



March 21-25, 2022
San Francisco, CA

GDC22 ANIMATION SUMMIT

THE FACIAL ANIMATION PIPELINE OF MARVEL'S GUARDIANS OF THE GALAXY

Simon Habib

Lead Technical Animator
Eidos Montreal

#GDC22



A vibrant, action-packed scene from the game Guardians of the Galaxy. Star-Lord is in the foreground, pointing at the viewer. Rocket Raccoon is on the left, firing a weapon. Groot is in the background, and Gamora is on the right, holding a sword. The scene is set in a futuristic, industrial environment with red and blue lighting.


eidos™
montreal

A SQUARE ENIX COMPANY

MARVEL
GUARDIANS
OF THE **GALAXY**

Simon Habib

Lead Technical Animator

 @simonize23

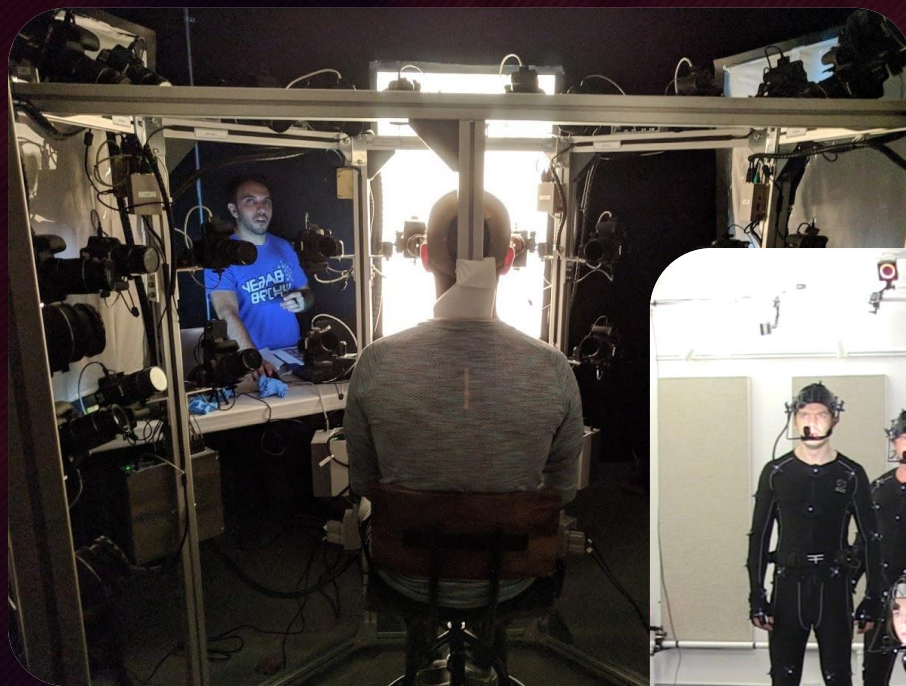
 linktr.ee/simonize23

CINEMATIC SAMPLE



TABLE OF CONTENT

1. Our Vision
2. Photogrammetry Scan
3. Performance Capture
 - Cinematics
 - Banters / Barks
 - E-Motion Capture
4. Batch Processing
5. Cinematic Polish
6. Q&A



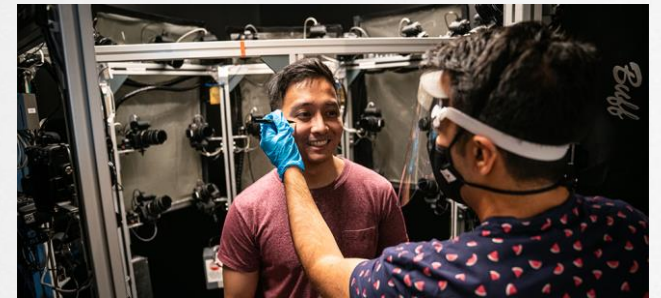
1. OUR VISION

- Performance-driven narrative
 - Ensemble cast of 5
 - Stylized, yet believable
 - Non-human characters
- Technical Innovations
 - Photogrammetry
 - Audio vs. video-based animations
 - In-house mocap stage
 - Advantages of full PCap
- Quantity *and* Quality
 - Bronze / Silver / Gold



