



# UNIVERSITY OF CALIFORNIA RIVERSIDE

DEPARTMENT OF MATHEMATICS

## COLLOQUIUM

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**Irena Swanson**  
(Reed College)

"Integral Closures"

**Abstract:**

Kummer introduced "ideal numbers" when it was realized that not all extensions of the ring of integers have a unique factorization of its elements. With that he started the theory of ideals in rings and a systematic study of the notion of the integral closure of rings. In particular, in integrally closed extensions of the ring of integers at least locally one still has unique factorization.

I will explain what integral closure accomplishes in commutative algebra and in algebraic geometry, how it is used, and how it is computed. Important ingredients and applications for this theory are valuations, multiplicities, adjoints of ideals, separability, and others. Due to Ratliff's work, integral closure behaves better in locally formally equidimensional rings. I will present my related work with various collaborators (Huebl, Huneke, Singh), especially regarding Rees valuations, adjoints of ideals, and a new algorithm for computing the integral closure. An illustrative example for all is the case of monomial algebras and monomial ideals, which can also be looked at combinatorially and geometrically.

**Wednesday, January 19<sup>th</sup>, 2011**

**Surge 284**

**4:10-5:00pm**

*Tea Time at 3:40pm*