NGW E-Ink Workshop

Never Graduate Week!
May 10, 2021

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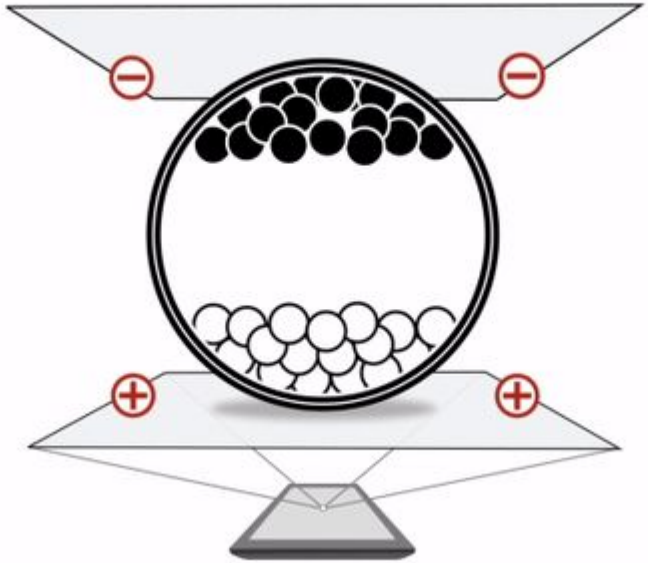
What We're Going to Do!

- Talk about e-ink (and why it's cool)!
- Use the command line
- Work with Python libraries
  - ICS
  - Inky
  - Pillow
- Go through template code - push calendar events to an Inky display
- Customize our displays!

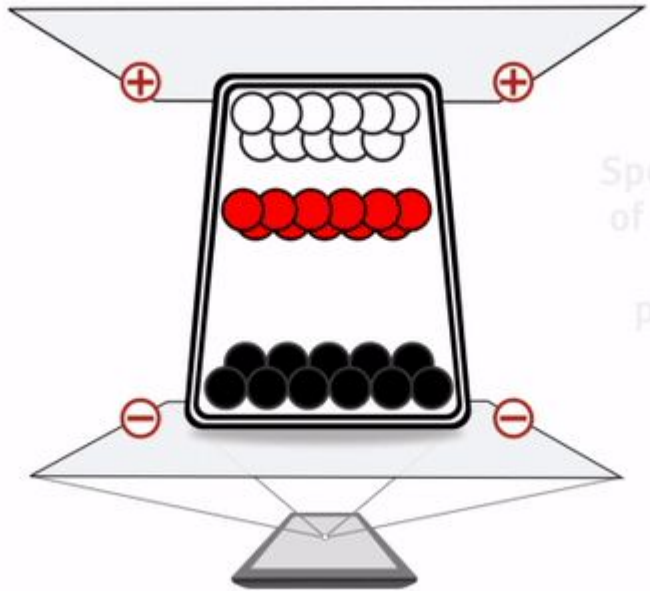
A (Brief) History of E-Ink

- Developed in 1997 at the MIT Media Lab
- First patent filed in 1996 (almost all patents exclusively held by E Ink Corporation at this point)
- Uses changes in electric charges to move pigments from top to bottom of transparent microcapsules
- Originally black and white, currently available with up to 32,000 colors (Advanced Color ePaper)