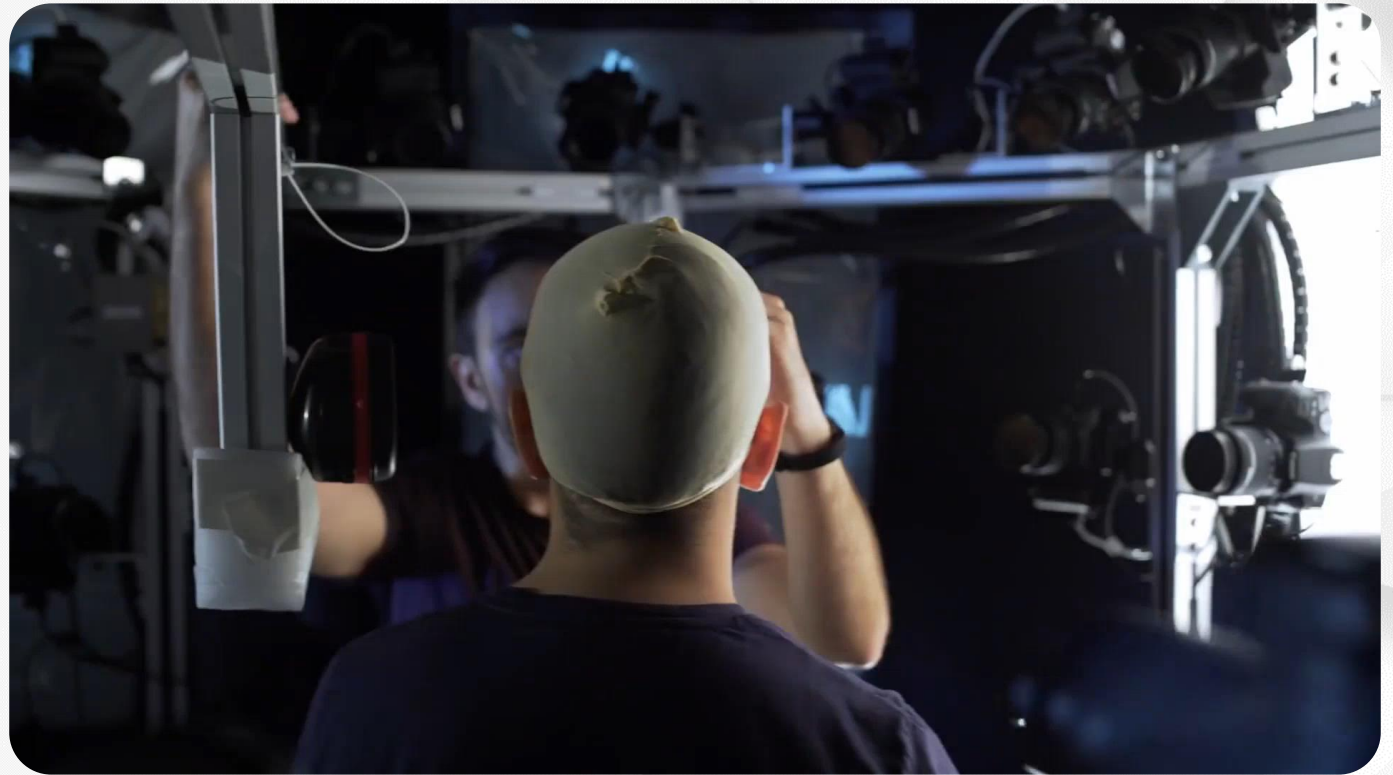
PHOTOGRAMMETRY SCANS

The process of taking hundreds of images of a subject from many different angles to build a 3D model



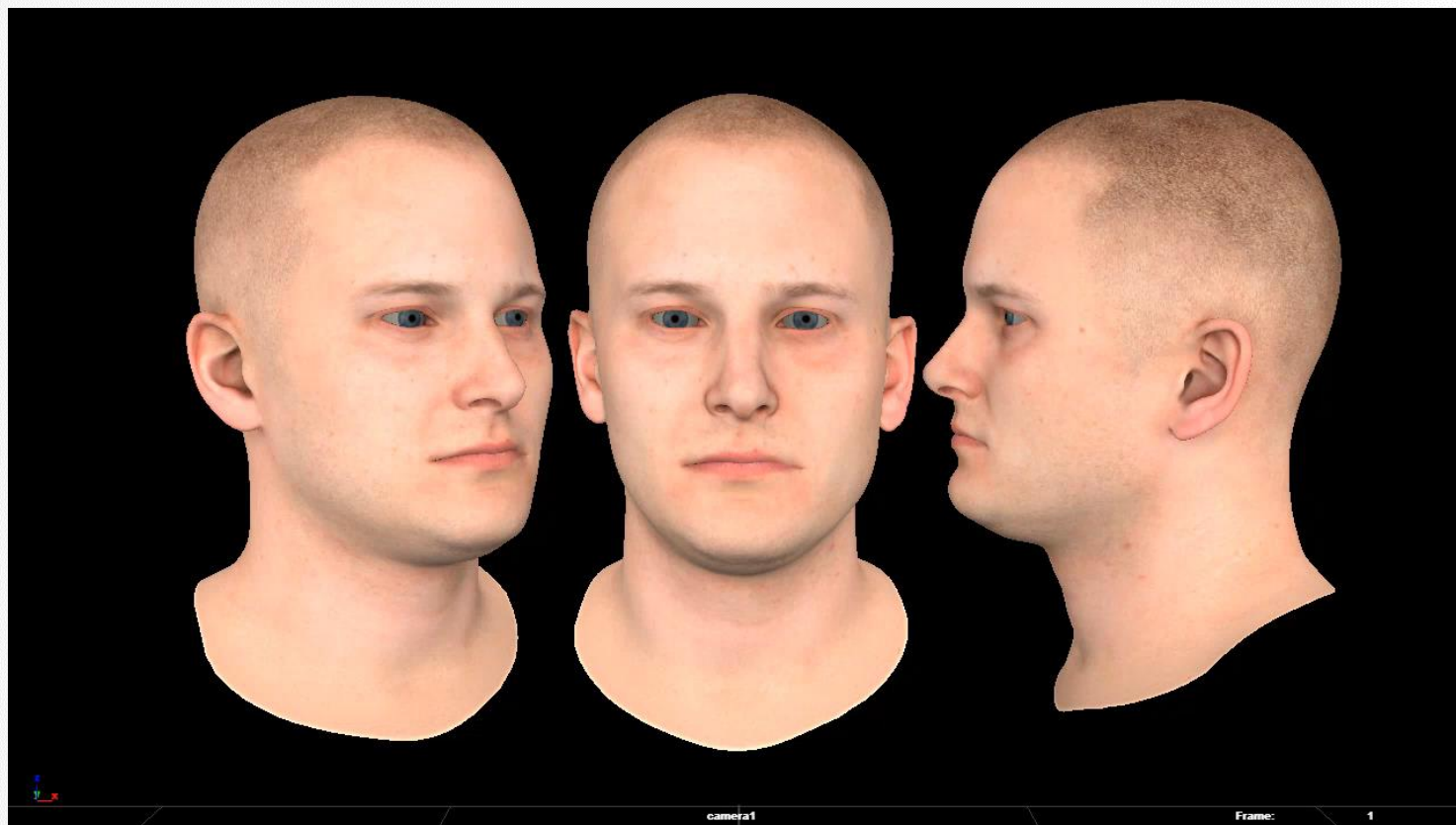
2. PHOTOGRAMMETRY SCAN INTRODUCTION

- Pixel Light Effects
 - 40 DSLR cameras
 - 5 softbox lights
- Model Casting
 - 13 scan sessions
 - ~100 facial markers
 - 25 expressions → 138 shapes
- Workflow
 - .CR2 → Lightroom Classic
 - Reality Capture (batch)
 - Wrap3 → ZBrush



2. PHOTOGRAMMETRY SCAN

BLEND SHAPE PREVIEW



PERFORMANCE CAPTURE

From our in-house motion capture set, our actors' body motion, facial performances, and voices are recorded simultaneously.

