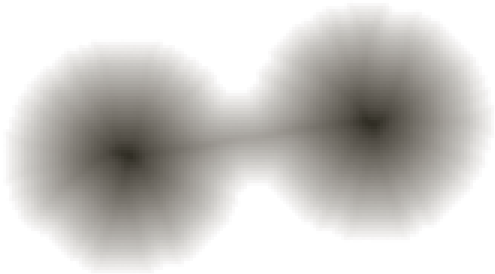
Lecture 5 – Image Segmentation（图像分割）

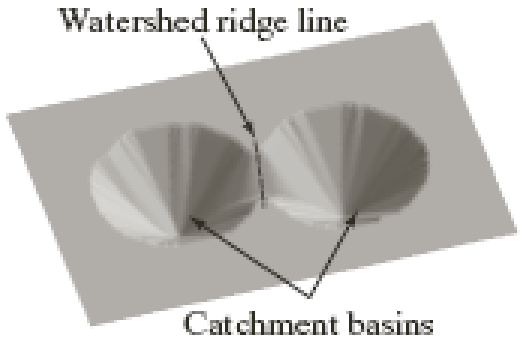
This lecture will cover:

- Morphological Image Processing （形态学图像处理）
  - Morphological operation
  - Morphological algorithm
- Image Segmentation（图像分割）
  - Point, Line and Edge Detection（点、线和边缘检测）
  - Thresholding（阈值处理）
  - Region-based Segmentation（区域分割）
  - **Segmentation using Morphological Watersheds（形态学分水岭分割）**

Morphological Watersheds

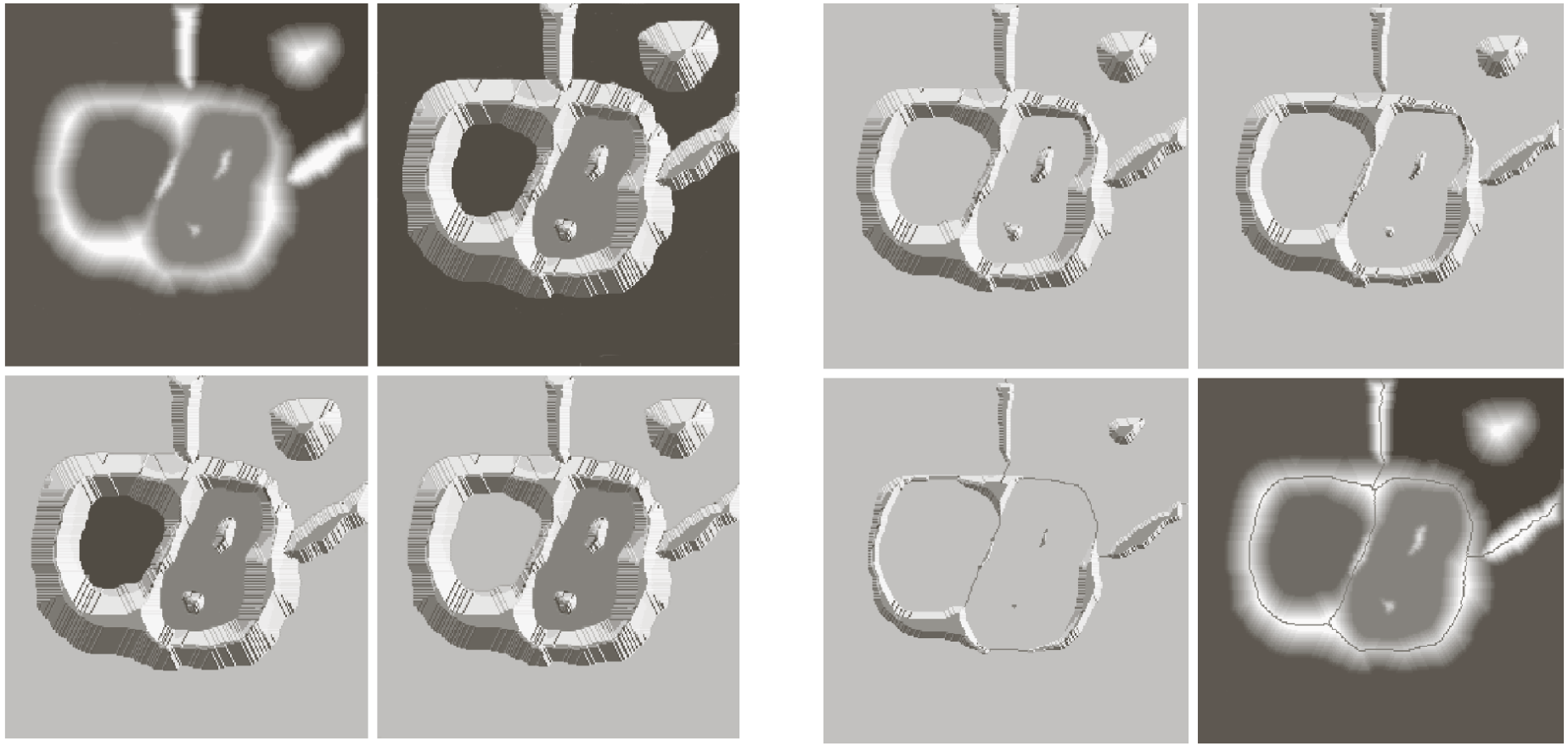
- Catchment Basin(汇水盆地) or Watershed(分水岭)
- Divided Line(分割线) or Watershed Line(分水线)
- topological surface (拓扑表面)





