

SIGGRAPH 2016 : retours sur le futur

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September 15, 2016

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- SIGGRAPH 2016
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- Wow time

2 Technical Papers

- ZoeMatrope: A System for Physical Material Design
- Perspective-aware Manipulation of Portrait Photos
- cSculpt: A System for Collaborative Sculpting
- Procedural Voronoi Foams for Additive Manufacturing
- SemanticPaint: Interactive Segmentation and Learning of 3D World

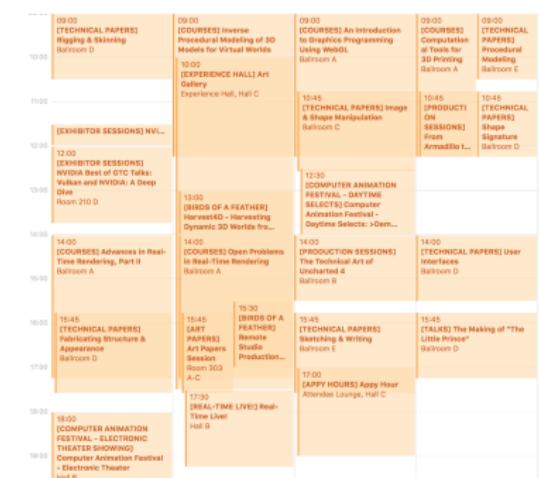
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SIGGRAPH 2016 (Anaheim)

- 14 000 attendees / 153 exhibitors
- Technical Papers :
 - Submitted: 467, Accepted: 119,
 - Acceptance Rate: 25% (sources: kesen)
- 4 sessions in parallel
- Lots of extras: BoFs, Wow demos...
- Co-located events : Web3D 2016



VR Village

Reality and Virtual Reality Basketball demo by OptiTrack @ Siggraph 2016



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

VR Village

VR Mech Simulator



https://www.youtube.com/watch?v=HDn_oNP1Krc

Art



Figure: photo credit: Submergence, Anthony Rowe, Gaz Bushell, Liam Birtles, Chris Bennewith, Oliver Brown Squidsoup

Real-time live

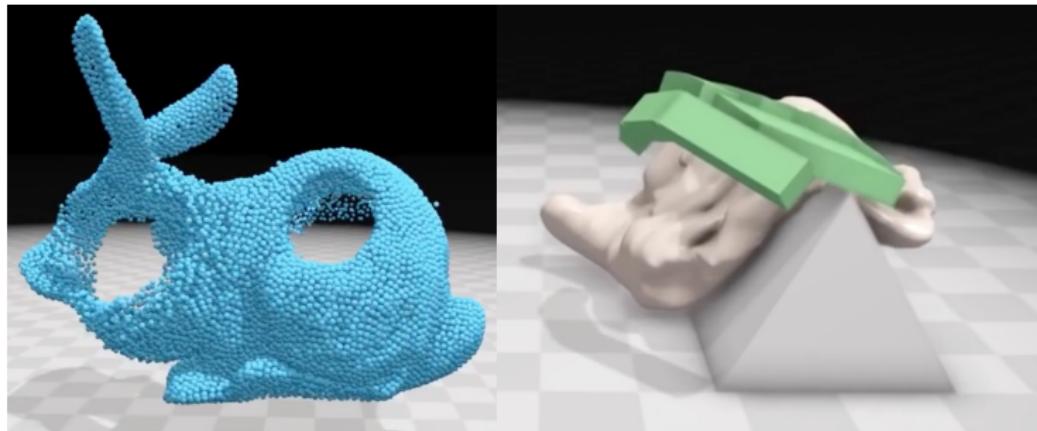
From Previs to Final in Five Minutes: A Breakthrough in Live Performance Capture



<https://www.youtube.com/watch?v=JbQSpfWUs4I>

Real-time live

Real-Time Simulation of Solids With Large Viscoplastic Deformation

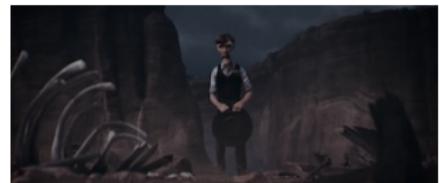


<https://www.youtube.com/watch?v=xvMgGGMPzFU&t=19m0s>

Computer animation festival

2 hours of short animation movies

BEST Borrowed Time (USA)



