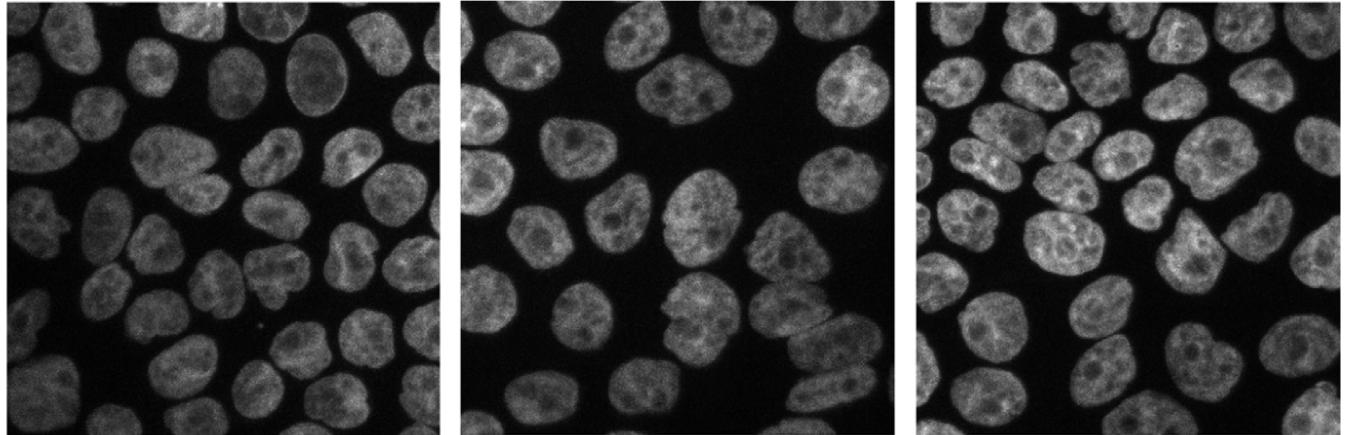


Lab 7 Sessió 1

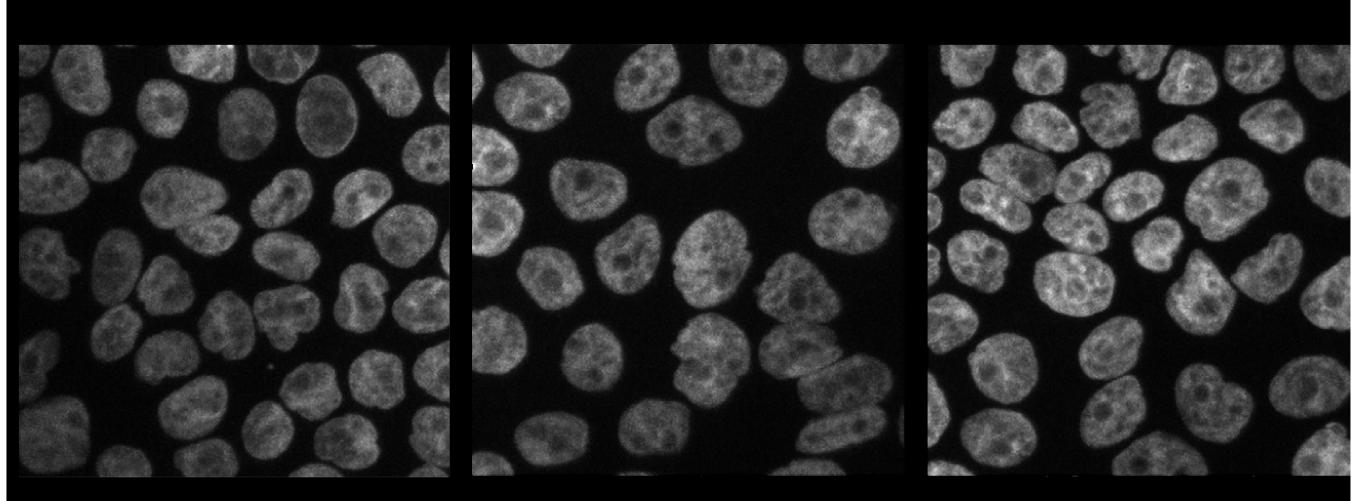
```
I = rgb2gray(imread('cellsegmentationcompetition.png'));
imshow(I)
```



