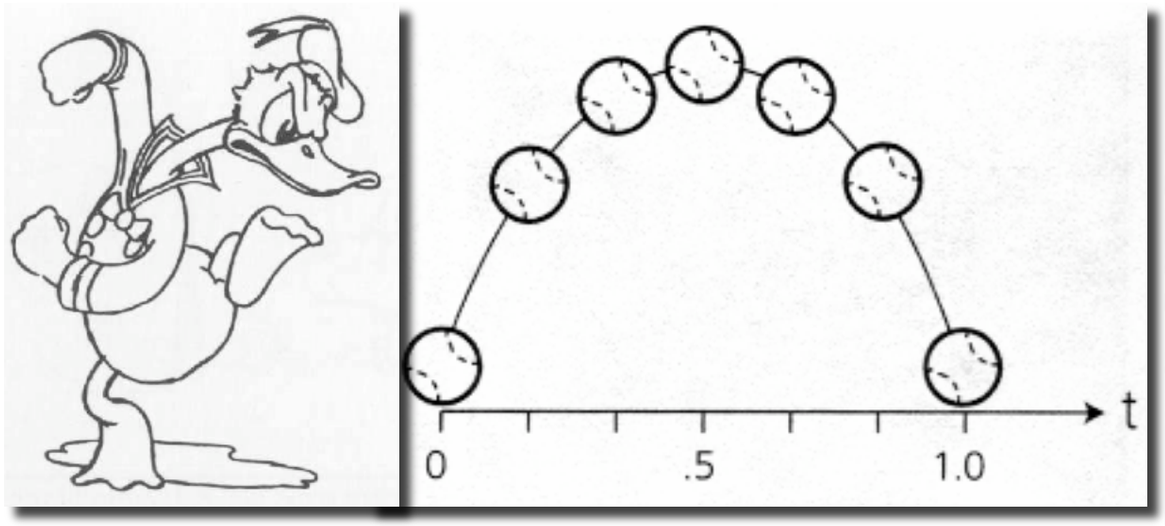
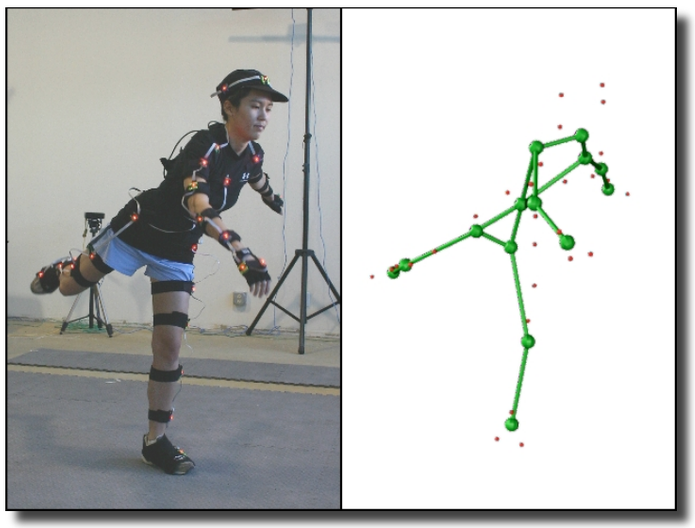
Techniques for Creating Animation

