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**John C Wood,\*** ([j.c.wood@leeds.ac.uk](mailto:j.c.wood@leeds.ac.uk)), School of Mathematics, University of Leeds, LS16 7QJ Leeds, England. *Harmonic morphisms between Riemannian manifolds.*

Harmonic morphisms are mappings of Riemannian manifolds which preserve solutions of Laplace's equation; elementary examples are conformal transformations of the complex plane. The concept can be traced back to Jacobi who wanted to find all complex-valued solutions  $f$  to Laplace's equation on Euclidean 3-space such that any analytic function of  $f$  is still a solution—such maps are precisely the harmonic morphisms. This problem was also posed by probabilists working in stochastic processes, harmonic morphisms being the Brownian path-preserving transformations. Harmonic morphisms can be characterized as harmonic maps which satisfy an additional condition called 'horizontally weakly conformality' or 'semiconformality', which is dual to the condition of weak conformality. We will give a general overview of the subject, concentrating on constructions of harmonic morphisms, and recent applications to finding Einstein and self-dual metrics. (Received February 20, 2004)