Review

• thresholding
• Convolution filters (area-based filters)
• blend()
• filter()
Apply filters

```java
void applyFilter(int n) {
    for (int y=0; y<img.height; y++) {
        for (int x=0; x<img.width; x++) {
            img2.pixels[y*img.width+x] = filters[n].apply(x, y, img);
        }
    }
    img2.updatePixels();
    image(img, 0, 0);
    image(img2, width/2, 0);
    textSize(20);
    text(filters[n].name, width/2+width/25, height/25);
} // end applyFilter()
```

Measuring Confluency in Cell Culture Biology

- Refers to the coverage of a dish or flask by the cells
- 100% confluency = completely covered

- Image Processing Method
  1. Mask off unimportant parts of image
  2. Threshold image
  3. Count pixels of certain color

Blend: Subtract

Filter: Threshold

Count pixels to quantitate: 5.3% confluency

Vision Guided Robotics Colony Picking

Predator algorithm for object tracking with learning
http://www.youtube.com/watch?v=1GhNXHCQgIM

Video Processing, with Processing
http://www.youtube.com/watch?v=rKhblUyvK1c
Video Processing

- Video is a sequence of still images.
- All image processing techniques apply per frame.
- Interesting effects can happen between frames.

Simple Video

- Import video library
  ```java
  import processing.video.*;
  Capture cam;
  ```
- Create a Capture object which represents a camera
  ```java
  void setup() {
    size(640, 480);
    cam = new Capture(this,
    640, 480);
    cam.start();
  }
  ```
- Start camera
- Read a frame if it is available
- Draw the frame
  ```java
  void draw() {
    if (cam.available()) { 
      cam.read();
    }
    image(cam, 0, 0);
  }
  ```
Examples

- simpleVideo
- diffFrame
- textVideo