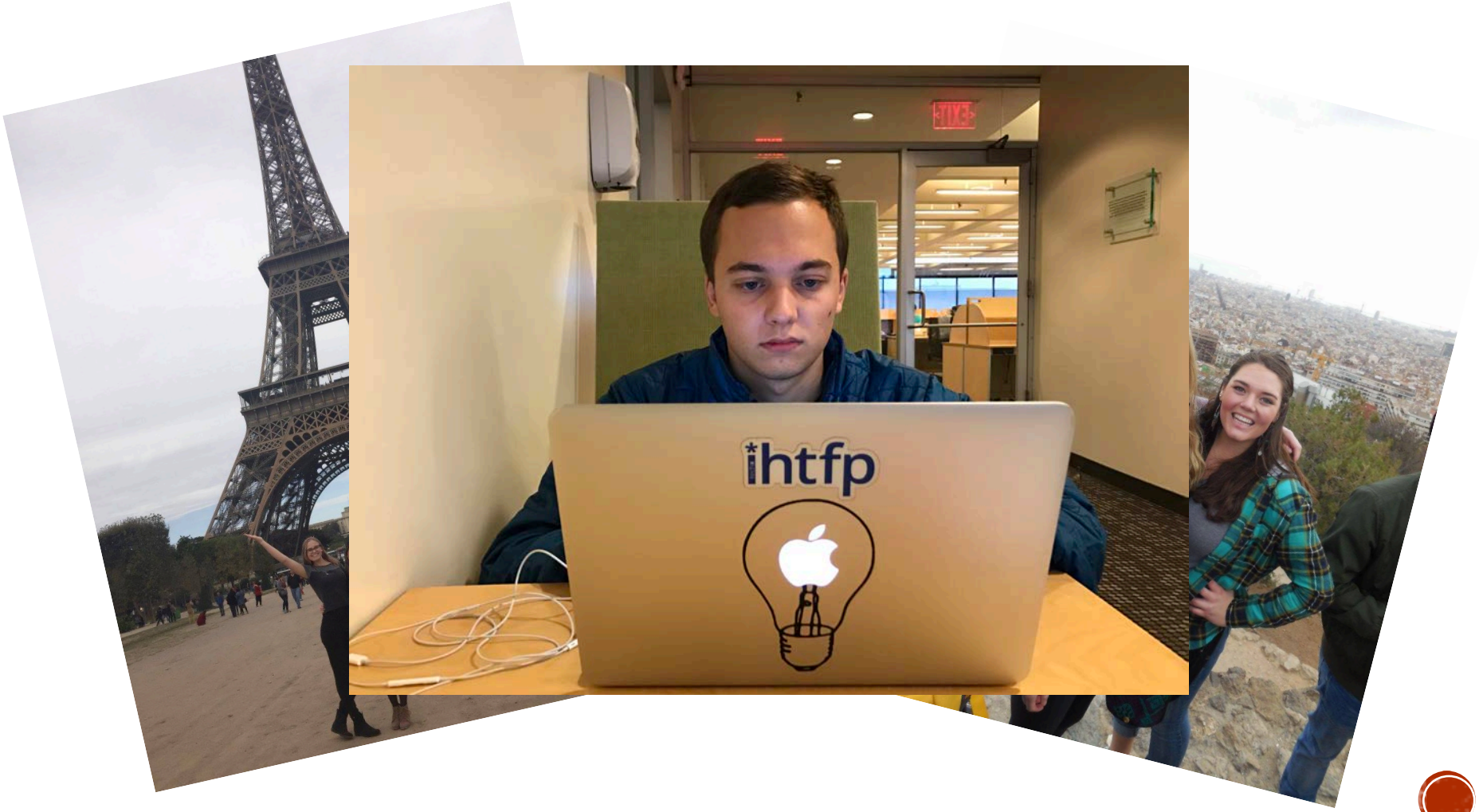

ihtfp

FPGA PASSPORT

Lorenzo Vigano & Diana Wofk
6.111 Fall 2016 Final Project

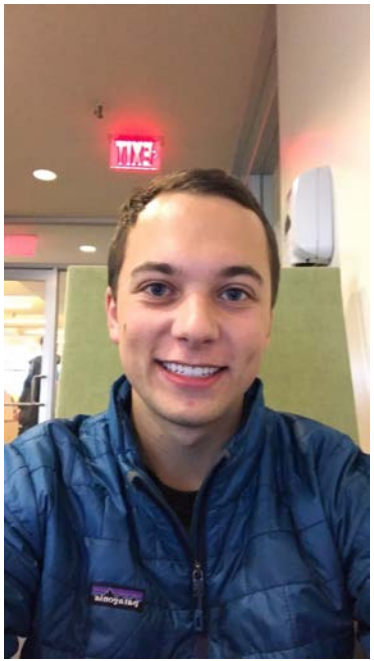
OVERVIEW

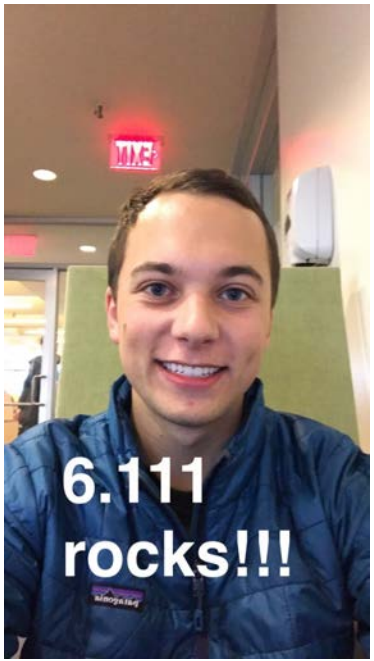
- Photobooth Application
- Filters, fun, and Facebook
- Text, graphics, and options galore!

CAMERA CAPTURE

- Live feed from NTSC camera is shown on monitor
