

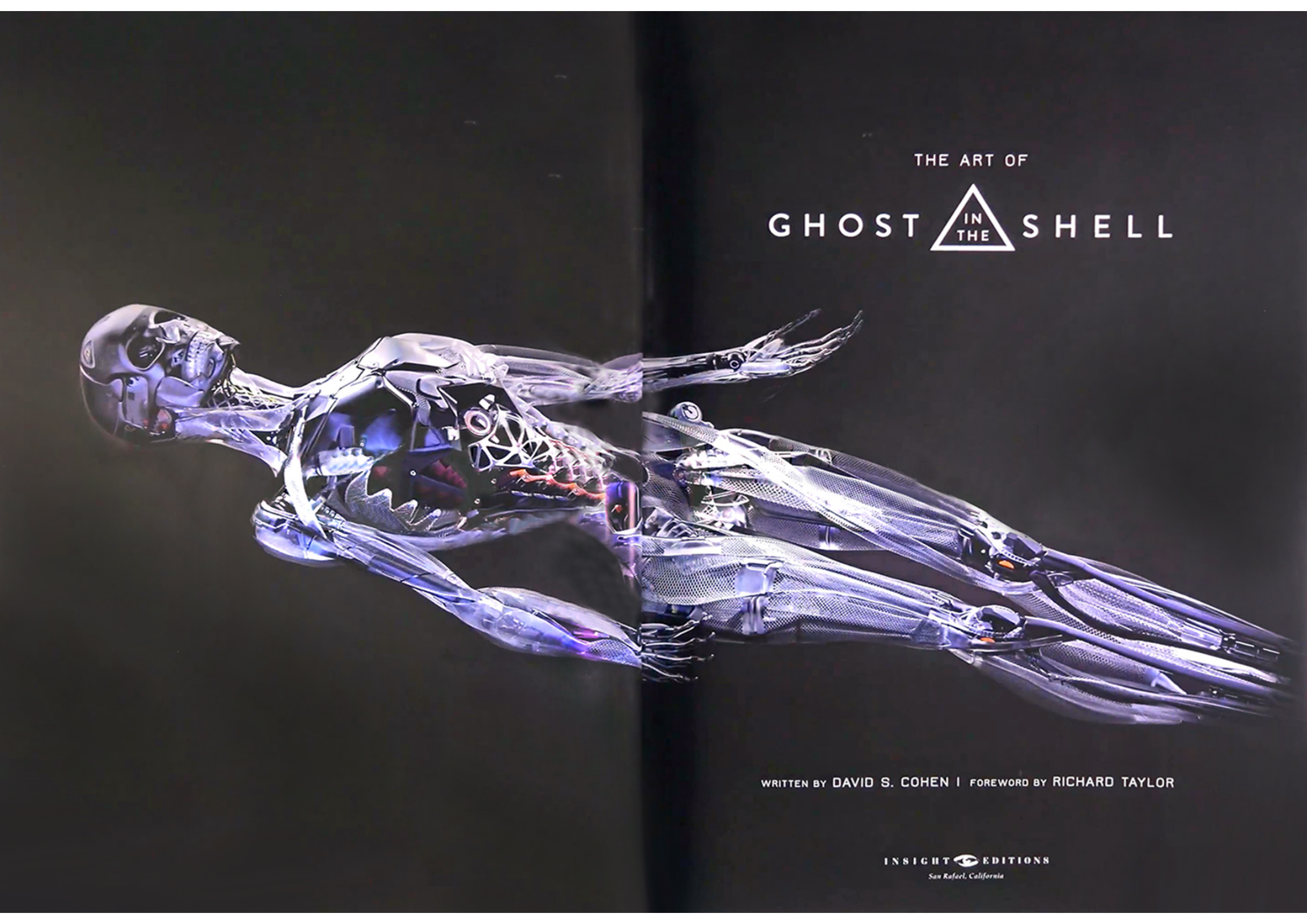
THE ART OF

GHOST IN THE SHELL

WRITTEN BY DAVID S. COHEN | FOREWORD BY RICHARD TAYLOR



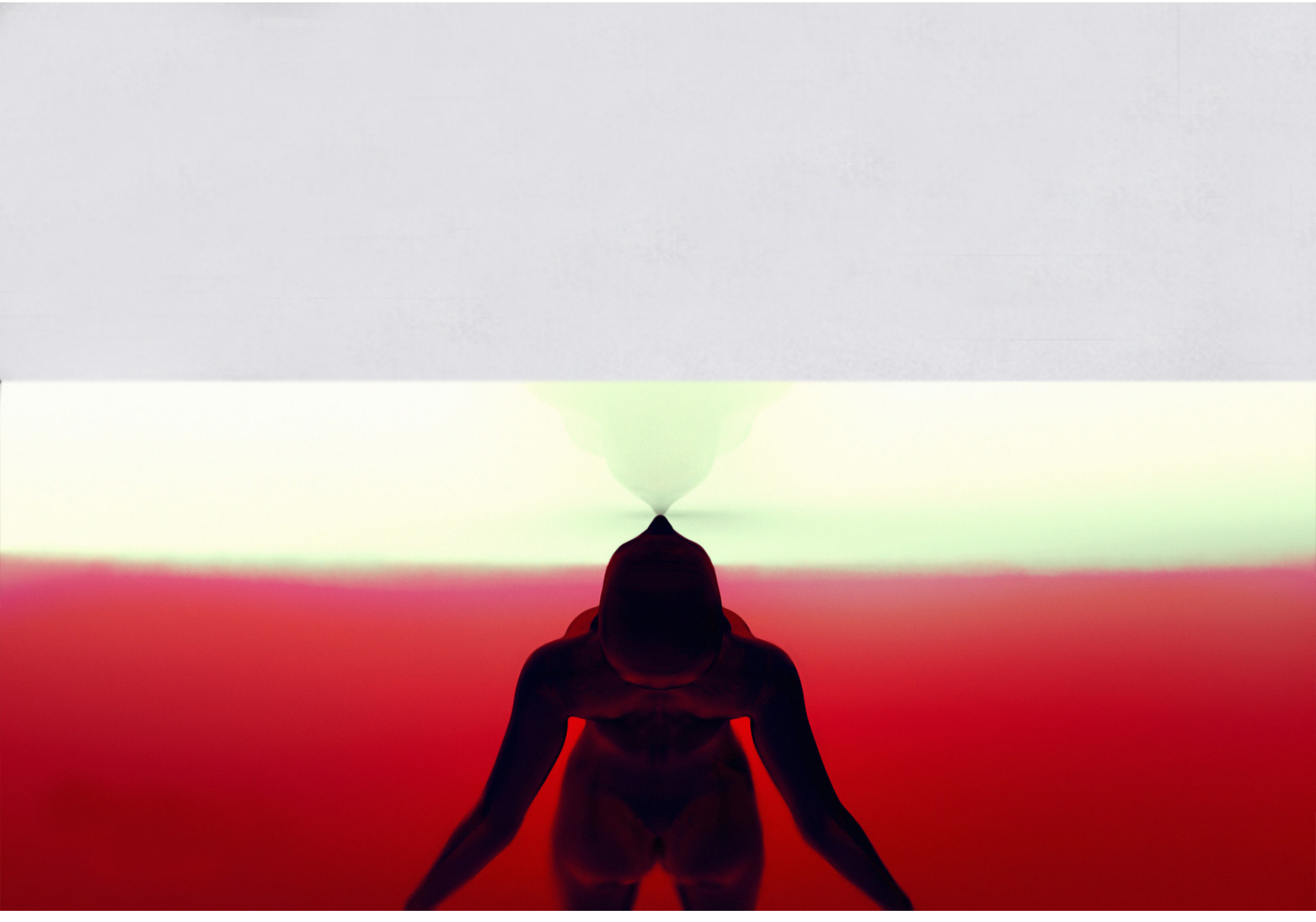
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INSIGHT EDITIONS
San Rafael, California





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FOREWORD

Respect is the word we had front of mind as our team embarked on our part of the concept design for the live-action *Ghost in the Shell* feature film. The film depicts a fictional world that has been explored and enjoyed by an international audience numbering many millions over the past twenty-five years. When creating that world on film, it was hugely important to the team that everything be approached in a way that was highly respectful of this rich heritage.

At Weta Workshop, it is fundamental that all our work comes from a place of deep understanding of the source material, in some cases bordering on reverence. So in the case of this project, our team needed to love the world of *Ghost in the Shell* as fans.

ABOVE Richard Taylor at Weta Workshop crafting some of the robot geisha masks that are an essential part of the look of *Ghost in the Shell*.

PAGE 1 Concept art establishes the vibrant visual design of the futuristic city in which *Ghost in the Shell* takes place. (Ash Thorp)

PAGES 2–3 The Major, the heroine of *Ghost in the Shell*, is a cyborg. Her robot body houses a fully functioning human brain, the origin of which is unknown to the Major herself. (Vitaly Bulgarov)

PAGES 4–5 In the "shelling" sequence early in the film, the Major rises to face her own reflection, introducing a visual motif that suggests her own dual nature. (Jeremy Hanna and Ben Hawker)

PAGES 6–7 The city in which *Ghost in the Shell* is set is loosely based on Hong Kong. (Maciej Kuciara)

It was, therefore, fortunate that many of our concept designers had spent much of their adult lives utterly enamored with the *Ghost in the Shell* saga. They provided director Rupert Sanders with their very genuine connection to the source material and were able to direct our wider concept design team in a considered way.

In 1989 Masamune Shirow brought Ghost in the Shell to life through his manga, which explored identity, consciousness, ethics, politics, and privacy at the point when mankind and information technology begin to merge. Mamoru Oshii and his team of talented filmmakers created the anime version six years later. It was an instant classic that influenced an entire generation of creatives.

When Rupert Sanders came to us in 2014 with plans to make a *Ghost in the Shell* live-action film, we were excited that our early conversations centered around making something meaningful; a film with heart that respected what the original creators were trying to communicate about what it means to be human.

The character of the Major is "born," quite literally, in the opening moments of Rupert's film. We see her brain being fused with her cybernetic body. She is presented as the embodiment of the human-technological pursuit and yet she finds herself asking eternal human questions: "Who am I?" "Do I exist?"

It's through projects like this one—where big questions are asked—that Weta Workshop really enjoys the conceptual challenges that best support these unique and complex ideas. We didn't get into the film industry for the "industry" part. Being located in Wellington, New Zealand, we're far removed from this world. We got into film to explore the unknown, to push past the mundane and find greater meaning in the subject matter. We were ready to go on this journey with the Major and to put our collective faith in Rupert. We wanted to embrace the creation of this new chapter of Ghost in the Shell lore. It was our earnest and heartfelt attempt at something worthy of what had come before.

For our crew, getting to work on the concept design and practical effects for this film has been a very special thing indeed, made all the more special by the decision to film it, principally, at Stone Street Studios in Wellington, New Zealand.

Our heartfelt thanks go out to director Rupert Sanders, executive producers Avi and Ari Arad, and producers Jeff Silver, Michael Costigan, and Barrie Osbourne for bringing together an international and local team of incredible artists and technicians in our windswept hometown of Wellington.

What unfolded was a technically challenging process that required intense collaboration. Jan Roelfs from Holland joined as production designer. Richard Johnson from Los Angeles came on as art director. Kurt and Bart from New York took on the exciting task of realizing the costume design. Jane O'Kane and Sarah Rubano collaborated closely with our team on the film's prosthetic elements. During early preproduction in L.A., Rupert turned to the creative brilliance of conceptual designers Maciej Kuciara, Ash Thorp, and Vitaly Bulgarov; their visionary first steps and ongoing design work were fundamental.

The movie was ultimately shot over many months here in Wellington and on location in Hong Kong. A terrific, eclectic, international cast and a talented crew embraced the challenges and technical demands of the production, of which there were many—as is so often the case when you're straining the boundaries of what can be achieved in-camera and in preparation for a significant postproduction process.

It was incredibly rewarding to have the chance to offer Weta Workshop's creativity and manufacturing craft, alongside the great talents of our local industry, to Rupert's vision for this hallowed property.