JURY Cosmos Laundromat (Netherlands)



STUDENT Crabe-Phare (France)



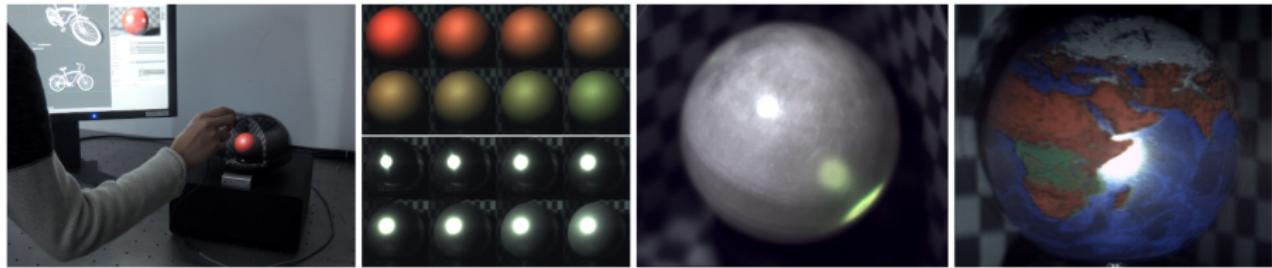
Production Sessions

Industrial Light & Magic Presents the Visual Effects of Star Wars: The Force Awakens



ZoeMatrope: A System for Physical Material Design

ZoeMatrope: A System for Physical Material Design [?]



ZoeMatrope: A System for Physical Material Design



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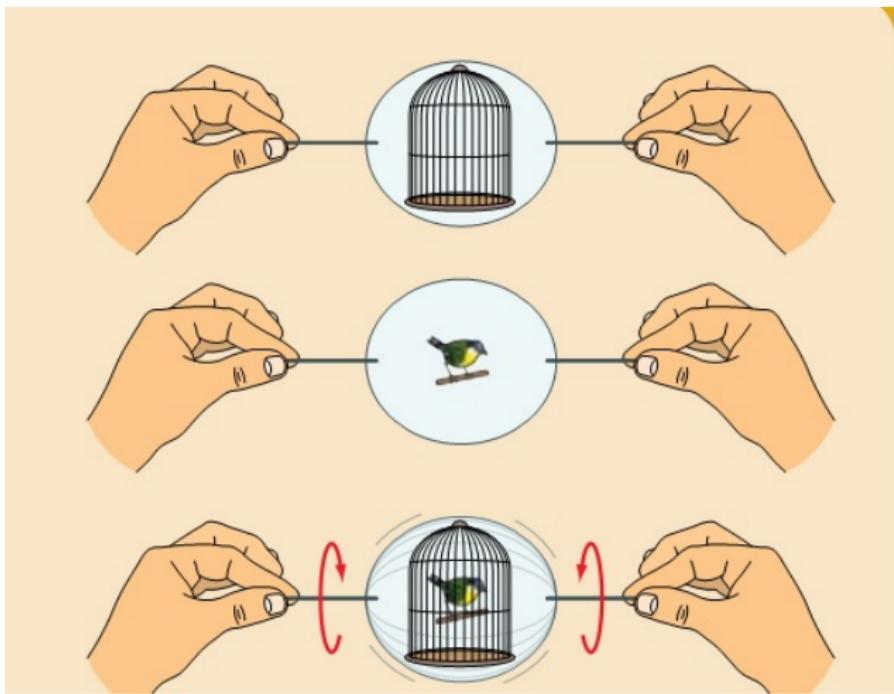
ZoeMatrope: A System for Physical Material Design



