

# State of Animation Tools in the Industry

Paul DiLorenzo\*  
DreamWorks Animation

Matthew Gong and Fredrik Nilsson  
DreamWorks Animation  
Martin de Lasa and Warren Trezevant  
Autodesk

Evan Goldberg  
Walt Disney Animation Studios  
Cyrus A. Wilson  
Rhythm & Hues

Rob Jensen  
Pixar

DreamWorks Animation, Pixar and Disney have invested in next-generation animation tools, or enhanced existing animation tools, for their animators. Autodesk has made a push in recent years to add and improve animation features in Maya. Rhythm and Hues built an extensible framework, Voodoo, that is used across multiple departments and received a 2013 Technical Achievement Academy Award.

This panel will bring together animators and engineers that have led efforts to design, implement and deploy these tools to their respective user base. We will provide an inside look into these tools to give audience members insight and context into the various ways animation is being done in the industry. We will discuss and explore animator topics such as important features of an animation tool (e.g., real-time playback, interactivity, enabling creativity, art-directable), how animators interact with the tool, unique workflows in these tools and their interaction with other departments.

We will dig deep into these tools to examine the different technical facets to achieve these results for the animators. We will examine the philosophy and architecture behind each tool, technologies and techniques (e.g., multi-threading) that enable high performance character and graph evaluation, user interface choices, and different ways to interact with the tool.

We will examine the remarkable interaction, relationship and processes required to bridge the gap between the creative and technical experts that come together to build these tools. We will conclude by discussing future trends of animation tools in the industry.

## DreamWorks Animation

Premo is DreamWorks Animation's next generation animation platform. Built in partnership with Intel, this platform is comprised of an animation tool, character technologies, and a high-performance multi-threaded dependency graph for character evaluation (LibEE) [Watt et al. 2012]. Premo offers a state-of-the-art animator experience with fully deforming characters, environments, and lighting in real-time at a fidelity that closely resembles final rendered images. Premo enables novel workflows that are highly efficient and keep the animators engaged in the creative process. Premo was used for all character animation on *How to Train Your Dragon 2* and is now in use by all of our animators on more than 6 productions.

## Walt Disney Animation Studios

Walt Disney Animation Studios brings characters to life through cutting-edge technology. A Maya foundation handles the basic operations, allowing our development to concentrate on higher-level functionality. New artists benefit from its familiar interface, while

proprietary tools and sophisticated algorithms create an experience that is hardly off-the-shelf. A suite of art direct-able deformers and sculpting tools facilitate heavily scrutinized aesthetics. Visually rich interfaces and direct manipulation make selection, posing, and keyframe/timing manipulation simple and intuitive. Code is extensively optimized, and even heavy rigs can scrub in real-time through a custom wrapper around Maya's node graph evaluation.

## Pixar

Presto is Pixar's next generation software package, currently deployed for rigging, animation, layout, and simulation. It is designed for feature film-making, with many features that make it possible to work across multiple shots and models in context. At its core is a system of live layering and referencing, making it easy to re-use assets or share setups across shots. Under the hood is a multi-threaded execution model that combines flow-graph dependencies with a more procedural deformer hierarchy. The user interface has a host of animation-centric features, including a highly tuned spline editor and embedded sketching features.

## Autodesk

Autodesk's R&D teams have been developing 3D animation software for TV, games, VFX, and feature film for more than 25 years. To meet this challenge, Autodesk leverages its ongoing collaboration with studios, including Dreamworks, Disney, and Weta, to solve complex creative and pipeline problems and uses these experiences to create more accessible tools for others. Examples have included Mudbox, XGen, and advances in MotionBuilders real-time animation and performance capture technology. More recently the Maya team has been investigating present and future requirements of CG character animation focusing on artist-friendly workflows, real-time animation display technologies, high performance simulation, and handling complex data.

## Rhythm & Hues

Voodoo is an extensible platform for character rigging, animation, camera tracking, matchmoving, fur grooming, crowds, 2.5D matte painting, photogrammetry and more. For 18 years, it has been the backbone of creature and environment work at Rhythm & Hues. It has brought to life characters like the mouse from "Mousehunt", Aslan from "The Lion, The Witch and the Wardrobe" and Richard Parker from "Life of Pi". Voodoo combines advanced features for artists working in parallel across pipeline stages; a unique architecture for innovative rigging, animation, and creature-FX workflows; and an artist-friendly development platform enabling small teams to combine component technologies into rich tools.

## References

WATT, M., CUTLER, L. D., POWELL, A., DUNCAN, B., HUTCHINSON, M., AND OCHS, K. 2012. Libee: A multi-threaded dependency graph for character animation. In *Proceedings of the Digital Production Symposium*, ACM, New York, NY, USA, DigiPro '12, 59–66.

\*e-mail:paul.dilorenzo@dreamworks.com