



The conceit in the film *The Spiderwick Chronicles* is that fairies inhabit the real world—they live in our backyards in Anytown, USA. Some are friendly flower sprites; others are definitely not. And one, at least, is hungry for power.

Based on a series of books of the same name by Holly Black and Tony DiTerlizzi, the story begins as the nine-year-old twins Jared and Simon Grace, their older sister Mallory, and their mother move into great-aunt Lucinda's creepy, old, run-down house, the Spiderwick Estate, somewhere in New England. When Jared discovers great-uncle Arthur Spiderwick's *Field Guide to the Fantastical World Around You* in a secret room, the children's adventure begins. "This is a story about the ordinary becoming extraordinary," says Mark Waters, who directed the Paramount Pictures and Nickelodeon Movies film.

Actor Freddie Highmore plays both twin boys, Sarah Bolger is Mallory, Mary-Louise Parker is their mother, and Joan Plowright is their aunt Lucinda. In addition, the film features a cast of CG fairies. Indeed, most of the 500 visual effects shots center on adding these fairy characters—various types of goblins, a troll, an ogre, flower sprites, a griffin, and so forth—to live-action scenes. Industrial Light & Magic and Tippett Studio created the 500 visual effects shots, and of those, shared approximately 15 shots.

Natural Forces

*Industrial Light & Magic and Tippett Studio create delicate, monstrous, and cunning CG fairies for the live-action film *The Spiderwick Chronicles**

By Barbara Robertson

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Three of the fairy characters talk: Mulgrath (Nick Nolte), Thimbletack (Martin Short), and Hogsqueal (Seth Rogen). Mulgrath, designed and created at ILM, is a nine-foot-six-inch-tall ogre that can transform into such other creatures as a snake, animated at ILM, or a crow, animated at Tippett. Thimbletack is an eight-inch-tall brownie (a house elf) who, when anyone treats him unkindly, has a fit and transforms into his alter ego, the nasty, green Boggart. Tippett created Thimbletack's original design; ILM brought the character to life. Hogsqueal, meanwhile, is a jolly two-and-a-half-foot-tall hobgoblin, designed and performed at Tippett.

In addition to these talking fairies, both studios designed and created several other species: at ILM, a variety of flower and insect sprites, a half-lion/half-eagle griffin with a 25-foot wingspan, and tiny dandelion-seed sylphs; at Tippett, multiple nasty goblins, a bullgoblin, and a troll.

Thimbletack and Boggart

Although Tippett provided early designs for Thimbletack, ILM art director Christian Alzmann's crew of seven artists took the character in hand when it became clear they'd be moving the creatures through ILM's pipeline.

"It's very important when you're doing this work, especially with CG, to have the people who are doing the work also design the characters with the tools they have in mind," says Phil Tippett, the film's animation supervisor and character designer. "It's more streamlined." To give the audiences cues about Thimbletack's size, the ILM artists used buttons, needles, and other props to highlight the house servant's diminutive stature. For his alter ego Boggart, the artists referenced frogs, fish bellies, and books of skin diseases.

While the artists refined the character's look, the R&D department began devising Fez, a new facial animation tool, for their eight-inch CG star. "Thimbletack had to go through a wide range of different emotions and he would have to speak, so we thought this was a good opportunity to push R&D to upgrade our animation tools," says Tim Harrington, animation supervisor.

With Face Don, a new module within the Fez animation system, animators can quickly block in a performance by pulling preset facial expressions from a library onto the character and using all or part of those expressions. "You can blend expressions," Harrington says. "You can cut and paste, and use the mouth from one expression and the eyes from another." To demonstrate the tool, Harrington quickly creates an expression for Thimbletack that he calls "evil laughter" by combining a laughing mouth with angry eyes. "Animators can have a face blocked in within an hour or two using this tool," he notes.

Once the animators have blocked in the face,

they can use a second Fez module, called Face Select, to refine the expressions. "The concept is that you break down the controls into the muscles of the face," Harrington says. Because selecting precise controls for particular muscles on a CG model can be difficult and tedious, the R&D team created an interface based on a human face. "Say you want Thimbletack to smile," Harrington says. "You select the muscle in the human face that creates the smile, in this case, the zygomatic major, and when you do, it pulls up all the controls you need to edit that part of Thimbletack's face."