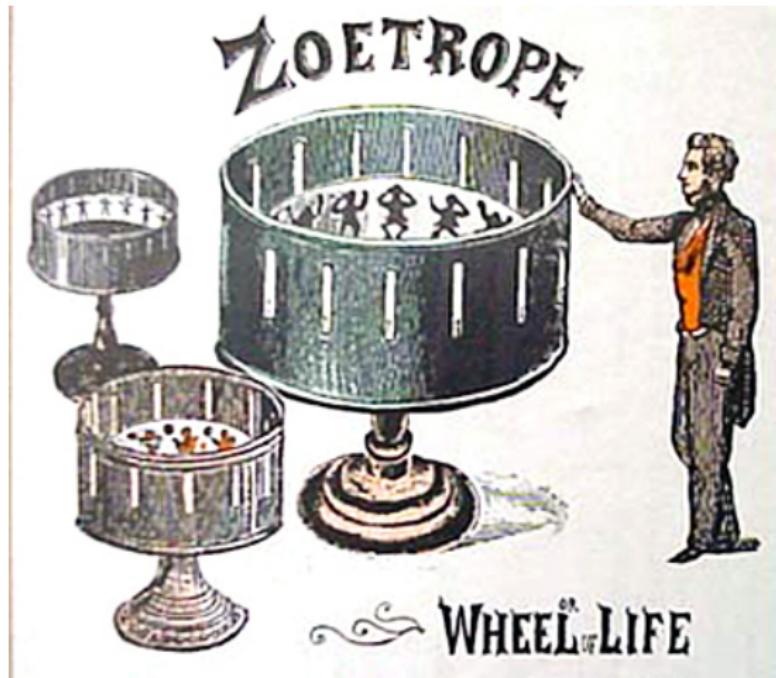
- Context: 3D product design
- Challenges: Variety of materials, resolution, dynamic range
- *Reality is the most realistic representation*

ZoeMatrope: A System for Physical Material Design

Thaumatrope



ZoeMatrope: A System for Physical Material Design



<https://www.youtube.com/watch?v=5khDGKGv088&t=23s>

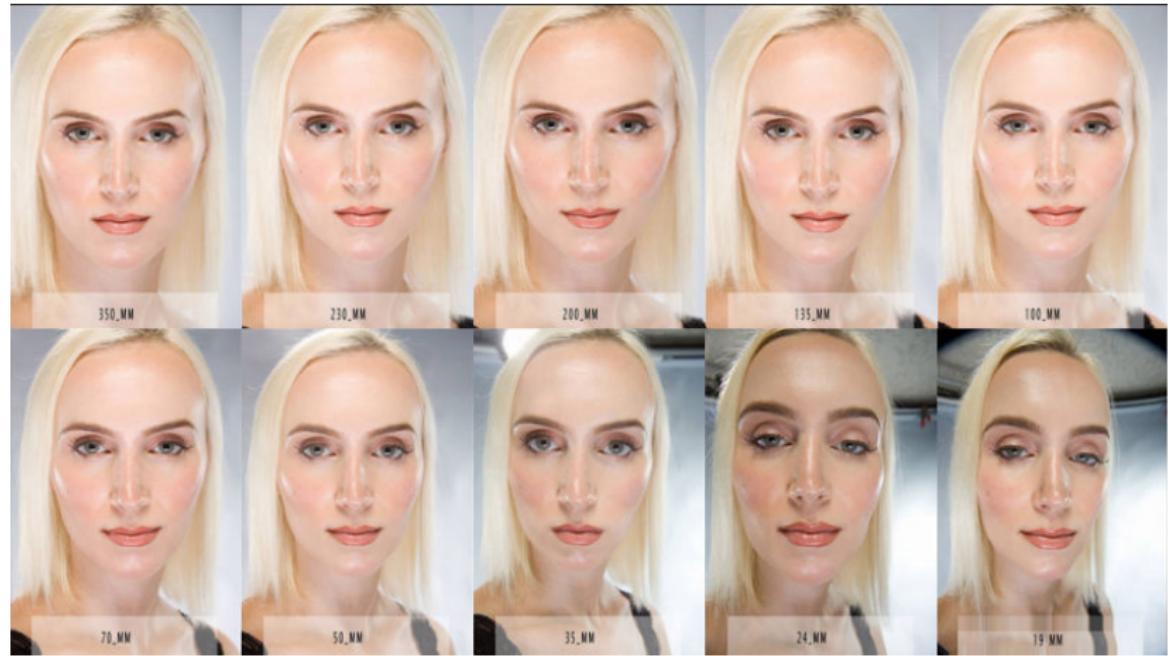
ZoeMatrope: A System for Physical Material Design

