



# Melange

A Kurt Kaminski Project

Shown at the MAT End of The Year Show

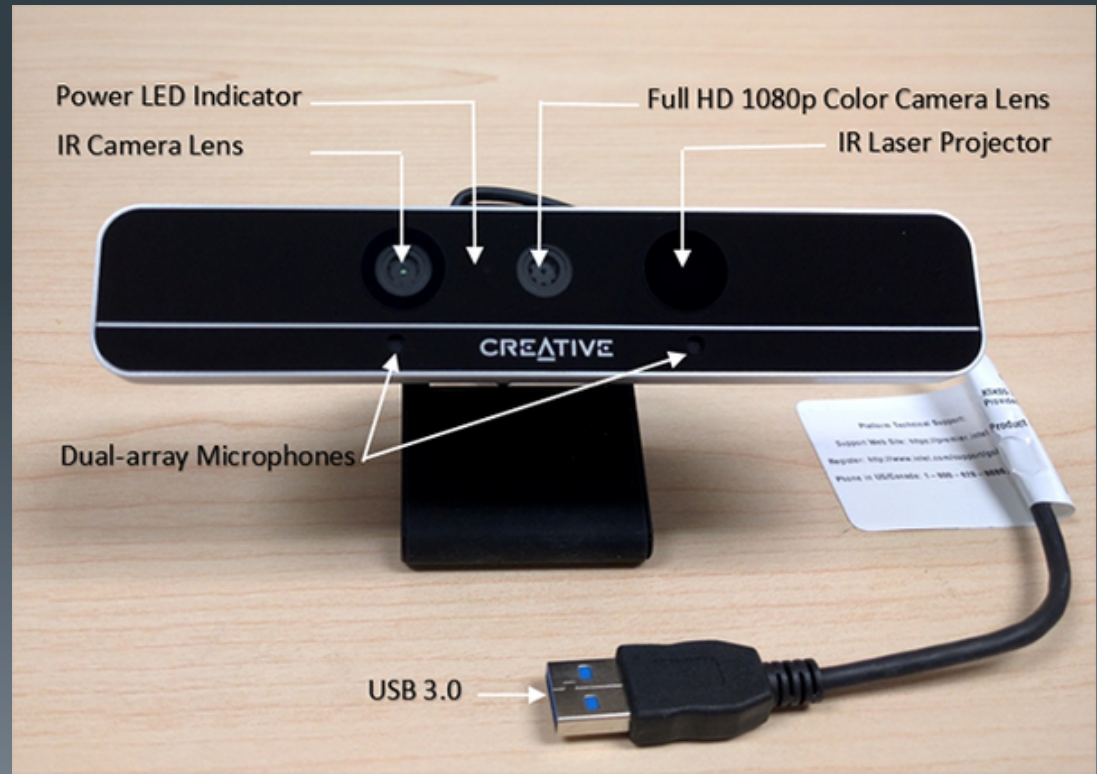
# Basics

- Melange is a 2D fluid simulation that uses spatial sensors and a fluid algorithm
- One can use their hand to move the visuals shown on screen
- There is also sound that triggers when one moves their hand



