

# COLLOQUIUM

DEPARTMENT OF MATHEMATICS AND STATISTICS  
OAKLAND UNIVERSITY  
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## Hamilton and Jacobi Come Full Circle

### **Abstract**

To the student of mechanics, the names Hamilton and Jacobi are closely linked: in 1837, Jacobi extended Hamilton's work in dynamics giving rise to what we know today as the Hamilton-Jacobi theory.

In this talk, we bring these two contemporaries together in a completely different and unexpected way. In 1843, W. R. Hamilton carved the equations defining the algebra of quaternions on the stones of Brougham Bridge, Dublin. Two years later, in an unrelated piece of work, C. G. J. Jacobi described an iterative method for calculating the eigenvalues and eigenvectors of an  $n \times n$  symmetric matrix. We show that Hamilton's quaternions hold the key to extending Jacobi's algorithm to a variety of other structured eigenproblems. Among these are Hamiltonian and skew-Hamiltonian eigenproblems with the additional structure of symmetry or skew-symmetry.

**372 Science and Engineering Building**

**Thursday, March 7th, 2002**

**3:00 to 4:00 P.M.**

**(Refreshment at 2:30 to 3:00 P.M. in Room 368,  
Science and Engineering Building)**

**About the speaker**

Niloufer Mackey received her undergraduate degree from the University of Bombay and her doctorate from the State University of New York at Buffalo. Her mathematical interests are in matrix analysis and numerical linear algebra. She is currently at Western Michigan University in Kalamazoo, where she is Associate Professor. As Faculty Advisor to a thriving Pi Mu Epsilon chapter, she is always on the look-out for good speakers who can connect with an undergraduate audience. If you fit this description, she would love to hear from you!