

Ian Winters

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video, live media and photography

## The Extended Now: Resource list for installation and performance.

SUSSEX HUMANITIES LAB  
INTRO WORKSHOP TO PROJECTION MAPPING AND DATA

Primary tools:

Isadora using the Data array actor and projection mapper  
Jupyter Notebook and Pandas

Workshop license info:

User Information:

License Name: Ian Winters Workshop Mac  
Serial Number: ISM-91015  
Password: reason-circle  
Contact Email: [ian@ianwinters.com](mailto:ian@ianwinters.com)

License Information:

Platform: Macintosh  
Version: Isadora v2.x

Type: Standard Edition  
License Count: 15  
Remaining Registrations: 15  
Expiration Date: 12/08/18 (Month/Day/Year)

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User Information:

License Name: Ian Winters Workshop Win  
Serial Number: ISW-91015  
Password: gem-video  
Contact Email: [ian@ianwinters.com](mailto:ian@ianwinters.com)

License Information:

Platform: Windows  
Version: Isadora v2.x

Type: Standard Edition  
License Count: 5  
Remaining Registrations: 5  
Expiration Date: 12/08/18 (Month/Day/Year)

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Two excellent tools for easily integrating live & recorded media, performance and many types of sensor data are **Isadora** (created by Mark Coniglio), and **Max-MSP**.

Typically most projects involving performance and physical computing will also need code written for the microcontroller and its interface with a computer. Processing, Open Frameworks and the Arduino IDE are three of the main tools in this regard.

### Patching environments:

#### **Isadora**

Current version is 2.6.2 available at <https://troikatronix.com/get-it/> with version 3.0 being released shortly. manual is here: <http://troikatronix.com/files/isadora-manual.pdf>

Tutorials are at <http://www.youtube.com/user/troikatronix>

Forum at <https://community.troikatronix.com/>

There are academic licenses available, and, the demo version is fully functional – except you can't save. Your workshop license will typically continue to work until the end of the month.

#### **Max-MSP**

<http://cycling74.com/downloads/>

The classic audio patching environment. There are also academic licenses available. The demo version is fully functional for 30 days. The latest release (max 8.0) also has a subscription feature.

#### **Pure Data**

<https://puredata.info/>

Closely related to Max-MSP is the Pure Data or PD, an open-source patching language originally created by IRCAM.

#### **VPT (Video Projection Tool) v8**

<https://hcgilje.wordpress.com/vpt/>

A free projection mapping tool built in Max 7

#### **Vvvv**

<http://vvv.org/>

VVVV is a PC only node based programming tool that is particularly useful for working with 3-d graphics and also has tools for integrating with more complex SQL and ODBC databases and XML files as data sources for live visualizations both on / off the network. A steeper learning curve than isadora. Free for non-commercial use, 500 euros for a license.

#### **Resolume**

<http://resolume.com/>

An FFGL based projection mapping and VJ tool. An interface similar to Abelton Live but for video.. Particularly targeted toward VJs. Very easy to learn.

#### **TouchDesigner**

<https://www.derivative.ca/>

Originally PC only visual design and patching environment, now available on MAC.. Excellent set

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of tools for large scale installations and projection mapping but quite pricey (\$2200). Free non-commercial license usable up to 1280x1280 resolution.

### Media Servers and Show Control:

#### QLab

<https://figure53.com/qlab/> **OSX only**. Provides audio and video cue playback with basic projection mapping tools and color correction tools. Very friendly to stage managers out of the box.

#### Watchout

<https://www.dataton.com/watchout> Windows only. Common large venue media server / show control system. Requires additional license key and dedicated computer per projector plus show control machine.

### Code based:

#### Jupyter Notebook / Python

<http://jupyter.org/install>

#### pandas – python library for data analysis

<https://pandas.pydata.org/>

#### Processing 3

Open source creative coding environment based on Java. Current release 3.4

<https://processing.org/download/?processing>

#### Open Frameworks

A c++ based set of open source frameworks for creative coding

<http://openframeworks.cc/about/>

#### Arduino IDE

The development environment for Arduino and similar microcontrollers. Current working version 1.8.7

<http://arduino.cc/en/Main/Software>

#### TeensyDuino

The arduino environment add-on for working with the Teensy microcontrollers.

[http://www.pjrc.com/teensy/td\\_download.html](http://www.pjrc.com/teensy/td_download.html)

### Plugins, drivers, and utilities:

#### HAP Codec and AVF Encoder

<https://github.com/Vidvox/hap>

codec for very fast interactive playback. AVF encoder is a free transcoder tool.

