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Daniele Guido (guido@mat.uniroma2.it), Universita di Roma "Tor Vergata", Dipartimento di Matematica, I-00133 Roma, Italy, **Tommaso Isola** (isola@mat.uniroma2.it), Universita di Roma "Tor Vergata", Dipartimento di Matematica, I-00133 Roma, Italy, and **Michel L. Lapidus*** (lapidus@math.ucr.edu), University of California, Department of Mathematics, Riverside, CA 92521-0135. *Ihara Zeta Functions for Self-Similar Fractal Graphs.*

We discuss a joint work (to appear in Trans. Amer. Math. Soc.) in which we suitably define and study the Ihara zeta function attached with a self-similar fractal graph. We obtain an Euler product, a Dirichlet series expansion, a meromorphic extension, and especially, a "determinant (factorization) formula" for this zeta function. (The latter formula involves a suitably regularized infinite dimensional determinant, the definition of which requires certain operator algebraic techniques.) When the underlying fractal graph is "regular", we also show that the associated zeta function satisfies a natural functional equation. If time allows it, we shall briefly discuss counterparts of these results for infinite periodic (or "covering") graphs. We shall also explain how this work may serve as a helpful discrete model for the study of the moduli space of fractal membranes and the associated modular flows of zeta functions (and of their zeros) introduced in the presenter's forthcoming book, "In Search of the Riemann Zeros: Strings, fractal membranes and noncommutative spacetimes" (Amer. Math. Soc., in press, Dec. 2007), in connection with a new conjectural geometric and dynamical interpretation of the Riemann Hypothesis. (Received September 08, 2007)