

MATHEMATICS  
SEMINAR

*Riemannian Geometry and Biomedical Data*

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**Abstract:** Statistics is a science for everyone who wishes to collect, analyze, interpret, and understand data. Over the last few years, due to rapid technological developments, we handle increasingly large and complex data. For example, understanding biomedical data, that lie on matrix manifolds, in order to early detection of disease to prevent, control, or provide improved health care with low costs. Therefore, one of the most important steps in analyzing this type of data is understanding the structure of the surfaces where data live on them. To this end, differential geometry allows us to develop local methods to understand the global properties of surfaces that data lie on them. In this talk, after giving some examples of datasets that lie on curved spaces, I will provide an intuitive definition of Riemannian manifolds and their basic properties. Then, I will describe matrix manifolds and explain how to measure distances between two points and challenges that may arise when we want to calculate the mean of datasets and mention techniques that can be used to tackle these challenges. In the end, some resources and content will be provided to engage undergraduate students to know more about this research area to find the right way to develop their ideas and interest and take steps to build their future research areas.

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MSC W201 and Zoom

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