**Matrox triple head** drivers (to use the double head or triple head on your own machine). For pre 10.13 machines:

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<http://www.matrox.com/graphics/en/support/drivers/download/?id=504>

**Osculator** (for OSC / midi translation)

<http://www.osculator.net/download/>

**Touch OSC** (for iPhone and pad) – provides easy templates / control interfaces for iPhone and iPad that send OSC to Isadora

<http://hexler.net/software/touchosc>

**GyroOSC** (for iPhone and iPad) – motion sensor to OSC app (App Store)

**Syphon** <http://syphon.v002.info/> - software that allows sharing of video streams between applications on OSX. Isadora includes Syphon out of the box (Syphon to video and Syphon to texture actor) as do many other applications.

**NIMate** – easy software interface to the Kinect – allows access to both Kinect cameras (depth map and RGB) and converts skeleton data to OSC. V2 released in 2016. <http://www.nimate.com/download/>

**Epocam hd** - from Kinomi (allows iPhone and Android phones to be used as wireless cameras inputting to Syphon / Isadora) multicam software is 19.99 on App Store. - <http://www.kinoni.com/>

**Ipcam2syphon** – open source program to all input of photojpeg compressed IPCAM feeds directly to Syphon (and thus Isadora) <https://github.com/bakercp/IPCAM2SYPHON/downloads>

**Soundflower** – OSX utility from cycling74 that allows routing of audio between applications. Problematic on Mavericks and later. <http://cycling74.com/downloads/>

**HAP codec** from Vidvox: new highly efficient codec for HD video supported natively in the new version of Isadora. For both PC and Mac. <https://github.com/vidvox/hap-qt-codec/releases/>

**Video compression:** Use Apple Pro-Res, HAP or H264 codecs on Mac. With v2.5 of Isadora you can use H264 files on the “performance mode”. The HAP codec is now supported in Isadora for both PC and Mac. On a PC use native AVI or WMV wrapper with PhotoJPEG or HAP.

Tools for compression include:

- Handbrake – free. <https://handbrake.fr/>
- QuickTime 7 Pro (if on older Mac OS 10.9 or earlier)
- Apple Compressor (49.99 or free w/ FCP) (OSX only):
- Adobe Media Encoder (free with Adobe apps)
- Mpeg streamclip (free) : <http://www.squared5.com/problematic-after-10.10>

### Video Hardware:

**Blackmagic Intensity Extreme Thunderbolt** or USB 3.0 version:

<http://www.blackmagicdesign.com/products/intensity>

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For high quality live capture of HDMI and any analog signal.

**Matrox triple head:** splits an outgoing monitor signal to three separate monitors. Allows a regular laptop to support three projectors simultaneously. Most recent mac laptops will want the “display port” edition. Be sure to choose the correct one for the machine you are planning on using it with. There are 4 non-interchangeable versions.

<http://www.matrox.com/graphics/en/products/gxm/th2go/displayport/>

### Lighting Control

Isadora works well with many types of DMX controlled fixtures as well as native Art-Net support. A USB > DMX interface or Artnet interface is necessary.

#### **DMXking**

<http://dmxking.com/>

DMX king is a new zealand based developer of inexpensive artnet and DMX interfaces. Great solid products.. They make a number of great Artnet > LED interfaces as well as the standard USB>DMX single universe box.

#### **ENTTEC**

<https://www.enttec.com/>

Enttec supplies the lighting industry standard DMX and artnet interfaces. The DMX Usb Pro or DMX Usb pro Mark II both work well with Isadora so long as you are using the FTDI driver set and the DMX user actor set.

#### **QLC Pro**

<http://www.qlcplus.org/>

Free software based lighting desk created by Massimo Callegari with OSC support – integrates easily with isadora via OSC to control complex multi-channel fixtures like moving lights and LED arrays.

### Physical computing and sensor resources

**Adafruit:** sensors, microcontrollers, tutorials, and parts – targeted to the DIY world

<http://www.adafruit.com/>

**Sparkfun:** sensors, microcontrollers, tutorials, parts – targeted to the DIY world

<https://www.sparkfun.com/>

**PJRC:** maker of the Teensy controller – a 32 bit arduino compatible microcontroller, with built in touch capacitance sensor, and 16 bit audio. <https://www.pjrc.com/store/>

**libelium / cooking hacks** two closely related firms that are the makers of the Xbee module, the e-health platform and similar products. <http://www.libelium.com/> and <http://www.cooking-hacks.com/>

**Mouser Electronics** – sells 1 to 1,000,000 of virtually any electronic component ever. Targeted to OEM engineers.

<http://uk.mouser.com/>

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**Jameco** –wholesaler of power supplies and electromechanical parts

