We started by looking at texture transfer for stylized facial performance.

http://dcgi.felk.cvut.cz/home/sykorad/facestyle.html

A common artist approach to handling facial animation is blend shapes. One recent result in puppeteering cartoon faces using blend shapes is shown in this paper:

https://dl.acm.org/citation.cfm?id=3073674
https://www.gameanim.com/2017/06/26/facial-retargeting-automatic-range-motion-alignment/

Blend shapes can be augmented with physical simulation to add realism in dynamic situations. This paper describes how to do this by having artists paint material stiffness on the face, which may be expression dependent.

https://www.youtube.com/watch?v=g4bo3g9pPZw

Researchers continue to pursue a fully physically based approach due to the possibility of doing surgical and other physical enhancement applications. This paper gives a recent example.


Muscle based models are used in the entertainment industry, but primarily as a tool to allow artists to create highly realistic facial expressions. This short paper gives insights from a muscle model put together for Kong.

https://dl.acm.org/citation.cfm?id=3105693
The next paper we looked at tackles the problem of capturing a facial performance with enough detail (including the dynamics of blood flow within the face) in order to be able to accurately render that performance under various lighting conditions.

https://dl.acm.org/citation.cfm?id=3275073  
https://www.youtube.com/watch?v=rzVtkNHzSVs

The following paper addresses the problem of puppeteering a realistic avatar created from a limited number of RGBD images. The use case is adjusting appearance in an situation such as video conferencing.


Finally, we looked at the Oculus / Facebook research on obtaining very accurate renderings which can be generated from such inputs as the cameras mounted on an Oculus headset.

https://www.youtube.com/watch?v=3IZ2KGH1lR0  
https://www.wired.com/story/facebook-oculus-codec-avatars-vr/

We then turned briefly to the topic of hair. We began with this Disney paper on control of hair behavior.


This paper builds on the following early paper which is a good reference for basic spring mass hair simulation.

For a broad overview of approaches to hair capture, style representation, and simulation, have a look at this survey:


On the simulation side, one significant area of study has been in how to handle curly hair, such as demonstrated in this paper.

https://dl.acm.org/citation.cfm?id=2485913
https://www.youtube.com/watch?v=UjHB-pHzwsk

We then looked very briefly on a collection of recent papers on the topic of 3D capture of hair detail from images and video.

https://dl.acm.org/citation.cfm?id=3275020
http://grail.cs.washington.edu/projects/hair/
