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Undergraduate Mathematics Day: Proceedings  
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## Poster: 2019 Undergraduate Mathematics Day

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# Undergraduate Mathematics Day at the University of Dayton

Saturday November 2, 2019



Photos Undergraduate Mathematics Day 2017

- An undergraduate mathematics conference
- Contributed 15-minute talks, especially by undergraduate students, on mathematics research, the learning and teaching of mathematics, the history of mathematics, and applications to disciplines related to mathematics
- Two invited addresses
- Submit articles (based on talks presented) for publication in refereed online Conference Proceedings
- No registration fee, complimentary lunch

Registration and information at

<http://go.udayton.edu/UndergradMathDay>

Registration deadline is Sunday, October 27, 2019.



## The 20th Annual Schraut Memorial Lecture

Tommy Ratliff, Wheaton College

### *So How do you Detect a Gerrymander?*

Partisan gerrymandering, or drawing district boundaries based primarily on party affiliation, has garnered a great deal of attention recently due to several high profile cases that have reached the United States Supreme Court. It is easy to look at some of the very oddly-shaped congressional districts that exist today and conclude that they must be gerrymandered. It is much more difficult to define clear criteria that detect excessive gerrymandering and that are compelling to the courts and public officials. In this talk we will see that this is not simply a geometric problem related to the shape of districts but that we must also consider the political geography of how voters are distributed within the state. We will

also look at some promising approaches that have been developed in the last two years which use Markov Chain Monte Carlo sampling methods to build large ensembles of districting plans that can help determine if a specific districting plan is an extreme outlier.



## Rachael Kenney, Purdue University

### *Where Did All the Numbers Go? Understanding and Succeeding in Math as MLLs - Mathematics Language Learners*

Mathematics is considered a language in itself, composed of natural language and a symbolic system of mathematical signs, graphs, and diagrams. The learning of mathematics is heavily dependent on both the symbolic language of the discipline (including syntax and organization of symbols) and the natural language of instruction (including discourse practices specific to this discipline). Working fluently within the multiple semiotic systems of the language of mathematics requires developing strong symbol sense and connecting meanings of symbols to meanings in natural language. The symbolic tools that make mathematics so powerful are the very tools that often prevent learners from being successful

in mathematics because they are not able to engage with the language in ways that are meaningful to them. As mathematicians, it is important to consider how can we make the language of mathematics more meaningful and accessible to all learners and users of mathematics. In this talk, we will discuss some of the wonders of the language of mathematics and consider reasons why mathematicians or mathematics teachers are able to interpret mathematics through its symbolic representations while novices often struggle as mathematics language learners (MLLs). We will discuss whether the claim that mathematics is a “universal language” makes sense, particularly when working with English language learners in mathematics, and we will examine frameworks for symbol sense in mathematics.