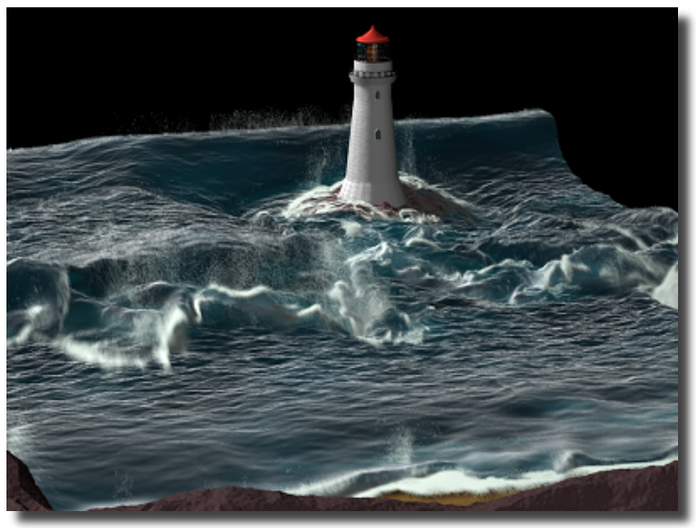


Keyframing

Procedural Animation



Data-driven Animation



Physical Simulation

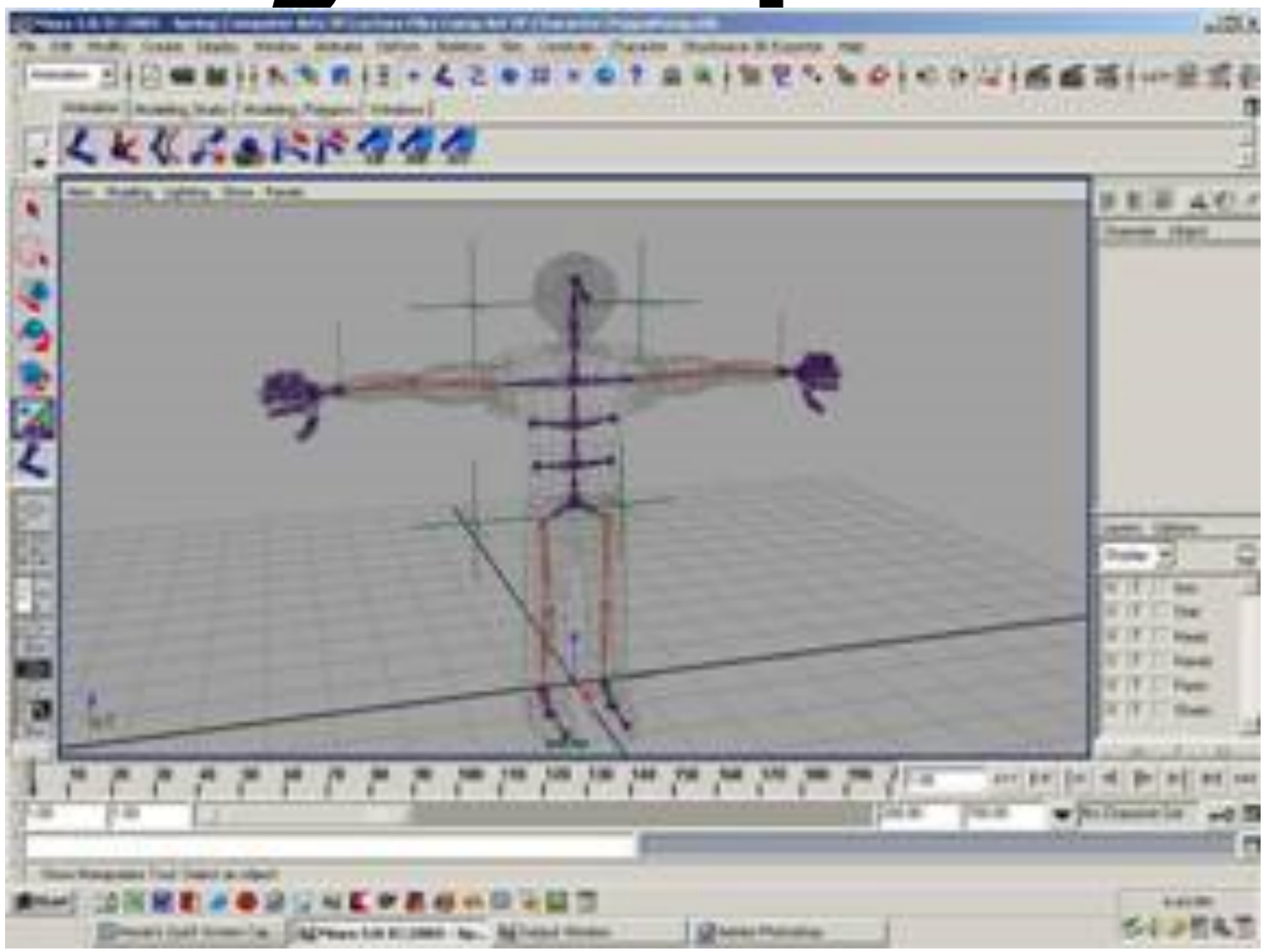
Keyframing: animation

A basic walk cycle tutorial:

