

“Finsler surfaces of constant curvature.”

**Monday, March 12, 2007
4:10pm
60 Evans Hall
University of California, Berkeley**

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When Riemann gave his famous 1854 address ‘On the hypotheses that lie at the foundations of geometry’, he proposed a far-reaching generalization of the non-Euclidean geometry that Gauss had developed in secret, one that would encompass not only Gauss’ ideas about curvature and shortest paths, but that would be able to model far more general notions of distance and minimization. (For example, Riemann’s proposed notion of geometry would encompass the case of finding shortest-time routes through moving media, such as wind or water.) However, Riemann found it difficult to generalize Gauss’ curvature to these new geometries except in the special cases that we now call Riemannian geometries.

It was only after Hilbert called attention to this problem in his famous address to the 1900 ICM in Paris that geometers took up the problem of studying curvature properties of Riemann’s more general models, nowadays called Finsler geometries, after P. Finsler’s work on them around 1920.

It came as a surprise that, even for 2-dimensional Finsler surfaces, the natural curvature tells only part of the story. Exotic examples of Finsler surfaces of constant curvature were discovered by Hilbert, Funk, and Katok.

Recently, progress has been made in understanding the constant curvature surfaces in Finsler geometry, and interesting connections with Zoll metrics and dynamical systems have turned up.

In this talk, I will give a survey of this history and its recent developments. No familiarity with Finsler geometry will be assumed; instead, I will concentrate on the geometric motivations and key ideas and describe their relationship with more familiar aspects of differential geometry.

Refreshments at a nearby establishment immediately following the talk!

*The purpose of these lectures is to introduce the present year’s research programs at MSRI to the mathematical sciences community in Berkeley. The talks will be **expository and nontechnical**, providing some of the flavor of ongoing research at MSRI.*

Graduate students and Postdoctoral Fellows are particularly invited to attend these lectures.

Further information and links to the MSRI program and workshop web pages are available at:
<http://www.msri.org>