<http://www.jameco.com/>

**Farnell**- UK based wholesaler

<http://uk.farnell.com/>

**pluginwear** – Italian based distributor of wearable textile materials

<http://www.pluginwear.com/default.asp?mod=home>

**markertek** – conductive textiles in quantity and many other professional AV products

<http://www.marktek-inc.com/eeontexconducttextiles.htm>

**imagesco** : stretch sensors

<http://www.imagesco.com/sensors/stretch-sensor.html>

**Parts express** – us based audio parts wholesaler

<http://www.parts-express.com/>

**Tindie** – open source hardware market

**First surface mirrors**

<http://www.mirotek.com/index.html>

### Some specific products

\* conductive thread - <https://www.kitronik.co.uk/e-textiles-conductive-thread.html>

and <http://www.adafruit.com/products/640>

\* resistive thread

\* conductive rubber - <http://www.adafruit.com/products/519> 350 ohms / inch > stretches by ~ 70%

\* velostat- pressure sensitive carbon film that changes resistance in relation to pressure. combine with woven conductive fabric (1ohm/ft) - use in conjunction w/ velostat for a effect pressure sensor

\* knit conductive fabric - stretchy jersey type fabric - can work as a "variable" resistor to sense stretch.

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## The Extended Now: Reading list for installation and performance.

### Technical references and guides

#### Web sources

**kobekant** (Hannah perner wilson's resource on e-textile based computing)  
<http://www.kobakant.at/DIY/>

**Adafruit tutorials** : <https://learn.adafruit.com/>

**CNMAT** (center for new music and audio technology) – has a useful materials resource page describing materials in house <http://cnmat.berkeley.edu/resources>

#### Reading Capacitor Codes

[http://www.ece.ucsb.edu/courses/ECE002/2A\\_F08Shynk/ReadingCapacitorCodes.pdf](http://www.ece.ucsb.edu/courses/ECE002/2A_F08Shynk/ReadingCapacitorCodes.pdf)

#### Reading resistors

<http://www.instructables.com/id/How-to-read-color-codes-from-resistors-1/>

#### voltage divider circuit analysis (many options – all about cit

[http://www.allaboutcircuits.com/vol\\_1/chpt\\_6/1.html](http://www.allaboutcircuits.com/vol_1/chpt_6/1.html)

### Books on coding and work with physical sensors.

#### Learning processing 2<sup>nd</sup> ed.

Daniel Shiffman

#### The Nature of Code: simulating natural systems with processing

Daniel Shiffman

#### Processing: a programming handbook for visual designers and artists

Casey Reas and Ben Fry

#### Programming Interactivity

Joshua Noble

#### Making things talk: physical computing with sensors, networks and arduino \*

Tom Igoe

### Theoretical and background reading

#### Aesthetics of Interaction in Digital Art

Katja Kwastek

#### Alien Agency: Experimental Encounters with Art in the Making.

Chris Salter. 2016.

#### A History of Experimental Film and Video, 2nd Ed.

L. Rees

#### Audio – Vision: Sound on Screen

Michel Chion

#### Avant garde Theatre 1892-1992

Christopher Innes

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**The Blaue Reiter Almanac \***

Wassily Kandisky and Franz Marc

**Bodies in Code: interfaces with digital media**

Mark B Hansen

**Closer**

Susan Kozel

**Death 24x a Second: Stillness and the Moving Image**

Laura Mulvey

**Devising performance, a critical history**

Deirdre Haddon and Jane Milling.

**Digital Performance \***

Steve Dixon

**Lunenfeld, Peter (ed.). The Digital Dialectic: New Essays on New Media.** 1999. Leonardo / MIT Press. Cambridge, MA.

**Entangled: Technology and the Transformation of Performance \***

Chris Salter

**Exhausting Dance: performance and the politics of movement**

Andre Lepecki

**Installation art: a critical history**

Claire Bishop

**Interaction of Color \***

Josef Albers

**Intermediality in Theatre and Performance**

Freda Chapple and Chiel Kattenbelt, eds. 2006.

**Landscape and Power**

WJT Mitchell, ed. 1994

**Moving without a body: Digital Philosophy and Choreographic Thoughts**

Stamatia Portanova

**New Screen Media: cinema-art – narrative**

Martin Reiser and Andrea Zapp

**Noise: The Political Economy of Music**

Jacques Attali

**Performance and Technology**

Susan Broadhurst and Josephine Machoon

**The Pattern Language \***

Christopher Alexander

**Sensorium: embodied experience, technology and contemporary art \***

Caroline Jones



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**Sounding New Media: immersion and embodiment in arts and culture \***

Frances Dyson

**The Space of Encounter**

Daniel Liebeskind

**Staging the Screen: the use of film and video in Theater**

Greg Gieskam

**Touch: sensuous theory and multisensory media**

Laura U Marks

**The Way of Acting: The Theater Writing of Tadashi Suzuki**

Tadashi Suzuki

**Twentieth Century Performance Reader \***

Ed. Teresa Brayshaw and Noel Witts

**Walking and Mapping: Artists as Cartographers \***

Karen O'Rourke. MIT Press

**The Wooster Group Workbook**

Andrew Quick