1062-58-193   **Michel L Lapidus*** (`lapidus@math.ucr.edu`), Department of Mathematics, University of California, Riverside, CA 92521-0135, and **Hung Lu** (`hlu@hpu.edu`), Department of Mathematics, Hawai'i Pacific University, Honolulu, HI 96813-2785. *p-Adic Fractal Strings and Their Complex Dimensions, via Geometric Zeta Functions and Tube Formulas.*

The archimedean theory of fractal strings and their complex dimensions has been developed by the author and his collaborators, particularly Machiel van Frankenhuijsen, in a series of papers and research monographs. See, e.g., the book (by MLL & M-vF) "Fractal Geometry, Complex Dimensions and Zeta Functions", Springer, 2006 (2nd rev. and enl. ed. to appear in 2011). In this talk, we present a nonarchimedean (i.e., p-adic) counterpart of aspects of this theory, with particular focus on p-adic self-similar strings. We determine the structure of the complex dimensions (defined as the poles of a suitably defined zeta function) and show that every p-adic self-similar string is lattice" (or "arithmetic"), in a strong sense; we deduce that both the zeroes and the poles of the associated geometric zeta function are periodically distributed. We also obtain a (distributional) p-adic tube formula in this context, for the volume of suitably defined nonarchimedean tubular neighborhoods of the string. If time permits, we will conclude by proposing several open problems in this area, related in part to seemingly new aspects of p-adic harmonic and functional analysis. (Received August 08, 2010)