

## Doctoral Dissertation Defense

# “Lobachevski Illuminated: Content, Methods, and Context of the *Theory of Parallels*.”

by

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In the 1820's, Nikolai Ivanovich Lobachevski discovered and began to explore the world's first non-Euclidean geometry. This crucial development in the history of mathematics was not recognized as such in his own lifetime. When his work finally found a sympathetic audience in the late 19th century, it was reinterpreted in the light of various intermediate developments (particularly Bernhard Riemann's conception of geometry), which were foreign to Lobachevski's own way of thinking about the subject.

Because our modern understanding of his work derives from these reinterpretations, many of Lobachevski's most striking ideas have been forgotten. Recovering this “lost mathematics” is not easy: Lobachevski's original works, which even his contemporaries failed to grasp, are still more difficult for the modern reader, who may lack training in subjects and techniques that Lobachevski took for granted in his audience.

Accordingly, I have produced an “illuminated” version of Lobachevski's most accessible exposition of his work, a German book that he published in 1840 entitled *Geometrische Untersuchungen zur Theorie der Parallellinien* (Geometric Investigations on the Theory of Parallels). I have produced a new English version of this work, together with extensive mathematical, historical, and philosophical commentary. The commentary expands and explains Lobachevski's often cryptic statements and proofs, while linking the individual propositions of his treatise to the related work of his predecessors (including Gerolamo Saccheri, J.H. Lambert, and A.M. Legendre), his contemporaries (including János Bolyai and Karl Friedrich Gauss), and his followers (including Eugenio Beltrami, Henri Poincaré, and David Hilbert). This dissertation thus supplies the contemporary reader with all of the tools necessary to unlock Lobachevski's rich, beautiful, but generally inaccessible world.

A copy of the dissertation is available in the Math Office (MA 105) for public inspection.

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3:10 p.m. – 5:00 p.m. in Math 109