# Depth Sensor

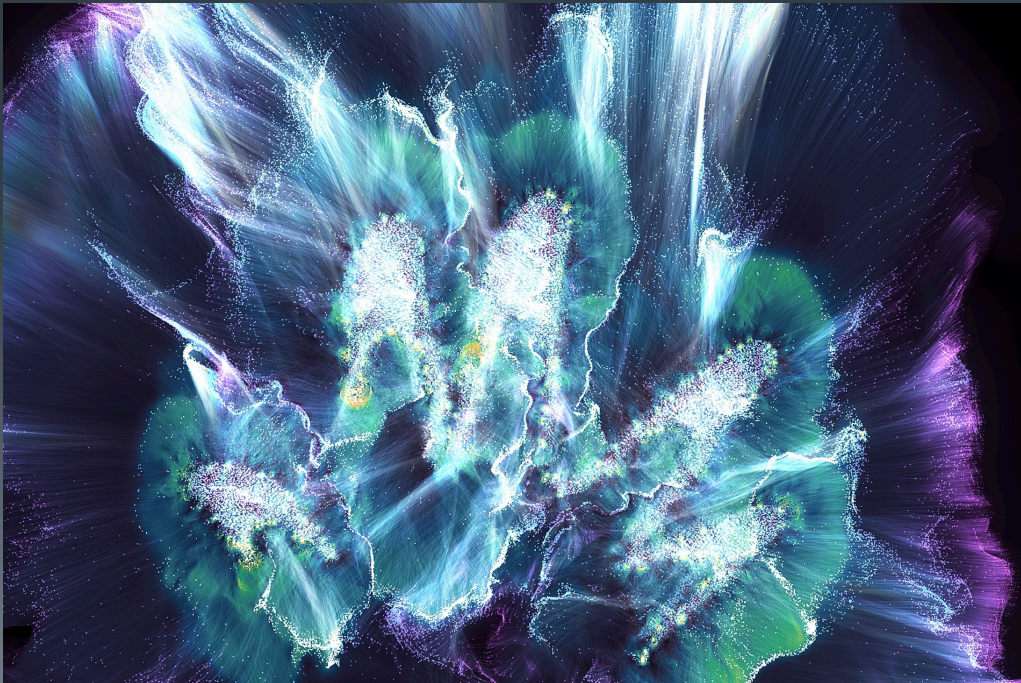
- Realsense SR300 depth camera
- 30 FPS – 1080p HD video image quality
- Full-hand skeletal tracking and gesture recognition
- Depth-enhanced augmented reality
- 3D object scanning





# Code

- TouchDesigner is the program needed to run Melange
- The code is written in python
- Used Optical Flow Algorithm
- Used GPUs (Graphic processing Unit)

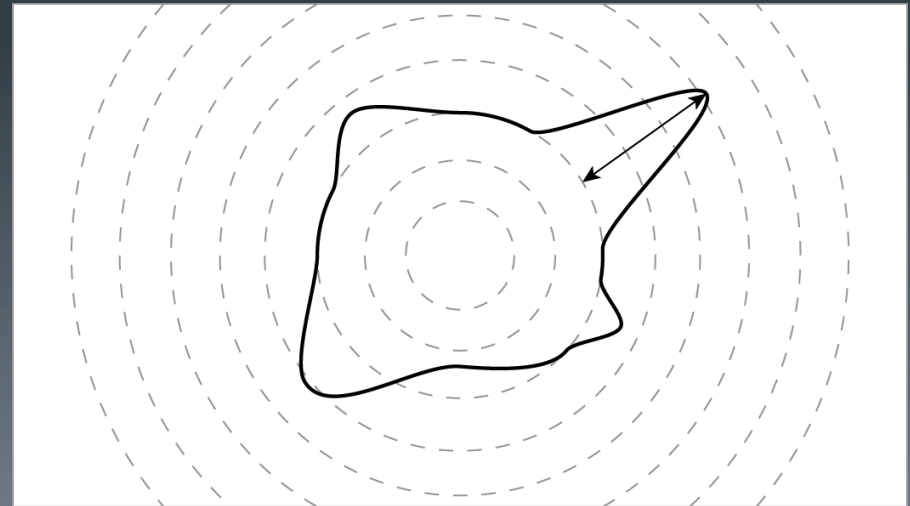
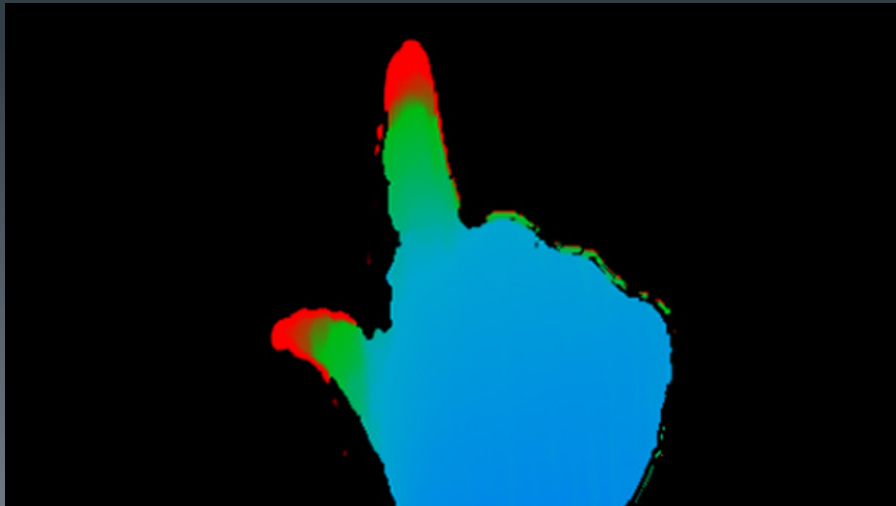


