

Vicky R. Zhu

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<https://vickcul.github.io/>

EDUCATION

University of Notre Dame 2018 - present

GPA: 3.97/4.0

- Ph.D. Candidate in Applied and Computational Mathematics and Statistics Anticipated May 2023
Advisor: Dr. Robert Rosenbaum
Research interests: Biological and Artificial Recurrent Neural Networks, Machine Learning.
- M.S. Applied and Computational Mathematics and Statistics Spring 2020

University of California, Berkeley 2015 - 2018

GPA: 3.64/4.0 (Cum Laude)

- B.A. in Mathematics Summer 2018
- B.A. in Statistics Summer 2018
Exchange semester: University of Melbourne, Australia Spring 2018

Pasadena City College 2013 - 2015

GPA: 4.0/4.0 (Summa Cum Laude)

- A.A. in Natural Science Summer 2015
Study abroad semester: University of Oxford, U.K. Spring 2015

TEACHING EXPERIENCE

University of Notre Dame, Mendoza College of Business 2020 - present

Adjunct Lecturer

Statistical Inference in Business (in-person): Spring 2021, 2022

- Used sample information to make inferences about unknown population in business context.
- Taught conceptual understanding of several key materials such as probability distributions, ANOVA, and regressions using statistical computing software R.
- Organized in-class activities and group discussion for the course projects.
- The median composite students evaluation reached to high as 4.7/5.0 in a class with 30 students.

University of Notre Dame, Dept. of ACMS

Instructor on Record

Statistics for Business and Economics I (online): Summer 2020

- Introduced probability concepts in business applications, including Bayes rule, random variable and its distribution, hypotheses testing, etc.
- Provided graphical representation through a variety of software and taught students with Microsoft Excel in practice.
- Developed weekly assignment and created videos, quizzes, and exams for students to succeed.

University of Notre Dame 2018 - 2020

Graduate Teaching Assistant

Held weekly office hours, prepared for tutorial, and led review sessions before midterms and finals. In addition, I also contributed to creating exams and grading assignment and exams.

- Undergraduate Artificial Neural Network. Spring 2020
- Undergraduate Computational Neuroscience. Fall 2019
- Undergraduate Intro to Probability. Spring & Fall 2019
- Undergraduate Intro to Business Statistics I. Fall 2018

University of California, Berkeley Summer 2018

Undergraduate Teaching Assistant

Assisted professors in courses ranging from 30-280 students, held weekly office hours for students needs additional help, and provided supplement course material.

- Undergraduate calculus II.
- Undergraduate Python programming.

University of California, Berkeley 2016 - 2018

Grader

Gaded written assignments, quizzes, and exams for undergraduate courses. Also provided digital summaries for the grading results.

- Undergraduate Abstract Algebra. Summer 2018
- Undergraduate Discrete Math course. Fall 2016

Pasadena City College 2014 - 2015

Tutor

Helped students with their coursework difficulties in learning center, and also demonstrated software skills with a step-by-step guidance.

- College Algebra. Fall 2015
- College Statistics. 2014 - 2015

RESEARCH EXPERIENCE

University of Notre Dame, Dept. of ACMS 2018 - present

- *Graduate Research Toward Ph.D.* Advisor: Prof. Robert Rosenbaum
–*Mathematical Analysis of Biological and Artificial Recurrent Neuronal Networks.*

University of California, Berkeley. Dept. of Mathematics & Statistics 2016 - 2017

- *George A. Miller Scholarship for Undergraduate Research* Advisor: Prof. David Aldous
–Independent research project using various methods to predict Oscars winning.
- *Undergraduate Research Apprentice Program (URAP)* Advisor: Prof. Stefanie Ebeling
–Numerically decode number theory cryptography problems.

Missouri State University. Dept. of Mathematics and Statistics Summer 2017

- *Research Experiences for Undergraduates (REU)* Advisor: Prof. Steven Senger
– Participated in algebraic combinatorics questions.

