Nicholas George Triantafillou* (ngtriant@umich.edu) and Katie R. Banks (krbanks@fas.harvard.edu). Omnimosaics. Preliminary report.

An omnimosaic $O(n,k,a)$, is defined to be an $n \times n$ matrix, with entries from the set $A = \{1, 2, ..., a\}$, that contains, as a submatrix, each of the $a^k \times k$ matrices over $A$. We present a general scheme for the explicit construction of omnimosaics which yields square omnimosaics with $n \approx ka^{k/2}$. Time permitting, we will outline techniques used to compute $\omega(k,a)$ for small $k$ and $a$, comment on higher-dimensional generalizations, and show that for fixed $k$ and $a$ the smallest possible size $\omega(k,a)$ of an $O(n,k,a)$ omnimosaic satisfies

$$\frac{ka^{k/2}}{e} \leq \omega(k,a) \leq \frac{ka^{k/2}}{e} (1 + o(1))$$

for a well-specified function $o(1)$ that tends to zero as $k \to \infty$. (Received September 17, 2010)