[https://github.com/  
kamindustries/Melange](https://github.com/kamindustries/Melange)

[https://github.com/  
kamindustries/Melange/  
commit/  
8b2a986e23860fceb86  
8664d526f7d7ea2e20d  
4f#diff-8f569737102abb  
878e7dd8967332a287](https://github.com/kamindustries/Melange/commit/8b2a986e23860fceb868664d526f7d7ea2e20d4f#diff-8f569737102abb878e7dd8967332a287)

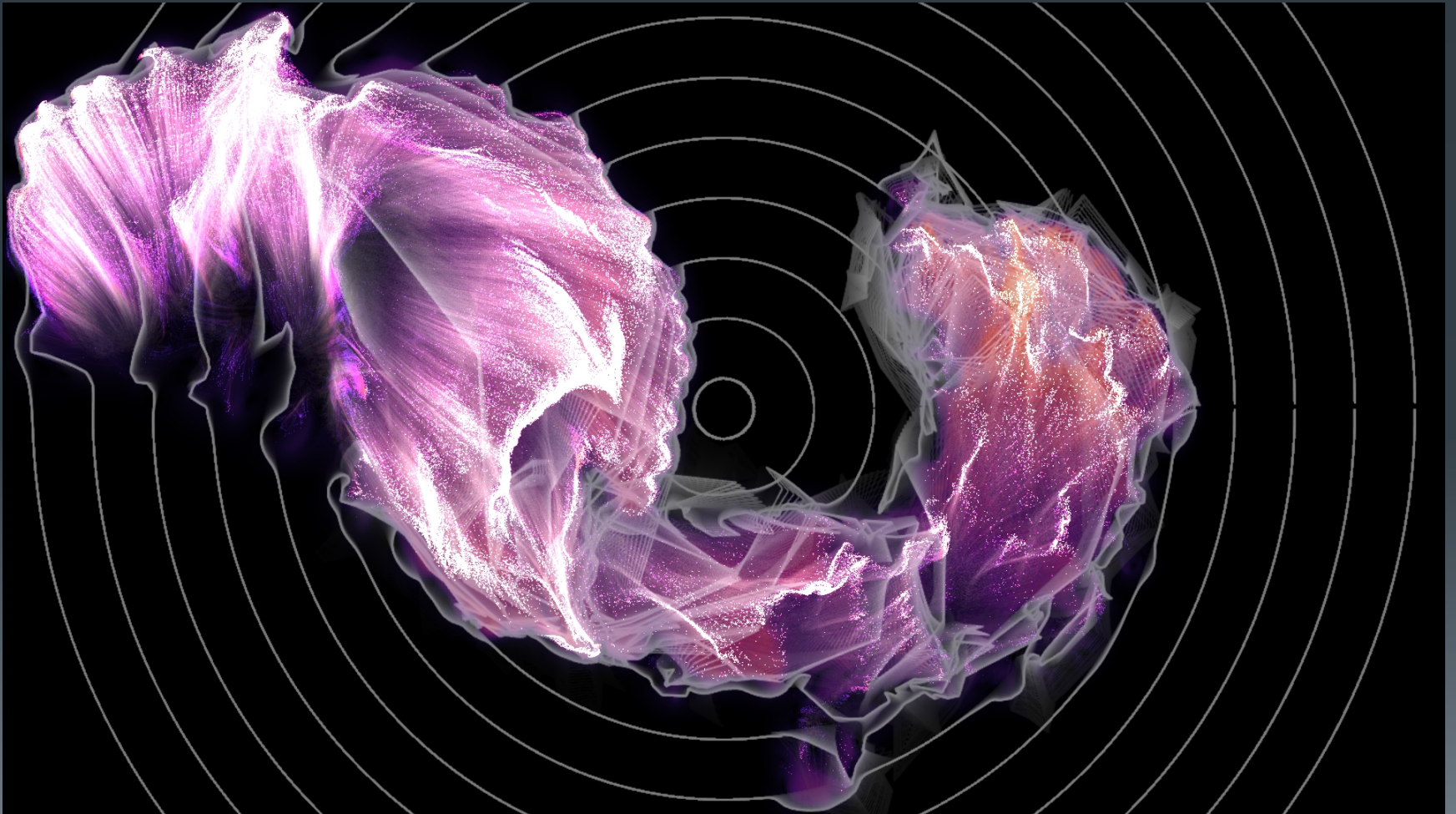