https://design.tutsplus.com/tutorials/animation-for-beginners-how-to-animate-a-character-walking--cms-25536

3D Keyframing: setup

Model, rig, and animate your character in Maya



https://www.lynda.com/course-tutorials/Rig-character-from-scratch-Maya/282268l/2314174-4.html

http://cgi.tutsplus.com/tutorials/creating-and-rigging-a-non-deformable-wooden-character-in-maya-part-1--cg-25436

http://www.youtube.com/watch?v=rWKLPDfamm0

Keyframing = Traditional Animation

Snow White

https://www.youtube.com/watch?v=1TtQ-CTMlEI

Toy Story

https://www.youtube.com/watch?v=wmiIUN-7qhE

Keyframing = Traditional Animation?

BoxTrolls

Stop Motion

Isle of Dogs

Kubo and the two strings

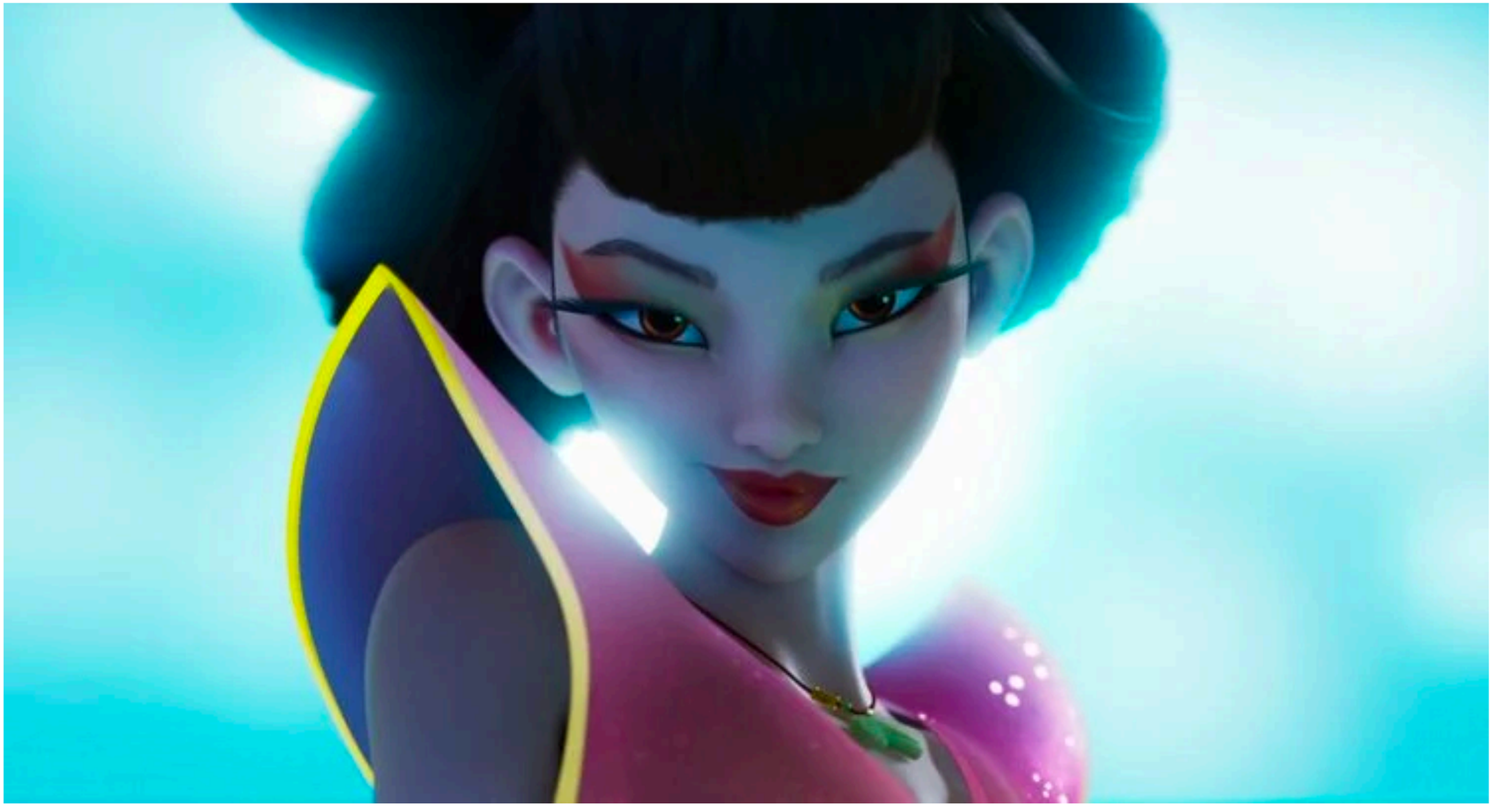
https://www.youtube.com/watch?v=xCBOiaJEoFw
https://www.youtube.com/watch?v=Vhpq7-c911A