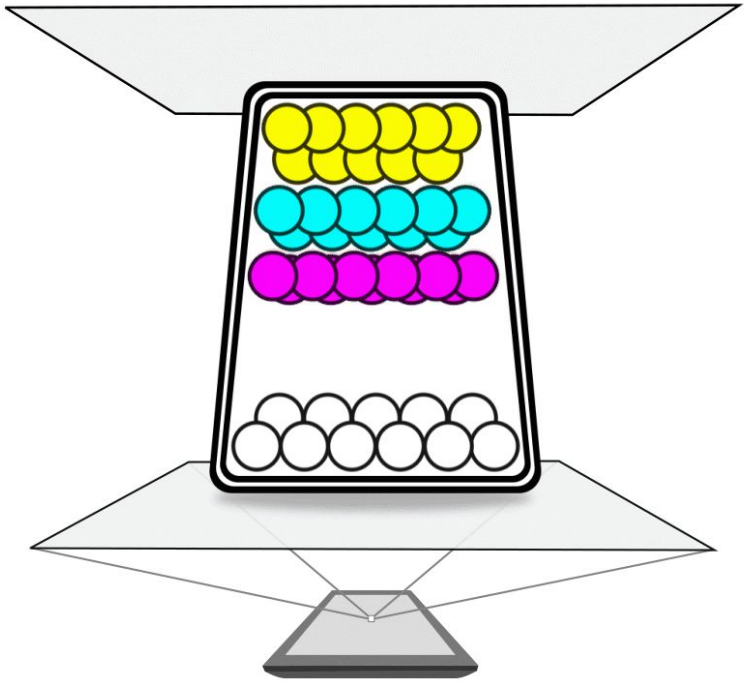
Different E-Ink Systems



Different E-Ink Systems



Different E-Ink Systems



State of the Art - Flexible Displays

https://www.youtube.com/watch?v=5qOSGyrIgMo

State of the Art - 31.2" color ePaper Display - $2300

Dasung E-Ink Monitor - Paperlike $1000 - $1100

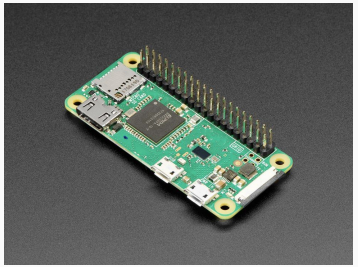
https://www.youtube.com/watch?v=vnUACe8Bsyg

What you can get: Pimoroni

Materials

(https://github.com/m-clare/NGW_E_Ink_Workshop)

- Raspberry Pi Zero WH



- Pimoroni e-ink display
  - (pHAT or wHAT)

- MicroSD card with Raspberry Pi OS and wifi enabled*
- 5v power supply

Connecting to your Pi Zero W

Prerequisites:

Pi Zero W connects to your Wifi and has SSH enabled!

https://code.mendhak.com/prepare-raspberry-pi/

https://desertbot.io/blog/setup-pi-zero-w-headless-wifi

Note for Windows!

SSH using either:

PuTTY

Powershell

Connecting to your Pi Zero W

If you *don't* know your pi name and password:

Default login:

```
$ ssh pi@raspberrypi.local

pi@raspberrypi.local's password: raspberry
```

If you know your pi name (and password):

```
$ ssh pi@{$HOSTNAME}.local
```

Connecting to your Pi Zero W

To get out of your pi:

```
pi@raspberrypi: ~$ exit
```

Pushing Code to your Pi Zero W Using SCP

SCP

```
$ scp /path/to/local/file.txt pi@{$HOSTNAME}.local:target/directory
```

Cloning the repos

Ssh into your pi:

```
$ mkdir workspaces && cd workspaces

$ git clone https://github.com/m-clare/NGW_E_Ink_Workshop.git

$ git clone https://github.com/pimoroni/inky.git

$ cd NGW_E_Ink_Workshop

$ pip3 install -r requirements.txt
```

The Inky Library

Sample scripts: Inky wHAT

```
$ cd inky/examples/what
```

Sample scripts: Inky pHAT

```
$ cd inky/examples/phat
```

The Inky Library

Missing packages for demos…

fonts

quotes

weather

```
$ pip3 install font-$FONT-NAME

$ sudo apt install python-lxml

$ sudo pip3 install wikiquotes

$ pip3 install geocoder
```

