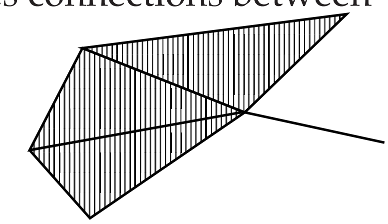
# Sara Faridi

## Commutative Algebra

Dr. Faridi's research aims to produce ways to "count" algebraic invariants of monomial ideals, or check if they are Cohen-Macaulay, without doing complicated algebraic calculations, using tools from combinatorics, topology, and homology.

**Simplicial complexes**: In her research she explores connections between algebraic objects called "monomial ideals" and geometric ones called "simplicial complexes". A monomial is a product of variables, and a monomial ideal is a collection of combinations of a set of monomials. Monomial ideals are the breeding ground for examples and counterexamples in Algebra, where they serve as a measuring stick for what one can and cannot expect to happen for a general ideal.



| | 1 | 4 | 5 | 2 |
|---|---|---|---|---|
| 0: | 1 | . | . | . |
| 1: | . | 1 | . | . |
| 2: | . | 3 | 5 | 2 |

**Combinatoric Algebra:** One direction in her research is investigating combinatorial objects whose related ideal is Cohen-Macaulay (a subtle property whose presence in an algebraic or combinatorial structure ensures that ``things work'', even if not perfectly). Once an object is Cohen-Macaulay, it behaves beautifully and complex calculations become easy, and once you have inside knowledge of the structure of that object.

**Monomial Ideals:** The resolution of an algebraic object is a way to describe it using a set of invariants such as projective dimension, Betti numbers, regularity and Hilbert functions. The idea is that even if you might have difficulty describing an ideal itself, its resolution describes it in terms of simpler objects.

For more information, contact:

*Dr. Sara Faridi*
*Department of Mathematics and Staistics*
*Dalhousie University*
*(902) 494-2658, sara.faridi@dal.ca*


DALHOUSIE UNIVERSITY
*Inspiring Minds*