3D Animation

Coco and cloth simulation

https://www.youtube.com/watch?v=NCAuK_gBStE&feature=emb_logo

Keyframing = Traditional Animation?



https://collider.com/best-animated-movies-2020/

Principles of Traditional Animation
[Lasseter, SIGGRAPH 1987]

- Stylistic conventions followed by Disney's animators and others

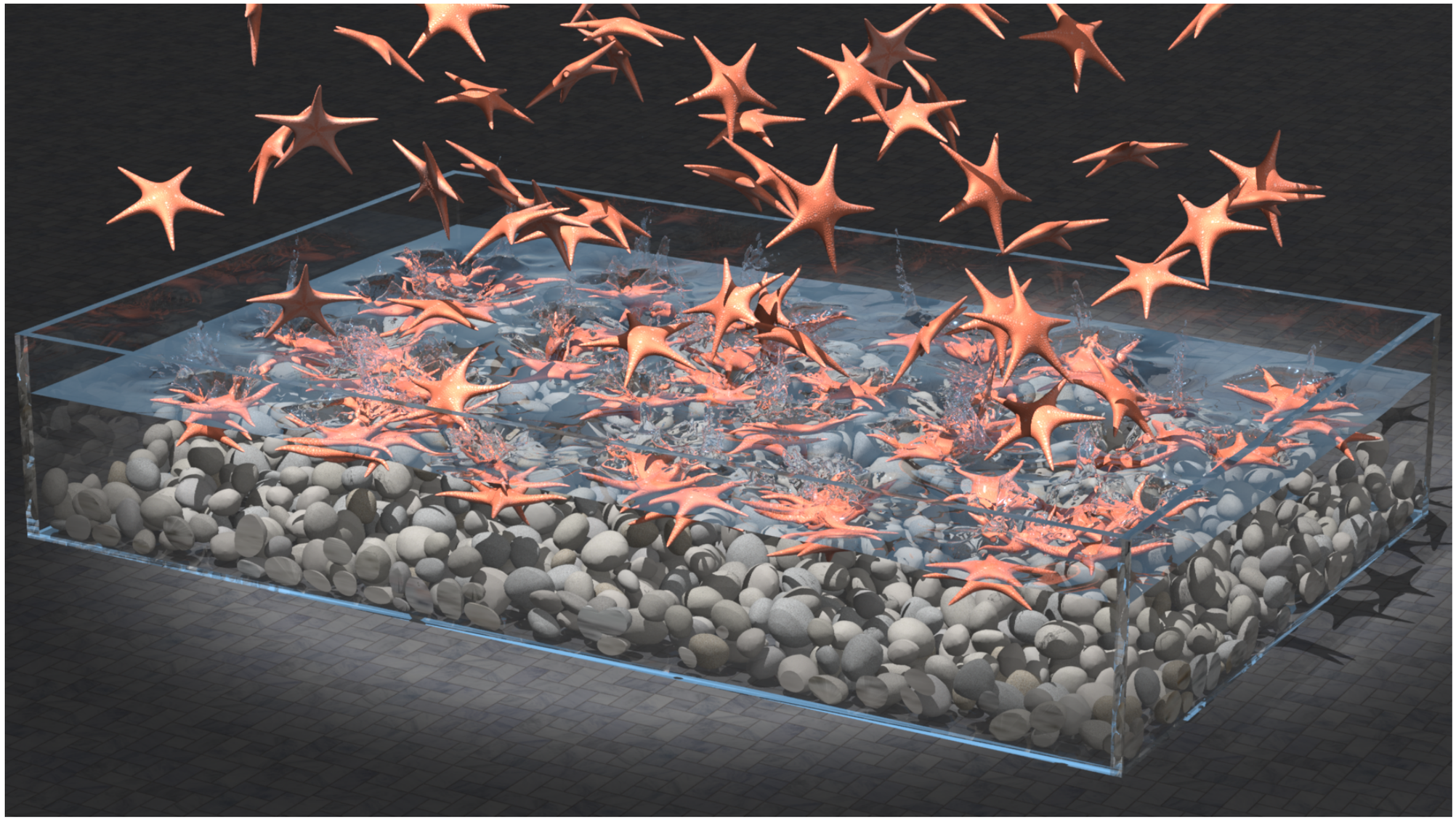
- From experience built up over many years
  - Squash and stretch -- use distortions to convey flexibility
  - Timing -- speed conveys mass, personality
  - Anticipation -- prepare the audience for an action
  - Followthrough and overlapping action -- continuity with next action
  - Slow in and out -- speed of transitions conveys subtleties
  - Arcs -- motion is usually curved
  - Exaggeration -- emphasize emotional content
  - Secondary Action -- motion occurring as a consequence
  - Appeal -- audience must enjoy watching it