Willamette University. Dept. of Mathematics Summer 2016

- *Research Experiences for Undergraduates (REU)* Advisor: Prof. Peter Otto
– Participated in mixing time of Markov chain research problems.

PROFESSIONAL EXPERIENCE

Bayer

Data Scientist / Statistician

July 2021

- Evaluated partial least squared (PLS) methods and implemented dynamical-inner PLS algorithm in synthetic data (using Python).
- Performed survival and clustering analysis within UK-biobank sleeping data (using R).

Federal Reserve Bank of Chicago

Risk Specialist Data Analysis Contractor

May 2021

- Built several supervised and unsupervised machine learning (ML) models for the mutual funds pattern analysis during COVID pandemic.
- Used ML models for predictions and analysis economic uncertainty during Delta Variant.

PUBLICATIONS

Journal

- **Zhu. V.** & Rosenbaum, R. Learning fixed points in recurrent neuronal models. *In Progress*, 2022.
- Xu, X., **Zhu. V.**, Hong, Y., Mielke, J., Sohler, F., Kryukov, I., & Ghadessi, M. The impact of active day and restful night on cardiovascular diseases in UK-biobank population. *In Progress*, 2022.

- **Zhu. V.** & Rosenbaum, R. Evaluating the extent to which homeostatic plasticity learns to compute prediction errors in unstructured neuronal networks. *Journal of Computational Neuroscience*, 2022. ([link](#))
- Baker. C., **Zhu. V.**, & Rosenbaum, R. Nonlinear stimulus representations in neural circuits with approximate excitatory-inhibitory balance. *PLoS Computational Biology*, 2020. ([link](#))
- Otto, P., Savoie. B., Wright. A., & **Zhu. V.**, Mixing Time of the Generalized Rooks Walk *Submitted*, 2020.

Conference Proceeding

- Desgrottes. M., Senger, S. Soukup. D., & **Zhu. R.**, A Generalized Framework for Studying Finite Rainbow Configuration. *Combinatorial and Additive Number Theory (CANT) conference*, 2018.

PRESENTATIONS

- *Decoding Stimulus Category from Single-trial Neural Activity.*
Neuromatch Academy, Remote. Jul. 2022
- *The Relationship of Extracellular Fields - Neural Oscillations and Spikes.*
Neuromatch Academy, Remote. Jul. 2021
- *Sleeping Analysis in UK Bio-bank data.*
Bayer Data Analytical and Statistical Meeting, Remote, [YouTube Link](#). Aug. 2021
- *Nonlinear Stimulus Representation in Semi-balanced Networks and Learning.*
Neuromatch Conference, Remote, [YouTube Link\(1:32:21-1:50:58\)](#). Oct. 2020
- *Rainbow Configuration.*
Nebraska Conference for Undergraduate Women in Mathematics, Lincoln, NE, Feb. 2018
- *Frame Geometry.*
Missouri State University, Springfield, MO. July, 2017
- *Mixing Time of the Generalized Rooks Walk.*
Northern California Undergraduate Conference, Sonoma, CA. Mar. 2017
- *Mixing Time of Rooks' Walk.*
Joint Mathematics Meeting (JMM), Atlanta, GA, Jan. 2017
- *Prediction of Oscar Best Picture Award.*
Miller Scholar Meeting. Berkeley, CA. Aug. 2016

- *Sleeping Analysis within UK Bio-bank.*
American Statistical Association Conference, Remote, [YouTube Link](#). Aug. 2021
- *Nonlinear Stimulus Representations in Neural Circuits with Approximate Excitatory-Inhibitory Balance.*
Society for Neuroscience (sfn) Meeting, Chicago, IL. Oct. 2019
- *Mixing Time of Markov Chain with the application on Rooks' Walk.*
University of California, Berkeley, CA. Apr. 2017
- *A Generalized Framework for Studying Finite Rainbow Configuration.* Nebraska Conference for Undergraduate Women in Mathematics (NCUWM), Lincoln, NE. Feb. 2017

