new insights from gene network evolution on traditional evolutionary theories

Boston, MA, United States

Sep. 2017 - May 2021

Network Science Institute, Northeastern University

RESEARCH ASSISTANT

- Developed a mechanistic model that elucidated widely observed temporal patterns in ecological and financial systems

Boston, MA, United States

Sep. 2016 - Aug. 2017

Condensed Matter Theory Group, Department of Physics, National Tsing Hua University

RESEARCH ASSISTANT

- Analyzed and predicted the characteristic length scale of pattern formation in interacting prey-predator systems

Hsinchu, Taiwan

May 2014 - Jun. 2015

Skills

Programming Python, Julia, R, C/C++, LaTeX, SQL
Machine Learning PyTorch, PyTorch Lightning, scikit-learn
Languages Traditional Chinese, English

Open Source Software

netrd — Comparing Graph Distances between Network Reconstructions

CO-DEVELOPER

- Implemented reconstruction methods and dynamics simulators on networks

github.com/netsiphd/netrd

netconv — Converting Network Data Formats

CO-DEVELOPER

- Designed core data structure and implemented file format converters

github.com/netsiphd/netconv

Projects

Anomaly Detection for Multivariate Time Series using Generative Adversarial Networks

INVESTIGATOR

- Modified the f-AnoGAN framework with frequency-domain Transformer architecture and applied to sensor/NASA public datasets

Self-Supervised Learning on Electroencephalography of Motor/Imagery Experiments

CO-INVESTIGATOR

- Adapted DINO, a vision SSL model, on EEG collected in motor/imagery experiments and assessed multi-task performance

Mining Frequent Sequential Patterns from Genomics Data

INVESTIGATOR

- Proposed position-based *A-priori* algorithm to mine transposable elements from genomes of *Arabidopsis thaliana*

Network Analysis on ATP Tennis Players' Match History

INVESTIGATOR

- Scraped, visualized and analyzed matches between ATP tennis players as a network

Publications

A Family of Fitness Landscapes Modeled through Gene Regulatory Networks

YANG CH & SCARPINO SV

Dec. 2021

bioRxiv 2021.12.03.471063

netrd: A library for network reconstruction and graph distances

MCCABE S, TORRES L, LAROCK T, HAQUE SA, YANG CH, HARTLE H, & KLEIN B

Jun. 2021

J. of Open Source Software, 6(62), 2990

The Ensemble of Gene Regulatory Networks at Mutation-Selection Balance

YANG CH & SCARPINO SV

Apr. 2021

bioRxiv 2021.04.11.439376

Reproductive barriers as a byproduct of gene network evolution

YANG CH & SCARPINO SV

Jun. 2020

bioRxiv 2020.06.12.147322

The effect of human mobility and control measures on the COVID-19 epidemic in China

KRAEMAR MUG, YANG CH, GUTIERREZ B, WU CH, KLEIN B, PIGOTT DM, OPEN COVID-19 DATA WORKING GROUP, PLESSIS LD, FARIA

May 2020

NR, LI R, HANAGE WP, BROWNSTEIN JS, LAYAN M, VESPIGNANI A, TIAN H, DYE C, CAUCHEMEZ S, PYBUS OG, & SCARPINO SV

Science 368(6490): 493–497

Honors & Awards

2017 **SYNS Travel Grant**, Society of Young Network Scientist, NetSci 2017

IN, United States

2012 **Outstanding Academic Achievement Award**, National Tsing Hua University

Hsinchu, Taiwan

Professional Service

Translator

COMPLEXITY EXPLAINED BOOKLET (TRADITIONAL CHINESE)