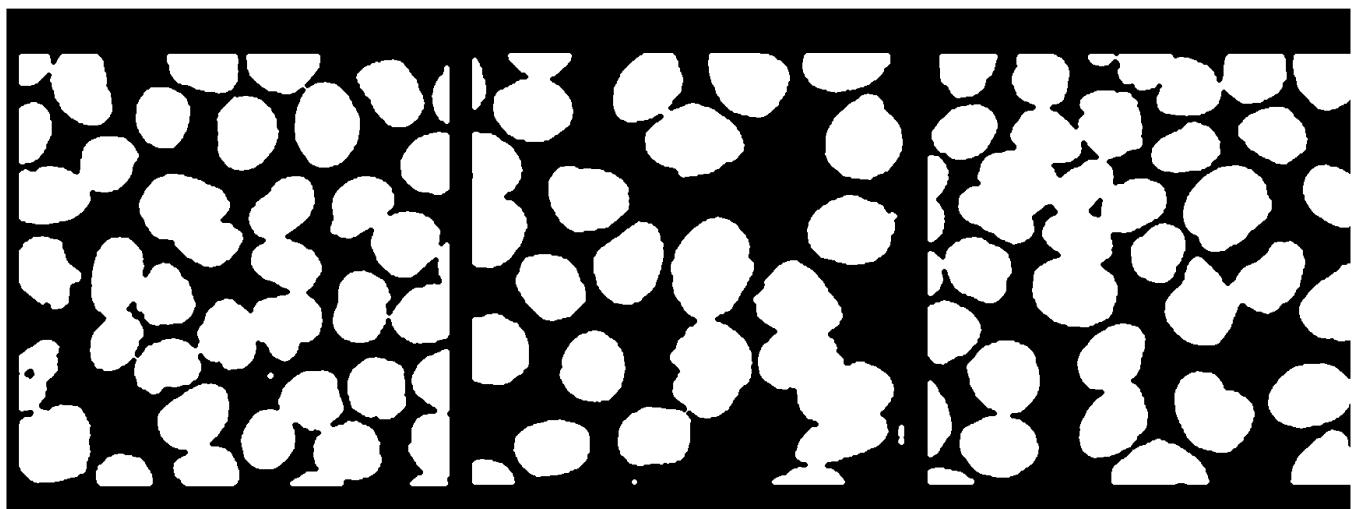
```
IB = I > 250;
SB = false(size(I));

SB(:, 1) = true;
SB(:, end) = true;
SB(1, :) = true;
SB(end, :) = true;

RB = imreconstruct(SB, IB);
RB = imdilate(RB, ones(6,6));
I(RB) = 0;
imshow(I);
```

