



The Math/Stats Colloquium
Department of Mathematics and Statistics
San José State University



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Algorithm Refinement: A 20-Year Retrospective

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Abstract: Computational fluid dynamics (CFD) calculations often employ Mesh Refinement so that a fine grid is used only in regions that require high resolution. However, hydrodynamic PDEs break down as the grid spacing approaches the molecular scale. Algorithm Refinement is an effective approach for such multiscale problems that span macroscopic to microscopic scales. Algorithm Refinement typically couples two structurally (physically and algorithmically) different computational models, which are used in different regions of the problem (e.g., inside and outside a shock wave). The talk will review Algorithm Refinement, describing both its strengths and weaknesses, and outline promising future directions.

Background: PDEs and undergraduate numerical analysis.

About the speaker: Dr. Alejandro Garcia is a professor in the Department of Physics and Astronomy and an affiliate with the Center for Computational Sciences and Engineering. Dr. Garcia is the author of the textbook *Numerical Methods for Physics* and was named SJSU President's Scholar in 2000 and Outstanding Professor in 2013.

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