# Optical Flow Algorithm

- Optical Flow - the pattern of apparent motion of objects, surfaces, and edges in a visual scene caused by the velocity of an object in relation to the rest frame of another object.
- Kurt uses the camera to take images of the subject (one's hand) and replaces the edges of the figure with velocity vectors.



# Flow Lines

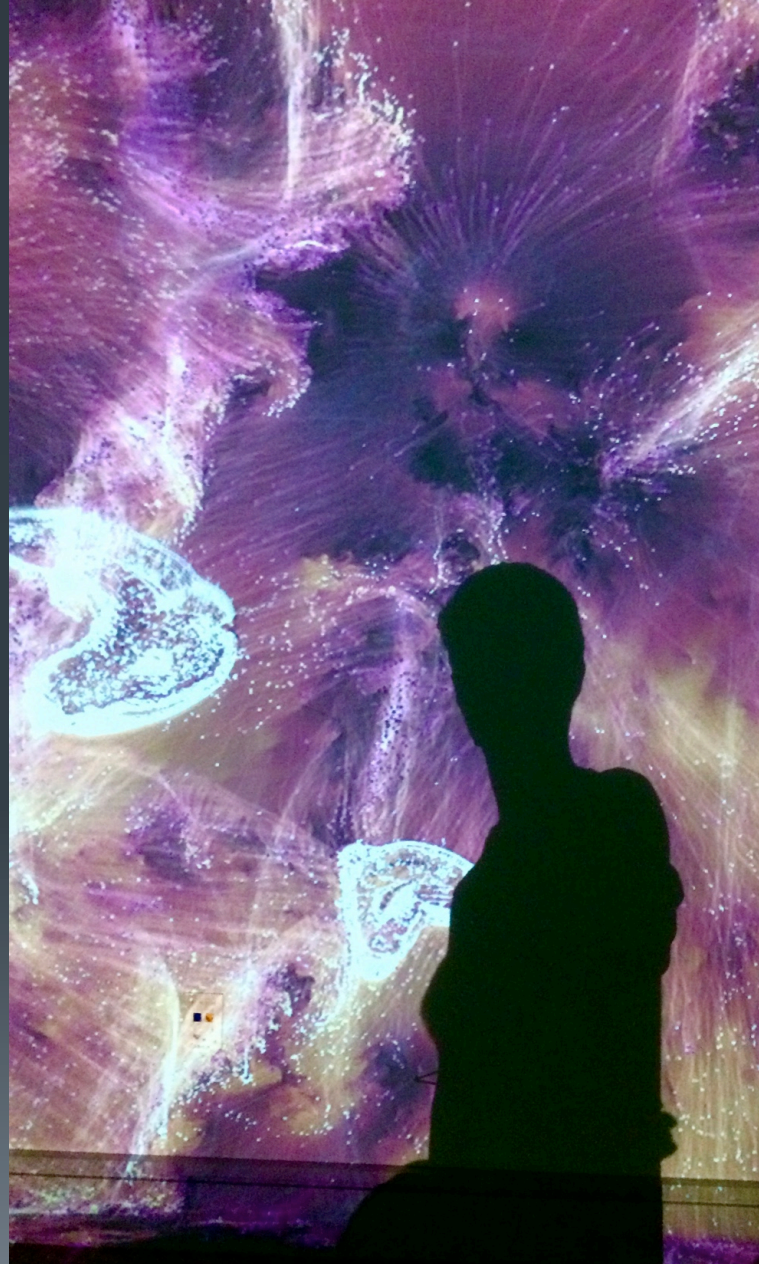
- Velocity was used to advect particles and produce flow lines