Procedural Animation

http://www.massivesoftware.com/

http://www.animationboss.net/behind-scenes-marvels-black-panther-vfx/

Physics-based Animation



http://physbam.stanford.edu/~fedkiw/

Data-driven Animation

http://graphics.cs.cmu.edu/

Motion Capture Lab

Wean 1334

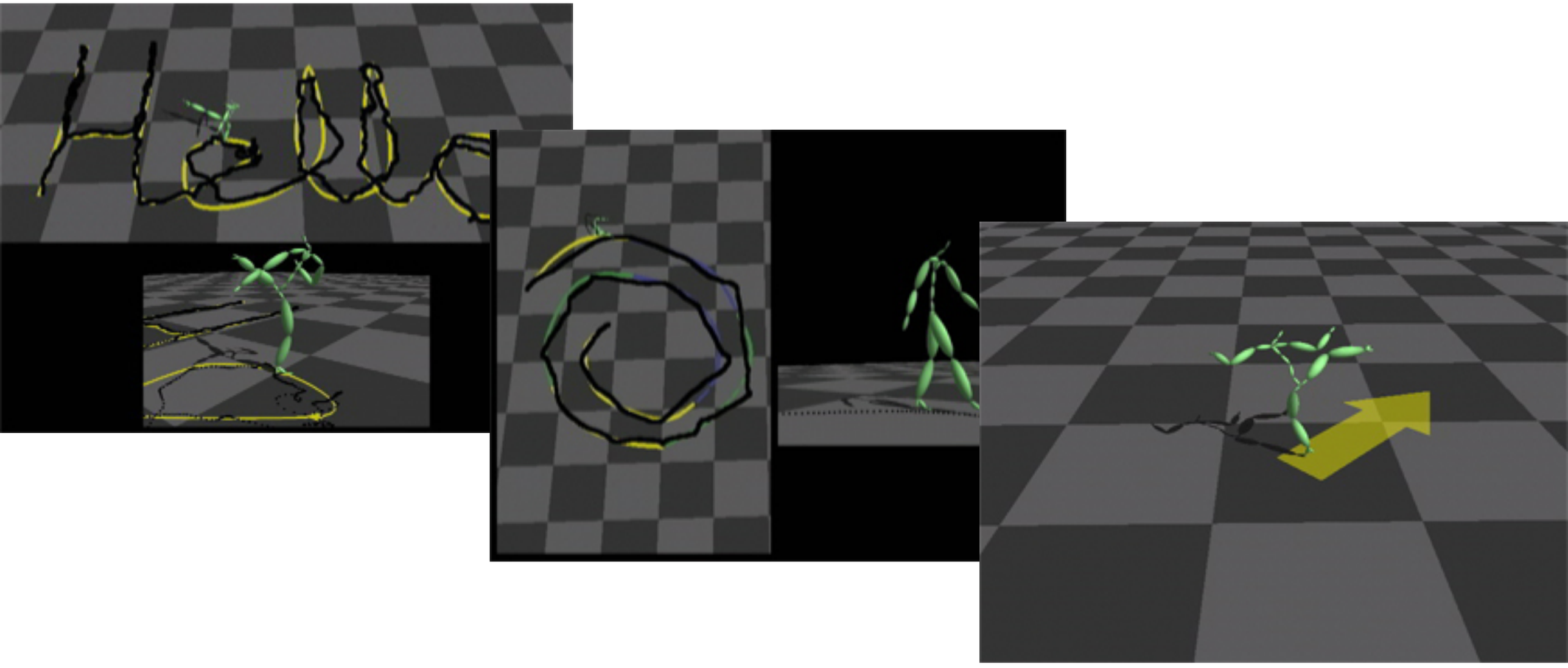
https://www.youtube.com/watch?v=1rbgZNBGA1g

http://graphics.cs.cmu.edu/

We can capture an individual performance

https://www.youtube.com/watch?v=P2_vB7zx_SQ

What about creating autonomous or responsive characters? Motion Graphs (2002)



http://www.cs.wisc.edu/graphics/Gallery/kovar.vol/MoGraphs/

Lucas Kovar (U. Wisconsin / ILM)
with Michael Gleicher

What about creating autonomous or responsive characters? Learning (2020)

Character Controllers using Motion VAEs

HUNG YU LING, University of British Columbia, Canada
FABIO ZINNO, Electronic Arts Vancouver, Canada
GEORGE CHENG, Electronic Arts Vancouver, Canada
MICHIEL VAN DE PANNE, University of British Columbia, Canada

