Poramate Nakkirt

Contact Information

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Department of Statistics
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Research Interest

Bayesian statistics, Data science, Machine learning, Biostatistics/Epidemiology, Random matrix theory, Random networks, Constraint satisfaction problems

Education

Iowa State University, Ames, USA
M.S. in Statistics, passed written prelim exam — 2021-present
Advisor: Dr. Chong Wang

University of Colorado, Boulder, USA
B.A. in Mathematics, *magna cum laude* & *distinction* — 2016-2019
Advisor: Dr. Sean O'Rourke

Employment and Internship

Data Scientist, King Mongkut's Institute of Technology Ladkrabang,Thailand — Feb-Dec 2021

- Designed survey sampling and analyze complex data
- Developed a public policy for local officials

Publications and Preprints

- Trevisan, G., Morris, P., Silva, G.S., **Nakkirt, P.**, Wang, C., Zimmerman, J., *Producer-Based Participatory Surveillance for Swine Pathogens-Exploration of the Concept through Simulations*, **Veterinary Sciences**, 2022,9,*submitted*.
- Deng, G., El Sai, E., Manders, T., Mayr, P., **Nakkirt, P.**, Sparks, A., *Sandwiches for Promise Constraint Satisfaction*, **Algebra Univers**, Vol. 82, No. 25 (2021). [**Article**] [**arXiv**]
- **Nakkirt, P.**, *The Eigenvalue Distribution of the Watts-Strogatz Random Graph*, submitted, `preprint`, `arXiv:2009.00332v2 [math.PR]`, 2021. [**arXiv**]

Programming Languages

- Statistical tools: Python, R, JMP, SAS, SQL, Microsoft Office, MATLAB
- Reporting: LaTeX, Markdown, HTML

Research Experience

Department of Veterinary Diagnostic & Production Animal Medicine, Iowa State University
Research Assistant, Summer 2022-present
Project: *Participatory Surveillance for Swine Pathogens and Simulations*
Mentor: Dr. Chong Wang and Dr. Jeffrey Zimmerman

- Use statistical methods to design the collection of data
- Use R and SQL for managing data formats and cleaning data on concentrated animal feeding operations(CAFOs) and census data
- Use ADSM software to simulate and automate pathogen spread of swine over the space and time for many scenarios
- Develop machine learning algorithms to better monitor the infectious disease
- Conduct and analyze the probability of detecting infected farms based on participatory surveillance spatial sampling design

- Analyze the probability of detecting infected herds based on spatial sampling design

Department of Statistics, Iowa State University
Class Project in Bayesian Statistics, Spring 2022
Topic: *Bayesian Analysis for Bike-Sharing Service in Washington D.C.*
Instructor: Dr. Danica Ommen

- Designed the solution for the shortage of bikes for the Bike-sharing program in Washington D.C.
- Conducted Bayesian hierarchical model to analyze the effect of bike demand on the rental duration during weekday rush hour
- Performed a sensitivity analysis to the choice of hyper-parameters of the prior distribution.

CU Boulder
Research Assistant, **Universal Algebra Research Group**, CU Boulder, 2019
Project: *Sandwiches for Promise Constraint Satisfaction*
Mentor: Dr. Peter Mayr

- Explored examples of a PCSP over Boolean structures which reduces to a tractable CSP of size 3 but not smaller
- Proved properties of PCSPs that reduce to system of linear equations, or CSPs with semilattice and majority polymorphism

Researcher, **Undergraduate Honors Thesis**, CU Boulder, 2019
Topic: *Limiting Moments of the Eigenvalue Distribution of the Watts-Strogatz Random Graph*
Mentor: Dr. Sean O'Rourke

- Developed new algorithm for small-world random graphs
- Computed and simulated eigenvalues based on adjacency matrices, and conjecturing its distribution
- Proved first moment, second moment, and limiting third moment of Spectral distribution

Research Assistant, **Math REU Summer Research**, CU Boulder, 2019
Topic: *Promise and Constraint Satisfaction Problems (CSP)*
Mentor: Dr. Peter Mayr and Dr. Athena Sparks

- Proved the existence of smallest structure that reduces PCSP to a tractable CSP via sandwiches for semilattice
- Constructed an affine sandwiches

Research Assistant, **Experimental Math Lab**, CU Boulder, 2018
Project: *Binomial Transform of Sequences*
Mentor: Dr. Ilia Mishev

- Explored new integer sequences and its formulas by using binomial transform method
- Discovered *Inverse Binomial Transform of Apery numbers* (A322519), potentially added to **The On-Line Encyclopedia of Integer Sequences**
- Discovered negated sequences and invariant sequences defined by some particular recurrence relations
- Proved the properties of own inverse, negated, and invariant

Researcher, **Math Kids Study Group**, CU Boulder, 2018-2019

Topic: *Algebraic Geometry and problems of Sheaves*
Mentor: Dr. Leo Herr

- Developed a foundation of knowledge of Algebraic Geometry
- Proposed new findings to other graduate students at the weekly meeting

Honors and Awards

Thailand Government Scholarship (Top 1 in selection)
Graduate program 2021-present

- The Contract working as tenure-track faculty at the **Department of Statistics, Naresuan University, Thailand** after completing Ph.D.