Industrial Light & Magic developed a new facial animation system, called Fez, to help animators give Thimbletack (shown on the previous page) and Mulgrath (shown here) mischievous and monstrous expressions.

Harrington points out that because most animators and artists have studied anatomy, the interface gives them intuitive control. "They can jump in and quickly learn how to use the tool," he says. As a result, he expects that both Fez modules—Face Don and Face Select—soon will roll onto other films.

The R&D team also created a new set of tools especially for Thimbletack's transformation into Boggart. As Thimbletack, he looks like a cute elf; as Boggart, he looks like a mean frog. But, even though the characters' appearances vary wildly, modelers built their different shapes from the same mesh to enable a seamless blend for the full-3D geometry transforms.

Because anger and frustration motivate Thimbletack's transformation and he doesn't really want to turn into Boggart, ILM animated the transformation as if Thimbletack were trying to hold it back. His head starts to bubble, and then the transformation happens violently and suddenly. On the other hand, Boggart's transformation back into Thimbletack is smoother, as if he's melting into the other form.

"Mark didn't want the transition to happen all at one time," Harrington says. "He wanted the face to transition, and then maybe the arms. He wanted



Red Cap, an evolved goblin, leads the charge. Tippett Studio animators meticulously gave each goblin a unique role, even during fast-moving battle scenes.

them staggered.” New tools called Thimbletack fat shapes made it possible to have the different body parts transform at different times.

Mulgrath, the Ogre

In addition to designing tools that helped animators quickly create expressions and transitions for Thimbletack, ILM used new methods and tools to prototype designs for the ogre Mulgrath. The reason is twofold. By putting a character’s model into animation tests quickly, the crew can get feedback from the director without moving the model through the standard character pipeline. And, animation tests on prototype models can uncover possible problems in the model’s design. Tools such as Pixologic’s Zbrush and Autodesk’s Maya helped the modelers create the 3D characters, and ILM’s proprietary software Block Party sped character rigging for animation.

Mulgrath began, though, as pencil on paper. “We did a lot of artwork to explore this character,” says Alzmann. “For reference, we used bulls, goats, and trees. We anchored him in nature by using tree branches and bark.” As the script progressed, concept artist and designer Carlos Huante began sculpting the character.

“The idea behind rapid-prototyping animation is that you quickly create a model and do animation tests during the

design phase,” Harrington explains. “You can figure out how he moves and how his proportions affect how he moves. So, the big win in rapid prototyping is that you can quickly make changes to his proportions. It’s much easier to make these changes when you’re in the design phase than in shot production when you’ve created a final model.”

With Block Party, the crew could remap the skeletal structure and muscles onto Mulgrath, which resulted in a working skeletal, muscle, and skin system.

“You can see Mulgrath’s muscles tensing up, you can see his pecs flexing and jiggling around as he swings his arms,” Harrington says. “And, you can see stuff moving in his shoulders and arms.”

Byron the Griffin

Some of the most difficult work for the ILM crew was in creating the half-eagle, half-lion griffin and shots with children riding on the creature. “We have hair and feathers—hundreds of thousands of feathers—on this thing,” says Tim Alexander, visual effects supervisor at ILM. The quantity of hair and feathers alone would have caused long rendering times; but to pull more detail than usual out of the texture maps on the feathers, the artists decided to render the feathers at 8k resolution.

“Luckily we had a lot of processors

left over from *Pirates* and *Poseidon*,” Alexander says.

To create the illusion that the Grace children ride on the back of the flying creature, the crew began by blocking in the griffin’s movement and camera angles in previs. Data from the previs then drove a motion-base rig on a blue-screen stage. “The actors could react to the movement of the griffin,” Harrington says. “We shot the first pass with Sarah [Bolger] and Freddie [Highmore] playing Jared, and then a second pass with Freddie playing Simon.” Later, animators created the griffin’s performance to match the live-action shots, and composers fit the children onto the griffin’s back, adding backgrounds created in ILM’s digital matte-painting department.

ILM handled other shots that called for Highmore to be “doubled” in scenes with both twins, as well. “The books are about identical twins, and we are wonderfully loyal to the books,” says director Waters, who ruled out using identical twin actors in favor of hiring Highmore for the job even though that meant more postproduction work.

“We did everything on set,” Alexander says. “We didn’t use motion control unless we absolutely needed to, and only a couple shots used bluescreen. And we didn’t bury them behind glass or branches. They cross over each other.” That meant ILM roto artists and painters needed to meticulously remove images of Highmore from one live-action shot and fit him into another. “I think that methodology went a long way toward making the doubling shots look as real as possible,” he says.

