

# DANIEL CICALA

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Department of Mathematics  $\diamond$  Southern Connecticut State University

[danielmichaelticala.github.io](https://danielmichaelticala.github.io)

## EDUCATION

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UNIVERSITY OF CALIFORNIA, RIVERSIDE

2019

*Ph.D. in Mathematics*

*Riverside, California*

Supervisor: Dr. John Baez

Thesis: Rewriting Structured Cospans: A Syntax for Open Systems

UNIVERSITY OF OTTAWA

2014

*Masters of Science in Mathematics*

*Ottawa, Ontario*

Co-supervisors: Dr. Richard Blute and Dr. Alistair Savage

Thesis: Matrix Problems and their Relation to the Representation Theory of Quivers and Posets

NEW JERSEY INSTITUTE OF TECHNOLOGY

2008

*Bachelor of Science in Mathematics*

*Newark, New Jersey*

## PROFESSIONAL EXPERIENCE

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ASSISTANT PROFESSOR (2019—2022)

*Southern Connecticut State University*

LECTURER (2019—2022)

*University of New Haven*

OWNER AND STATISTICAL CONSULTANT (2020—Current)

*LEAP, LLC*

## COURSES TAUGHT

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SOUTHERN CONNECTICUT STATE UNIVERSITY

Elementary Statistics

Intermediate Applied Statistics

UNIVERSITY OF NEW HAVEN

Calculus I

Discrete Mathematics

Network Theory

Applied Category Theory (reading course)

Elementary Statistics

Intro to Financial Engineering

Python for Data Science

Linear Algebra with Statistical Applications

UNIVERSITY OF CALIFORNIA, RIVERSIDE

Multi-variable calculus

Topology Ph.D. qualifying exam seminar

Machine learning (undergrad research project)

## PUBLICATIONS & PREPRINTS

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(with Christina Vasilakopoulou) Comparing Adjoints and Fibrations. *(in preperation)*

(with John Baez, Simon Cho, Nina Otter, Valeria de Paiva) Applied Category Theory in Chemistry, Computing, and Social Networks. Not. Am. Math. Soc. Vol. 69, No. 2, pp 292-297, 2022.

Rewriting Structured Cospans. arXiv: 2001.09029 *(submitted to Mathematical Structures in Computer Science.)*

Categorifying the ZX-calculus. *Proceedings 14th International Conference on Quantum Physics and Logic*, Electron. Proc. Theor. Comput. Sci., EPTCS 266, pp 294–314, 2018.

(with Kenny Courser) Spans of cospans in a topos. *Theory Appl. Categ.*, Vol. 33, No. 1, pp 1-22. 2018

Spans of cospans. *Theory Appl. Categ.*, Vol. 33, 2018, No. 6, pp 131-147.

## TALKS

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TOWARDS REWRITING OPEN SYSTEMS