# Colors

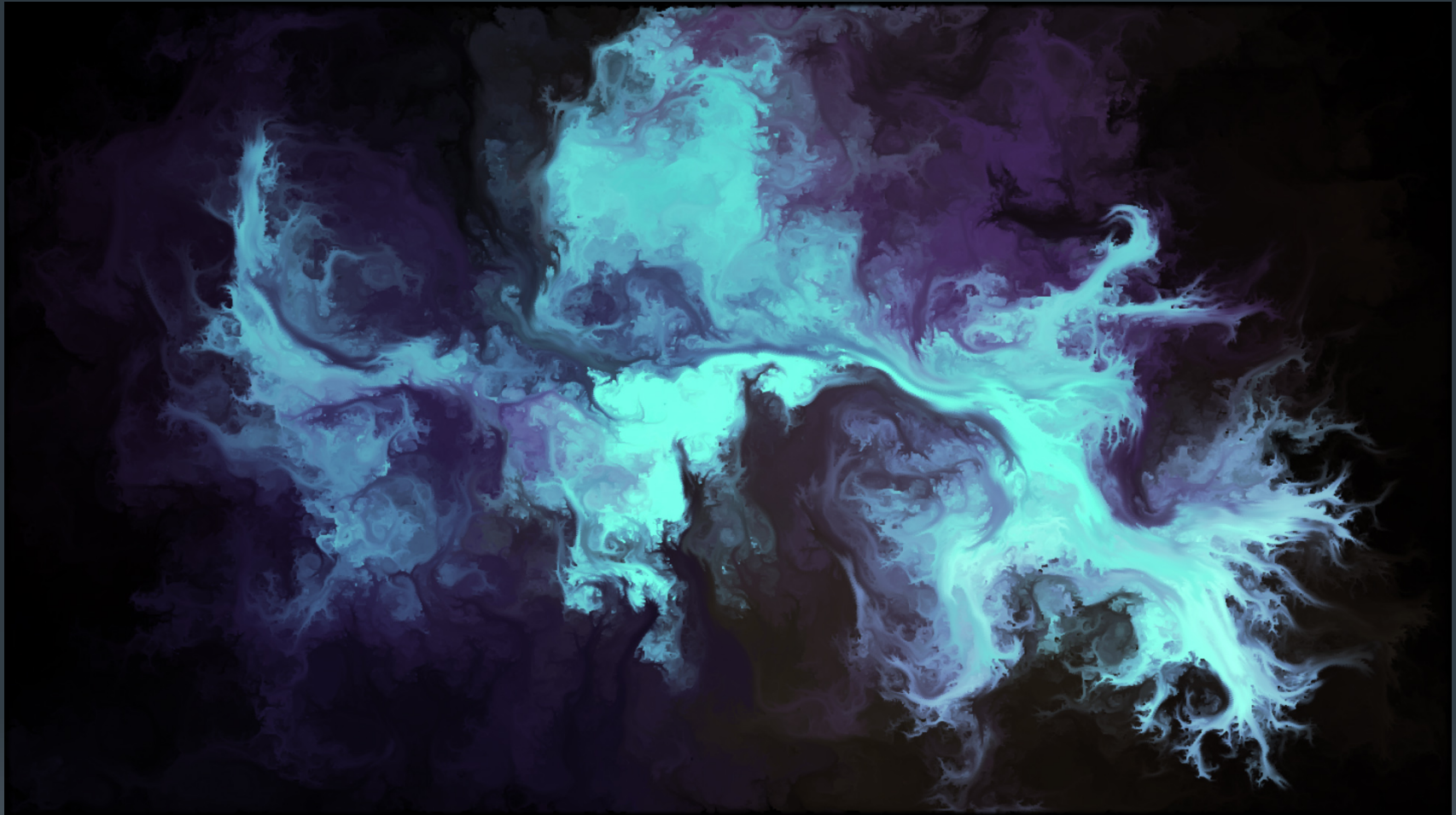
- Mapped a color ramp to the magnitude of the velocity
- A color ramp is a range of colors that are used to fill some type of region



# Physical Modeling

- This was used to create the sounds made for Melange
  - Physical Modeling Synthesis is sound made by mathematical equations and algorithms
  - The sound was mapped to the movement of one's hand
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- There's a lot more about this subject on the internet  
[https://en.wikipedia.org/wiki/Physical\\_modelling\\_synthesis](https://en.wikipedia.org/wiki/Physical_modelling_synthesis)





<https://www.twitch.tv/videos/149823316> - A Talk on Melange

<http://www.kurtkaminski.com/melange> - More Photos

<http://show.mat.ucsb.edu/page.html?id=8> - MAT Website