Richard Taylor
Design and Effects Supervisor
Weta Workshop



OPPOSITE Robot geishas help establish *Ghost in the Shell*'s blend of technology and traditional design. The geishas' costumes seem traditional, but the robots that wear them are unlike anything in the world of 2017. (Nick Keller)

PAGES 12–13 Concept art reveals a stunning *Ghost in the Shell* cityscape, complete with giant "solograms," enormous holograms that seem to be solid rather than simple projections. (Marco Gorlei, MPC)

INTRODUCTION

For more than thirty years, Ghost in the Shell has transfixed audiences. Focusing on a hard-boiled cyborg detective known as the Major, and Section 9, the elite anti-cyberterrorism force she leads, the saga has become one of the most influential in science fiction history.

The Major was first introduced in a sprawling philosophical 1989 manga by Masamune Shirow, which imagined a mid-twenty-first-century world where people routinely have parts of their brains cyber-enhanced, opening the door for cyber-hacking of the mind. In Shirow's cyberpunk-flavored story, Major Motoko Kusanagi, herself a full cyborg with a human mind (or "ghost"), must hunt a particularly dangerous cyber-hacker, the Puppet Master, who turns out not to be a person, but an artificial intelligence created by government agencies—agencies against which it subsequently seeks bloody revenge.

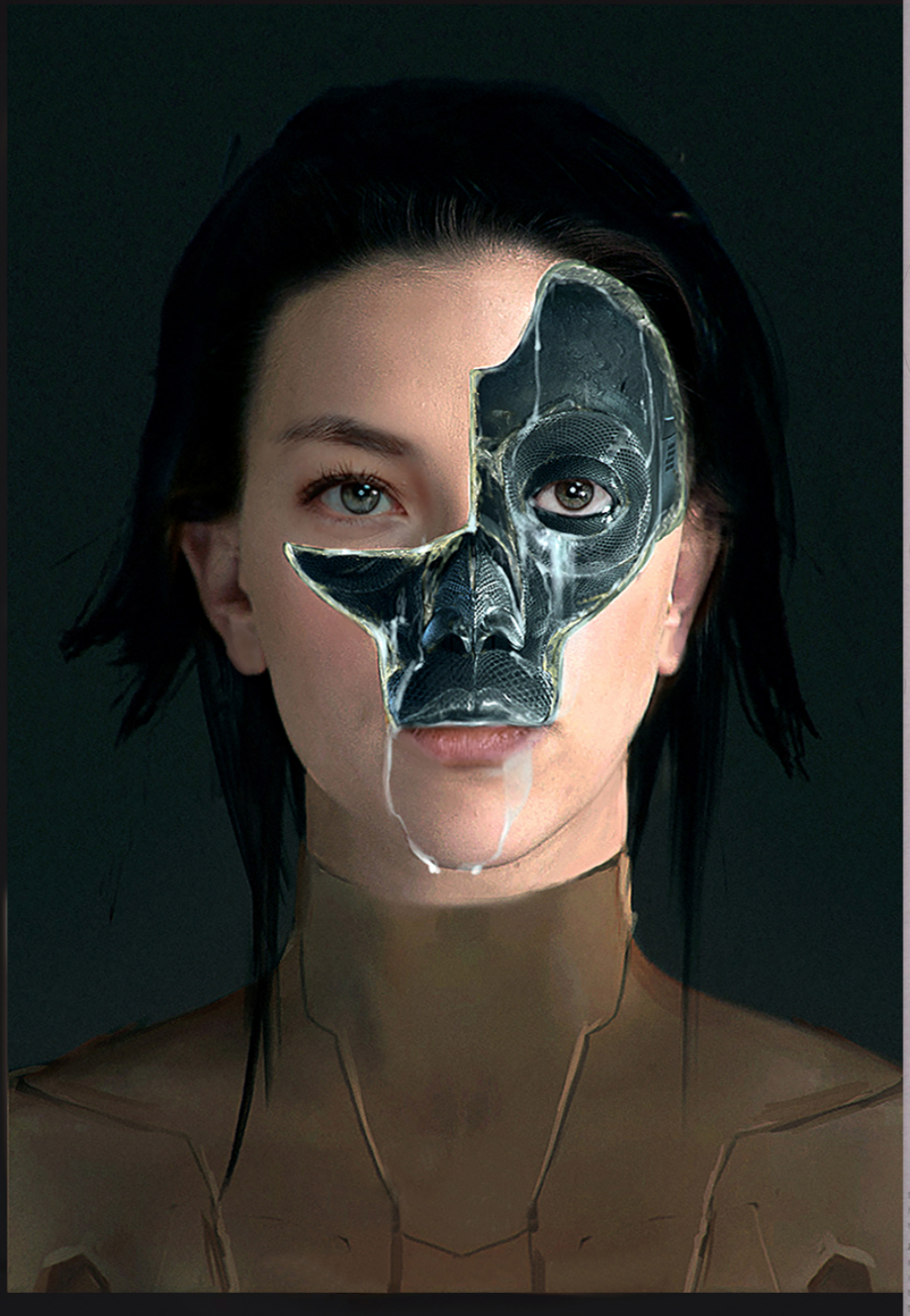
Although the popular manga went on to spawn more volumes, it is director Mamoru Oshii's 1995 anime adaptation that remains the most revered entry in the saga. Oshii's masterful film not only gained a global following but also helped build international interest in anime as an art form. The success of the anime led to a sequel in 2004, *Ghost in the Shell 2: Innocence*, also directed by Oshii, plus a TV series, *Ghost in the Shell: Stand Alone Complex*, and another anime film, *Ghost in the Shell: Stand Alone Complex—Solid State Society*. However, one medium that never received a Ghost in the Shell adaptation was live-action cinema, despite the saga's influence on science fiction moviemaking. Over the years several filmmakers have attempted to adapt the saga into a live-action film, but none of the projects ultimately came to fruition. That is, until 2015, when a team led by producers Avi and Ari Arad (the father-son team behind *Iron Man*) and director Rupert Sanders finally got a live-action version of the story off the ground. Sanders, who'd had a smash hit with his first film, *Snow White and the Huntsman*, had shown he was both a superior visual stylist and able to deliver a thrilling film driven by a dynamic and multidimensional female character.

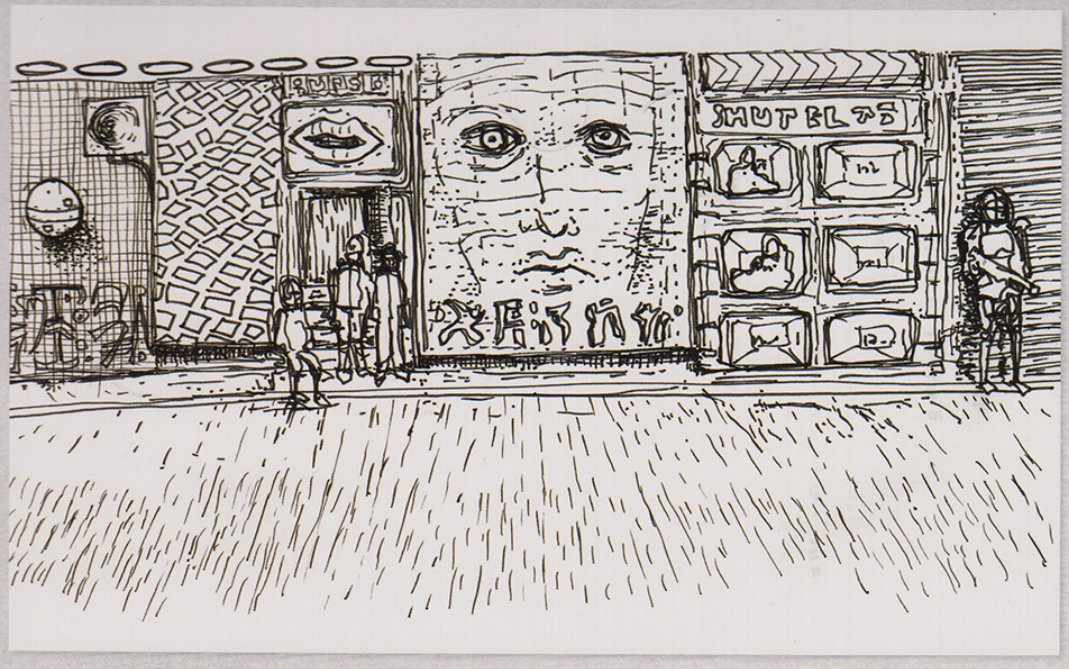
If Sanders had the right stuff for a live-action reimagining of the story, there was also an actress with an incredible filmography that made her a perfect fit for the role of lead character Major Killian: Scarlett Johansson. As Black Widow in the Marvel cinematic universe, she'd shone as an action heroine; as Lucy in Luc Besson's sci-fi action film of the same name, she'd excelled as a vulnerable yet potentially deadly woman evolving into something beyond human; and as an artificial intelligence in *Her*, she'd been charming, enchanting, and yet ultimately nonhuman, and therefore unattainable. Johansson had the allure, the intensity, the charisma, and the acting skills to bring the Major to life.

"There's very few Scarlett Johanssons," says Sanders with a smile. "Globally, there's very few actresses who have that kind of edge to them. She's got a very cyberpunk edge to her. She's tough . . . She showed she could be an action movie star. It's hard to be a movie star and it's very hard to be an action movie star. And she had all of those facets. That to me was the Major."

With Johansson starring and Sanders at the helm, the Ghost in the Shell saga was finally set to get the live-action film it deserved. However, before that could happen, every detail would have to be translated from the existing mythology into a realm of credible reality. Sanders and his team—including production designer Jan Roelfs, costume designers Kurt and Bart, and the artists at Weta Workshop—had to determine what to keep, and what to reinvent. This is the story of how they did it.


ADIPISCIN
損傷





OPPOSITE A study by Jeremy Hanna shows how the Major's synthetic skin overlays the robotic skeleton beneath.

ABOVE Director Rupert Sanders created a series of rough sketches to help communicate his vision for the project to the concept artists. This image shows a typical street from the world of *Ghost in the Shell*, complete with sologrames.

THE HEART OF THE STORY

Between the Ghost in the Shell manga, the anime films, and the TV series, it was clear to producer Avi Arad that there was more than enough material for not just a single live-action film, but an entire cinematic universe.

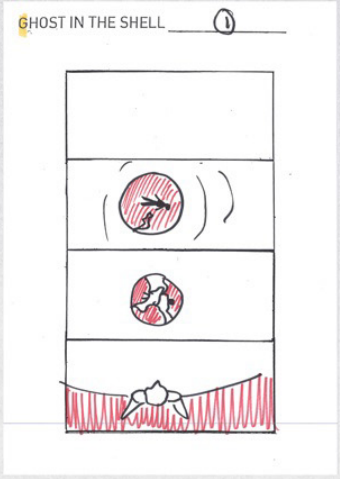
Arad was no stranger to the idea of expansive movie universes. In fact, he'd helped pioneer the idea while running Marvel Studios, the company that introduced the Marvel Cinematic Universe with *Iron Man* in 2008. "It was a very hard thing to do initially," he says. "Nobody wanted to make this [kind of] movie. The studios didn't understand the value. And now it's all they want to make."

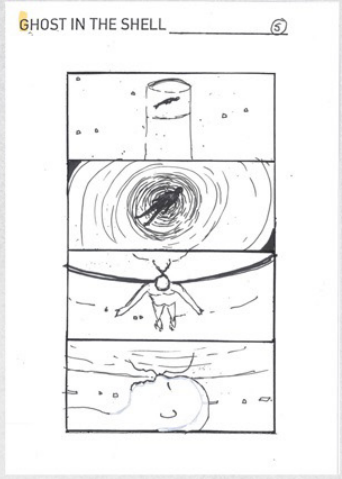
Arad had long been aware of Ghost in the Shell, as his son Ari, who would also come on board as a producer, had been a fan. Once he parted ways with Marvel Studios, Avi decided to pursue a number of hot properties; Ghost in the Shell was at the very top of his list. Tetsu Fujimura, founder of Japanese company Gaga Communications, joined forces with Avi to secure the rights from Japanese publisher Kodansha. It took three years, and, even after they'd reached an agreement in principle, there was another year of working out the contract details. When the deal was finally done, Fujimura became executive producer of the new film.

With Ghost in the Shell now part of Arad's stable, a chance encounter on a Malibu beach between the producer and a filmmaking legend helped give the live-action version momentum.

"I ran into Steven Spielberg," says Arad. "He had his young daughter with him, and I mentioned Ghost in the Shell and to my delight [she] did a somersault, she loved the property so much. That started the ball rolling." Spielberg's company, Amblin, came on board shortly afterwards.