- "Focus" switch → "Shutter" button
- One frame selected (now an image)
- Editing features…

TEXT & GRAPHICS OVERLAY

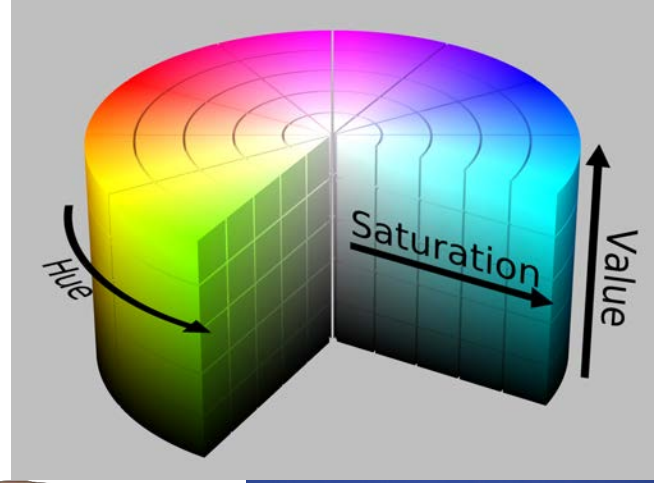


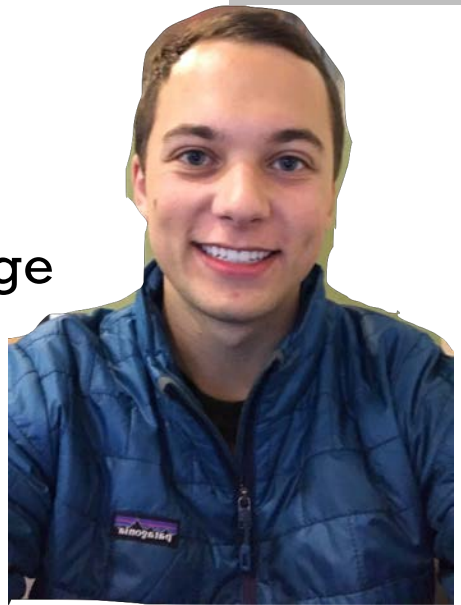


- Pre-determined text based on destination
  - e.g. “Greetings from Paris!”
- Several graphics to chose from
- User can move graphics and text