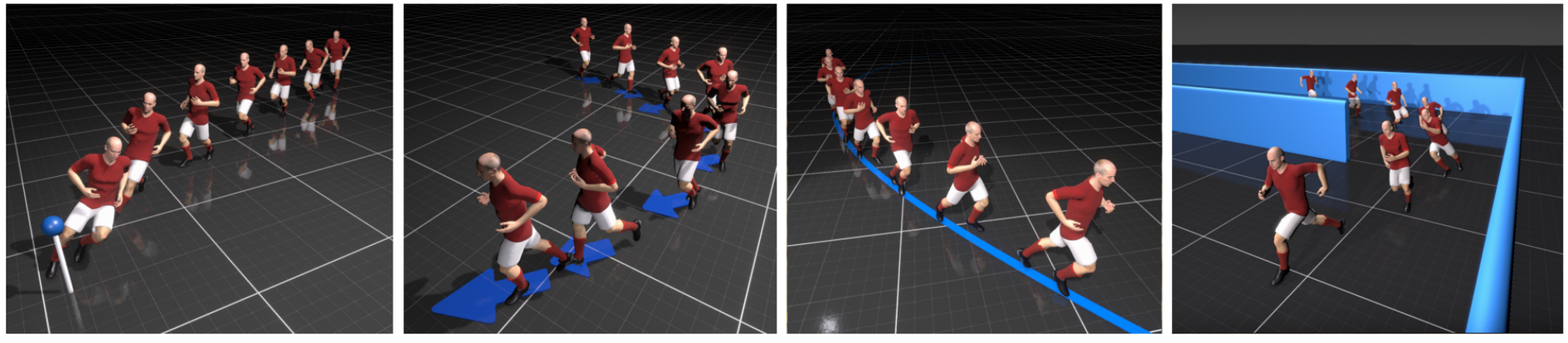


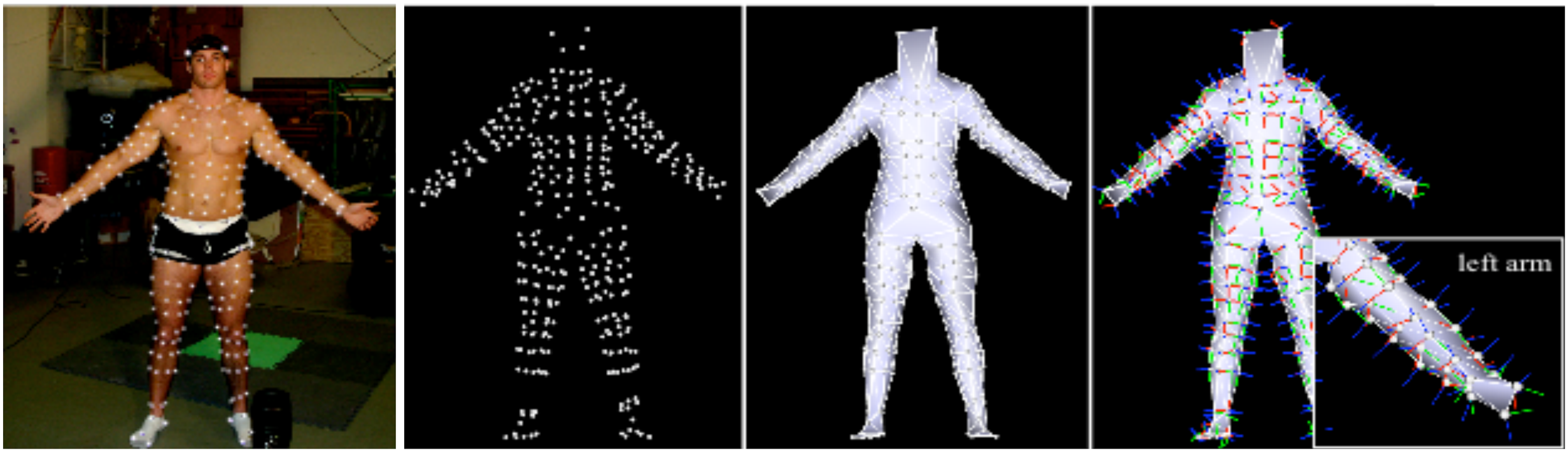
Fig. 1. Given example data, we learn an autoregressive conditional variational autoencoder that predicts the next pose one frame at a time. A variety of task-specific control policies can then be learned on top of this model.