Amblin oversaw the project for several years and developed a script. Along the way, a draft of that script crossed the desk of director Rupert Sanders, who at that time was a successful director of commercials. Sanders's first feature film, *Snow White and the Huntsman*, was not yet released. "I read a draft, and I was like, 'Oh, I'm obsessed with Ghost in the Shell, I'd love to do that,'" he remembers. "I got into it from seeing the animes. It was so atmospheric and it was so spectacularly cinematic, and it took you to such a different world."





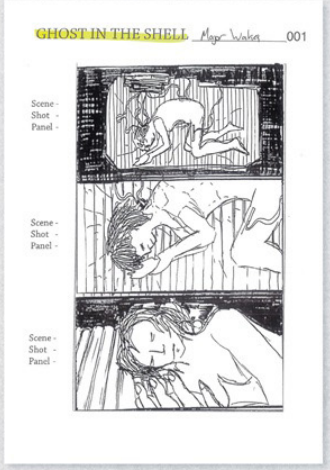


Following the success of his first feature film, Sanders was approached by Spielberg about directing *Ghost in the Shell*. "They showed me the script and it was very different from the original, and [Spielberg] said to me, 'This is where we are.'" In order to articulate his own vision for the project Sanders then created his own graphic novel, a hundred-page comic showing which story beats he would want to hit. "Like a DJ sampling records, I was down in the basement sampling *Ghost in the Shell: Stand Alone Complex*, pulling out pieces and trying to knit them together," he says. "I reframed the story in a way that to me felt more like it was from that world. And then I showed that to Steven and Avi, and everyone liked it." Sanders was soon attached to direct the film.

While the production had found its director, there was still the issue of how to update the story so that it would connect with a broad modern audience. Sanders's graphic treatment wasn't enough to flesh out the entire script, and there was a screenplay to be rewritten. For that, Sanders and his writers dipped extensively into the story material of the previous iterations of Ghost in the Shell, especially *Innocence*.

"It's always hard when you take on a cherished novel, a cherished play, a cherished remake of a film," says Sanders. "It's always that balance of how much do you lift and put in? How much are you inspired by, and how much do you reinvent? So you have to be kind of instinctual." Sanders and his writers went through the material, with the director pointing out concepts he liked and the team filling story holes as needed. "The original [anime], if you boil it down, it's very simple," says Sanders. "So we had to carry the essence of that into a bigger, more worldwide medium."

Certain iconic scenes from the 1995 anime became must-have moments: the Major sitting contemplatively in front of her apartment window, with the city visible in the background; the chase and fight sequence featuring the man in the "thermoptic" raincoat; the heroine's climactic battle with a robot tank.

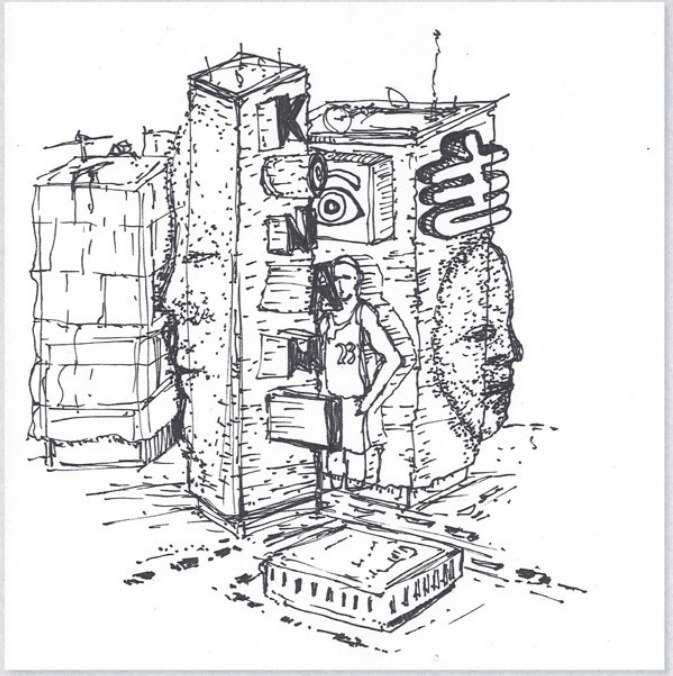


OPPOSITE TOP AND ABOVE Rupert Sanders's sketches for early scenes in the story, including the "shelling" sequence and the Major waking up in front of her window, both scenes well known to hard-core fans.

TOP RIGHT Solograms are used to advertise big-name brands and are sometimes as large as skyscrapers. (Rupert Sanders)

RIGHT A page from Rupert Sanders's personal notebook maps out the Major's story arc.

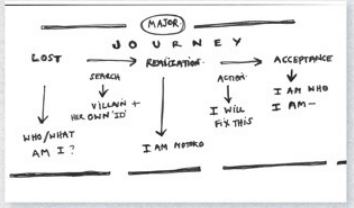
BELOW Concept art maps a bustling street from the world of *Ghost in the Shell*. (Ash Thorp)



But in a larger sense, Sanders says, "The film is very much about the dualism of humanity and technology, and to me it has two stories: the straight detective story, and then the 'Who am I?' [story]. As the Major starts down a path trying to find who the bad guy is, she finds out who *she* is."

Sanders sums it up as "a very noir premise," noting that "a lot of sci-fi borrows from film noir and detective stories, because they're very easy for the viewer to latch onto. Then once you've latched onto the more simple detective story . . . you can start to embellish it."

As in the original anime, in Sanders's film the Major's investigation leads her to uncover the sinister machinations of the government agencies that created her. But the true nature of the hacker she is hunting, his motives, and his relationship with the Major prove different from anything we've seen previously in the Ghost in the Shell saga.

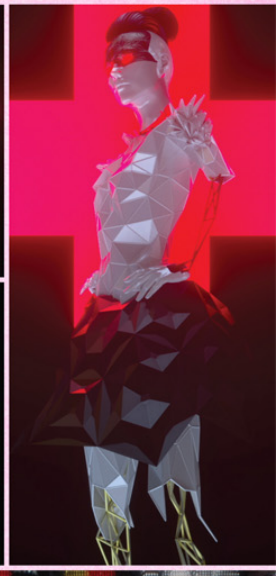


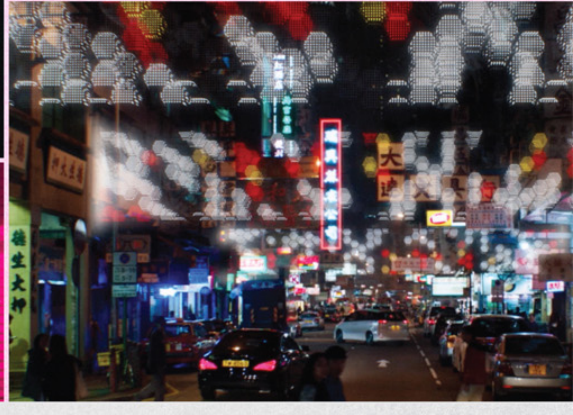














WORLD-BUILDING

While script and story development continued on one track, Sanders dove into the equally daunting task of visual development. The 1995 anime had created a richly detailed unique world that was immersive in ways that anticipated twenty-first-century trends in entertainment, including virtual reality. Sanders's 2017 version would have to be similarly imaginative and present its own detailed world, related but not identical to the animated Ghost in the Shell world. Though the 1995 anime is considered a cyberpunk classic, with its dehumanized high-tech future and its collection of antiheroes, this new live-action version would have its own distinct style; someone on the production affectionately dubbed it "Rupertpunk."

Sanders's vision of this world split from many science fiction trends. "A lot of sci-fi delivers a very apocalyptic vision of technology's role in our future," he says. "I wanted to have something that had hope and optimism for technology. The Major is human and machine, and coexists in both worlds. She is kind of the transcendence into a dual being, so she unifies the two in a hopeful way. At the end, when she's standing on the building, she's telling us 'I am both, and I embrace that.'"









This new Ghost in the Shell world had certain building blocks and rules. Shirow had conceived the story in the 1980s, before ubiquitous Internet, cellular phones, and wireless data networks, so his vision of the future didn't account for any of those inventions.

Sanders's live-action film wouldn't reinvent the technology or history of Ghost in the Shell to incorporate advances in the real world. Instead, it would create a parallel future based on the notion that the Ghost in the Shell universe went one way in the 1980s, while our world went another. Fashions and hairstyles from the 1980s would persist in this Ghost in the Shell universe.

"Creatively, the decision was made that the past is the future," says supervising art director Richard Johnson. "That as society has progressed, there's a tendency to hold on to the past in a big way. So a lot of our stuff is kind of retro-modern." The nostalgic style also made sense for a 2017 audience, observes Johnson. "There's kind of a hip culture today that favors the '80s music, some of the '80s clothing styles, some of the '80s design stuff," he says. "So it seemed to make sense to us to go that way." The on-screen architecture also draws much from 1980s Hong Kong.

Some elements of the film's look will seem familiar to fans: The designs of the vehicles, for example, which also carry a strong 1980s vibe, are very close to those seen in the anime. Other visual elements are inspired by classic twentieth-century architecture from the likes of Oscar Niemeyer and Paulo Soleri. The costumes pay homage to 1980s fashion but add influences from other science fiction films from around the same era.

The film's setting is a deliberately multinational future city inspired by Hong Kong. The creators of the 1995 anime had modeled the city in their story specifically after Hong Kong, so much so that certain locales are readily recognizable to those who know the city. Sanders reveals that to achieve a similar look, artists on his film traced photos of Hong Kong to draw the bones of their city. However, the city we see in the live-action film is not the real-world Hong Kong, despite the similarities. In this future universe, at least two new world wars have rocked the planet, and Earth's four great powers are the United States, Great Britain, China, and Japan, who together have formed a Great Power faction. All these nationalities and more are represented in this new city, so people of all races can be seen on the street.

Cinematographer Jess Hall credits Sanders for anticipating the future in ways beyond even Masamune Shirow's imagination. "It's not going to be a future of separate cultures," he says. "It's a future of hybridized culture, so I think he's very wise to integrate that into the film, and it feels richer for it."

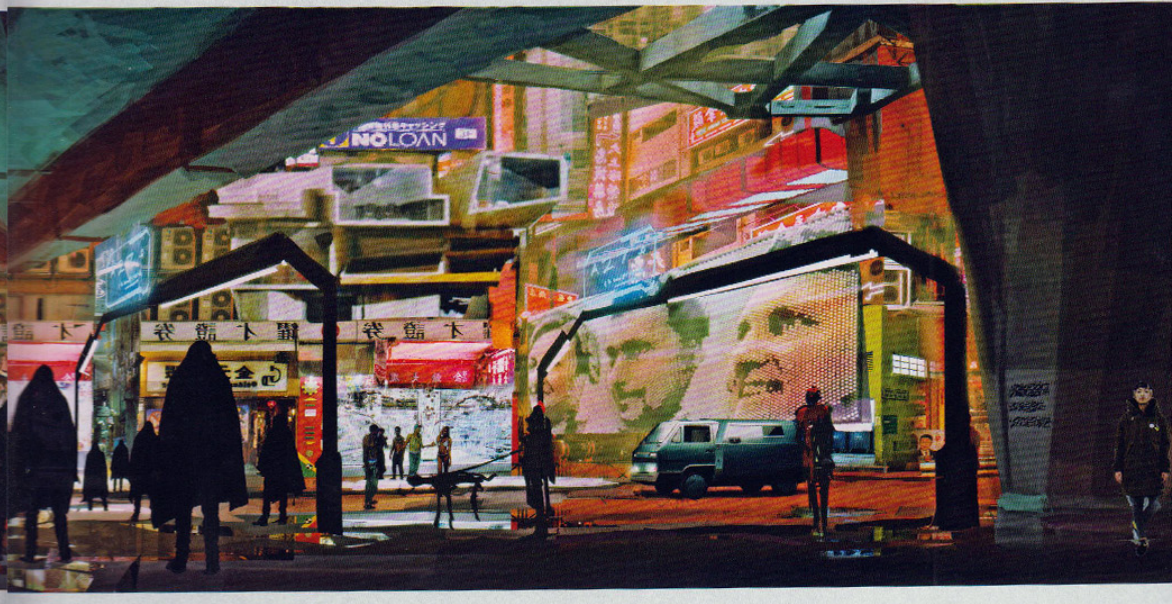
ABOVE The background players in *Ghost in the Shell* show just how far cyber enhancements have penetrated society. With so many people sporting "cybers," there's urgent need for an antihacker force like Section 9. (Leri Greer)

PAGES 18–19 Modern viewers may be used to the juxtaposition of old and new, high- and low-tech, but *Ghost in the Shell* reshuffles those combinations, abandoning some familiar technologies, such as cell phones, while introducing robotics and three-dimensional graphics unknown in the real world of 2017. (**TOP RIGHT** Ash Thorp. **ALL OTHER IMAGES** Maciej Kuciara)

ABOVE Geishas still have a function in the world of *Ghost in the Shell*, but many geishas are either robots or heavily cyberized. (Maciej Kuciara)

BELOW Concept art by Ash Thorp of a night street scene. Even the silhouettes of background players suggest a world related to, but different from, ours.