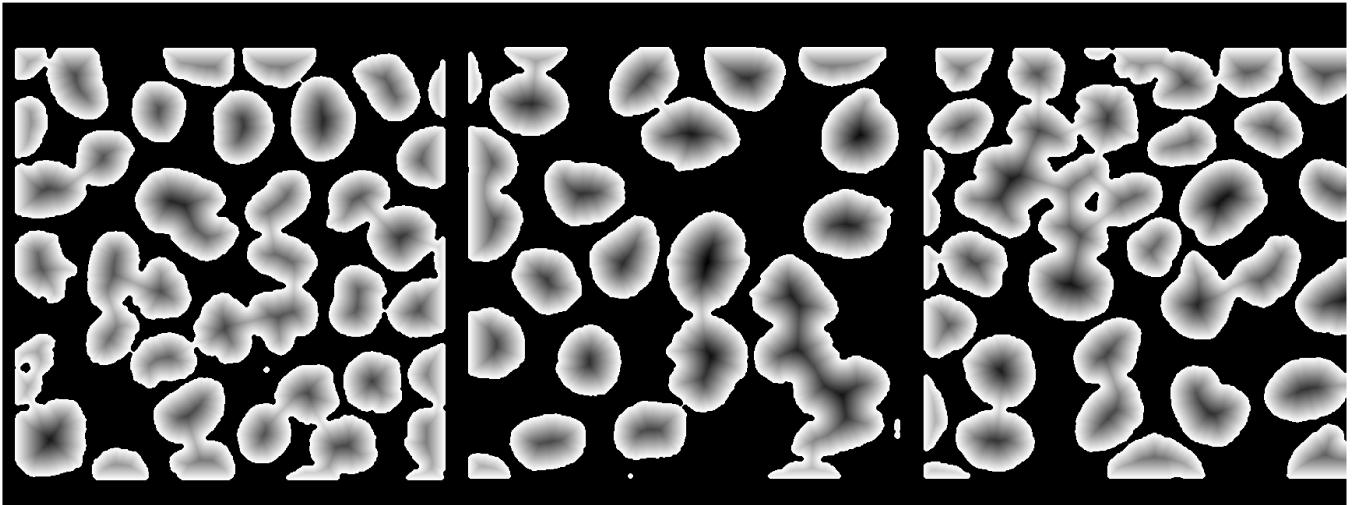


```
% preprocessat  
% filtrat  
OI = imopen(I, strel('disk', 4));  
CI = imclose(OI, strel('disk', 4));  
  
BW = CI > 20;  
imshow(BW);
```

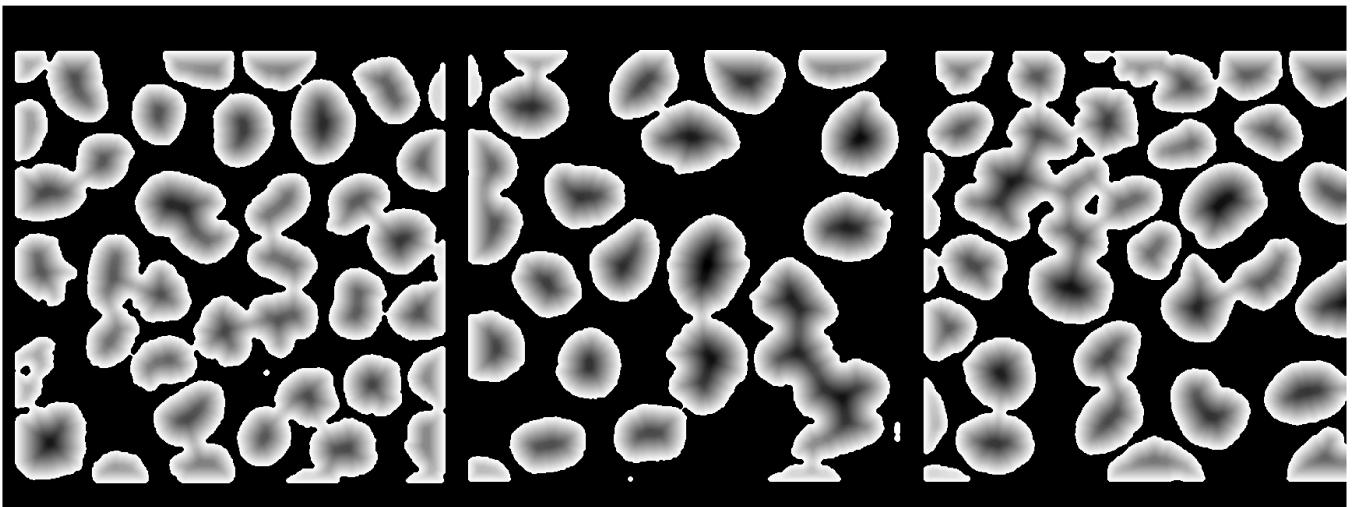


```
% segmentacio  
% per watershed  
  
DT = -bwdist(not(BW));  
DT(not(BW)) = -Inf; % pixels del background no s'omplin
```