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<https://www.youtube.com/watch?v=w0ZPvTYzbsc&t=19s>

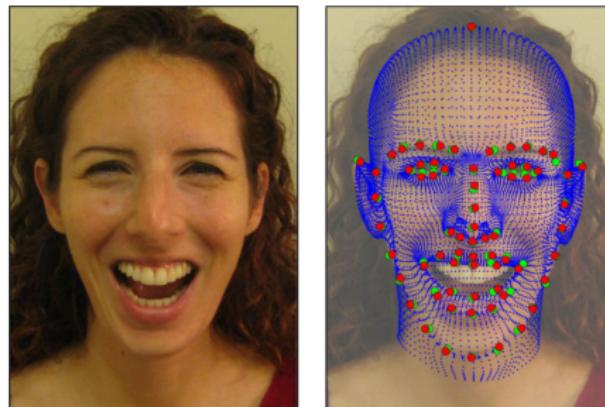
Perspective-aware Manipulation of Portrait Photos

Perspective-aware Manipulation of Portrait Photos [?]



Perspective-aware Manipulation of Portrait Photos

- ① Fiducial detection
- ② Parametrized 3D head model fitting
- ③ Manipulation



Input

Fit (full)

Perspective-aware Manipulation of Portrait Photos



Gn



Sn



Gn



Sn



Sf



Gf



Sf



Gf

Perspective-aware Manipulation of Portrait Photos

Applications:

- Distance correction
- Stereoscopy
- Pose correction

Perspective-aware Manipulation of Portrait Photos

Demo

<http://faces.cs.princeton.edu/demo/demo.html?input=0>

cSculpt: A System for Collaborative Sculpting

cSculpt: A System for Collaborative Sculpting [Calabrese et al., 2016]



Figure 1: Left: Models created by two artists sculpting collaboratively starting from a sphere. Right: Collaborative edits to geometry and materials. Colors on the left side and insets encode the total percentage of edits performed by each user: green for user A, blue for user B, and cyan for both.

<https://www.youtube.com/watch?v=H--1zSkarhk>

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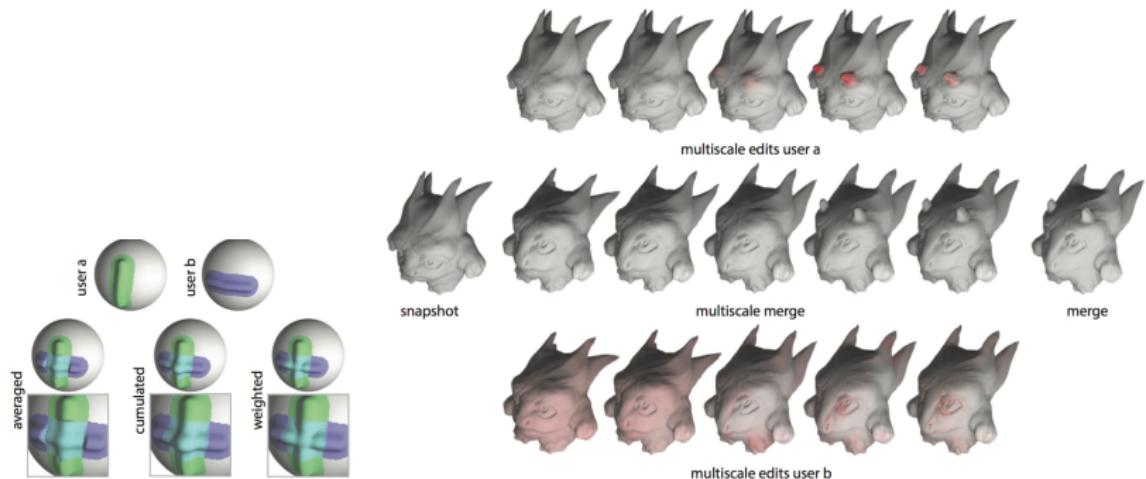
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- Challenge: Multiscale representation → edits applied at different spatial frequencies
- Result: less conflict == smoother collaboration
- Limitation: connectivity updates, scale invariance

cSculpt: A System for Collaborative Sculpting

Per-vertex combination for merging multiscale edits



Procedural Voronoi Foams for Additive Manufacturing

Procedural Voronoi Foams for Additive Manufacturing
[Martínez et al., 2016]