OPPOSITE The Hanka Corporation popularized cyber enhancements. However, the very existence of Section 9 suggests they're not as safe as Hanka wants the public to believe. (Ash Thorp)

TOP Some *Ghost in the Shell* vehicles are modeled after counterparts from other iterations of the saga, but others were designed from scratch by the film's concept artists. (Ash Thorp)

CONCEPTING

In the early stages of the production Sanders enlisted a trio of top tech-concept designers: Vitaly Bulgarov, Maciej Kuciara, and Ash Thorp. All three are famed for their ingenious, beautiful, and complex technical designs. Bulgarov's website hosts a sci-fi-style "concept design exploration" called *Black Phoenix*, which invites artists to contribute pieces that illustrate aspects of a fictional near-future robotics company. Thorp's work includes a project called *Lost Boy*, which depicts a character who sports costumes reminiscent of *The Road Warrior* and has high-tech bionic limbs; Kuciara has created concept art for several films, including *Captain America: Civil War*, *X-Men: Days of Future Past*, and *Jupiter Ascending*, providing evocative ideas for both technology and environments.

"[They] were the key guys who really helped me articulate the vision," says Sanders. "Vitaly actually designs fully articulated robots in Korea for factories. Ash is more of a graphics designer, and Maciej has a good kind of attitude; he's more of a comic book designer. So the three of them were really good facilitators in doing different facets of the design of the film."

Kuciara and Bulgarov were already working on concepts for vehicle design and the Major's thermoptic suit when the decision was made to move the production from Los Angeles to Wellington in New Zealand. There, Sanders would be working with the multi award-winning Weta Workshop, the Wellington-based design and manufacturing facility co-founded by Richard Taylor and Tania Rodger and famous for their work on the *Lord of the Rings* and *The Hobbit* motion picture trilogies. Not only would Weta Workshop help design the world of the film and provide the stunning physical special effects and makeup effects the company has become known for, but they would also act as a creative partner, helping to develop and design the world of the film.

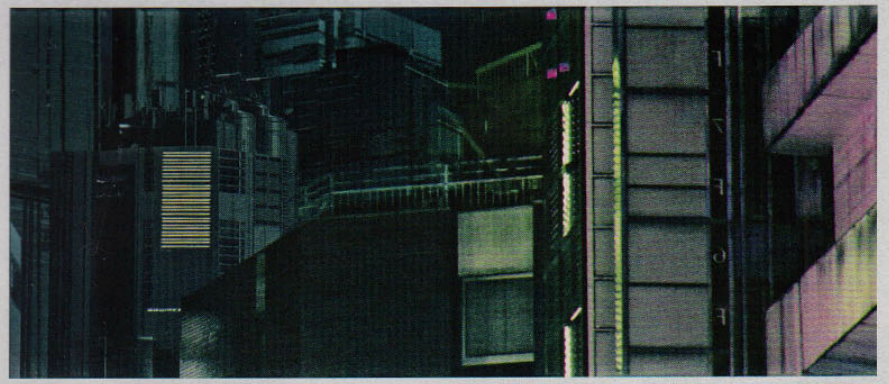
"[It has become] more and more a part of our job. We find that we tend to be world builders and story doctors," says Ben Hawker, a member of Weta Workshop's design team who, along with Leri Greer, was co-concept art director for *Ghost in the Shell*. "And we're quite trusted in that way these days . . . But to the degree it was [the case] on this project, I think it's been unprecedented."

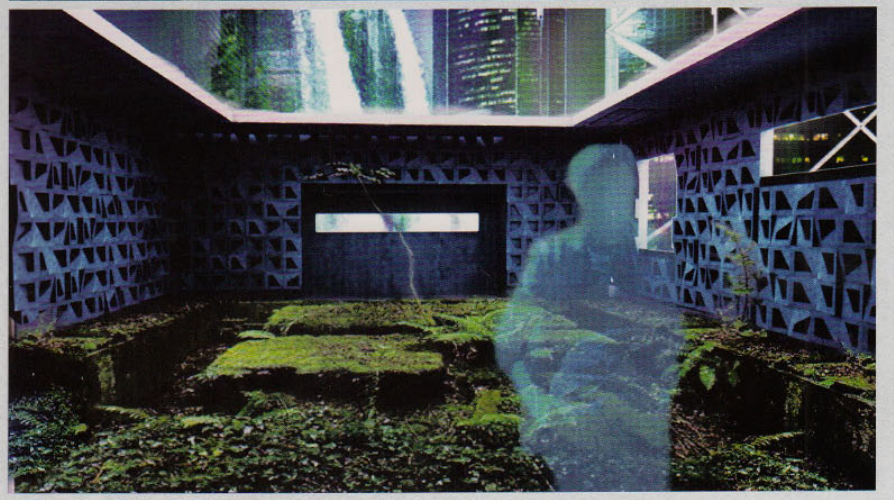
Arriving in Wellington, Sanders found a cadre of experienced, passionate artists eager to help him develop ideas. The Weta Workshop team was already familiar with Ghost in the Shell, not just because many of the artists were huge fans of the saga, but because the company had worked on previous attempts to make the property into a live-action film, including Spielberg's version.

None of that earlier art carried over to Sanders's version, but the artists' enthusiasm for the material did. Ghost in the Shell was a touchstone

continued on page 26

攻殼機動隊
ASH THORP





OPPOSITE Concept art by Ash Thorp shows a large sologram on the side of a building. In addition to their use as advertising devices, solograms also are utilized for traffic signage and telecommunications.

TOP Architectural details of the futuristic city by Ash Thorp.

ABOVE Even the ramshackle urban landscape pulls in elements of Japanese garden design, allowing those who can afford it a retreat from the chaotic world outside.



for several of Weta Workshop's artists, including Hawker and Greer.

Greer, in particular, became the in-house guru on all things Ghost in the Shell, the go-to guy when his fellow artists needed guidance on the correct look and feel of the universe. "You couldn't look for better source material for making a film, especially visually," says Greer. "[Shirow] was obsessed with looking at really interesting tech, combining it with story and then drawing it on the page. It's a very worthy subject matter to try to bring to film."

"Personally," says Hawker, "[Ghost in the Shell] sort of changed my life, seeing it in the cinema in the mid-'90s. I was in my early twenties at the time and I'd never seen anything like it.

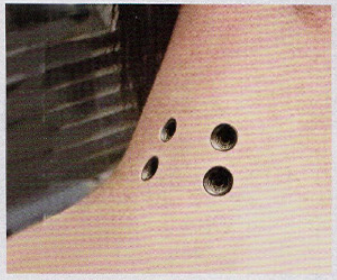
"We were very happy Rupert decided to make a film using the elements of the manga and the TV series and of these anime films, but did not try to do a deliberate remake," continues Hawker. "He'd say, 'Here is the world; here are the pieces; let's tell a brand new story, because nothing is ever going to quite match the magic of that first anime film.' I think it held a special enough place in Rupert's mind and heart and he could see that it held that place in the fans' hearts and minds as well—us included—that he wouldn't want to tread on that in any way."

The Weta Workshop Design Studio became a hub for the design work on *Ghost in the Shell*, helping to unify the visions of Sanders's concept designers and the costume and production designers. The starting point for concept designs was the Major herself. Since she represented a zenith of technology, her look would establish a kind of ceiling, a limit other cybers couldn't exceed. Her appearance would also help define that of her main antagonist, Kuze, as he was a deformed, twisted version of the Major's technology, albeit one who would become more sympathetic as the story unfolded.

ABOVE In the world of *Ghost in the Shell*, having cyber enhancements fitted and updated is commonplace. (Leri Greer with Adam Middleton)

The world of Sanders's *Ghost in the Shell* would be harsh, even unpleasant, by general standards. As in the animated versions, the live-action *Ghost in the Shell* anticipates a world where the line between human and machine is blurring by the day. In this version, nearly all city dwellers are "cyberized" and sport some kind of cyber-enhancement implant. Shoppers browse for enhancements at the cyber store the way today's consumers feed their tech cravings at the Apple Store. Any mental or physical deficit can get a cyber upgrade. "Live faster, fuller, better, more," say the ads. Want to understand multiple languages without years of schooling? Want eyesight like an eagle and hearing like a bat? There's a cyber for that, and the Hanka Corporation, the world's leader in cyber-enhancement technology, is happy to sell it to you. Purveyor of prestige gadgetry that promises to improve your life, Hanka boasts R&D that is second to none, just like its ambition; it created the Major's body, after all. But there's a dark side to Hanka, too, as the Major slowly discovers.

The sight of cyber enhancements might seem grotesque to the audience, yet in this world, cyber enhancements are a new form of conspicuous



consumption, revealing the gap between haves and have-nots. The poor have cheap, black-market cybers; the rich are fitted with the latest and greatest. The ultimate upgrade is an entirely new body: a cybernetic housing for a human brain, which can be perfect in ways that no human body can be. However, as Avi Arad says, "In this movie, we deal with the idea that what is so beautiful about human beings is the imperfections." Those flaws come from the ghost, from the human soul.

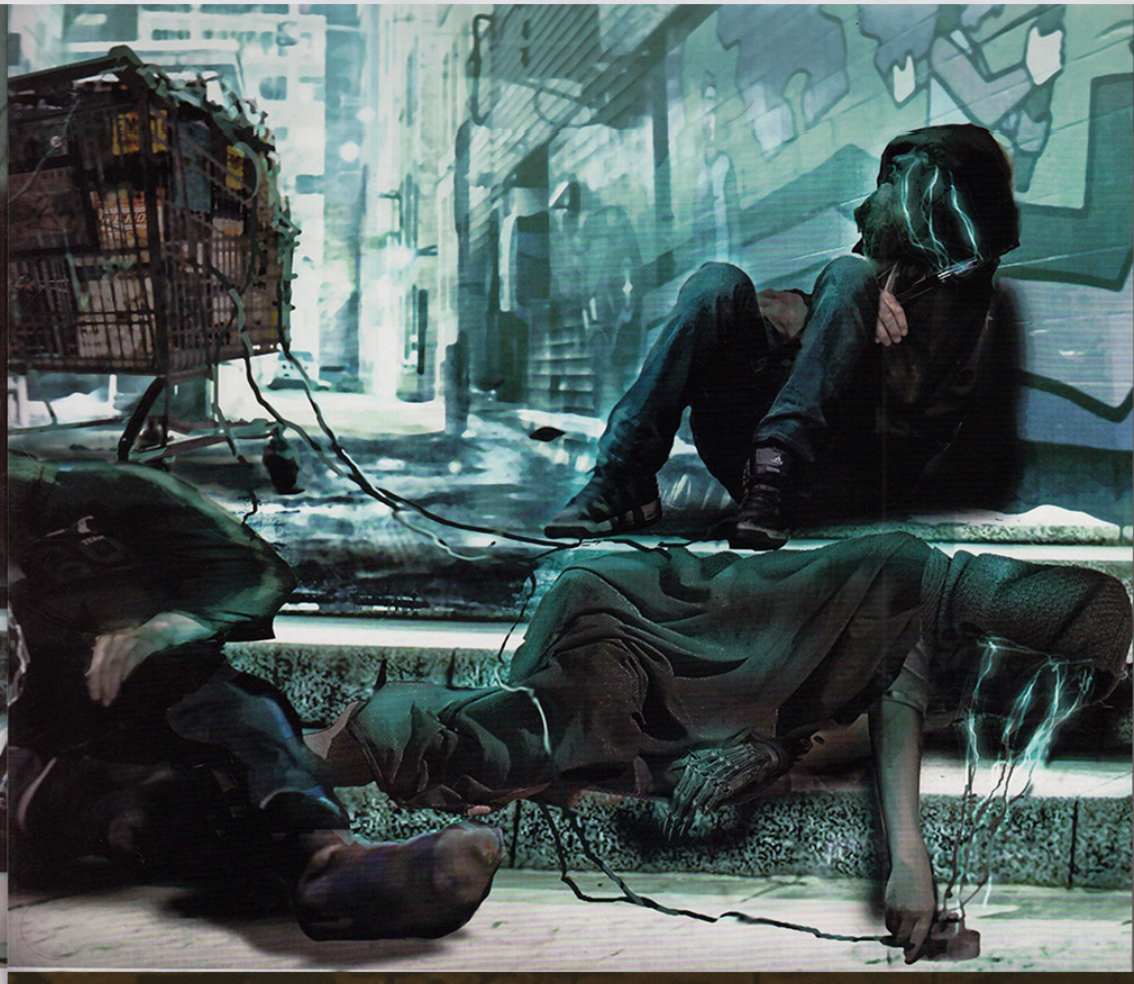
One conceptual problem that the creative team had to address was how deeply cyberization had penetrated society and how many people had enhancements. There were differing ideas about that at first, but eventually it was settled that 80 percent of the public would have modest cyber enhancements, while 20 percent would be extremely enhanced. Within that 20 percent, 1 or 2 percent would be nearly all cyborg—or, like the Major, entirely so. If it seems like that split doesn't leave room for people without cybers, that's no accident. In this world, only rare eccentrics live without enhancements.