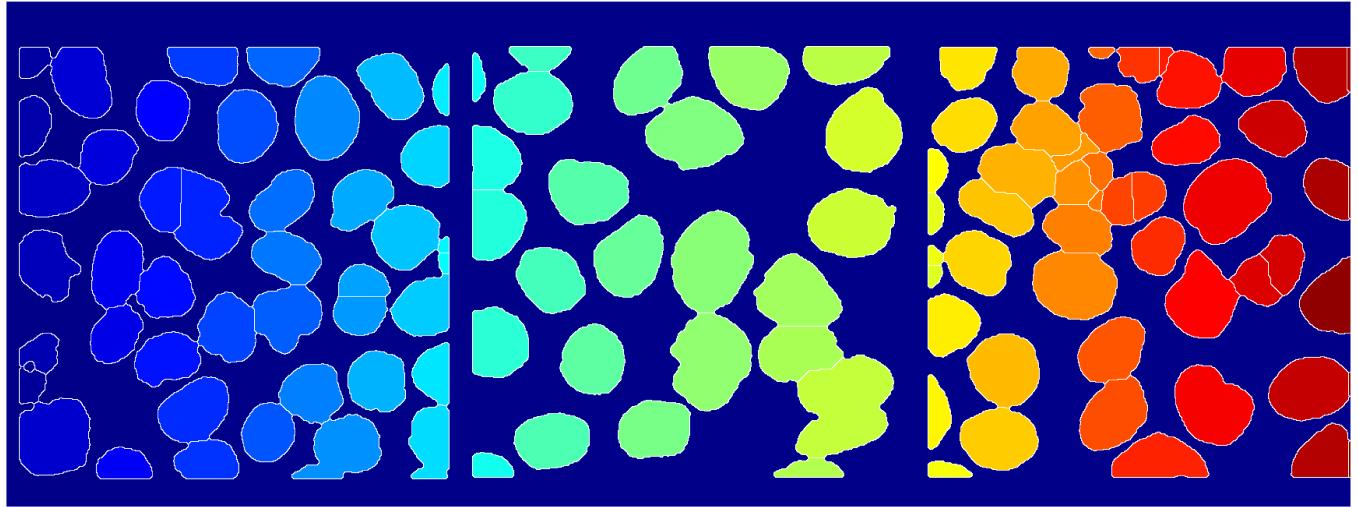
```
DT = imclose(DT, strel('disk', 4));
```



```
imshow(DT, []);
```



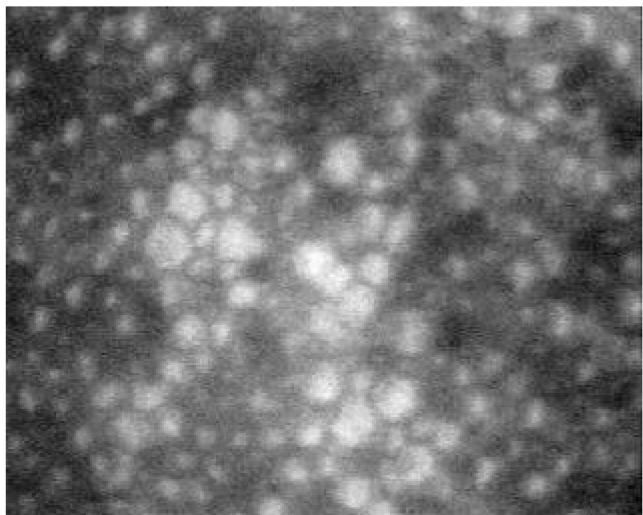
```
L = watershed(DT);  
imshow(label2rgb(L));
```