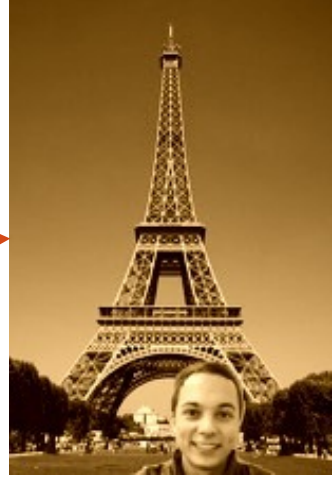
CHROMA-KEY COMPOSITING

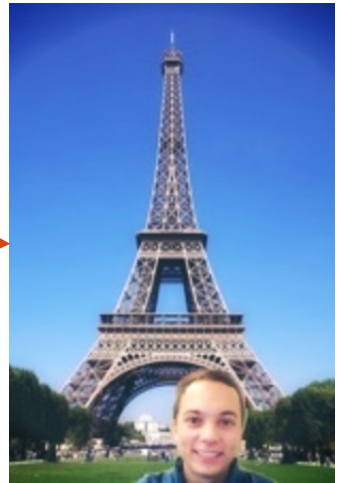
- YCrCb → RGB → HSV
- HSV makes detecting the background simpler as it allows for easy thresh-holding on hue/saturation/brightness
- Detect and then remove the green-screen; replace with background image