Working with Pillow

https://pillow.readthedocs.io/en/stable/handbook/index.html

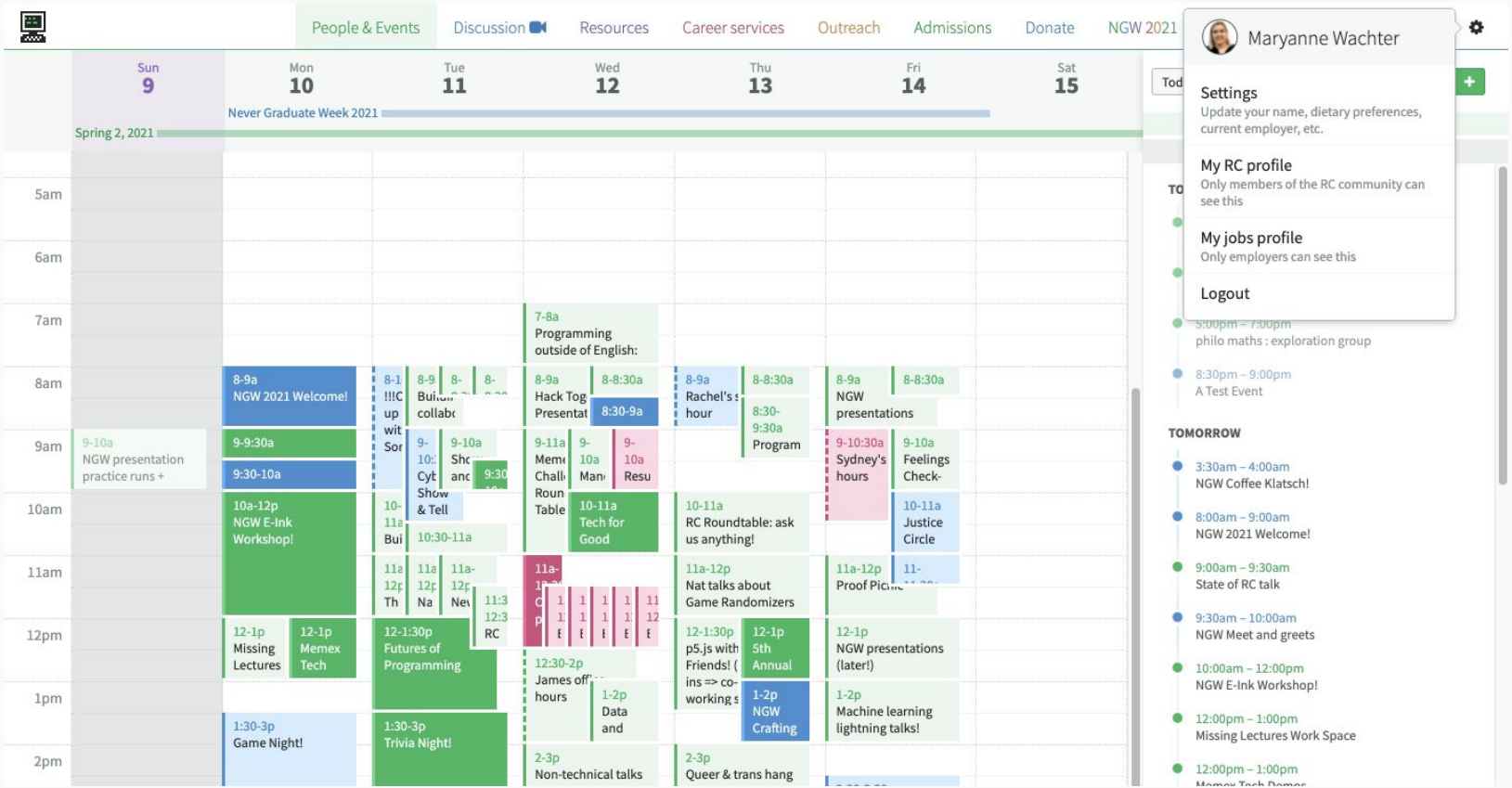
- Images can be manipulated (stretched/shrunk) to canvas size
- Images can be copied and pasted based on available canvas size (do the math!)
- Images *must* be fit to Pimoroni resolution to render
- Images *must* be converted to a Pimoroni friendly palette