Exercici

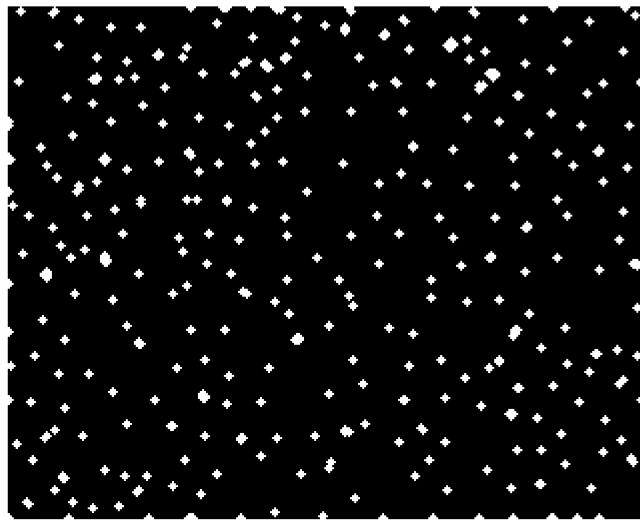
V1

```
I = imread('cornea.tif');
imshow(I);
```

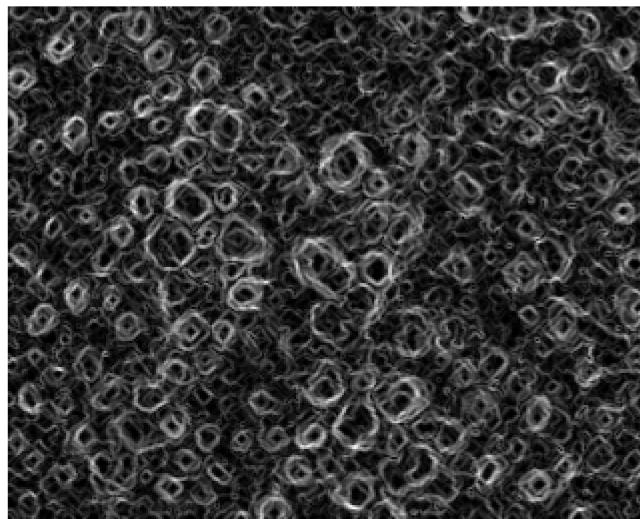


```
% preprocessat
% filtrat
OI = imopen(I, strel('disk', 2));
CI = imclose(OI, strel('disk', 2));
I = OI;
```

```
IRM = imregionalmax(I);  
imshow(IRM, []);
```

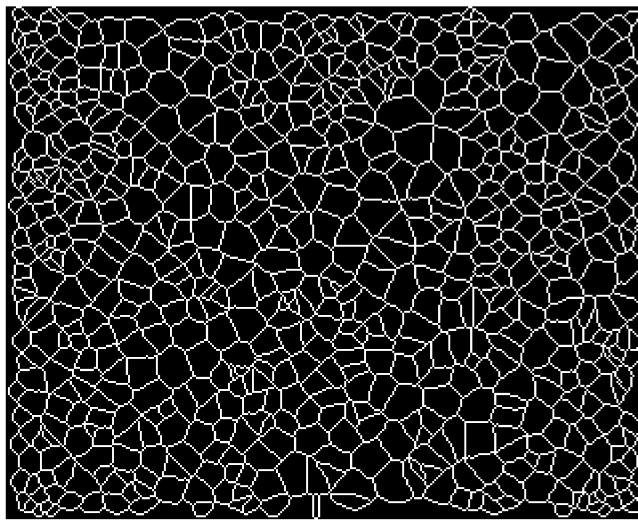


```
IG = imggradient(I);  
imshow(IG, []);
```