COMPETITION & AWARDS

Arthur J. Schmitt Leadership Fellowship in Science and Engineering
University of Notre Dame, IN. 2018 - present

Kaggle Data Competition: crossroads analytic challenges
Rank: Semi-final (4th place). [YouTube Link](#) Winter 2021

Domination of Midwestern Association of Graduate Schools
Excellence in Teaching Awards [YouTube Link](#) 2020-2021

Applied and Computational Mathematics & Statistics Professional Development Award
University of Notre Dame, IN. Spring 2020, Summer 2021, 2022

Schmitt Travel Grant Award
University of Notre Dame, IN. Spring 2020

Striving for Excellence in College and University Teaching Certificate
University of Notre Dame, IN. Spring 2020

Benjamin A. Gilman International Scholarship for Traveling <i>The U.S. Department of States.</i>	Spring 2018
Carroll Grants <i>Berkeley Educational Opportunity Program, CA.</i>	Spring 2017, 2018
AMS Undergraduate Travel Award <i>Joint Mathematics Meetings at Atlanta, GA.</i>	Fall 2017
NSF Grant DMS 1559911 Award for REU <i>Missouri State University, Springfield, MO.</i>	Summer 2017
Academic Opportunity Fund Award <i>Berkeley ASUC Academic Affairs for Nebraska Women in Mathematics Conference, CA.</i>	Fall 2016 & 2017
NSF Grant DMS 1460982 Award for REU <i>Willamette University, Salem, OR.</i>	Summer 2016
George A. Miller Scholarship for Undergraduate Research <i>University of California, Berkeley, CA.</i>	2015 - 2017
The Collin Lai and Susan Hum Merit Scholarship for Academic Excellence <i>Los Angeles County office, CA.</i>	Fall 2016
Robert Westerbeck Scholarship <i>Pasadena City College, CA.</i>	Fall 2015
Hixon Teacher Preparation Scholarship <i>Pasadena City College, CA.</i>	2015 - 2016
Pacific Asian American Scholarship for Perseverance <i>Pasadena City College, CA.</i>	Spring 2015

LEADERSHIP & VOLUNTEER ACTIVITIES

Pi Day 5k Marathon, Notre Dame, IN	2019 - 2022
<ul style="list-style-type: none"> • <i>Outreach & Race route organizer</i> – <i>Organized the race route and ensured safety of all participants.</i> 	
Schmitt Society Concession Stand, Notre Dame, IN	2019 - 2021
<ul style="list-style-type: none"> • <i>Fund raising committee</i> – <i>Raised fund \$2,500 in 2019 and \$3,000 in 2021 for boys and girls club.</i> 	

- AWIS-ND Mentorship Program, Notre Dame, IN** 2018 - 2019
- *Mentor*
 - *Mentored two undergraduate women in science each semester in developing their career plans and organized workshop in building LinkedIn networks and CVs.*
- Cal Day, Berkeley, CA** Spring 2017
- *Orientation Coordinator*
 - *Oriented incoming students with department information and encouraged greater opportunities for students from underrepresented groups in STEM fields.*
- Upward Bound, Monterey Park, CA** 2014 - 2015
- *English Phonics Instructor*
 - *Taught new immigrants basic English via phonetic form.*
- Sunrise Foundation, San Gabriel, CA.** 2013 - present
- *Voiceover and translator*
 - *Translated English to Chinese and hosted cultural events for the local community.*

TECHNICAL SKILLS

Proficient: Python, R, Matlab, LaTeX, Excel, SQL, JMP, Azure

Experienced: Dash, Tableau, C/C++, Mathematica, Photoshop, Illustrator

Languages: English, Mandarin

PROFESSIONAL MEMBERSHIPS

- Association for Women in Science** 2018 - present
- *Professional Development Committee*
 - *ACMS Department Representative*
 - *Undergraduate Mentor*
- Schmitt Leadership Society** 2018 - 2022
- *Vice President*
 - *Website Designer & Developer*