https://www.cs.ubc.ca/~hyuling/projects/mvae/

Dense Body Capture

Laser Range Scanning

Dense Marker Capture



Sang Il Park (CMU / Sejong University)
with Jessica Hodgins

To be continued on Monday ☺

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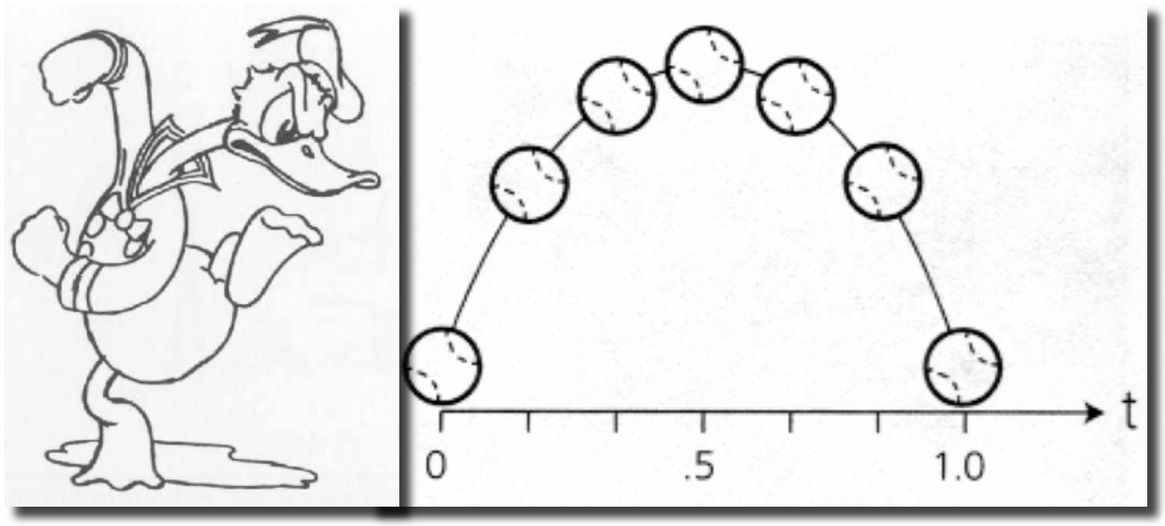

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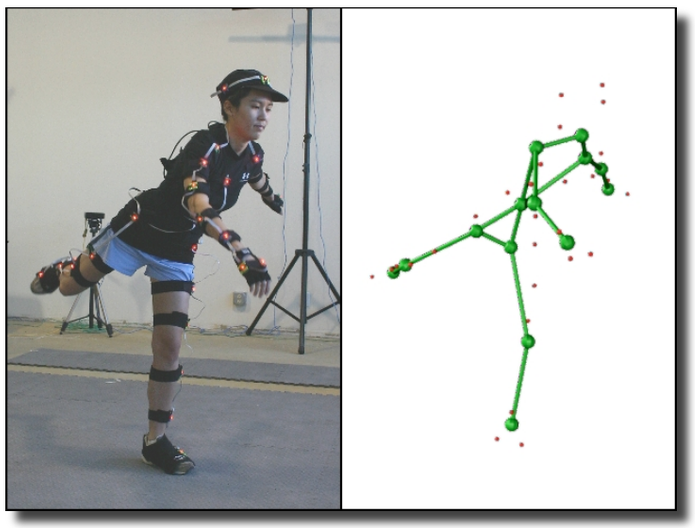

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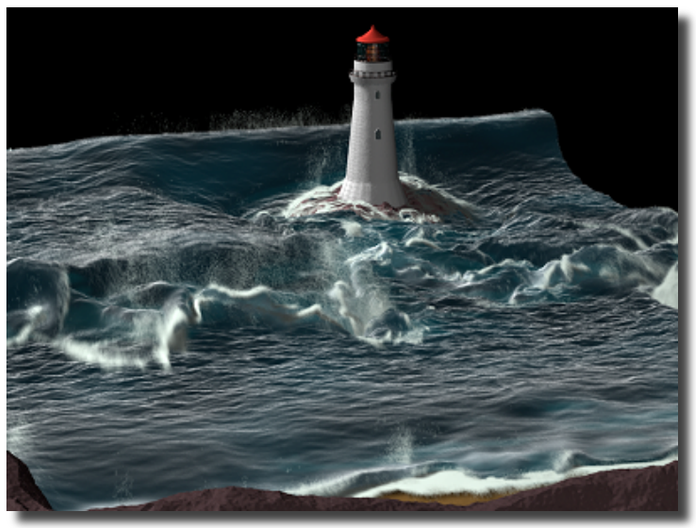

Physical Simulation