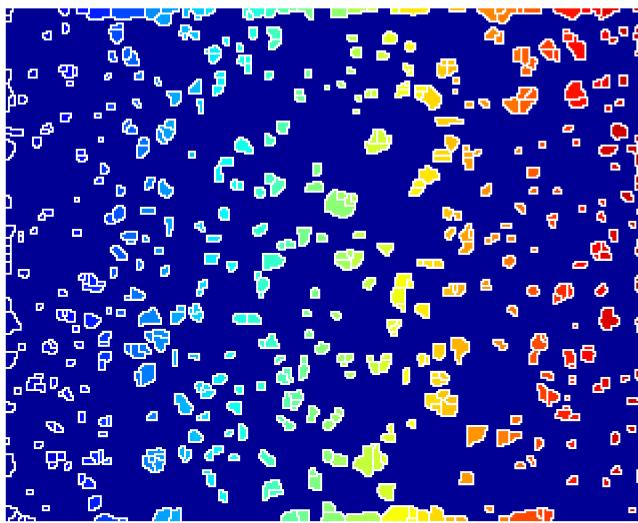


```
BWIG = imbinarize(IG);
```

```
ISkel = bwskel(BWIG);  
imshow(ISkel);
```



```
I(ISkel) = -Inf;  
I(IRM) = 255;  
  
L = watershed(I);  
imshow(label2rgb(L))
```



V2

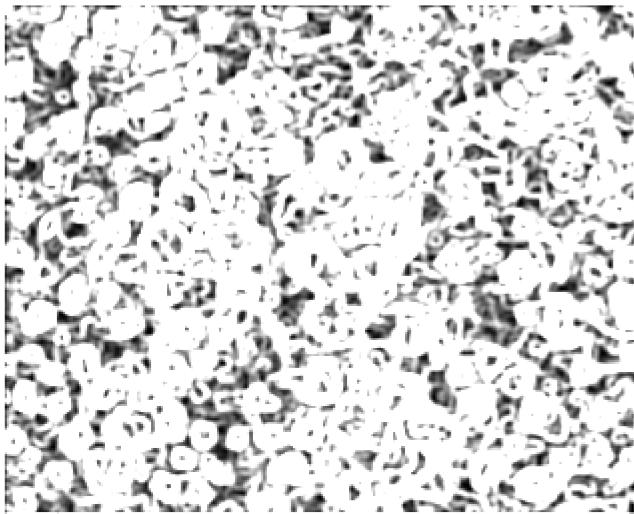
```
I = imread('cornea.tif');
I = medfilt2(I, [2,2]);

SE = fspecial("disk", 1) > 0;
I = imopen(I, SE);
I = imclose(I, SE);
IRM = imregionalmax(I);

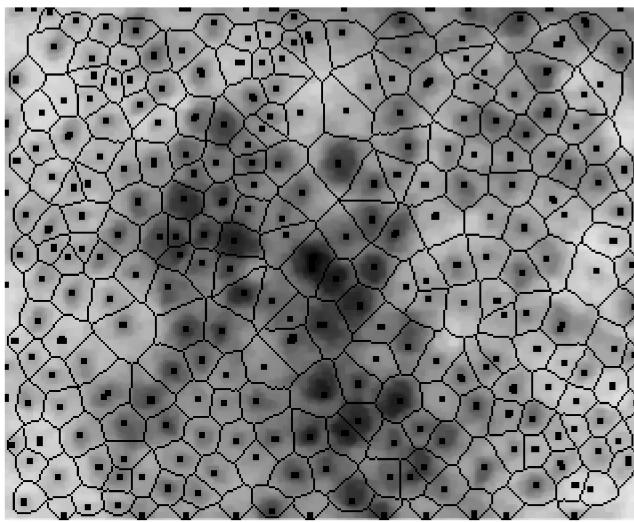
IREC = imreconstruct(I .* uint8(IRM), I);

SK = bwskel(not(IRM));
SKIZ = bwmorph(SK, "spur", Inf);
SKIZ = SKIZ & not(bwhitmiss(SKIZ, [-1 -1 -1; -1 1 -1; -1 -1 -1]));

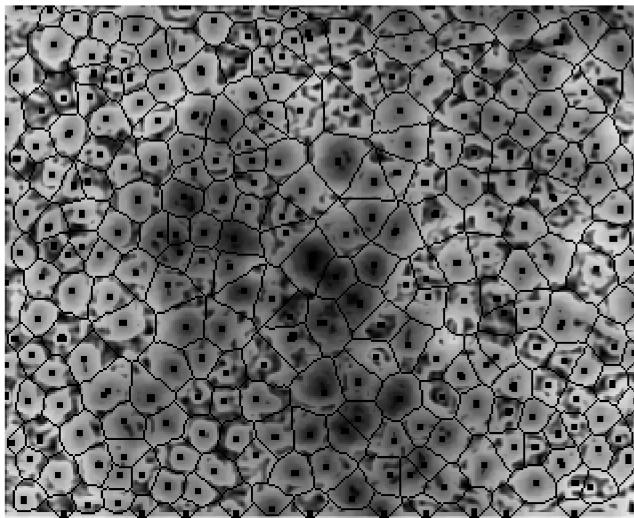
G = uint8(imgradient(IREC));
G = imfilter(G, ones(3,3));
imshow(G);
```