Where there are cyber enhancements, though, there will be hackers. In this world, people choose to use cables rather than wireless connectivity because of the danger of having their minds hacked. Sanders wanted a colorful "tech look," says Hawker, to go with the cables and ports on human bodies: "Rupert would say, 'Look, it needs more cables on it. We need to plug something into that or put a port here.' And that would come back to [his] drawing on an illustration or working with the makeup artists."

Sanders's desire to include translucency in the designs added a twist to the concepts. When an object is opaque, the designer may only need to create its exterior, especially if the object is mainly set decoration or part of the background. For translucent objects, though, the designer has to take the interior into account as well, since the object is see-through. That meant more design work for the team, and as a result, *Ghost in the Shell*'s designs became unusually deep and detailed.

That depth extends to the human (and cyborg) body. "Negative space," the absence of something, became important—including the absence of body parts. Kuze, in particular, is missing parts of his body, as are several other characters glimpsed throughout the story. Later in the film, after being injured, the Major herself begins to lose pieces of her body. In each case, the designers had to account for the interior of the body, not just the surface.









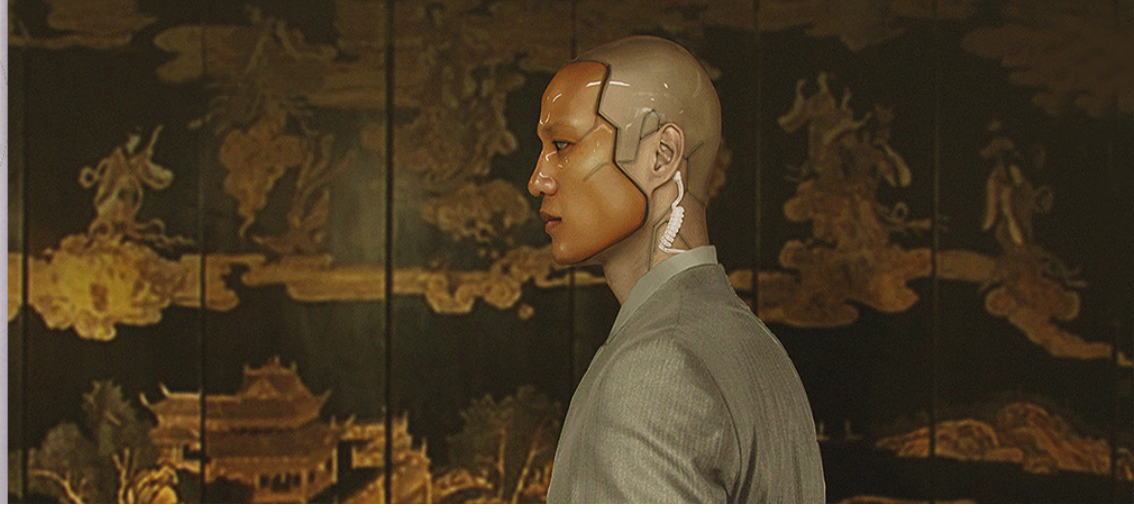
TOP LEFT Data-cable ports in a human neck have long been a part of Ghost in the Shell mythology. [William Bennett in consultation with Sarah Rubano and Jane O'Kane]

LEFT Like the geishas, *Ghost in the Shell*'s gang members combine the traditional, in the form of gang tattoos, with high-tech, in the form of black-market cyber enhancements. [Adam Middleton]

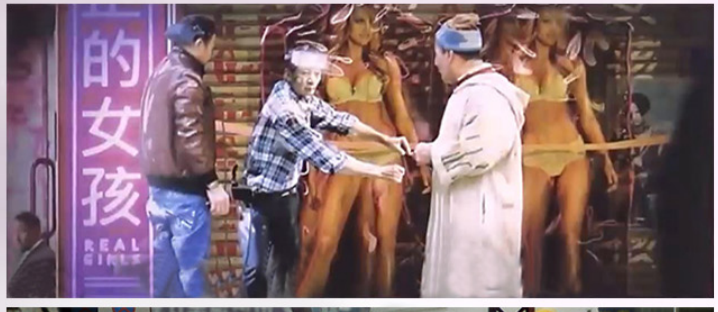
TOP In this concept image, virtual reality has become so addictive that some people have lost control of their own lives in pursuit of the escapism it offers. Note the shopping cart full of batteries, which have been stolen to power the perpetrators' virtual reality addiction. [Greg Tozer]

ABOVE Special effects makeup designer Sarah Rubano carries out a makeup test for a gang member character played by Matthew Jeng.

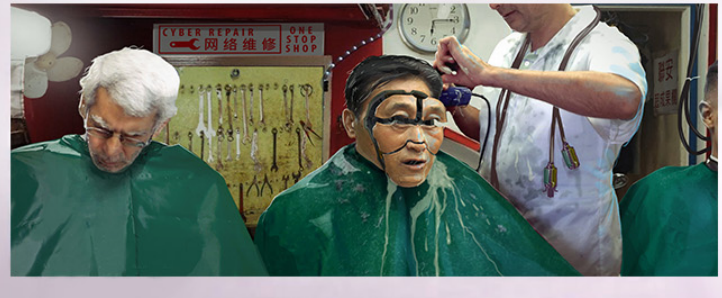
OPPOSITE BOTTOM Hanka employs robotic bodyguards to protect their top people. [Jeremy Hanna]











OPPOSITE Once cyber enhancements become ubiquitous, they also become fodder for fashion. Dreadlocks can look like cables. (William Bennett)

THIS PAGE These concepts show a typical slice of life from the world of *Ghost in the Shell*. (**TOP** William Bennett, **CENTER** Adam Middleton, **BOTTOM** William Bennett)



Sanders showed his commitment to the concept artists by eschewing a private office and instead setting up his desk in their midst, making himself available for frequent consultations. Before the move to New Zealand, he had been working with concept designers Bulgarov, Kuciara, and Thorp for a year, and had a clear idea of how he wanted this Ghost in the Shell world to look. Arriving with pages of images he'd compiled as reference, Sanders soon impressed the Weta Workshop team with his preparedness and clarity of vision. One of his favorite techniques would be to review the artists' test drawings and draw on top of them to augment, rrect, or clarify. "For us to have a director that n communicate through illustration is a very werful tool," says Richard Taylor, Weta rkshop's design and effects supervisor.

"We'd have an overlay on the wall," says nders of the process, "and we'd all sketch stuff d that would go from overlay to sketch to kind rough comp." The outcome of the process was wealth of very detailed concept drawings that eta dubbed "vignettes." These near-photo-alistic images of specific moments from the film included not just the set and prop designs, but the costume designs and the lighting as planned by the cinematographer, and even the background players and their costumes—in short, every element that would be seen on-screen.

Before the process was over, Weta Workshop artists had created over 2,000 concept design pieces, including specialty costumes, characters, weapons, miniatures, prosthetics, and background characters. However, the principal characters would be defined not just by the designers and director, but by the cast who played them.



TOP AND OPPOSITE BOTTOM Even when cityscapes were shot on location, they were transformed to match concepts created by the design team. (Ash Thorp)

ABOVE Director Rupert Sanders would draw directly onto copies of his team's production art to communicate his vision for the project. Concept artist William Bennett can be seen at the right.





CHARACTERS

"There are many stories in *Ghost in the Shell*," says Pilou Asbaek, who stars as the Major's partner, Batou. "All of these characters have a story, which is what makes it [so complex]." Indeed, the characters' history can be read in their enhancements, be it the cyber eyes that become Batou's most distinctive feature, or Section 9 member Ishikawa's mech-liver, which he has implanted so that he can go on frequent drinking binges without dying of cirrhosis.

Movie characters are typically created by a collaboration of writer, director, and actor, with designers chiming in if the character is to be animated. But on *Ghost in the Shell*, Weta Workshop's artists were involved from an early stage, and not just with designing and creating the prosthetics. "That's right down to allowing us the freedom to offer conceptual ideas at an early story-writing level," says design and effects supervisor Richard Taylor. "Rupert's really opened the floor up to all of us to freely share thoughts. He is constantly taking down notes, doing his felt-tip marker sketches as he absorbs and takes on board the greater thoughts of the group." Those thoughts were disseminated to the creative team and often found their way into the script and, subsequently, the characters at the heart of the story.

One of the most notable aspects of *Ghost in the Shell*'s cadre of dynamic characters is the sense that they have been assembled from all over the globe, the filmmakers having put together a multicultural ensemble that gives the film its own unique identity, differing from the manga and anime, which have a distinctly Japanese milieu. The film still has a strong Japanese sensibility, however, through the presence of acclaimed Japanese actors including Takeshi Kitano and Rila Fukushima, but other performers were drawn from all over the world: Scarlett Johansson and Michael Pitt from the United States; Michael Wincott from Canada; Tawanda Manyimo from Zimbabwe (although he's now a native of New Zealand), Chin Han from Singapore, Asbaek from Denmark, Lasarus Ratuere from Australia, and Danusia Samal from England. Other actors in the film hail from Turkey and Fiji.

"But we understand each other," says Yutaka Izumihara, the actor who plays Section 9 sniper Saito, "and creating together with different identities, philosophies, [and backgrounds] is fantastic. The energy to be [together as] *one* is fantastic."

OPPOSITE Scarlett Johansson as the Major. The actress sees Major Killian as a being whose mind-body (or ghost-shell) connection isn't entirely in sync. Her detective story is both a hunt for a criminal and a search for herself.

ABOVE Pilou Asbaek plays the Major's partner, Batou.



MAJOR MIRA KILLIAN

"'Who is the Major?' is a good question," says Scarlett Johansson. "This film is really about the Major's journey of self-discovery." That is literally true. The Major has a human ghost in her robot shell, and appears human, but her appearance is mostly for the convenience of others. She may retire to her apartment at night, but it's to recharge, not to sleep. She may see a doctor when she "glitches," but the doctor is Dr. Ouelet, an engineer, not a physician. When the action begins, the Major does not know who she is, or even that she should be wondering about who she is. She's too focused on fighting cyberterrorism, which she believes is the greatest threat facing mankind. She has no reason to suspect that her own history will prove as important as her mission.

When it comes to the motivation that will drive the Major's quest, the live-action version of *Ghost in the Shell* parallels the 1995 anime. Mamoru Oshii, who directed the anime, says of the Major: "Her feelings and her body are not in sync. She has a fierce, combative side, but inside she has a strong sense of insecurity, which agitates her. She tries her best to hide those anxieties." Worse, says Oshii, she is a cyborg—not human, but not a robot either: "That's why she has this conflict between her mind and body. That's the complexity of this character."

