# Image Histogram Matching

In this problem, you will predetermine a threshold value and use this threshold and histogram matching to segment a new crack image.

You will determine a reference threshold value based on the following image, "refImg" (00004.jpg from the Concrete Crack dataset):

And apply this threshold to segment a new image, "newImg" (00143.jpg from the concrete crack dataset), with and without histogram matching.

Write code that will:

- Determine the reference threshold value from refImg.
- Use this threshold to segment newImg without histogram matching. Save the results as newImgBW.
- Match newImg's histogram to refImg's histogram. Then use the reference threshold to segment the histogram-matched crack image. Save the results as matchImgBW.

Consider your results. Which segmentation is more accurate? Noisier? If you were detecting cracks to identify areas of a dam that need repair, would the histogram-matched segmentation be sufficient? Share your thoughts on the forums.

```
refImg = im2gray(imread("00004.jpg"));
newImg = im2gray(imread("00143.jpg"));

refThresh = graythresh(refImg)
```

```
refThresh = 0.4510
```

```
newImgBW = imbinarize(newImg, refThresh)
```

```
newImgBW = 227×227 logical array
   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1···
   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
     :
     :
```

```
matchImg = imhistmatch(newImg,refImg)
```

```
matchImg = 227×227 uint8 matrix
   146   146   150   150   150   150   150   150   150   150   150   150   150···
   146   150   150   150   150   150   150   150   150   150   150   150   150
   150   150   150   150   150   150   150   150   150   150   150   150   150
   146   146   150   150   150   150   150   150   150   150   150   150   150
   146   146   146   146   150   150   150   150   150   150   150   150   150
   146   146   146   146   150   150   150   150   150   150   150   150   150
   150   150   146   150   150   150   150   150   150   150   150   150   150
```

```
150    150    150    150    150    150    150    150    150    150    150    150    150
150    150    150    146    150    150    150    150    150    150    150    150    150
150    146    146    146    150    150    150    150    150    150    150    150    150
     ⋮
     ⋮
```

```
matchImgBW = imbinarize(matchImg,refThresh)
```

```
matchImgBW = 227×227 logical array
    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1···
    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1
    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1
    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1
    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1
    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1
    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1
    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1
    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1
    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1
     ⋮
     ⋮
```

```
montage({newImg, newImgBW, matchImgBW})
```