[Cinematics | Banters | E-Motion]



3. PERFORMANCE CAPTURE CINEMATICS

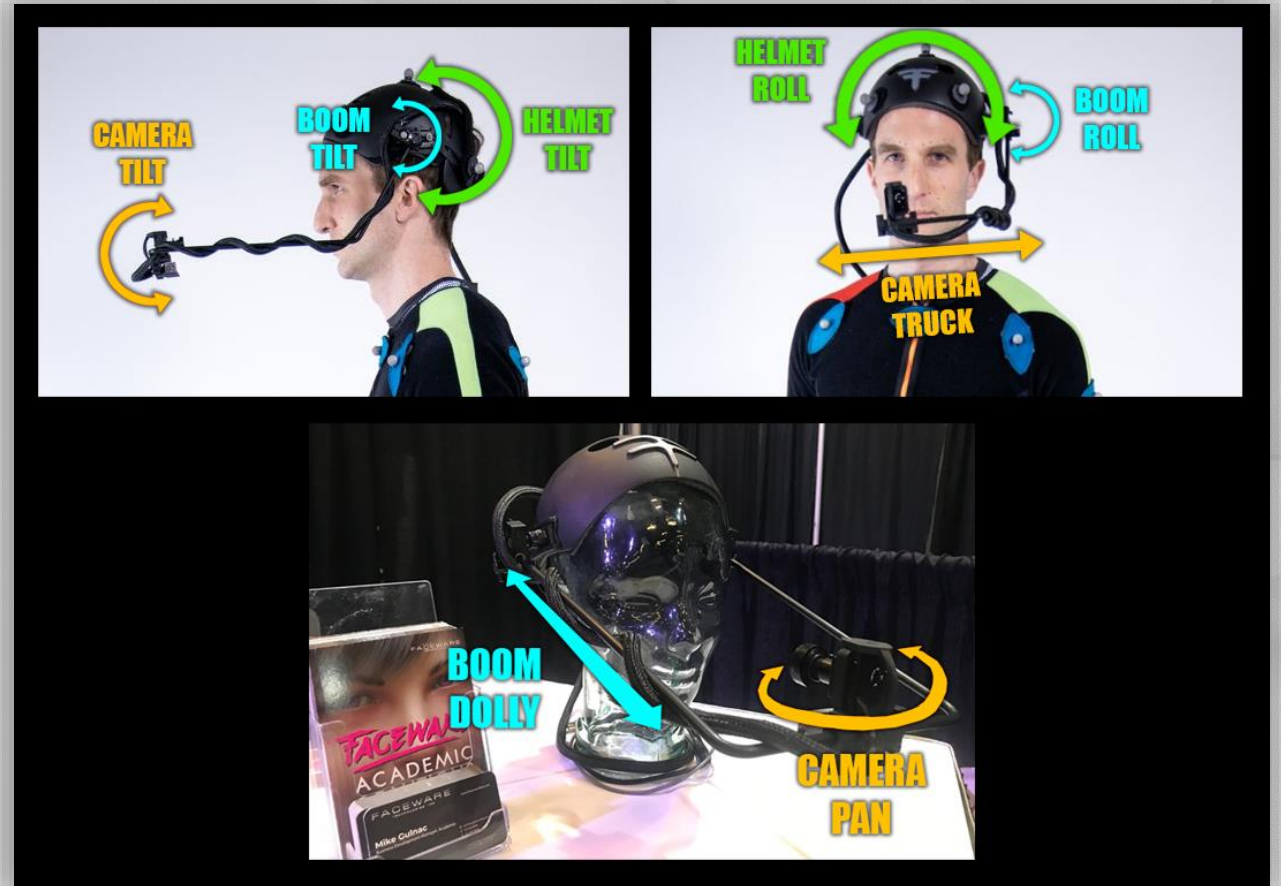
- In-House Volume
 - Up to 7 actors / 6 HMC
 - Individual LAV mics
 - Conversations, locomotion, stunts
- OptiTrack / Faceware
 - Timecode sync
 - Lumiere - global trigger
- On Set Crew
 - Actor suit-up
 - Restrictive measures



3. PERFORMANCE CAPTURE

FACEWARE HMC

- Faceware Mark III
 - RGB 720p 60fps
 - Dimmable LED, on/off switch
 - Double-boom for stability
 - Swappable batteries
 - Wireless video transmitter
 - Monitor with grid overlay
- Calibration
 - 27 facial markers
 - Framing / focus
 - Comfort