NIST, Apr. 2020

Applied Category Theory Workshop

A SAMPLE OF GAME THEORY

U. New Haven, Mar. 2020

All-Girls Math Summer Camp

THE BORSUK-ULAM THEOREM IN REAL-COHESIVE HOMOTOPY TYPE THEORY

Carnegie Mellon U. , Aug. 2019

HoTT International Conference

GLOBAL CASCADES ON SOCIAL NETWORKS

UC Riverside, Jan. 2019

UC Riverside Network Theory Seminar

SYNTAX AND INDUCTIVE REWRITING FOR OPEN NETWORKS

Baltimore, Jan. 2019

Joint Mathematics Meetings, special session in Network Science

A CATEGORICAL SYNTAX WITH STRUCTURAL REWRITING FOR NETWORKS

Scripps, Oct. 2018

SoCal-Nevada MAA Section

A LOW-KEY INTRODUCTION TO SYNTHETIC DIFFERENTIAL GEOMETRY

UC Riverside, May. 2018

Math Connections

A SYNTAX FOR PURE STATE QUBIT QUANTUM MECHANICS

UC Riverside, Nov. 2017

AMS Western Sectional

OPEN GRAPHS IN BICATEGORIES OF SPANS AND COSPANS

U. British Columbia, July 2017

Category Theory 2017

GENERALIZING LAWVERE THEORIES

U. British Columbia, July 2017

Category Theory 2017

CATEGORIFYING THE ZX-CALCULUS

Radboud University, July 2017

Quantum Physics & Logic 2017

UNIVERSAL ALGEBRA AND FUNCTORIAL SEMANTICS

UC Riverside, April 2017

UCR Graduate Student Seminar

NOTIONS OF LAWVERE THEORIES

Virtual, April 2017

Kan Extension II

SPAN OF COSPANS  
UC Riverside, Sept. 2016  
UCR Graduate Student Seminar

QUASI-CATEGORIES  
UC Riverside, Febr. 2016  
Dr. Julie Bergner's Homotopy Theory Seminar

## PROFESSIONAL SERVICE

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### CLASSES DEVELOPED

- ▷ Financial Engineering,
- ▷ Theory of Interest I and II,
- ▷ Statistical Learning I and II,
- ▷ Linear Algebra with Statistical Applications

### DEVELOPED ACTUARIAL SCIENCE MAJOR

- ▷ Co-developed a brand new B.S. in Actuarial Science
- ▷ Developed new coursework
- ▷ Represented math department throughout the administrative approval process
- ▷ Applied to Society of Actuaries for Validation by Educational Experience (VEE) status for UNH classes in statistics, economics, and finance (pending as of October 11, 2022)
- ▷ Crafted copy material with Marketing Department
- ▷ Lead outreach and growth efforts

### COMMITTEE WORK AND TASK FORCES

- ▷ Joint task force to increase representation with the university for non-tenure track faculty
- ▷ Math Department Curriculum Committee, oversaw amalgamation of B.A. with the B.S. in Mathematics
- ▷ Search committees—tasked to hire a lecturer with a specialty in Statistics, on task force to hire new Math Department Chair

## PROFESSIONAL SERVICE

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MATHEMATICAL RESEARCH COMMUNITIES BY AMS (Summer 2022)  
*Beaver Hollow, NY*

- ▷ Key organizer
- ▷ Wrote winning proposal to the AMS to run a [Mathematical Research Community](#) in Applied Category Theory

APPLIED CATEGORY THEORY ADJOINT SCHOOL  
*Various Locations*

- ▷ Obtained NSF Funding, am co-PI on grant
  - NSF Standard Grant #NSF-21-541
  - Award Number: 2216871
  - Award Period: 07/01/2022-06/30/2023
  - Title: The Adjoint School: A Training Program for New Researchers in Applied Category Theory
- ▷ Steering Committee Member since 2020 for international [mentor-model program](#) that trains young researchers
- ▷ Organizer for 2019 Oxford University iteration
- ▷ School now receives on average 140 applications for 16 positions each year,

- ▷ Mentors are internationally-recognized researchers
- ▷ Since 2018: 11 research papers written, 26 survey articles written.

#### MATHEMATICS GRADUATE STUDENT ASSOCIATION *UC Riverside*

- ▷ Formed a chapter of the UCR Graduate Student Union and served as president for its first year.

### PROFESSIONAL DEVELOPMENT

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SECOND STATEBOX SUMMIT 2018 September 2018  
*Schoorl, Netherlands*

Summit organized by Statebox to advance mathematical methods useful in blockchain technology.

APPLIED CATEGORY THEORY 2018 Spring 2018  
*Leiden, Netherlands*

Workshop organized by Bob Coecke, Brendan Fong, Aleks Kissinger, Martha Lewis, Joshua Tan.

KAN EXTENSION SEMINAR Spring 2017  
*Worldwide via video calls*

Seminar organized by Emily Riehl, Brendan Fong, and Alexander Campbell.

MRC IN HOMOTOPY TYPE THEORY Summer 2017  
*Snowbird, Utah*

Working group led by Mike Shulman and Dan Licata focused on applications of cohesive HoTT.

AARMS Summer 2016  
*Halifax, Nova Scotia*

Courses:

- Categorical Logic and Higher Category Theory by Mike Shulman and Peter Lumsdaine
- Categories, Quantum Computation, and Topology by Jamie Vicary