Undergraduate program, One District One Scholarship 2015-2019

- Only one senior high-school student in the city

CU Boulder
Research Experience for Undergraduates Funding 2019
Dean's List, College of Arts and Science 2016-2019

The American National Honors Society
Phi Beta Kappa 2019-present
Pi Mu Epsilon (National Math Honors Society) 2017-present

Statistical Consulting

Statistics in Community (STATCOM), Iowa State University
Provide statistical consulting for research project in Agricultural & Life Sciences 2021-present

Teaching Experience

Iowa State University
Teaching Assistant (TA): leading a weekly Lab section, grading homework, and holding TA office hours

- STAT 301 Intermediate Statistical Concepts and Methods Spring 2023
- STAT 305 Engineering Statistics Fall 2022
- STAT 231 Probability and Statistical Inference for Engineers Spring 2022
- STAT 341 Intro to Theory of Probability and Statistics I Spring 2022
- STAT 101 Principles of Statistics Fall 2021
- STAT 326 Intro to Business Statistics II Fall 2021

CU Boulder
Grader: grading weekly homework assignments for two class sections

- MATH 2020 Number Systems Fall 2019
- MATH 2001 Intro to Discrete Mathematics Spring 2018
- MATH 1150 Pre-Calculus Fall 2016

Teaching Assistant (TA): leading a recitation, planning weekly in-class activities, reviewing midterm and final exams, holding TA office hours.

- MATH 1150 Pre-Calculus Spring 2019

Academic Tutor: helping student's homeworks and exams for math courses

- The Mathematics Academic Resource Center Spring 2019

Independent Study Sessions

Random Matrices & Random Graphs for Research Level • Advised by Professor Sean O'Rourke	Fall 2019
Graduate-Level Probability Theory & Measure Theory • Advised by Professor Sean O'Rourke	Spring 2019
Topics in Binomial Transform of Sequences • Advised by Dr. Ilia Mishev	Fall 2018

Presentations and Posters

Sandwiches for Promise Constraint Satisfaction, MAA MathFest, Undergraduate Poster Session, Denver, CO. (January 2020)

Promise Constraint Satisfaction Problems, Research & Innovation Week, CU Boulder (October 2019)

Learning Assistance Poster, Mentor and Noyce Scholars Poster Session, CU Boulder (April 2019)

Binomial Transform of Sequences, Research & Innovation Week, CU Boulder (October 2018)

Invited talks

Making inspiration for improving English skills, SP IDOL, Sriyapai School, Chumphon, Thailand (June 2020)

Promise constraint satisfaction problem on n-coloring graphs, Math Summer Research Seminar, CU Boulder (June 2019)

Global Diversity of Englishes, Diversity and Inclusion Summit, Program for Writing and Rhetoric, CU Boulder (November 2018)

How to succeed in college, SP IDOL, Sriyapai School, Chumphon, Thailand (May 2017)

Professional Memberships

Statistics in the community (STATCOM)	2021-present
STATers, organization for STAT graduate students	2021-present
Institute of Mathematical Statistics	2020-present
Mathematical Association of America (MAA)	2019-present

Conference and Seminar Participation

Statistics Graduate Program, Iowa State University	
Bayesian Statistics Group Seminar	2022-present
Statistics Group Seminar	2021-present
Graphics Group Seminar	2021-2022
Survey Working Group Seminar	2021-2022
BLAST International Conference, CU Boulder	
Foundation of Mathematics and Universal Algebras	May 2019
Math Graduate Program, CU Boulder	
Probability Seminar	2017-2019
Algebra Seminar	2017-2019

Services

Treasurer of ISU STATCOM	2022-present
STATCOM, Meeker Elementary School, Ames, Iowa	
Invitation for Statistics Activities on STEAM Night	April 2022

International Festival Event, CU Boulder

Thailand cultural presentation(co-organizer)	April 2019
The Royal boating ceremony and modern Thai dance(performer)	April 2018
Local dance from four regions of Thailand(performer)	April 2017
Thai Cultural Martial Art of Thai Boxing(performer)	April 2016

Vice President of the Boulder Thai Student Association 2017-2019

Math Club, CU Boulder

Volunteer Co-Organizer on π *Day* event March 2017

References

Dr. Chong Wang, Professor of Statistics, Iowa State University,
(515) 294-3836, chwang@iastate.edu

Dr. Ulrike Genschel, Associate Professor of Statistics, Iowa State University,
(515) 294-7766, ulrike@iastate.edu

Dr. Farzad Sabzikar, Associate Professor of Statistics, Iowa State University,
(515)-294-3440, sabzikar@iastate.edu

Dr. Jeffrey Zimmerman, Professor of Veterinary Diagnostic & Production Animal Medicine, Iowa State University,
(515) 294-1073, jjzimm@iastate.edu