3. PERFORMANCE CAPTURE

CINEMATIC P-CAP SAMPLE



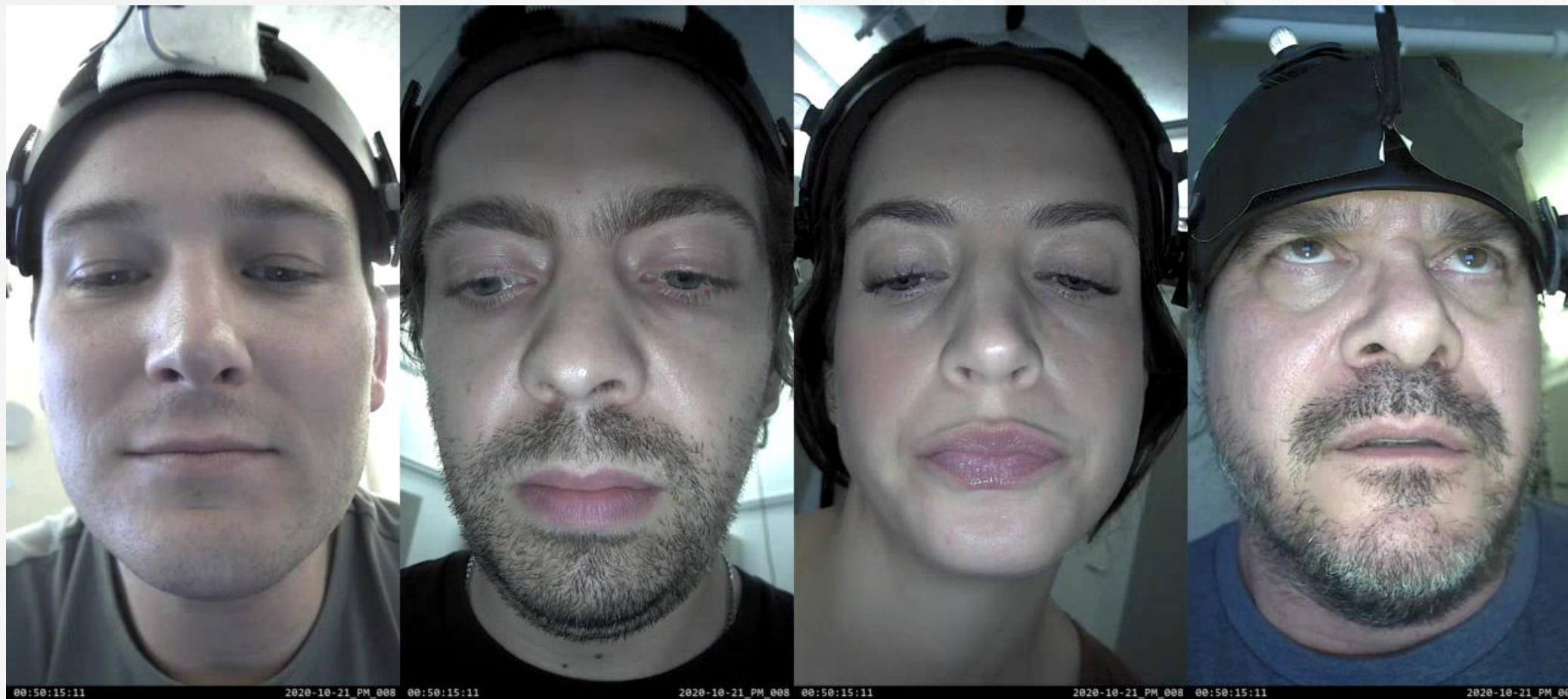
3. PERFORMANCE CAPTURE

BANTERS / BARKS

- Recorded Together
 - Maintain chemistry
 - Audio booth & mocap stage
 - 23K lines of dialogue
- Data Process
 - TC metadata from audio clips
 - Lower face for lip sync
 - ML Emotion Track



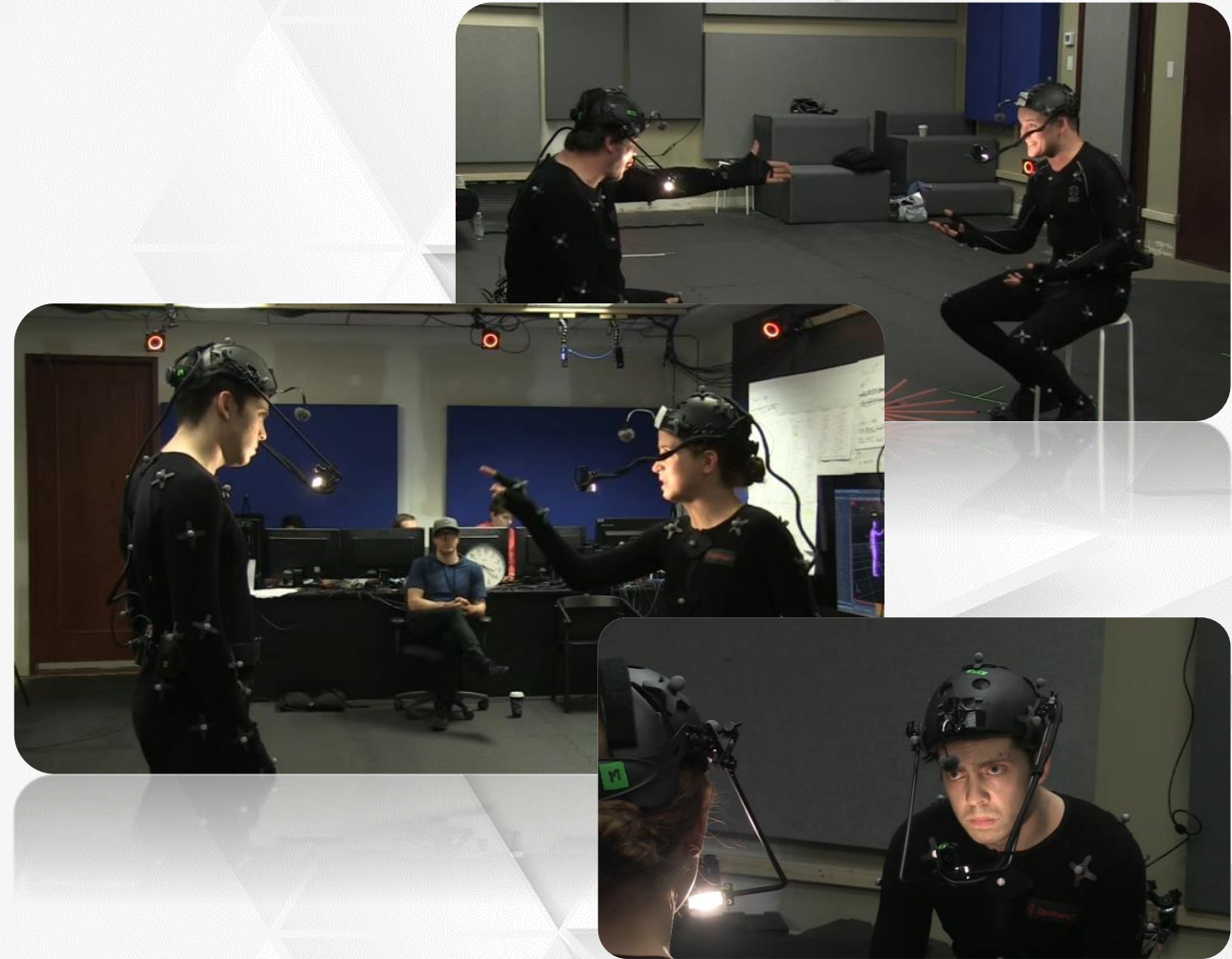
3. PERFORMANCE CAPTURE BANTERS SAMPLE



3. PERFORMANCE CAPTURE

E-MOTION CAPTURE

- Theory
 - Non-verbal gestures
 - 1-on-1 / speaker & listener
 - Standing & seated
 - Layered over locomotion
- HMC footage
 - ML Emotion Track
- Machine Learning Summit:
Emotion Detection for Expressive
Characters in GOTG - By Romain Trachel



