

Caleb Schultz Kisby

Greenville, SC • caleb.schultzkisby.me • cckisby@gmail.com

RESEARCH INTERESTS

I am a computer scientist studying the foundations both natural and machine learning, using formal models drawn from logic, theoretical computer science, and cognitive science—including neural network learning, classical belief revision policies, and updates that reflect properties of human learning and development. I'm especially interested in questions such as:

- How can we extract, interpret, and verify the internal beliefs of trained neural networks?
- How can we systematically design learning algorithms beyond the ones we're familiar with?
- How powerful and reliable are different learning algorithms, when compared to one another?
- Is provably correct AI alignment possible?

EDUCATION

- 2018 – PRESENT **PhD Candidate**, Indiana University, Bloomington, USA
PhD in Computer Science (in progress), minor in Logic.
Jointly advised by Lawrence Moss and Saúl A. Blanco
- 2014 – 2018 **Bachelors**, University of South Carolina, Columbia, USA
BSCS in Computer Science, BS in Mathematics, *Summa Cum Laude*
Undergraduate research advised by George McNulty

PEER-REVIEWED PUBLICATIONS

1. **Caleb Schultz Kisby**, S. Blanco, and L. Moss. [What Do Hebbian Learners Learn? Reduction Axioms for Iterated Hebbian Learning](#). AAAI, Feb. 2024.
2. **Caleb Kisby**, S. Blanco, and L. Moss. [The Logic of Hebbian Learning](#). The International FLAIRS (Florida AI Research Society) Conference, May 2022. *Nominated for Best Student Paper*.
3. **Caleb Kisby**, S. Blanco, A. Kruckman, and L. Moss. [Logics for Sizes with Union or Intersection](#). AAAI, Feb. 2020.
4. L. Gates, **Caleb Kisby**, and D. Leake. [CBR Confidence as a Basis for Confidence in Black Box Systems](#). International Conference on Case-Based Reasoning, Sep. 2019.

SUMMER SCHOOL COURSES

- JUN 2025 Course for the North American Summer School for Logic, Language and Information (NASSLLI), Seattle, USA. Co-taught with Nina Gierasimczuk. [\[Course Page\]](#)
Course Title: *Computational Learning in Dynamic Logics*

TALKS AND PRESENTATIONS

- POSTER First FLANN (Workshop on Formal Languages and Neural Networks) (May 2026)
Logics with Neural Network Semantics
- INVITED TALK Seminar on Logic and Interactive Rationality, University of Amsterdam, Online (Sep 2024)
The Modeling Power of Neural Networks
- POSTER PhD Visit Day, Indiana University (Feb 2024)
Reduction Axioms for Iterated Hebbian Learning

TALK & POSTER	AAAI (Feb 2024) <i>Reduction Axioms for Iterated Hebbian Learning</i>
INVITED TALK	1 st GALAI (General Algebra, Logic & AI) Workshop, Chapman University (Jan 2024) <i>Logical Dynamics of Neural Network Learning</i>
POSTER	Trusted AI DoD Grant Project Meeting, University of Notre Dame (Apr 2023) <i>Neural Network Semantics</i>
POSTER	AI Center Open House, Indiana University (Mar 2023) <i>Reasoning about Neural Network Learning</i>
TALK	Cognitive Lunch Seminar, Indiana University (Feb 2023) <i>A Semantic Theory for Neuro-Symbolic AI</i>
TALK	The International FLAIRS (Florida AI Research Society) Conference (May 2022) <i>The Logic of Hebbian Learning</i>
TALK	Logic Seminar, Indiana University (May 2022) <i>The Logic of Hebbian Learning</i>
POSTER	Trusted AI DoD Grant Project Meeting, IUPUI (Apr 2022) <i>Reasoning about Neural Network Learning</i>
TALK	Trusted AI DoD Grant Project Meeting, Indiana University (Mar 2022) <i>From Logic to Hebbian-Learned Nets and Back</i>
TALK & POSTER	AAAI (Feb 2020) <i>Logics for Sizes with Union or Intersection</i>
TALK	Logic Seminar, Indiana University (Sep 2019) <i>Logics for Sizes with Union or Intersection</i>
TALK	International Conference on Case-Based Reasoning (Sep 2019) <i>CBR Confidence as a Basis for Confidence in Black Box Systems</i> (joint talk with L. Gates)
TALK	PL Wonks Seminar, Indiana University (Sep 2019) <i>Syllogistic Logic with Sizes of Sets and Noun Union</i>
POSTER	Discover UofSC, University of South Carolina (Apr 2017) <i>Exploring Non-finitely Based Finite Algebras</i>

SERVICE

OCT 2024	Local Organizer for the KOI Combinatorics Conference
FEB 2024	Volunteer for AAAI, as well as for the AAAI Workshop on Neuro-Symbolic Learning and Reasoning in the era of Large Language Models
NOV 2023	Reviewer for the AAAI Workshop on Neuro-Symbolic Learning and Reasoning in the era of Large Language Models (2 reviews)
JUN 2023	Local Organizer for CALCO (Algebra and Coalgebra in Computer Science), & jointly-held MFPS (Mathematical Foundations of Programming Semantics)
SEP 2019	Reviewer for the Journal of Logic, Language, and Information (1 review)

OTHER CONFERENCE ACTIVITY

JUL 2023	Participated in NeSy (Workshop on Neural-Symbolic Learning and Reasoning)
JAN 2023	Participated in the IBM Neuro-Symbolic AI Workshop
MAR 2017	Participated in the Special Session on Algebras, Lattices, and Varieties at the AMS Spring Southeastern Sectional Meeting

HONORS AND AWARDS

MAY 2025	Recipient of the Robert K. Meyer Graduate Fellowship in Logic, Indiana University
MAR 2024	Recipient of the SCALE Ambassador Award for excellence in leadership and research, US Department of Defense
MAY 2022	“The Logic of Hebbian Learning” nominated for Best Student Paper at FLAIRS 2022
AUG 2019	Recipient of the Paul Purdom Fellowship, Indiana University
APR 2018	Outstanding Senior in Computer Science, USC Columbia
APR 2018	Recipient of the Jeong S. Yang Award for Excellence in Undergraduate Mathematics, USC Columbia
APR 2017	Recipient of the Thomas Markham Mathematics Scholarship, USC Columbia
JAN 2017	Recipient of the Magellan Scholar Undergraduate Research Grant, USC Columbia

TEACHING EXPERIENCE

Indiana University (Teaching Assistant)

SUMMER 2025	CS 241 - Discrete Structures (Head TA)
SPRING 2025	CS 241 - Discrete Structures (Head TA)
FALL 2024	CS 231 - Intro to the Mathematics of Cybersecurity (Head TA)
SPRING 2021	CS 200 - Introduction to Programming (Head TA)
FALL 2021	CS 200 - Introduction to Programming (Head TA)
SUMMER 2021	CS 241 - Discrete Structures
SPRING 2021	CS 200 - Introduction to Programming
FALL 2020	CS 200 - Introduction to Programming
SPRING 2020	CS 241 - Discrete Structures
FALL 2019	CS 501 - Graduate Theory of Computing CS 401 - Theory of Computing
SUMMER 2019	CS 241 - Discrete Structures

University of South Carolina (Undergraduate Teaching Assistant)

FALL 2016	Math 374 - Discrete Structures
SPRING 2016	Math 174 - Discrete Structures for Informatics
FALL 2015	Math 141 - Calculus I
SPRING 2015	Math 142 - Calculus II