complexityexplained.github.io

Outreach Coordinator

GRADUATE STUDENT ASSOCIATION OF NETWORK SCIENCE

May 2018 - May 2021

Co-Organizer

2ND ANNUAL NETWORK SCIENCE RESEARCH SYMPOSIUM

Jun. 2019 - Nov. 2019

Co-Organizer

1ST ANNUAL NETWORK SCIENCE RESEARCH SYMPOSIUM

May 2018 - Nov. 2018

Voluntary Lecturer

NETWORK SCIENCE GRADUATE STUDENT BOOTCAMP

Aug. 2017, 2018, 2019, & 2020

Reviewer

PHYSICAL REVIEW E, ENTROPY, & SCIENTIFIC REPORTS

Outreach

Open NetSci Hackathon 2019

PARTICIPANT OF THE CONVERTING NETWORK FORMAT PROJECT

- Developed netconv, a command-line lightweight graph format converter

Burlington, VT, United States

May 2019

DataHack@Yale 2017

PARTICIPANT OF THE McCRYSTAL GROUP

- Visualized organizational cooperation networks and spotlighted influencers

New Haven, CT, United States

Feb. 2017

Presentations

TALKS

Mutation-Selection Balance of Gene Regulatory Circuits

EVOLUTION 2019

Providence, RI, United States

Jun. 2019

Population-Genetics Modeling of Gene Regulatory Networks

NETWORK MODELS IN CELLULAR REGULATION SYMPOSIUM, NETSCI 2019

Burlington, VT, United States

May 2019

Ensemble of Gene Regulatory Networks Consequent to Evolutionary Processes

STATISTICAL INFERENCE ON NETWORK MODELS SYMPOSIUM, NETSCI 2019

Burlington, VT, United States

May 2019

Emergence of Laplace-Distributed Growth Rates in Network Dynamics

APS MARCH MEETING 2019 (AMERICAN PHYSICAL SOCIETY MARCH MEETING)

Boston, MA, United States

Mar. 2019

Reproductive Barriers Results from Gene Regulatory Evolution

2ND JOINT CONGRESS ON EVOLUTIONARY BIOLOGY

Montpellier, France

Aug. 2018

Reproductive Barriers Results from Gene Regulatory Evolution

3RD ANNUAL MARINE SCIENCE CENTER GRADUATE STUDENT SYMPOSIUM

Nahant, MA, United States

May 2018

Emergence of Laplace-Distributed Growth Rates in Complex Systems

9TH COMPLENET (INTERNATIONAL CONFERENCE OF COMPLEX NETWORKS)

Boston, MA, United States

Mar. 2018

Pattern Formation in Interacting Prey-Predator Systems

COMPLEX SYSTEM SYMPOSIUM AT NATIONAL CENTER FOR THEORETICAL SCIENCE

Hsinchu, Taiwan

May. 2015

POSTERS

Ensemble of Gene Regulatory Networks Derived from Population Genetics

NETSCI 2020 (INTERNATIONAL SCHOOL AND CONFERENCE ON NETWORK SCIENCE)

Rome, Italy

Sep. 2020

Ensemble of Gene Regulatory Networks Consequent to Evolutionary Processes

NETSCI 2019 (INTERNATIONAL SCHOOL AND CONFERENCE ON NETWORK SCIENCE)

Burlington, VT, United States

Jun. 2019

Ensemble of Gene Regulatory Networks Consequent to Evolutionary Processes

COLD SPRING HARBOR LABORATORY NETWORK BIOLOGY MEETING 2019

Cold Spring Harbor, United States

Mar. 2019

Speciation Results from Gene Network Evolution

SMBE 2018 (ANNUAL MEETING OF THE SOCIETY OF MOLECULAR BIOLOGY AND EVOLUTION)

Yokohama, Japan

Jul. 2018

Speciation Results from Gene Network Evolution

NETSCI 2018 (INTERNATIONAL SCHOOL AND CONFERENCE ON NETWORK SCIENCE)

Paris, France

Jun. 2018

Speciation Results from Gene Regulatory Network Evolution

NETSCI 2018 (INTERNATIONAL SCHOOL AND CONFERENCE ON NETWORK SCIENCE)

Boston, MA, United States

Mar. 2018

Linear Stability Analysis for Interactive Prey-Predator Systems

THE PHYSICAL SOCIETY OF REPUBLIC OF CHINA (TAIWAN) ANNUAL MEETING

Hsinchu, Taiwan

Jan. 2015

