

# Christian Schulz

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## Education

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**PhD:** Mathematics, University of Illinois at Urbana-Champaign, May 2023 (expected)

Dissertation: “Definability and decidability for expansions of Presburger arithmetic by sets definable from positional numeration systems”

Committee: Lou van den Dries, Philipp Hieronymi, Jeffrey Shallit, Carl Jokusch

**BS:** Computer Science and Mathematics, Rose-Hulman Institute of Technology, May 2017

Summa Cum Laude

## Honors and Awards

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**GAANN Fellowship**, 2017 and 2018

Awarded by the U.S. Department of Education to several candidates chosen by the Department of Mathematics at UIUC as excellent students who have a need for financial assistance

**Heminway Gold Medal**, 2017

Awarded by the faculty at Rose-Hulman Institute of Technology to the graduating senior with the highest grade point average

**Clarence P. Sousley Award**, 2017

Awarded by the mathematics department at Rose-Hulman Institute of Technology to the graduating senior who most demonstrates exceptional work in mathematics

## Research

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**University of Illinois at Urbana-Champaign**, Summer 2018 – present

Advisor: Philipp Hieronymi

- Work on my doctoral research in definability and decidability for expansions of Presburger arithmetic

**University of West Georgia REU**, Summer 2016

Advisor: Bruce Landman and Abdollah Khodkar

- NSF-funded REU on combinatorics, number theory, and graph theory
- One resulting publication; see below

## Mentoring

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**University of Illinois at Urbana-Champaign**, Fall 2019 – present

**Team Leader**, Illinois Geometry Lab

- Fall 2019: “Automatic theorem proving”
- Spring 2020: “Building a theorem prover”
- Fall 2020: “Pecan – an automated theorem prover”
- Spring 2021: “Developing Pecan”

## Teaching

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**University of Illinois at Urbana-Champaign**, Fall 2019 – present

**Teaching Assistant**, Department of Mathematics

- Fall 2019: Math 241, Calculus III (honors section)
- Spring 2020: Math 241, Calculus III
- Fall 2020: Math 241, Calculus III (Head TA assignment)
- Spring 2021: Math 415, Applied Linear Algebra

## Papers

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“Existence of some signed magic arrays” (with A. Khodkar and N. Wagner), *Discrete Math.* 340 (2017), 906-926.

“Decidability for Sturmian words” (with P. Hieronymi, D. Ma, R. Oei, L. Schaeffer, and J. Shallit), in preparation.

“Pecan: an automated theorem prover for automatic sequences using Büchi automata” (with R. Oei, D. Ma, and P. Hieronymi), in preparation.

“Fractal dimensions of  $k$ -regular sets” (with A. Block Gorman and P. Hieronymi), in preparation.

“A strong version of Cobham’s theorem” (with P. Hieronymi), in preparation.

## Talks

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“Existence of some signed magic arrays” (with A. Khodkar and N. Wagner), Midwestern Conference on Combinatorics and Combinatorial Computing, 15 October 2016.

“The theory of addition with predicates for the powers of 2 and 3,” University of Illinois at Urbana-Champaign, 15 March 2019.

“Deciding the theories of expansions of the real ordered group via Ostrowski numeration,” University of Illinois at Urbana-Champaign, 5 November 2019.

“The fractal properties of real sets defined by Büchi automata” (with A. Block Gorman and P. Hieronymi), University of Illinois at Urbana-Champaign, 6 November 2020.