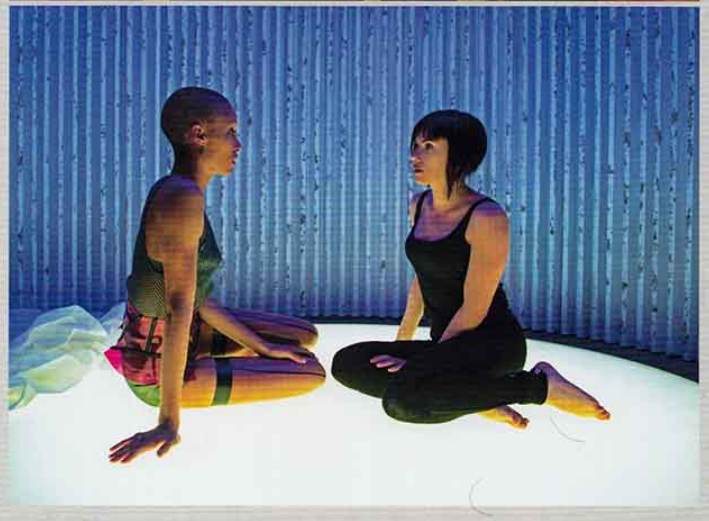
That tension between her mind and body was an acting challenge for Johansson. "[There's] a distance between her brain and her body," says Johansson. "She's not quite *in* herself." Where the connection of a human mind and body is fluid, she says, the Major is experiencing a "ripple" in that connection. "It's been challenging to kind of create that ripple, but it's been interesting."

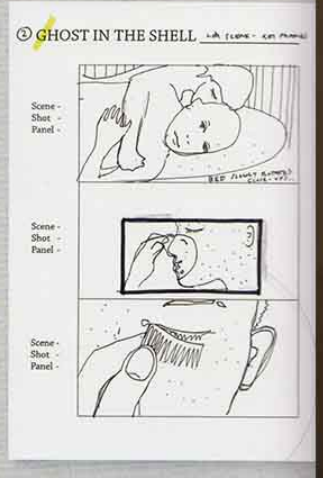
Johansson was a fan of the Ghost in the Shell manga and anime, and as she and Sanders began working together, they saw the opportunity to add touches of humanity to the Major. Those who watched Johansson's work on the film describe her acting choices with words like "curiosity" and "intensity." Yoshiki Sakurai, writer of the *Ghost in the Shell: Stand Alone Complex* TV series, watched her film a scene and was amazed. "She just walks through the alley, but she walks like a tiger—gracefully, beautifully," he says. "But she doesn't know she's graceful, she's beautiful. And she's trained to be like that as a cyborg."

TOP The Major leads her anti-cyber terrorism squad, Section 9.

RIGHT Concept art shows the Major suited up in her tactical body armor. (Adam Middleton)







TOP Rupert Sanders directs Johansson on the Aramaki's office set.

CENTER The Major's search for herself includes exploring intimacy. She may not be able to feel all human sensations, but she vaguely remembers them.

ABOVE A Rupert Sanders sketch outlines the scene where the Major visits a streetwalker.

OPPOSITE This conceptual piece showing the Major's cybernetic skin draws on classic Ghost in the Shell mythology for visual inspiration. [Andrew Baker]





OPPOSITE A poncho concept for the Major by Rebekah Tisch based on costume designs by Kurt and Bart.

ABOVE Concept art by Adam Middleton shows the Major recharging, a process that involves dangling from a series of cables in her apartment.

BELOW Scarlett Johansson as the Major.

As the story begins, the Major is defined mostly by her job as a cybercrime fighter, sent to bring down a lethal hacker who has targeted the engineers at Hanka. She's a superior soldier and tactician, a fearless fighter and the respected leader of her unit, Section 9. But then she comes face-to-face with an adversary who forces her to confront her inner conflict. "Kuze is a sort of mirror for the Major to reflect upon," says Johansson. "She's completely enraptured by him. It's sort of inexplicable until she discovers the truth about her own identity, and her relationship to his character."

That search for identity, to discover one's true self, makes *Ghost in the Shell* a universal story, says Johansson: "The feeling of isolation that we experience as part of the human experience, and then the subsequent connectivity that we all share in unexpected ways, these kinds of themes are always relevant. I think the audience, and certainly even myself as the audience, wants to connect with this kind of story. We want to place ourselves in the character's plight and live the journey through them. That's the magic of connecting with film."

The Major embodies the ultimate dilemma of cyber enhancement: If we replace our bodies with machines, at what point do we cease to be human? Or is there something in the soul, in the ghost, that technology cannot erase? Avi Arad calls the Major "probably the most important individual in this new world, because she was born twice. When she finds out who she is, the question is, 'So what do I do now? I dump the system. I go nuts.'" But Johansson sees the Major's ultimate choice as a heroic one, even though she never chose to be a hero or a crime fighter. "I think that when the character really shines the most is when she is self-sacrificing," she says. "She finds herself in this body, in this circumstance, and by the end of the film, she embraces this decision that's been made for her. She owns the decision to be the Major."

Johansson's fellow actors were aware that the role of the Major would be difficult to pull off but feel that the actress deftly embodied the character. Tawanda Manyimo, who plays Section 9's highly cyberized weapons and explosives expert, Boma, was impressed with Johansson's charisma. "She comes in and just sweeps the room with her personality and her presence," he says. "You can trust that she's going to just nail this, and she does. I think that marries quite well with the character of the Major."

Pilou Asbaek agrees. "To work with her is like going back to school, man," he says. "Every day you learn something new. I kind of like that."

Prior to the role being cast, Mamoru Oshii was concerned that a flesh-and-blood actress would make the character *too* expressive, and bring too much of the performer's personality. But Johansson soon assuaged his concerns. "The movement of her eyes is brilliant," says Oshii. "The way she shows expressions of anxiety in some moments, then switching to her fierce powerful eyes. These transitions are very strong."





SECTION 9

If the Major embodies the promise and potential danger of a cyberized future, her Section 9 team shows how people slide toward that future without necessarily choosing to fully embrace it. Section 9 is an elite Hanka Corporation unit that fights cybercrime, and its members include some of the most enhanced individuals in the world. Johansson calls them "an unruly bunch of pretty tough people—a funky bunch." All are masters of their chosen specialties, and when they come together they become a formidable, unified force, yet their individual styles make them a quirky and colorful group. Manyimo says that despite the darkness of their work, "There's still a cheekiness there, there's maybe a frivolity, a poking of fun."

The Section 9 actors trained together, lived at the same place during training and shooting, and bonded throughout. Lasarus Ratuere, who plays Ishikawa, says, "That constant time together, constantly pushing one another at training and motivating and being in each other's ear, and just watching each other's development, not only physically but spiritually—it acts as a terrific glue. It takes the relationship and the chemistry to a different level."

TOP LEFT Concept art by Maciej Kuciara shows Section 9's armored assault vehicle.

CENTER Section 9 logo concepts by Leri Greer.

OPPOSITE Section 9 may be an antihacking force, but its cyber-warfare involves plenty of combat. Its team members are specialists and are all individualistic, right down to their choice of augmentation.

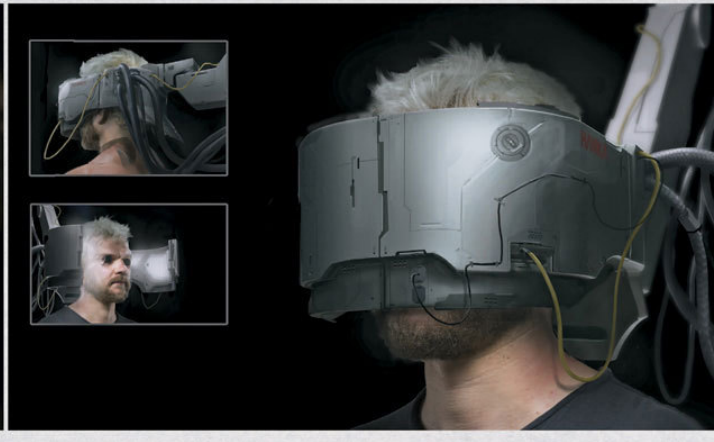
BELOW Section 9 member Togusa (Chin Han) drives Section 9 on another dangerous mission.













OPPOSITE Batou (Pilou Asbaek) in the midst of a deadly shootout with cyber-hacked suspects.

TOP LEFT Weta Workshop character concept art shows Batou with a cyber arm fitted to replace his original arm, which, according to his backstory, he lost in combat when he was a Ranger in Section 4. (Jeremy Hanna)

TOP RIGHT Batou receives his cyber eyes via this piece of high-tech cyber equipment. (Dane Madgwick)

ABOVE Weta Workshop prosthetics supervisor Jason Docherty applies eye prosthetics to Batou actor Pilou Asbaek.

BATOU

The Major's partner and second-in-command is ex-military, a ruthless and experienced killer, and yet also the heart and soul of Section 9. "He is the character that people would relate to," says Pilou Asbaek, the Danish actor who plays the role. "That's one of the reasons why it was so important for me that he eats pizza, he drinks beer, he loves dogs: these basic things that I personally can relate to and hopefully the audience will as well."

Perhaps Batou's humanity is what draws the Major to him. "I think when the Major is with Batou, it's the most human she feels," says Asbaek. "She feels protected, emotionally, when she's with him. She trusts him, and she probably doesn't trust that many people." Batou is the one person with whom the Major shares quiet moments. "He reminds her of the life that she perhaps once had or that could be possible," says Johansson.

Asbaek says the manga has been his bible for playing Batou. "I'm going back to 'Who is he?'; 'Where is he from?'; and 'What does he want?' Very, very simple questions you use as an actor . . . [Batou] 'lets the fist talk'—I don't know if you can say that in English, but it makes sense in Danish."

Is Batou in love with the Major? Asbaek thinks so. "Major is the one who got away from Batou," he says. "It says so much about Batou that he falls in love with a cyber, he falls in love with a ghost in a shell, and that she's the only one he can connect with, and vice versa." Yet whatever romantic longings Batou may carry for her, or her for him, the two do not act on them. "If you look at the anime and you look at the manga, the strongest love is the unspoken love," he says.

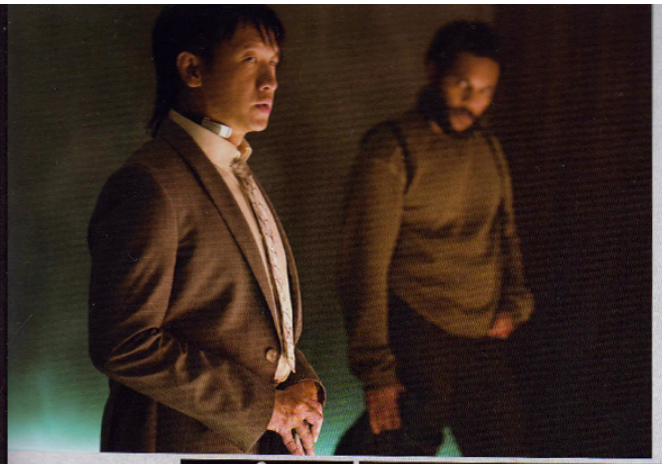
The Batou of the 1995 anime has cyber eyes. In this live-action version, fans will see how he gets them. The cyber eyes may be an enhancement for Batou, but for Asbaek, who had to wear prosthetic pieces over his eyes throughout the shoot, they were anything but: "Your peripheral vision is like zero, so I couldn't see that much," he says, adding that this "makes the fight bits very difficult because I had no idea if someone was attacking me. But you know, as long as it looks cool!"

Sanders calls Asbaek "a great find" and "a great actor." "He nailed it so quickly," says the director. "We work long hours and when you're wearing prosthetics, it's brutal. And our schedule was kind of quite manic."

Batou's cyber eyes were no easy job for the artisans at Weta Workshop. When a prosthetic goes over a human eye, it has to provide room for the wearer's eyelashes to move. "If you just put your own finger against your eyelash and hold it there for a couple of minutes," says Richard Taylor, "it will drive you crazy because your lashes are being agitated." But any prosthetic that provides clearance for lashes sits far off the actor's face, and Sanders didn't want that, says Taylor. "He wanted the eye pieces to feel like they were buried into the sockets of the actor's eyes. And that simple thought—let's just put round, goggle-like prosthetics on the actor's eyes—was a really, really interesting problem to solve." They cracked it by making a life cast of Asbaek's face with the eyepieces in place, then building a makeup design from that, making it look like the eyepieces were embedded in his eye sockets.