3. PERFORMANCE CAPTURE

BANTERS IN-GAME SAMPLE



BATCH PROCESSING

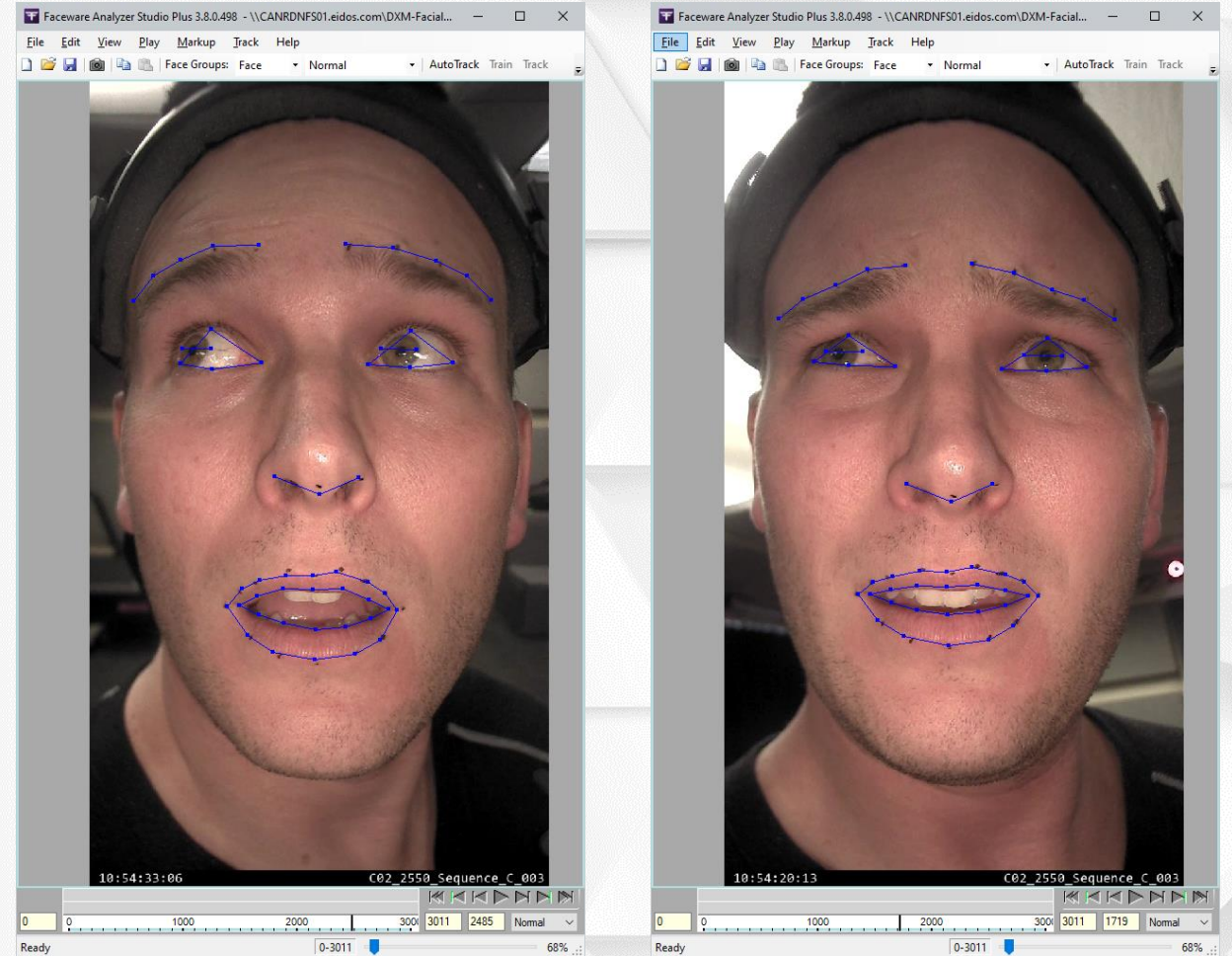
The ability to run through thousands videos, automatically track actors' facial performances, and apply first pass animations to their respective character rigs.



