

TEMPLE UNIVERSITY  
Department of Mathematics

# Applied Mathematics and Scientific Computing Seminar

Room 617 Wachman Hall

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## A Topological Framework for Structure Analysis in Spatial Point Sets

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### **Abstract.**

Many everyday systems can be abstracted as sets of points in space – the Milky Way galaxy and the aluminum housing of your iPhone can both be viewed as large collections of point-like objects. Understanding how these points are arranged is thus an interesting and natural problem, though aside from perfect crystals and ideal gases, describing this structure in an insightful yet tractable manner can be a very challenging problem. We present a unified framework for classifying and identifying local structure in ordered and disordered systems of points. This framework is built on a semi-algebraic stratification of an appropriate configuration space by complete Voronoi topology. Applications to visualization in computational materials science are considered.