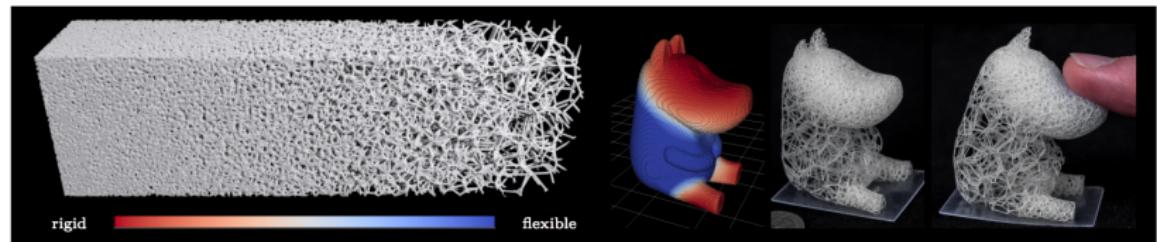


Figure 1: Our method procedurally generates structures with graded material elasticities, which can be directly fabricated. Here the user paints elasticity on a 3D model to create a flexible figurine. Model: Moomin (thing:1173447) by Jeroentjj.

<https://www.youtube.com/watch?v=ENksVUYBrGs>
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 - controlled isotropic elastic behavior (spatially graded to produce gradients of elasticity)
 - inverse mapping: from a target elasticity to the parameters driving the microstructure generation.

Procedural Voronoi Foams for Additive Manufacturing

Procedural voronoi foams generation algorithm, 2 params :

- the density ρ of Voronoi seeds per unit volume (seeds/mm³),
- the radius τ of the beams along the edges (mm).

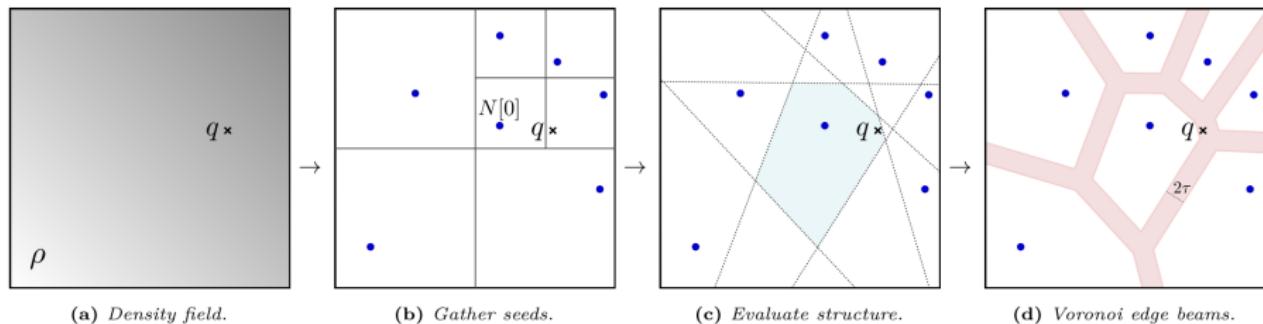


Figure 2: 2D overview of Algorithm 1. (a) Input query point q and density field ρ . (b) The seeds that could contribute to the Voronoi cell of $N[0]$ (which is the seed closest to q) are gathered (Algorithm 2). (c) The bisectors of the seed pairs influencing q are computed. (d) Finally, the algorithm checks whether q lies inside a beam of radius τ along the Voronoi edge.