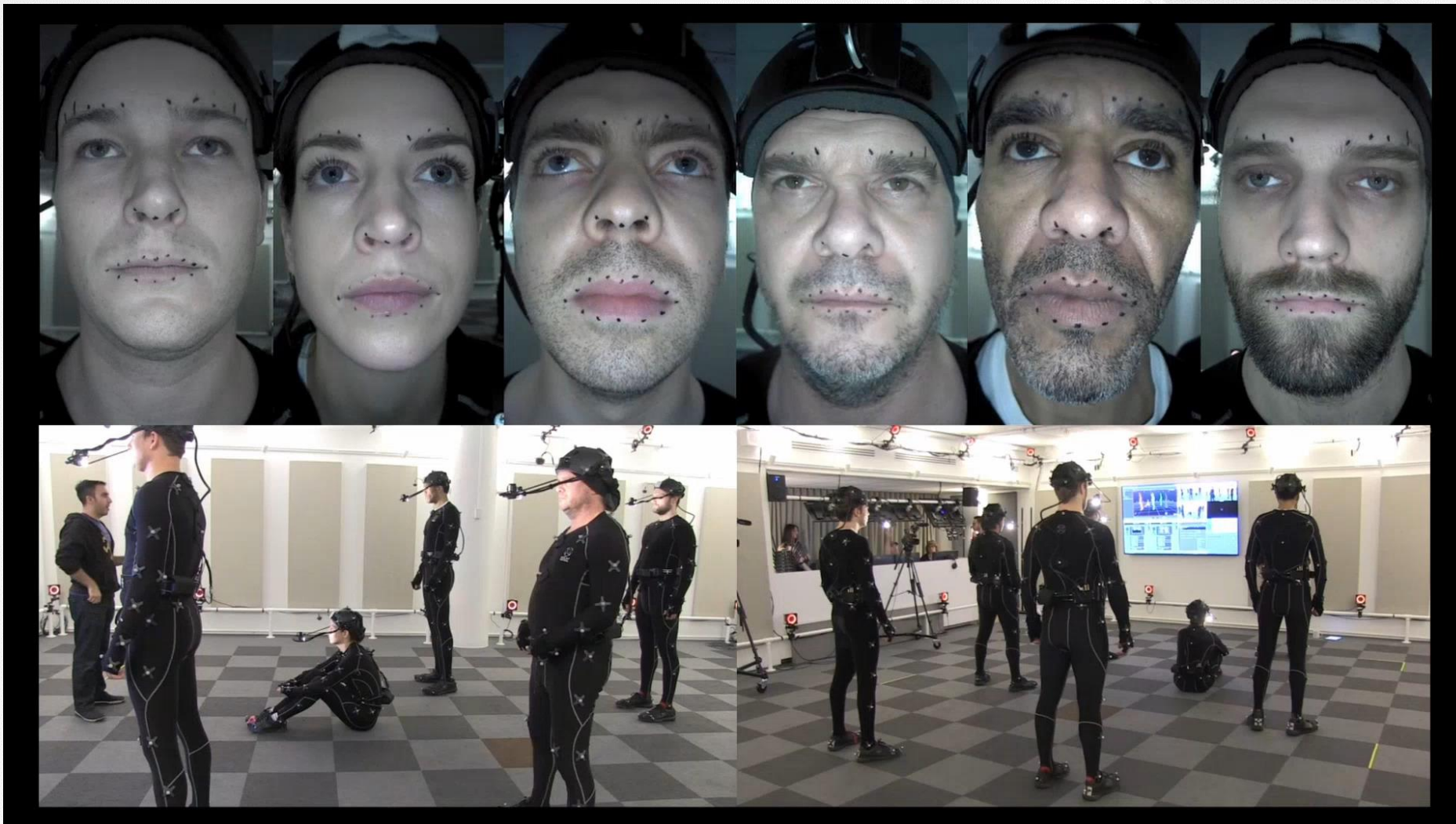
4. BATCH PROCESSING

CREATING PROFILES

- Training the software
 - Binding actor to character
- Analyzer - Tracking Model
 - Less is more
 - Consistency is key
- Retargeter - Pose Library
 - Include extremes & subtlety
 - Asymmetry
- Total Faceware profiles: 20



4. BATCH PROCESSING FACIAL ROM



4. BATCH PROCESSING

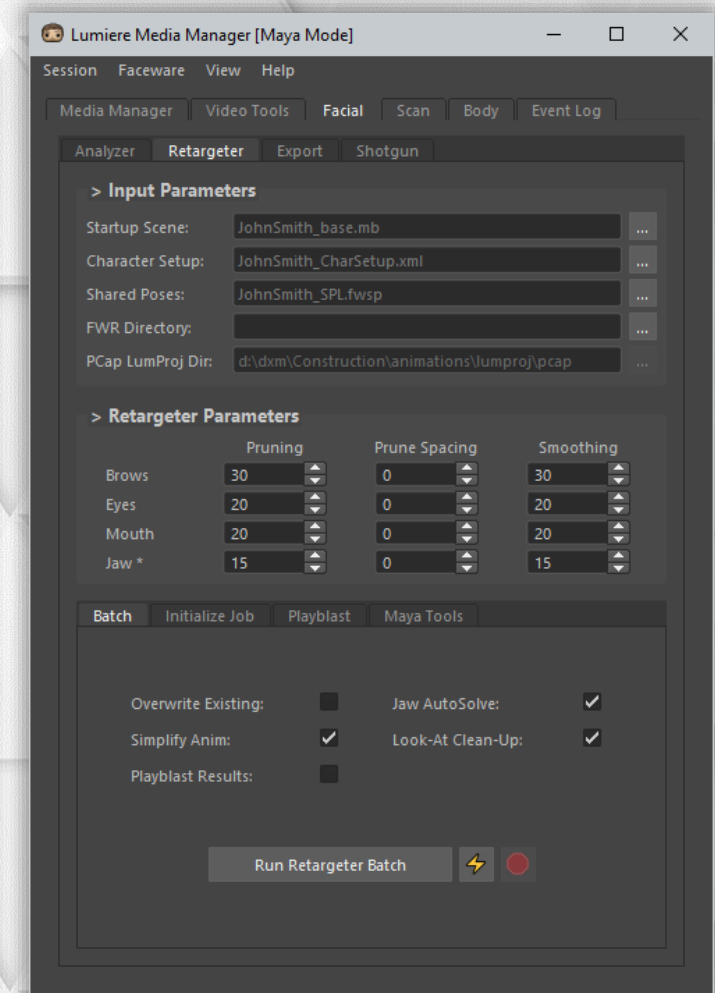
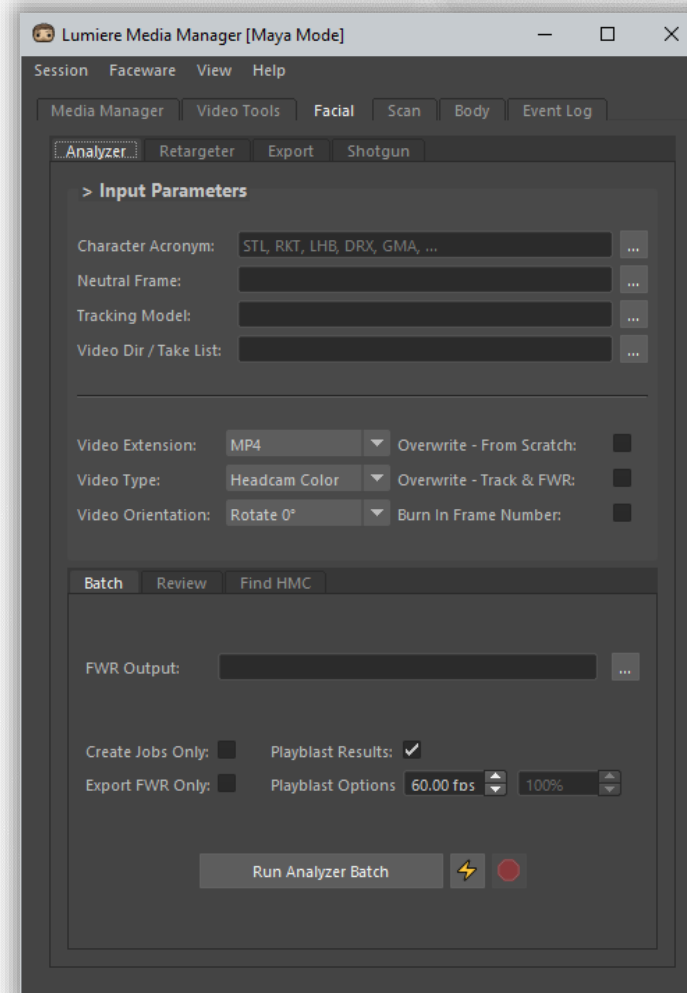
PYTHON TOOLS / UI

