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Room 220, Lady Shaw Building, The Chinese University of Hong Kong, Shatin, N.T., Hong Kong

# Joint Geometric Analysis Seminar

(Part of MIST program)

## *Minimal Surfaces and Allen Cahn Equations*

*Dr. Jingeon An*  
*University of Basel*

### Abstract

Minimal surfaces and Allen–Cahn equations are central topics in geometric partial differential equations and geometric measure theory. We provide a brief overview of the research history, with particular focus on the interface regularity of Allen–Cahn equations. We then introduce a promising new approach to second-order interface regularity for Allen–Cahn-type equations, based on the new discrepancy–curvature equation:

$$\nabla \cdot (\nabla \psi / |\nabla u|^2) = R$$

where  $\psi = F(u) - |\nabla u|^2/2$  is the Modica discrepancy and  $R$  is precisely the intrinsic scalar curvature of the level surfaces. Since the above equation holds for any semilinear equation

$$\Delta u = F'(u),$$

we expect that this approach is flexible and has broader applications beyond Allen–Cahn equations.

Date: June 3, 2026 (Wednesday)

Time: 10:00am-11:00am

Venue: LSB 222

*All are Welcome*