Sylphs and Sprites

At the other end of the scale from the griffin and ogre were the sprites and the dandelion-seed sylphs.

The sprites appear to the children when they visit Aunt Lucinda but usually camouflage themselves as insects or flowers. The creature designers created four varieties of flower sprites in different colors, a six-inch-tall water sprite, and

sprites that look like insects from one side and flowers from the other.

“The challenge with the flower sprites was to pose them so they looked like flowers in a flower bed and then figure out how to make them fly,” says Harrington. “They didn’t have traditional fairy or bug wings. They just had flower petals.” Animators solved that dilemma by deciding that the fairies were so light they could push themselves through the air with their petals, much like a jellyfish pushes through water. To move the petals, the crew used hand animation and simulation. “Getting the scattering sense of the petals was difficult,” says Alexander. “They’re very fluid and soft.”

Similarly, hand animation and simulation also moved the tiny sylphs, depending on their distance from the camera. “We see their little heads in extreme close-ups and also see them really far away,” Alexander says. Sometimes the crew used hero models of sylphs with simulated hairs, sometimes they put flat cards onto particles. “Scale was challenging for us,” he adds.

The sylphs appear at the end of the griffin flight, after the griffin lands in a sylvan glade surrounded by wintry, icy caverns. The sylvan glade was a digital environment created at ILM, as were the environments the children flew over on the way, each one representing another season. In addition to those environments, ILM created a full-CG version of the Spiderwick house and various set extensions. All told, 215 artists at ILM worked on 341 shots that occupied 30 minutes of the film.

Goblins

Much of the work at Tippet Studio centered on the goblins and, in particular, a battle scene during which many goblins race toward the Spiderwick house, where the children, in particular Mallory, fight them. The goblins are after Arthur Spiderwick’s *Field Guide*. They look something like giant frogs, but they’re nasty creatures that jab broken glass into their gums because they don’t have teeth.



Industrial Light & Magic designed the insect and flower sprites to hide in flower beds. When they emerge, they fly through the air with the help of hand animation and simulation tools.

On set, Phil Tippett gave crew members foam-core cutouts of the goblins that they manipulated using poles sticking out the back. “In the complicated action scenes, we were careful to make sure the lead goblins had specific color codes and numbers so we knew the location of each,” he says.

At the studio, Blair Clark and Joel Friesch supervised the visual effects, and Todd Labonte, animation supervisor, organized the work of the 28 animators who manipulated the digital goblins, the bullgoblin Red Cap, a troll, and the hobgoblin Hogsqueal.

“The tricky part is that we had a lot of scenes with a dozen or more goblins, which weren’t enough to do crowd simulation,” Labonte says. “They had to be hand-animated. So, multiple animators had to share one shot.” Thus, Labonte looked for ways to break the goblins into separate groups. Often, he had one animator do the basic choreography before putting more animators on the multi-goblin shots.

“Our theory about the goblins is that they’re cold-blooded, like frogs, when they’re at rest,” Labonte says. “Mark’s [Waters] take on them is that they’re the enemy and should be scary. So we used a pit bull mixed with a gorilla for their locomotion style.”

To maintain continuity during the animation process, they rendered the flat-

shaded goblins in Easter egg colors to tell them apart. When rendered in their final form, some would be fat, some skinny, some would have brown stripes, and some would have polka dots. “We wanted to make sure the leopard-spotted guy was in the lead, for example, so we’d draw out little charts showing which one was where during the chase,” Labonte explains.

When the battle begins, the goblins are invisible. As Thimbletack explains early in the film, “You don’t see us, now you do, but only if we want you to.” That is, unless you have a seeing stone.

When they’re invisible, the artists at Tippet replaced the real leaves with CG leaves in the live-action plates, to create the illusion that goblins are running through the fallen leaves on the ground and attacking Mallory. “We used RIB stamping to render out the leaves,” says Russell Darling, CG supervisor.

The RIB stamping technology, with which they can create arbitrary numbers of copies as needed during rendering, also helped the crew insert hundreds of goblins into a scene in which they race through the forest toward the house. For those shots, effects animators put particles representing the goblins on paths and then replaced the particles with a variety of goblins that moved using various animation cycles.