■ Analyzer Batch

- Pre-edited videos
- Neutral Frame
- Tracking Model

■ Retargeter Batch

- CharSetup / Shared Poses
- Retargeter Parameters
- Anim post-process
- Playblast



CINEMATIC POLISH

A technical and artistic polish pass on top of existing animations to obtain the highest fidelity and most believable animations.



5. CINEMATIC POLISH

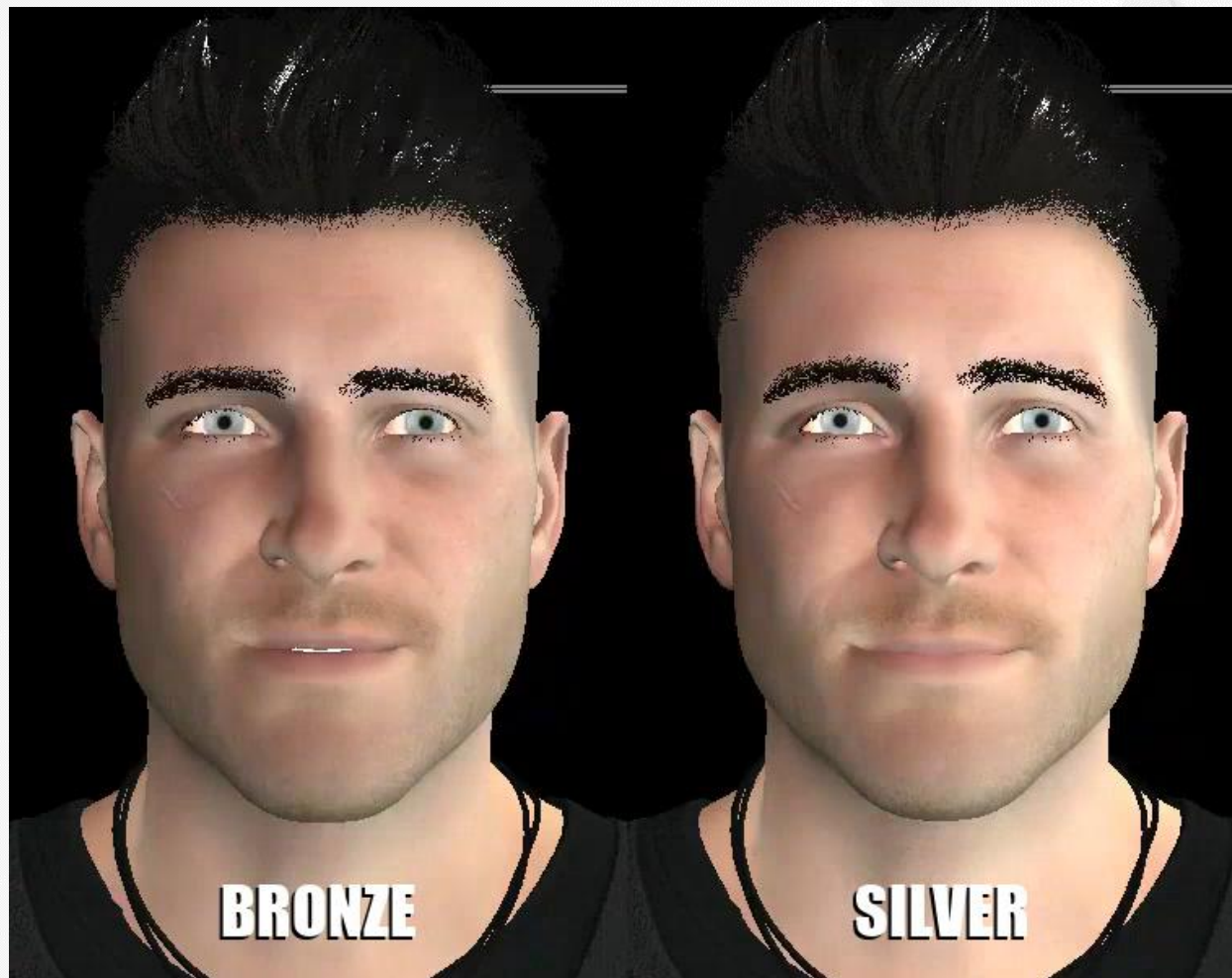
MOTION ARTISTS

- Body Mocap Data
 - Suit up actors / set up profiles
 - Data clean up & retarget to rig
- Silver Facial – Technical Pass
 - Match performance / 1-to-1 fidelity
 - Capture subtlety
 - Tongue animation for closeups
- Silver Facial – Artistic Pass
 - Emphasize or hold expressions
 - Accentuate asymmetry