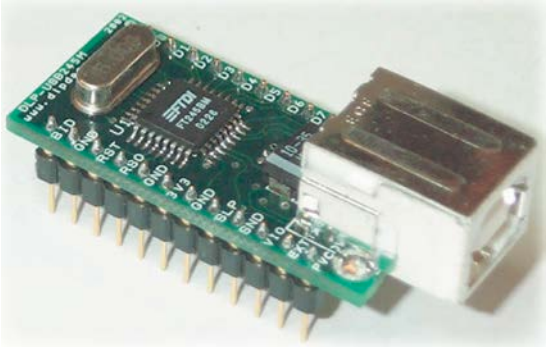
FILTERS

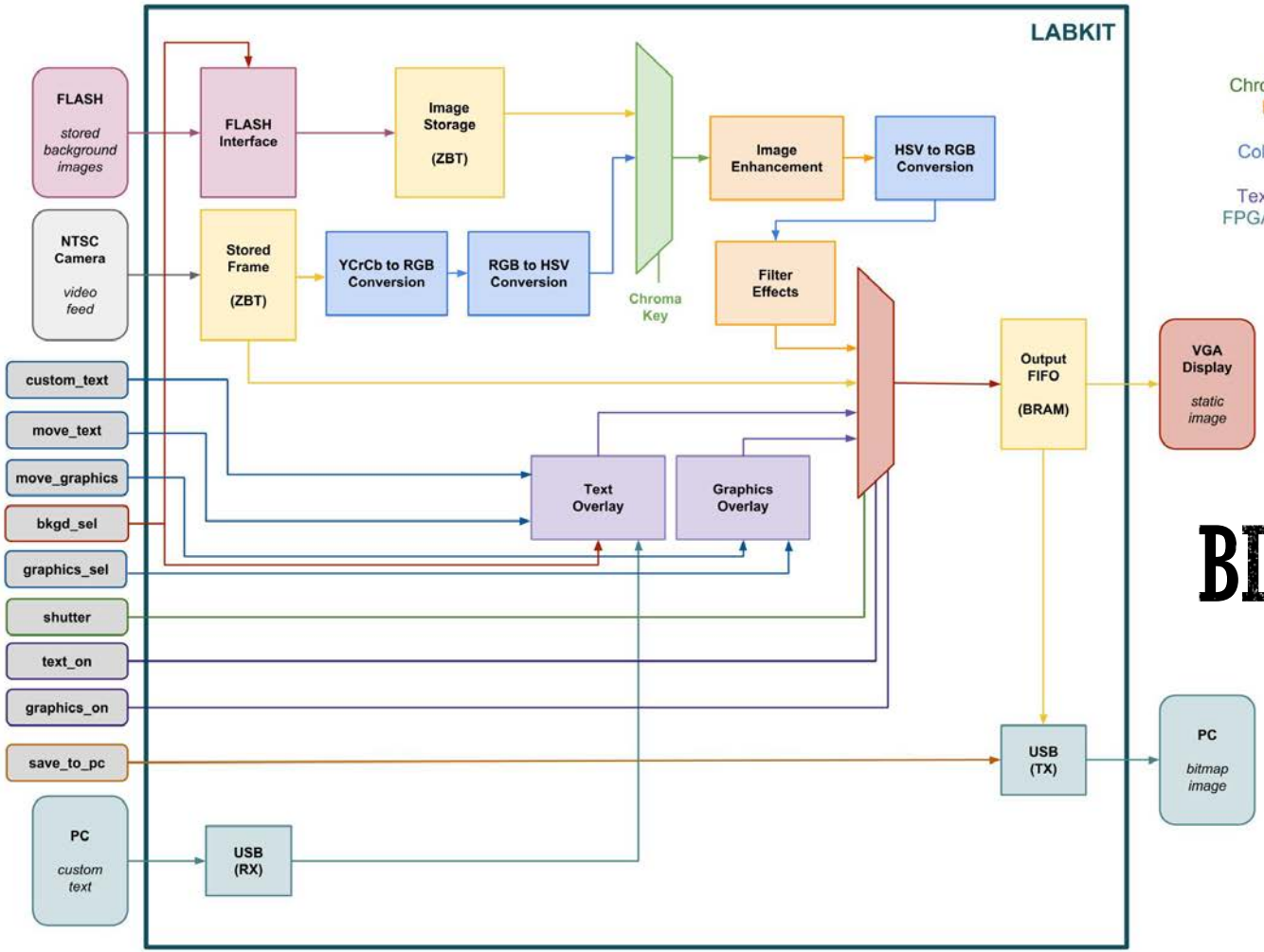




FPGA-PC COMMUNICATION

- Bidirectional data transfer via FTDI UM245M USB-to-FIFO
- **Labkit to PC**
  - bitmap image file sent to PC
- **PC to Labkit**
  - custom text input





Button/Switch Inputs
FLASH Interface
BRAM/ZBT Memory
Chroma-key Compositing
Filter Effects & Image Enhancement
Color Space Conversion
VGA Output
Text & Graphics Overlay
FPGA-PC Communication

HIGH LEVEL BLOCK DIAGRAM

GOALS

- **Baseline & Expected**
  - General functionality
  - Chroma-key compositing
  - Default text overlay
  - Basic graphics overlay
  - Simple filters
  - Image data output to PC
- **Stretch**
  - More complex filters
  - Image enhancement
    - saturation / brightness variation
  - Custom text input and overlay
  - Automatic placement of graphics
    - involves face detection

EXPECTED TIMELINE

- *Week of November 7*
  - Camera input and VGA output
  - ZBT memory
  - Color space conversion
  - Chroma key compositing
- *Week of November 14*
  - Chroma key compositing
  - Text generation
  - Filter effects
- *Week of November 21*
  - Graphics generation
  - Filter effects
- *Week of November 28*
  - Data transfer
  - Integration
- *Weeks of December 5 & 12*
  - DEBUG + OPTIMIZE + STRETCH

QUESTIONS?