"There will be some whirling and twirling of the lenses done in CG later," says special effects makeup designer Sarah Rubano, "but [the eyepieces were] practical. And that was a pretty amazing thing to conquer and maintain over the course of shooting."





TOGUSA

Togusa, played by Chin Han, is the other member of the group with no cyber enhancements. "He can't quite understand why people want to be cyber-enhanced," says Chin. "He's suspicious of anything that is a very cybernetic or technological." In addition, his suit and tie, and even his choice of weapon—a distinctive Mateba revolver instead of a bigger, higher-tech submachine gun—mark him out as something of an anomaly on the team. Chin even picked out a vintage digital calculator-watch he remembered from his own boyhood as part of Togusa's low-tech wardrobe. "It was the coolest thing in the world," he says "So that's how we built the character from the ground up, piece by piece."

Togusa and Batou often rely on each other—Batou for Togusa's intuition, Togusa for Batou's strength and physical abilities. "It's a classic good cop/badass cop relationship," says Chin.



adriya is a character created for the live-action ovie. In previous versions of the Ghost in the Shell tory, Section 9 has been depicted as an all-male rce, aside from the Major, and so the introduction f this additional female agent is a first.

"She's pretty tough," says Danusia Samal, ho plays the new character. "She'll sneak in to rovide weapons if someone's on a mission. If he's got a knife, she can do a bit of knife combat. he will shoot you and ask questions later, she's hat kind of girl . . . She's got a good sense of umor despite being tough."

Being physically smaller than some of the ther team members, she compensates by being ast, stealthy, and able to operate in tight spaces. Because I'm a little bit smaller, I'm the one ho kind of darts about," says Samal. Since the haracter is new, that gave Samal and the team ree rein to get creative and incorporate what-ver elements they felt would work—the actress's ondon accent, for example. "We've worked with hat she has," says Samal. "It's cool we get to ake her up from scratch."

PPOSITE TOP Legendary Japanese actor-director akeshi Kitano proved an inspiration to his astmates.

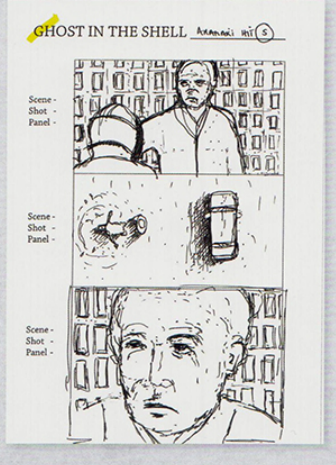
PPOSITE LEFT A storyboard sketch by Rupert anders explores the scene where Cutter's ection 6 team make the mistake of trying to mbush Aramaki.

OP Chin Han as the resourceful Togusa. asarus Ratsure as Ishikawa can be seen in the ackground.

GHT Ladriya, played by Danusia Samal, lends ection 9 some stealth.

OVE Concept for a cyber enhancement on adriya's right hand. Ladriya is an explosives xpert and, according to her backstory, this cyber as fitted after she lost a piece of her hand in an OD accident early in her career. [Adam Middleton]





ARAMAKI DAISUKI

The Major is the field leader of Section 9, but not its commanding officer. The burden of command, as well as the responsibility of mediating between Hanka and Section 9, lies with Aramaki Daisuki. Aramaki has more than thirty years on the job, and he brings a traditional sense of duty and honor to his work. To get a sense of who Aramaki is, just look at his gun: a vintage Smith & Wesson (old-school) in a leather holster tooled with samurai designs (older-school). He is traditional in another way, too. He is one of only two members of Section 9 with no cyber enhancements.

"The original human emotions within him haven't necessarily caught up with the evolved futuristic setting," says Takeshi Kitano, who plays Aramaki in the live-action film. "The times move forward at an amazing speed, but he has the stub-bornness of retaining his more human qualities."

Kitano is a legend at home in Japan, where he is best known by his stage name, Beat Takeshi, and revered as a comedian, TV host, director, and writer. His blistering performances in films such as *Zatoichi* and *Violent Cop* have brought him international acclaim, and in 1997 he won the Golden Lion at the Venice Film Festival for directing the crime drama *Hana-bi*. Needless to say, the cast and crew of *Ghost in the Shell* were well aware of his reputation and legacy.

Sanders had been an admirer of Kitano for many years. "When I first got excited by the idea of [casting Kitano], there was no other name for Aramaki but his," he says. Once he was on set with the actor, Sanders was impressed by the subtlety of his work. "You see it a little bit when you're directing him, and then when you look back and you see dailies, you're like, 'Wow, there's so much going on there.' He can really do so much with so little." Sanders reveals that when Kitano first came onto the set, the actor was a bit baffled: "He was like, 'I don't know what's going on. I'm in New Zealand in an abandoned paint factory, no one speaks Japanese, what am I doing?' Then, later, he was like, 'I love this!' He really got into the world. And then I showed him a couple of scenes of his and he was very happy."

Johansson says Kitano was as much a leader for the cast as his character is on-screen for Section 9: "There has to be a leadership quality to him, a strength, a kind of command, and Takeshi brings that with him just on set. [He is] a very artistic character. He's quite theatrical. He's got this really commanding presence about him.

"And of course, being the commander of Section 9," she adds, "he needs to have a kind of a bite to him, which Takeshi does. Not in a bad way, in the best way."



ISHIKAWA

Ishikawa is Section 9's intelligence and information technology officer. If Section 9 exists to fight "black hat" hackers, Ishikawa is Section 9's loyal "white hat" answer. He is an expert at deciphering code and intercepting messages.

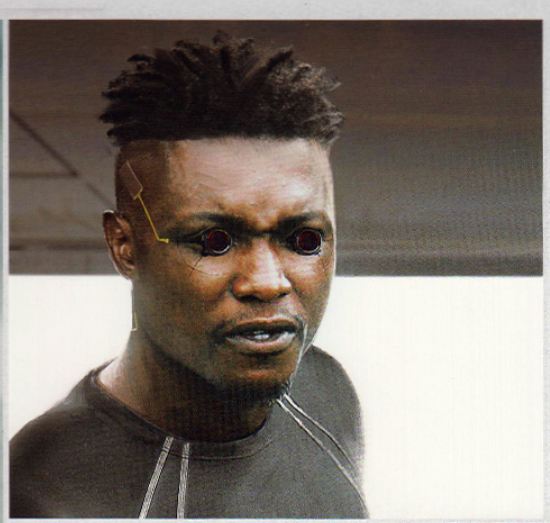
He gets a few chances to shine and show off his IT skills, says Lasarus Ratuere, who plays the character. "There's a nice little moment where he gets down and dirty, and gets under the Section 6 skin with his little pieces of technology." Ratuere reveals there was talk of having Ishikawa be shot to death in this story. "There was a question mark over it, in terms of 'Oh, he might be coming back to life as a cyborg.' But now he doesn't die. He's still functional and available to continue on, which is a great thing."

ABOVE Ishikawa, played by Lasarus Ratuere, unl
hell when Section 9 comes under fire.

OPPOSITE TOP LEFT Concept art depicts the formi
Boma, who here has augmentations that pay ho
his appearance in previous entries of the Ghos
Shell saga. (Adam Middleton)

OPPOSITE CENTER Yutaka Izumihara as Saito.

OPPOSITE BOTTOM In Section 9, Boma (Tawanda Ma
the muscle but sniper Saito (Yutaka Izumihara) is
even more lethal with his cyber "hawkeye," whic
him to pinpoint targets from a great distance.



BOMA

Boma, portrayed by actor Tawanda Manyimo, boasts many enhancements, including cyber eyes similar to Batou's and enhanced strength. "He's full-mecha," says Manyimo, "so he plugs in and recharges," just like the Major. As in the previous versions of the story, where his name is sometimes romanized as "Borma," Boma is physically intimidating. "With Batou, he's the biggest guy in Section 9," says Manyimo. But where Boma has previously been depicted as Caucasian or Japanese, in this film Boma is African, a decision that fits with the global approach to casting the Section 9 team.

"This is a guy who fought in the last world war," says Manyimo. "He's a soldier, he's huge, and there's kind of a steady rhythm about him, even [in] the way he speaks.

"And he's got the biggest shotgun," the actor adds with a laugh.

SAITO

Saito is a sniper by trade, enhanced with a cyber "Hawkeye" linked to a surveillance satellite and a cybernetic arm that lets him handle heavy weapons with ease. These high-tech augmentations make him a lethal sharpshooter who regularly brings down a target with a single shot—often making shots that a regular human could not.

Saito was in the First American War, quit the military to become a mercenary, and then quit being a mercenary to work for Section 9. He's played by Yutaka Izumihara, who says he wants to carry over elements of Saito's character from other entries in the Ghost in the Shell saga, including his thirst for righteousness and justice and his suspicion that the authorities are corrupt.





KUZE

The mysterious hacker facing off against Section 9, Kuze, is a new take on the antagonists Major Killian faced off against in the anime features and TV series. Actor Michael Pitt, who is playing the part, calls the character a combination of the Puppet Master from the original anime, the Laughing Man from the first season of the *Stand Alone Complex* TV series, and Hideo Kuze from the second season. But those characters are very different from one another—an artificial intelligence, a hacker with a fascination for the works of author J. D. Salinger, and a cyborg. Which villain is Kuze? And is he really a villain at all?

Pitt doesn't like to pin that label on him. "I think one of the things that makes the script really unique is the fact that he is viewed as the villain in the first half of the movie and maybe less so in the second half." Indeed, Kuze isn't a straight-up baddie; he's been wronged in ways that the Major will need to uncover to fulfill her mission—and her destiny.

Sanders's specific vision for Kuze evolved during prep, in part as a result of Pitt's contributions. Sanders pictured someone like David Bowie in *The Man Who Fell to Earth*, a withdrawn figure with orange hair. The Kuze they ultimately developed is a menacing figure, at least at first, but a physically fragile one. Conceptually, he reflects the Japanese art of *kintsugi*, in which broken pottery is mended with golden seams so that the repaired piece, with its imperfections, is more beautiful than the intact original was. "We went with this concept for Kuze because, as a cyborg, he could be built perfect, but he doesn't aspire to be perfect because he aspires to be more man than robot," says Richard Taylor. "So we used the idea of broken Japanese porcelain becoming integrated into his cyborg body. It's a very radical, crazy idea, and we developed it along with Rupert and Michael." Kuze's broken pieces also convey vulnerability, says Weta's workshop supervisor Rob Gillies, so his makeup and prosthetics draw on the look of weathered, fatigued machines. "He has a huge sort of intellectual prowess, but he is also very fragile, and that fragility we tried to portray through his costume and his look," Gillies says. "So we started out with designs of his upper body being breakable, and at some parts sort of put back together, like he'd repaired himself to some degree. So he wasn't completely immortal; he actually had a frailty about him."





ABOVE The image that adorns Kuze's chest was based on drawings by Kuze actor Michael Pitt, including this original sketch.

LEFT This study of Kuze's face highlights the way in which the character clings to the last vestiges of his humanity, despite the horrific changes that Hanka has wreaked on his body. (Jeremy Hanna)

OPPOSITE Along with holding on to his humanity, Kuze attempts to hold on to his cultural roots through the art that adorns his new body. (Jeremy Hanna)











Pitt had done his own drawings of Kuze, and eventually insisted that the character should have silver-blue hair. "Then he turned up and it looked amazing," says Sanders. Pitt says that finding the character of Kuze was challenging, simply because the science fiction genre removes the limitations people face in everyday life and makes so many acting choices possible. "It's kind of like an open door," says Pitt. "I mean, you can do anything." So the actor invented "pages and pages" of backstory for Kuze. "He was such a strange character," he says, "that I just didn't know any other way to do it."

Pitt also created rules for how Kuze would move, drawing on modern dance, ballet, and boxing. Before takes, he'd listen to legendary trip-hop group Massive Attack to get in the right mind-set, taking inspiration from the group's hypnotic, cerebral sound. Johansson found herself appreciating the intensity Pitt brought to the role. "It's really difficult to get anything past him," she says. "He really catches everything, which is so wonderful, because nothing gets dropped or lost. I think we really have a great dance between us, and even though those scenes have been difficult to pull apart, it's been such a pleasure to work with someone who was so bright and generous and captivating."

"He had this beauty and danger that was so great for the role," says Sanders, who knew Pitt before casting started. "He's not in the film the whole way through, so he had to do a lot with very little screen time, and he really did."