SemanticPaint: Interactive Segmentation and Learning of 3D World

SemanticPaint: Interactive Segmentation and Learning of 3D World
[Valentin et al., 2015]

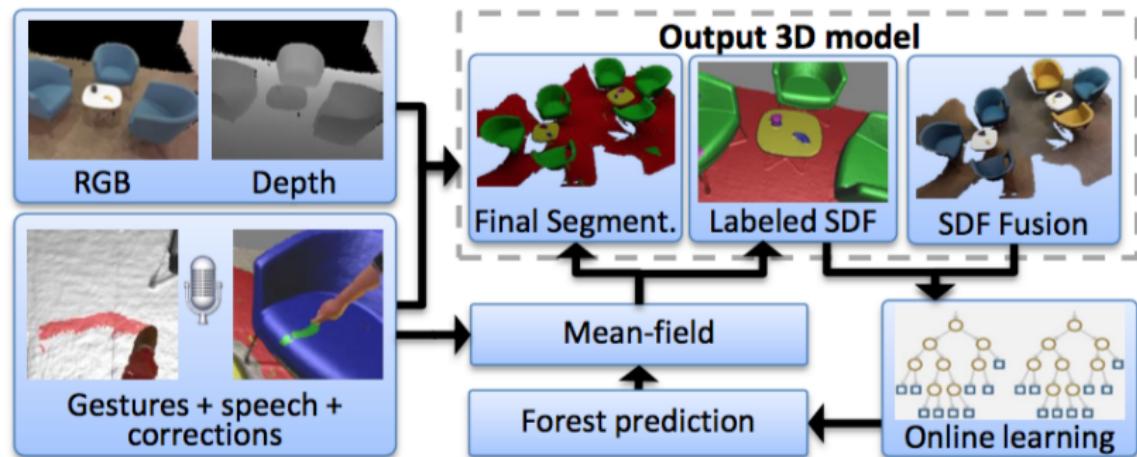


Fig. 3. Overview of 3D semantic modeling pipeline. See text for details.

SemanticPaint: Interactive Segmentation and Learning of 3D World

- 3D semantic modeling system
- User in the loop → online learning
- 2 modes: training and test

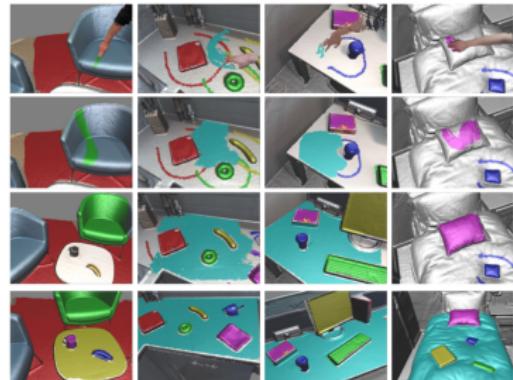


Fig. 6. Label propagation. Our efficient inference engine smoothly propagates class labels from the voxels touched by the user to the rest of the volume. Here we show examples taken from three environments of the coarse user labels (top row) and three time steps (middle three rows) as the mean-field updates are applied over time. The pairwise terms in our energy encourage a smooth segmentation that respects object boundaries. The last row shows the final label propagation results for all hand-labeled objects.

To conclude



Super experience for

- scientific diffusion,
- state-of-the-art VFX and games,
- networking!

Paper References I

-  Calabrese, C., Salvati, G., Tarini, M., and Pellacini, F. (2016). csculpt: A system for collaborative sculpting.
ACM Trans. Graph., 35(4):91:1–91:8.
-  Martínez, J., Dumas, J., and Lefebvre, S. (2016). Procedural voronoi foams for additive manufacturing.
ACM Trans. Graph., 35(4):44:1–44:12.
-  Valentin, J., Vineet, V., Cheng, M.-M., Kim, D., Shotton, J., Kohli, P., Niessner, M., Criminisi, A., Izadi, S., and Torr, P. (2015). Semanticpaint: Interactive segmentation and learning of 3d world. In *ACM SIGGRAPH 2015 Talks*, SIGGRAPH '15, pages 75:1–75:1, New York, NY, USA. ACM.

Ressources

- SIGGRAPH16 Papers:
<http://kesen.realtimerendering.com/sig2016.html>
- Real-time live:
<http://blog.siggraph.org/2016/07/real-time-wow.html/>
- Exhibitions: <https://www.rocketstock.com/blog/highlights-from-siggraph-2016/>
- Khronos events and videos:
<https://www.khronos.org/news/events/2016-siggraph>
- nvidia: <http://www.nvidia.com/object/siggraph2016.html>