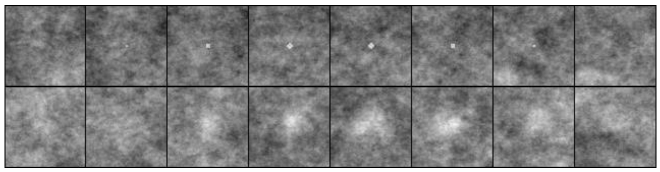
Supplementary Materials

Stimuli Generation

Supplementary Supplementary Fig. *1* shows a sample of several consecutive slices of both signals. Signals were designed to contain different ranges of spatial frequencies. While both the background and the MASS signal contain high power in the low frequencies, the MCALC signal contained higher spatial frequencies due to its sharp edges.



Supplementary Fig. 1: Example of several consecutive slices of the region of interest around a 3D simulated microcalcification (top) and mass (bottom) embedded in noise samples.

Channelized Hotelling Channel Details:

Below we describe the details for the channel models used in the current paper.

Gabor Channels

We used a set of 1-octave Gabor filters with 8 orientations and 6 central spatial frequencies (0.5, 1, 2, 4, 8, and 16 cycles per degree of visual angle) [69], [86]. Gabor channels are built using the following equation:

$$G_{x,y} = \exp\left(\frac{-4\ln 2(x^2+y^2)}{W_8^2}\right) cos[2\pi f(x\cos\theta + y\sin\theta)] \qquad (S1)$$

where f is the spatial frequency, θ is the orientation, and W_8 is the width.

Laguerre-Gauss channels

The channels were generated using the product of Laguerre polynomials and Gaussian functions:

$$u_j(r|a_u) = \frac{\sqrt{2}}{a_u}\exp\left(\frac{-\pi r^2}{a_u}\right) L_j\left(\frac{2\pi r^2}{a_u^2}\right) \qquad (9)$$

$$L_j(x) = \sum_{k=0}^{j}(-1)^k \binom{j}{k}\frac{x^k}{k!} \qquad (10)$$

using $j = [0, 3, 9, 17]$ and $a_u = [5, 10, 20, 40]$ for a total of 16 channels.

Difference of Gaussian Channels

The channels were generated by taking the subtraction of two Gaussian functions:

$$D_n(r) = \exp\left(\frac{-r^2}{Q2\sigma_n^2}\right) - \exp\left(\frac{-r^2}{2\sigma_n^2}\right) \qquad (11)$$

$$\sigma_n = \sigma_0 * \alpha^n \qquad (12)$$

using $\sigma_0 = 0.005$, $\alpha = 1.4$, $Q = 1.67$, and $n = [1 \dots 10]$.