To create the invisibility shield that

surrounds the goblins during the battle, the effects artists used a surface that they moved using Syflex's flesh-simulation software, and then rendered the surface with translucency. A special Pixar RenderMan shader written by lead technical director and lighting supervisor Erin Borland caused the goblins to materialize when Mallory looks through a "seeing stone."

Borland also developed shaders to show the effect of acid on the goblins' skin. "The idea is that things like vinegar and tomato juice basically burn them," says Darling. "Her shader was a three-stage effect that happens really fast." As Darling describes it, the skin initially boils up from the inside, displaces over

technical challenge: clothes. "Red Cap's clothes and his sword are like status symbols," Labonte says. "He spends a lot of time adjusting his clothing, and he never leaves his sword."

Tippett used Syflex for cloth simulation on both creatures, working from real costumes as reference. "We put the costumes on full-size maquettes," Darling says. They also asked crew members' children who were the same height as the creatures to wear the costumes so the simulation artists could see them in motion. "It was interesting to see how the heavy coats flapped around," he adds.

Proprietary software helped refine the cloth simulations by automatically fixing such problems as sleeves pocking into Red Cap's porky body. Despite his porcine appearance, Red Cap is one of the nasty fairies. "At one point, we were going to have Mulgrath execute Red Cap, but Red Cap was so intriguing, we kept him," says Clark. "But, we wounded him during the sword fight with Mallory. She slices him across the face, and the next time we see him, his eye is cataractous and

the old *Zorro* series," says Clark.

For animation reference, however, Labonte thought about Hogsqueal as a raccoon and also referenced John Belushi in *Animal House*. "He is sort of a con artist," Labonte says. "He's at home in the fairy world and also in the human world. The other creatures are animals, but he's smarter, although he's not well versed in the social graces."

Troll

Certainly not well versed in the social graces is the 50-foot troll, one of the most threatening creatures in the film. The malicious troll crashes through a tunnel as it chases the children during a fast-moving, teeth-flashing action sequence. Originally conceived as a crocodile-like water troll from the books, the crew eventually redesigned it into a dragon crossed with a dinosaur as the script changed.

As with the other creatures, Tippett took character design cues from nature to reinforce the notion that these creatures could exist in the real world. "Joel [Friesch] modified [the water troll] by replacing his webbed hands with dinosaur-like hands, and gave him growths along his back with grass and weeds growing out of them as his camouflage," says Clark.

By grounding even such creatures as a troll in nature and integrating them into the live-action story, Phil Tippett distances this intimate family film from what he calls "spectacle" films. "Spectacle films for the sake of spectacle bore me," he says.

It isn't likely that *The Spiderwick Chronicles* will bore anyone. ILM's enchanting flower fairies and sylphs, naughty Thimbletack, the monster Mulgrath, and the dramatic griffin are unique, as are Tippett Studio's troll, bullgoblin, hobgoblin, and goblins, and there's plenty of action, but it all lives within the story. ❖

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Tippett put digital clothes on the hobgoblins after testing real costumes on full-sized maquettes and children so that the crew could see the cloth in motion.

time, and changes to darker colors until it eventually looks like the bottom of a pond that has dried up. Painted maps designated the burn areas. For skin and muscle simulation, the crew used cMuscleSystem for Maya developed by Comet Digital and now owned by Autodesk. "Our rigging department augmented it with tension controls to blend body-part shapes," Darling explains. "We could paint a map to indicate where skin should be tighter or looser on top of the muscles and then run the skin simulation in Maya."

Red Cap and Hogsqueal

The more evolved goblins—the bullgoblin Red Cap and the hobgoblin Hogsqueal, which, unlike the goblins, are bipeds—provided the crew with an additional

he has a scar across his face." Clark got the idea for the scar from the nasty scar on Kirk Douglas's face in *The Viking*: "I always thought that was so intriguing and cool."

Unlike Red Cap, the porky Hogsqueal is jovial. As with most of the characters, rather than start with drawings, the studio worked with Mark Newman, a sculptor in nearby Oakland, California, to develop the design. "When you have a lot of people inclined to help with a design, you can get a lot of voices," says Tippett. "I prefer finding a really good sculptor and trying to nail the design in 3D."

To give Newman reference for the jovial hobgoblin, the studio provided photos of actors and characters from film. "We ended up with a lot of pictures of Sgt. Garcia from