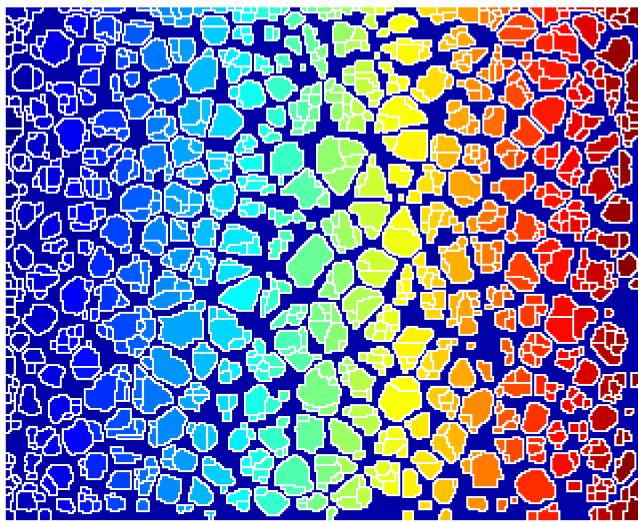
```
M = (255-I) .* uint8(not(SKIZ)) .* uint8(not(IRM));
imshow(M);
```



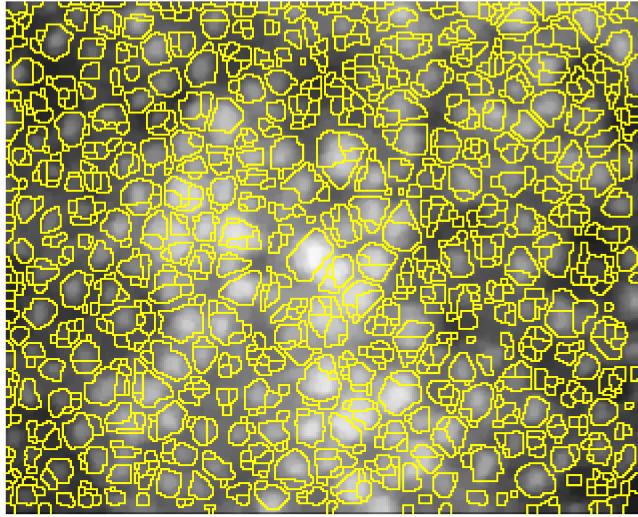
```
IDWS = double(G) .* double(M);  
imshow(IDWS, []);
```



```
WS = watershed (IDWS);  
imshow(label2rgb(WS));
```



```
IB = WS == 0;  
X = imoverlay(I, IB);  
imshow(X);
```



Segmentació per kmeans

```
% Reduir el nombre de colors d'una imatge  
I = imread('nenufar.jpg');
```

```
imshow(I);
```



```
R = I(:, :, 1);
G = I(:, :, 2);
B = I(:, :, 3);

O = [R(:, ), G(:, ), B(:, )];

IKM = kmeans(double(O), 15);

[f, c, p] = size(I);

Result = reshape(IKM, [f, c]);

imshow(label2rgb(Result), []);
```