Making Images

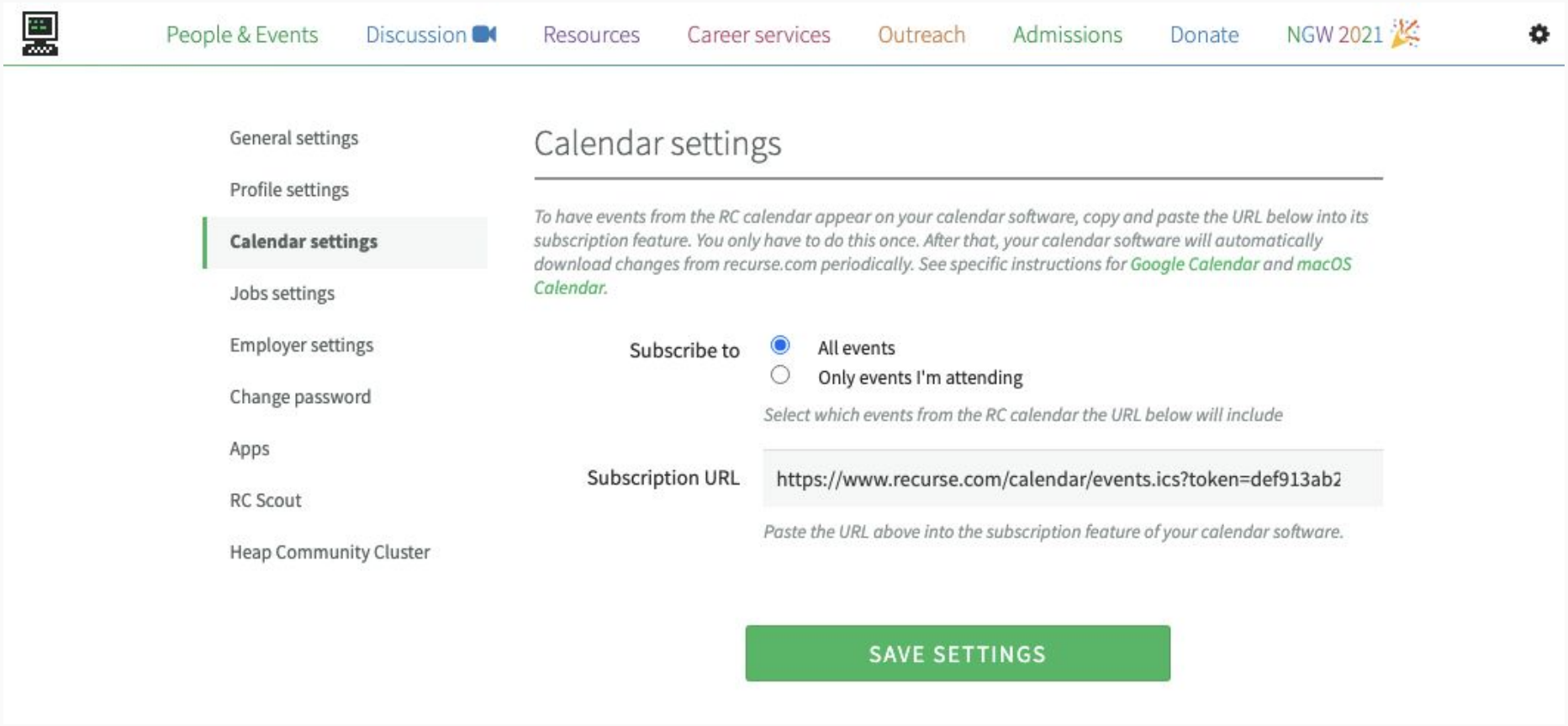
https://pillow.readthedocs.io/en/stable/handbook/index.html

- Necessary imports: Image, ImageDraw, ImageFont
- Upper left corner = (0, 0)
- Image can be rotated before pushing to Inky to put power cord at the top
- Sample images available in Inky demos (and a Recurse icon is provided in assets!)

Your Calendar Token



Your Calendar Token



Template Code

Your .env file: .env

```
ICS_TOKEN='abc0234...'
```

poller.py

```
load_dotenv(.env)
```

Template Code

Main script: poller.py

fetch_calendar

- does what it says on the tin!

fetch_formatted_text - baseline pretty printing

- can be modified to accommodate your taste - get creative!

Pushing Code to your Pi Zero W Using SCP

SCP

```
$ scp /path/to/local/file.txt pi@{$HOSTNAME}.local:target/directory
```

Running your script (...for a long time)

```
$ python3 poller.py
```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Music Consumption
Group
16:30 - 21:00
presentation_space