

# Mythology Meets Visual Feast in Beowulf with Nvidia

***NVIDIA Quadro Professional Graphics Boost the Creative Pipeline at Sony Pictures Imageworks in Latest All CG Action Movie***

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How can you use technology to bring a 1,200-year-old epic poem about heroes, monsters, and dragons to life? That was the challenge facing director Robert Zemeckis and Sony Pictures Imageworks in bringing the story of Beowulf to the silver screen.

Zemeckis and the Imageworks team used the Performance Capture technology pioneered in *The Polar Express*, which was also used again in the creation of *Monster House*, to tell the tale of the hero Beowulf (played by Ray Winstone). In the story, Beowulf comes to the mead hall of King Hrothgar (Sir Anthony Hopkins) to kill the monster Grendel (Crispin Glover) who has been plaguing Hrothgar's kingdom. After dispatching Grendel, Beowulf must face the wrath of Grendel's mother (Angelina Jolie), who seeks revenge for the death of her son. The story is based on the epic poem that is considered to be the first great work of English literature.

Performance Capture uses technology to track the body movements and facial expressions of the actors; the data is then collected and used to create an animated sequence based on the actors' performances. A particular challenge in making *Beowulf* was the sheer size of the production. With some scenes having over 70 characters, each actor's movements had to be captured, tracked, and mapped onto an animated character. Textures and lighting were then applied, giving the director real-time interactivity during the camera layout process.

This new level of pre-visualization added additional challenges. Typical pre-visualization uses simple, untextured geometry to block, or plan, the position of the camera, actors, and action in a scene. But for *Beowulf*, the filmmakers and the Imageworks team needed more. They wanted a pre-viz process that would convey the emotion, lighting subtleties, and tone of the scene. For this, higher quality graphics, akin to those found in state-of-the-art video games became a necessity. The trick was to find a graphics card that was up to the challenge of producing images of this quality in real time. The *Beowulf* team found it in NVIDIA Quadro professional graphics cards, which offered the processing power necessary to render multiple characters with texturing and lighting in real time. With Quadro™ solutions, the director was able to achieve the instantaneous feedback he needed during the layout process to compose, shoot, and alter the performance in real time.

"Quadro boards had the power to produce the real-time scenes that we needed during our performance capture integration and camera layout process," said Corey Turner, technical animation supervisor for Beowulf. "Some of our scenes were of enormous complexity, with over 70 characters whose actions had to be editable and rendered in real time. NVIDIA gave us the ability to visualize the director's vision in real time."

By integrating Quadro professional graphics into their creative pipeline, the Sony Pictures Imageworks team was able to layout and render truly complex action sequences. One of the most challenging was the first attack by Grendel in Hrothgar's mead hall. With over 70 characters and one moving camera battling it out in the hall, Zemeckis decided where the camera would be and how the action would play out after all the data was integrated into the real-time 3D scene. Only a small portion of the total action is shown in the final camera field of view, but the performance of Quadro graphics allowed him to layout and render all of the characters before deciding where the camera should be placed for the final shots.

Beowulf pushed the limits of Quadro performance throughout the film's production. One of the most challenging shots was a 107-second shot that started with approximately 60 characters dancing in the mead hall, which then moved to the roof of the hall, across four miles of countryside, and concluded in Grendel's cave. With characters, props, and terrain rendered in real time with full lighting and textures, the shot was divided into three sections for real-time pre-viz then edited back together. Zemeckis, however, was still able to visualize it appropriately and the full shot appears unbroken in the final film.

More Information at: [nvidia.com](http://nvidia.com). Images and Videos Courtesy of Paramount Pictures