15-464/15-664 Reference List for April 13, 2020

We began by looking at hair, starting with this paper on strand-accurate hair capture:

Nam, Giljoo, Chenglei Wu, Min H. Kim, and Yaser Sheikh. "Strand-Accurate Multi-View Hair Capture." In *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition*, pp. 155-164. 2019.
https://sites.google.com/view/gjnam

Followed by this paper on capturing dynamic hair motion using a commodity camera.

Yang, Lingchen, Zefeng Shi, Youyi Zheng, and Kun Zhou. "Dynamic hair modeling from monocular videos using deep neural networks." *ACM Transactions on Graphics (TOG)* 38, no. 6 (2019): 1-12.
https://dl.acm.org/doi/abs/10.1145/3355089.3356511
http://kunzhou.net/2019/dynamic-hair-capture-sa19.mp4

The interactive system for styling hair is shown here:

Xing, Jun, Koki Nagano, Weikai Chen, Haotian Xu, Li-yi Wei, Yajie Zhao, Jingwan Lu, Byungmoon Kim, and Hao Li. "HairBrush for Immersive Data-Driven Hair Modeling." In *Proceedings of the 32nd Annual ACM Symposium on User Interface Software and Technology*, pp. 263-279. 2019.
https://dl.acm.org/doi/abs/10.1145/3332165.3347876

The description of the hair in Brave can be found here:

Iben, Hayley, Mark Meyer, Lena Petrovic, Olivier Soares, John Anderson, and Andrew Witkin. "Artistic simulation of curly hair." In *Proceedings of the 12th ACM SIGGRAPH/Eurographics Symposium on Computer Animation*, pp. 63-71. 2013.
https://dl.acm.org/doi/abs/10.1145/2485895.2485913
https://www.youtube.com/watch?v=UjHB-pHZwsk

And the hair in Incredibles 2 is discussed in this video:
https://www.youtube.com/watch?v=jpXe-ieTnGM

We then moved on to talk about modeling the shape of the human body. I started by mentioning the SCAPE project from 2005:

Anguelov, Dragomir, Praveen Srinivasan, Daphne Koller, Sebastian Thrun, Jim Rodgers, and James Davis. "SCAPE: shape completion and animation of people." In *ACM SIGGRAPH 2005 Papers*, pp. 408-416. 2005.
http://robotics.stanford.edu/~drago/Projects/scape/scape.html

This was followed by the SMPL project at Max Planck, which attempted to make such tools more accessible and useful to animators.

Loper, Matthew, Naureen Mahmood, Javier Romero, Gerard Pons-Moll, and Michael J. Black. "SMPL: A skinned multi-person linear model." *ACM transactions on graphics (TOG)* 34, no. 6 (2015): 1-16.
https://smpl.is.tue.mpg.de/

Subsequent research by the same group added dynamics with a finite element outer layer of skin:

Kim, Meekyoung, Gerard Pons-Moll, Sergi Pujades, Seungbae Bang, Jinwook Kim, Michael J. Black, and Sung-Hee Lee. "Data-driven physics for human soft tissue animation." *ACM Transactions on Graphics (TOG)* 36, no. 4 (2017): 54.
https://ps.is.tuebingen.mpg.de/publications/meekyoung-siggraph

.. and addressed the problem of capturing clothing.

Pons-Moll, Gerard, Sergi Pujades, Sonny Hu, and Michael J. Black. "ClothCap: Seamless 4D clothing capture and retargeting." *ACM Transactions on Graphics (TOG)* 36, no. 4 (2017): 1-15.
https://www.youtube.com/watch?v=dVxj8tzx04U

We concluded with a very quick look at the following paper, which uses an inner volumetric muscle model to facilitate growing a range of body types, all of which can be physically simulated.

Saito, Shunsuke, Zi-Ye Zhou, and Ladislav Kavan. "Computational bodybuilding: Anatomically-based modeling of human bodies." *ACM Transactions on Graphics (TOG)* 34, no. 4 (2015): 41.
https://www.cs.utah.edu/~ladislav/saito15computational/saito15computational.html