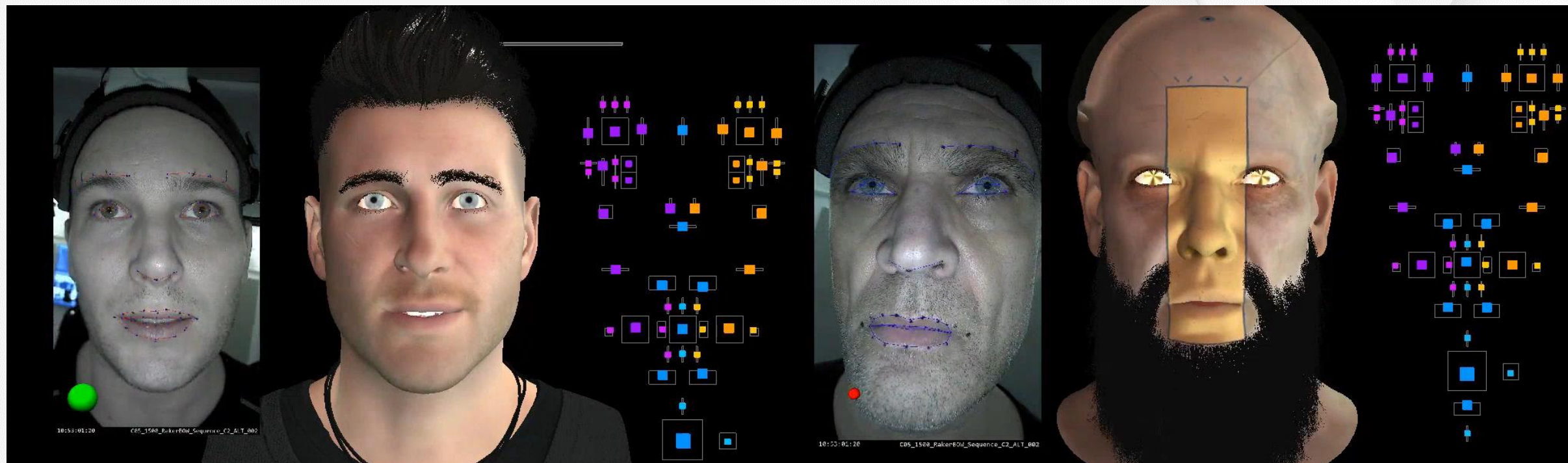


5. CINEMATIC POLISH

BRONZE / SILVER



5. CINEMATIC POLISH SILVER SAMPLE



5. CINEMATIC POLISH

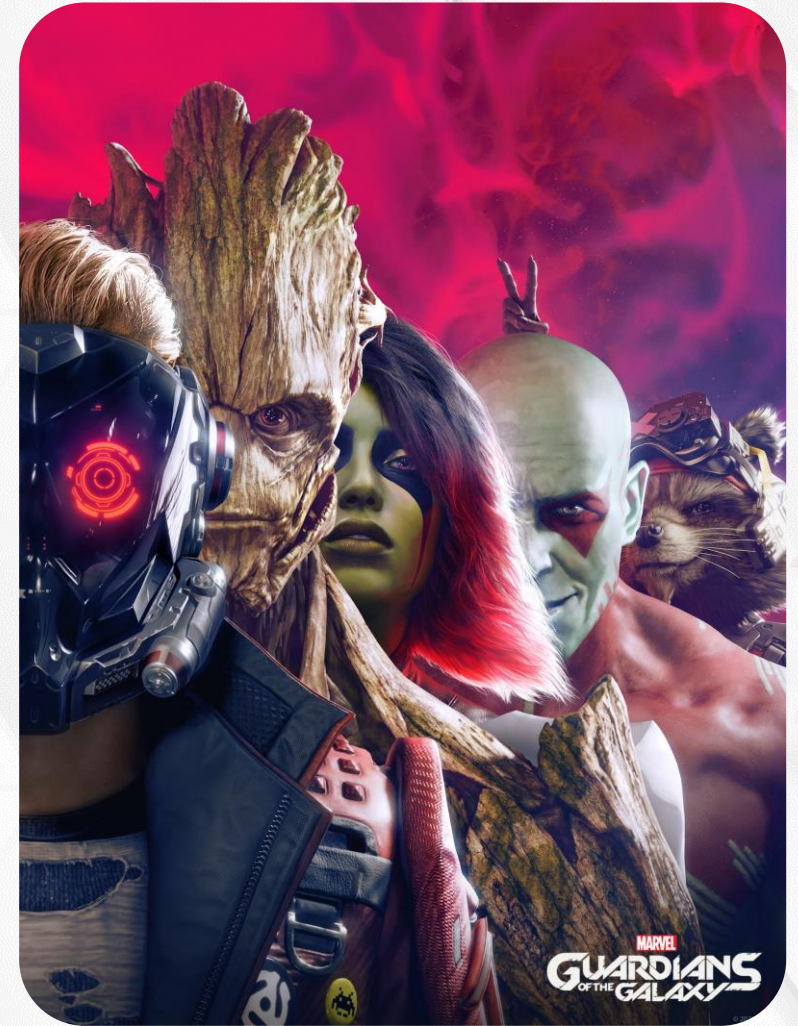
CINEMATIC ANIMATORS

- Scene assembly in MoBu
 - Multiple characters, props, vehicles
 - Cameras & environments
 - Animals & creatures
 - Head & look-at adjustments
- Gold Facial Anim Polish
 - Story beats / marketing
 - Fine tuning
 - Animate to camera



TAKEAWAYS

- Delivered on our promise
 - 13 scan sessions
 - 20 Faceware profiles
 - 23K lines of in-game dialogue - Bronze: 99.9%*
 - 5.25 hours of cinematics - Silver: 90% / Gold: 10%
- Looking to the future
 - More polish - in scene / camera
 - Higher realism - art direction
 - Engine preview - lighting / shaders



GOLD SAMPLE



THANKS FOR WATCHING !



Simon Habib

 @simonize23

 linktr.ee/simonize23

Q&A

