1120-42-120 **John Herr*** (jherr@iastate.edu) and **Eric Weber** (esweber@iastate.edu). *Fourier series for singular measures.*

Using the Kaczmarz algorithm, we prove that for any singular Borel probability measure μ on $[0,1)$, every $f \in L^2(\mu)$ possesses a Fourier series of the form $f(x) = \sum_{n=0}^{\infty} c_n e^{2\pi i n x}$. We show that the coefficients c_n can be computed in terms of the quantities $\widehat{f}(n) = \int_0^1 f(x) e^{-2\pi i n x}\, d\mu(x)$. We also demonstrate a Shannon-type sampling theorem for functions that are in a sense μ-bandlimited. (Received February 17, 2016)