Morphological Watersheds

- **Matlab function:** L = watershed(A, conn)



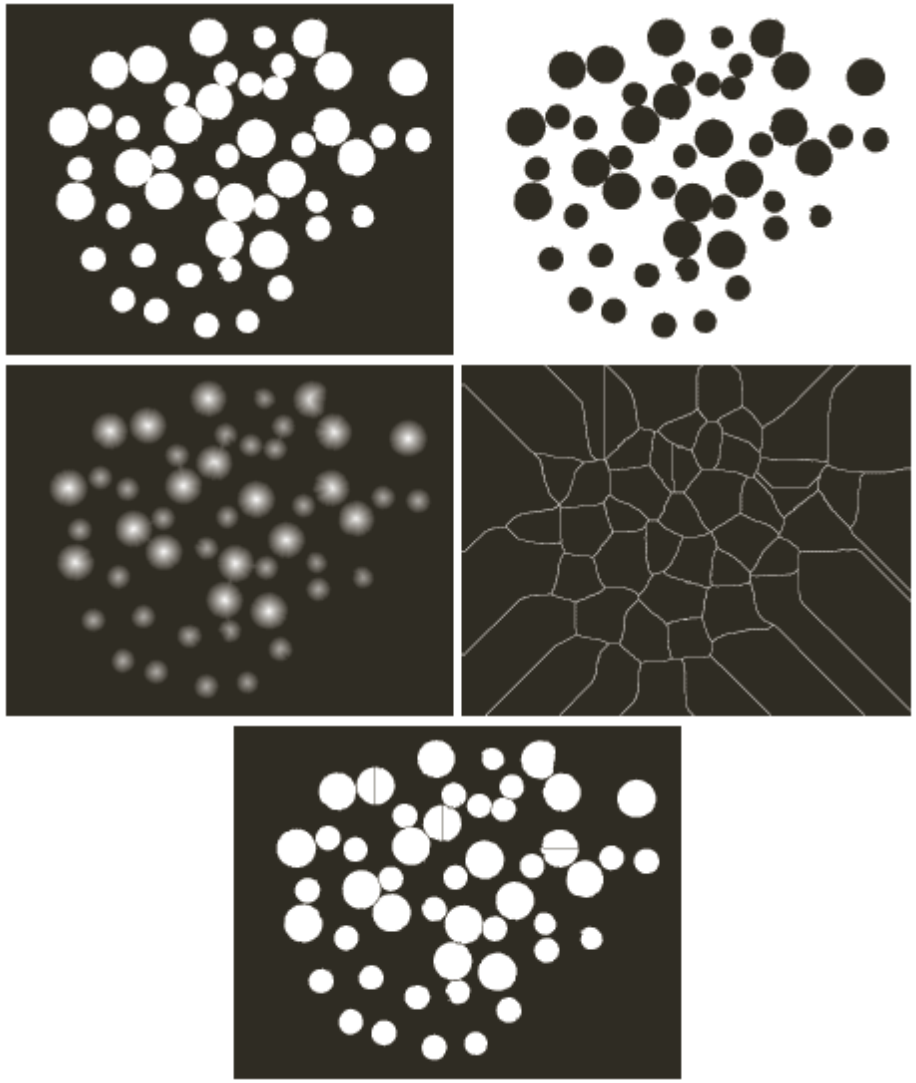
Watershed segmentation Algorithm

Using distance transform

D = bwdist(f)

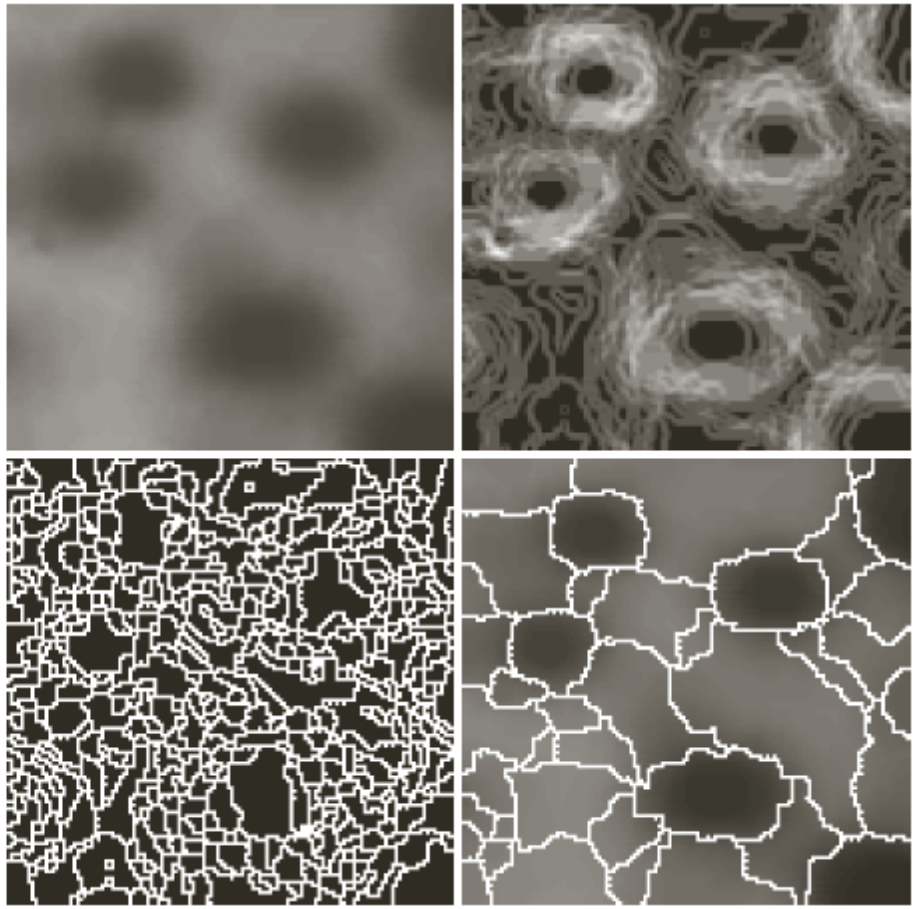
1	1	0	0	0
1	1	0	0	0
0	0	0	0	0
0	0	0	0	0
0	1	1	1	0

0	0	1	2	3
0	0	1	2	3
1	1	$\sqrt{2}$	2	$\sqrt{5}$
$\sqrt{2}$	1	1	1	$\sqrt{2}$
1	0	0	0	1



Watershed segmentation Algorithm

Using Gradient operators



The Use of Markers