The problem of finding configurations that are optimally-distributed on a set appears in a number of guises including best-packing problems, coding theory, geometrical modeling, statistical sampling, radial basis approximation and golf-ball design. We consider the geometry of \( N \)-point configurations \( \{x_i\}_{i=1}^N \) on a compact set \( A \) (with a metric \( m \)) that minimize a weighted Riesz \( s \)-energy functional of the form

\[
\sum_{i \neq j} \frac{w(x_i, x_j)}{m(x_i, x_j)^s}
\]

for a given weight function \( w \) on \( A \times A \) and a parameter \( s > 0 \).

Specifically, if \( A \) supports an Ahlfors \( \alpha \)-regular measure, we prove that whenever \( s > \alpha \), any sequence of weighted minimal Riesz \( s \)-energy \( N \)-point configurations on \( A \) (for ‘nice’ weights) is quasi-uniform in the sense that the ratios of its mesh norm to separation distance remain bounded as \( N \) grows. Furthermore, if \( A \) is an \( \alpha \)-rectifiable compact subset of Euclidean space with positive and finite \( \alpha \)-dimensional Hausdorff measure, one may choose the weight \( w \) to generate a quasi-uniform sequence of configurations that have (as \( N \to \infty \)) a prescribed positive continuous limit distribution with respect to \( \alpha \)-dimensional Hausdorff measure. This is joint work with E. Saff and D. Hardin. (Received December 13, 2011)