OPPOSITE, TOP RIGHT AND CENTER Since escaping the sinister experiment that forever changed his life, Kuze has had to scavenge parts for his body wherever he could find them. (Jeremy Hanna)

LEFT Michael Pitt as Kuze faces off with Scarlett Johansson. The green on his arms will be removed in visual effects to form "negative space."



ABOVE Rupert Sanders sketches explore his initial thoughts on how Kuze's lair should be depicted.

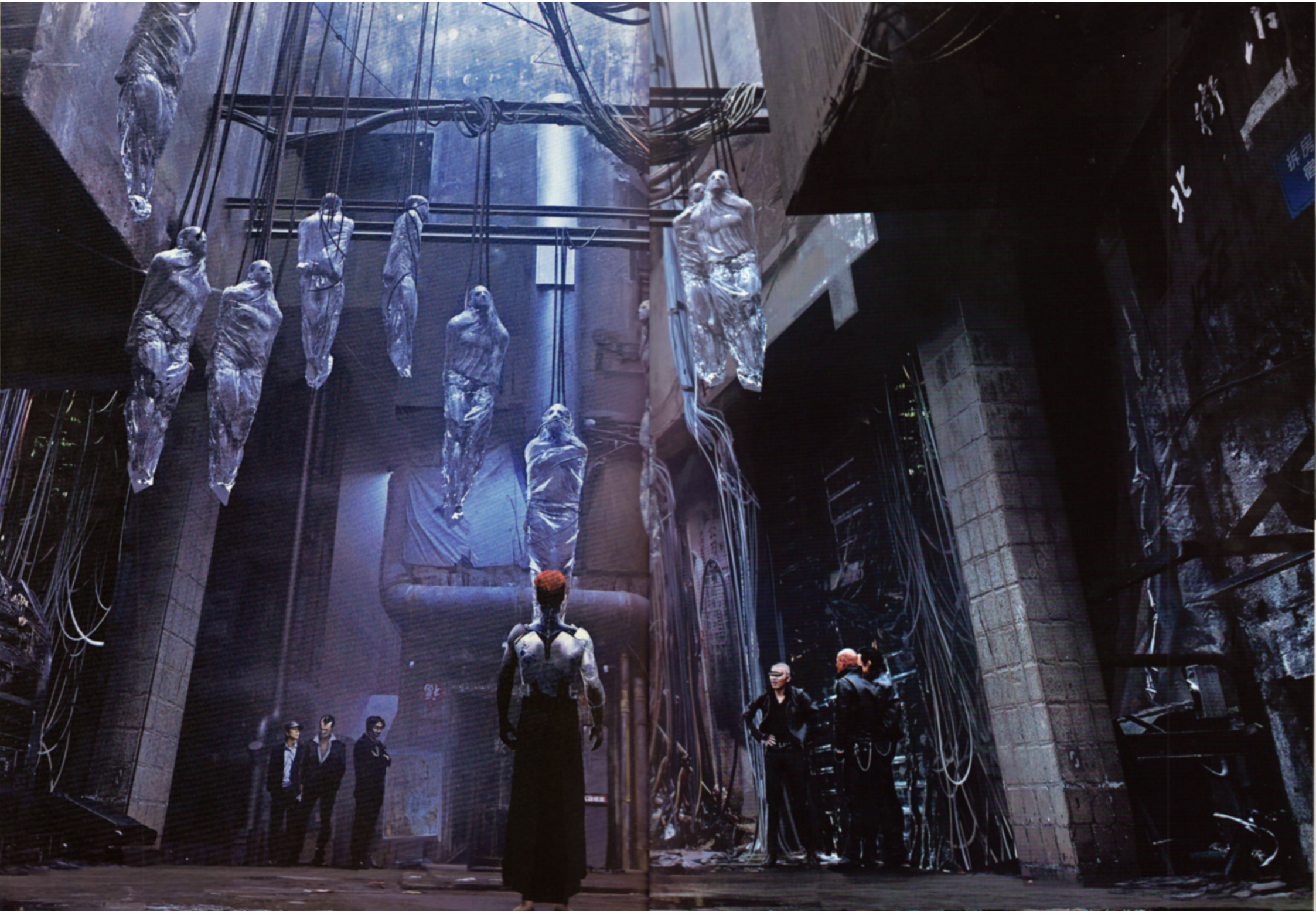
RIGHT, BELOW, AND OPPOSITE CENTER As the Major walks into Kuze's lair, she expects to find the headquarters of a criminal mastermind. Instead, she finds something far stranger. (Maciej Kuciara)

PAGES 56–57 The wrapped up bodies in Kuze's lair evoke insect cocoons. (Maciej Kuciara)











DR. OUELET

The *Ghost in the Shell* script describes Ouelet as "the matriarch of Cyber-Mind Technology," and she is that: *Time*'s Woman of the Year, hailed in the media as "the Einstein of the Brain." However, it's her relationship with her own creation, the Major, that proves central. In a sense, Ouelet is a new take on Victor Frankenstein, and Major Killian is her creature. Ouelet wasn't as reckless as Mary Shelley's protagonist, nor did she abandon her creation, but she committed her own sins along the way, and those sins come back to haunt both her and the Major.

Ouelet is a new character created for this version of Ghost in the Shell and the decision to make her female added a maternal aspect to the role that became a central part of the film's narrative. Juliette Binoche, the French actress renowned for her work on a number of international dramas, including her Oscar-winning role in *The English Patient*, was the perfect choice to bring gravitas, complexity, and compassion to the role. "I knew that I was coming in this movie to give it heart," says Binoche, "to give a sense of humanity. That's why Rupert was insisting on me doing it, I think; he wanted to have an actor who was able to convey those emotions."

Binoche is not a big science fiction movie fan and was unfamiliar with the Ghost in the Shell saga. However, she was drawn to Ouelet's complexity. "She's this kind of genius maternal person," says Binoche, "but at the same time, she has this darker place. I think somehow she married the devil. Her intention was not to be a devil, but I think somehow part of her scientific mind was so ambitious that she forgot a little bi of the human side of her. That's why when I read the script, I was kind of interested."

Ouelet's role in the film is relatively small, but every one of her scenes is crucial to the stor and our understanding of the Major. She is the Major's doctor, but more than that, she's her creator, mentor, confidante, and even mother. Fortunately the chemistry between Binoche and Johansson was just right. "Scarlett has an ability . . . to adapt herself to any situation," says Binoche. She cites the scenes where the Major's childlike emotions bubble up: "You see something going through the eyes. You want to believe that might be memory coming up, and she's becoming a real and complete human being. That was beautiful to see."

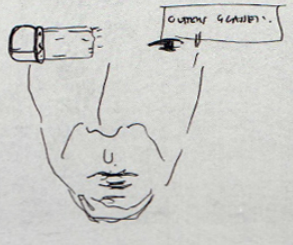




CUTTER

Secretary Cutter commands Section 6, a quasi-governmental outfit. He believes the Major to be the greatest asset in the fight against cyberterror and yet also nothing more than an expendable "experiment." Once Cutter discovers that the hacker Kuze may have infiltrated the Major's mind, he realizes that she might be coming close to discovering her own origins—information that could implicate him in a terrible crime—and so he puts pressure on Dr. Ouelet to permanently take her creation offline.

Cutter is played by London-based character actor Peter Ferdinando. Fans will recognize Ferdinando from the *Doctor Who* episode "Deep Breath," the feature *300: Rise of an Empire*, and, most significant of all, as the Black Knight in Sanders's previous film, *Snow White and the Huntsman*.





OPPOSITE TOP LEFT AND TOP RIGHT Dr. Ouelet is a mother figure to Major Killian, but that relationship becomes strained as the Major gets closer to cracking her case.

OPPOSITE BOTTOM RIGHT Cutter (Peter Ferdinando) seems to be on the side of Section 9, but his own agenda is quite dark.

OPPOSITE BOTTOM LEFT Conceptual sketch for Cutter's cyber by Ruper Sanders.

ABOVE Daniel Henshall as the Skinny Man.

RIGHT These guns were conceived as cheaply produced weapons that the characters would throw away after one use. The production called them "shop and drop" weapons. (William Bennett)

SKINNY MAN

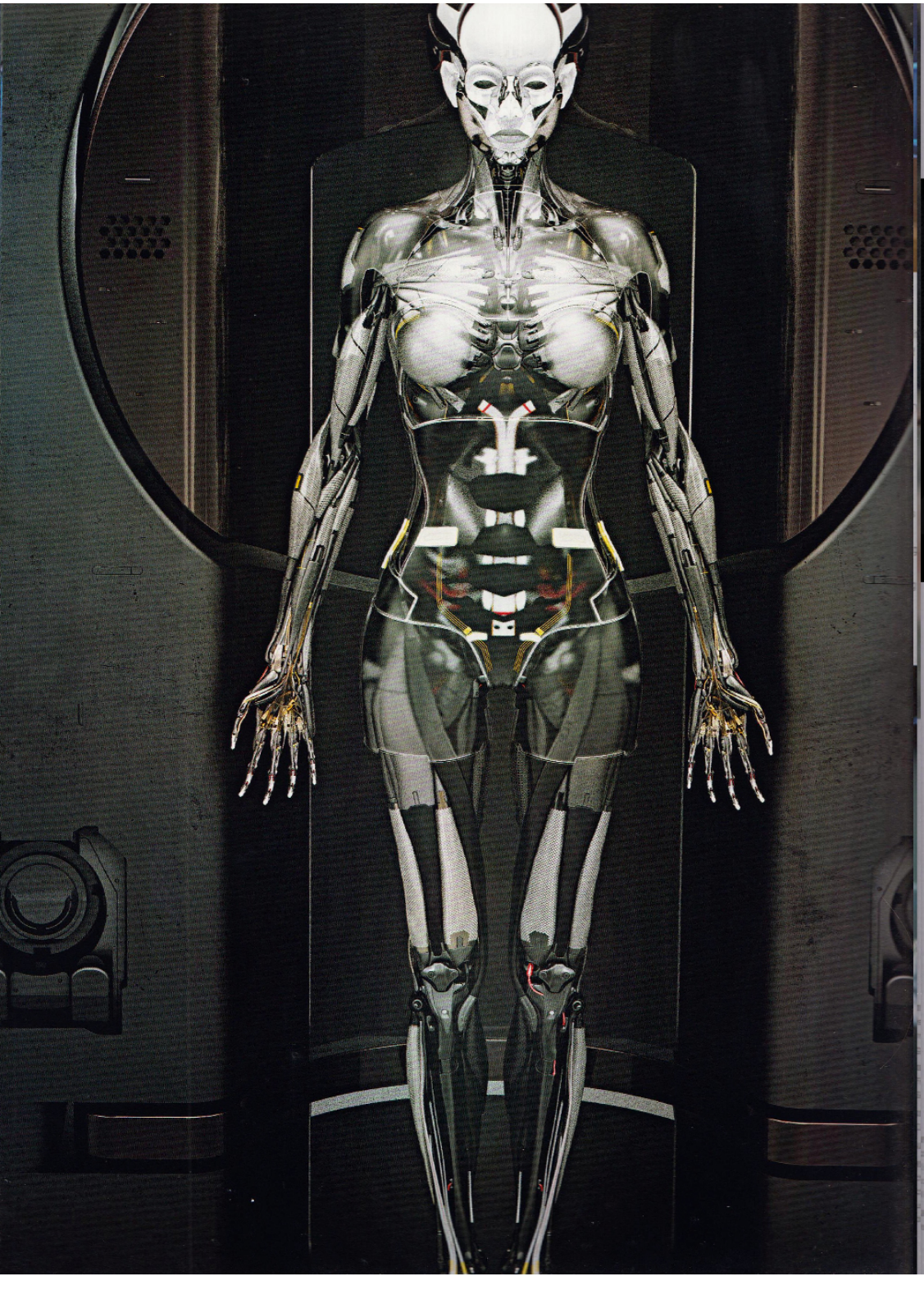
Fans of the 1995 Ghost in the Shell anime will be familiar with the scene that introduces the character known in the live-action version as Skinny Man. While some of the details surrounding the character are different in this new version, the sequence itself is full of satisfying nods to the source material. Skinny Man is an innocent garbageman who is cyber-hacked by Kuze and sent to kill Dr. Ouelet. His story is especially sad because Kuze has given Skinny Man false memories of a family—so while they are real to him, and he loves them, they don't actually exist.

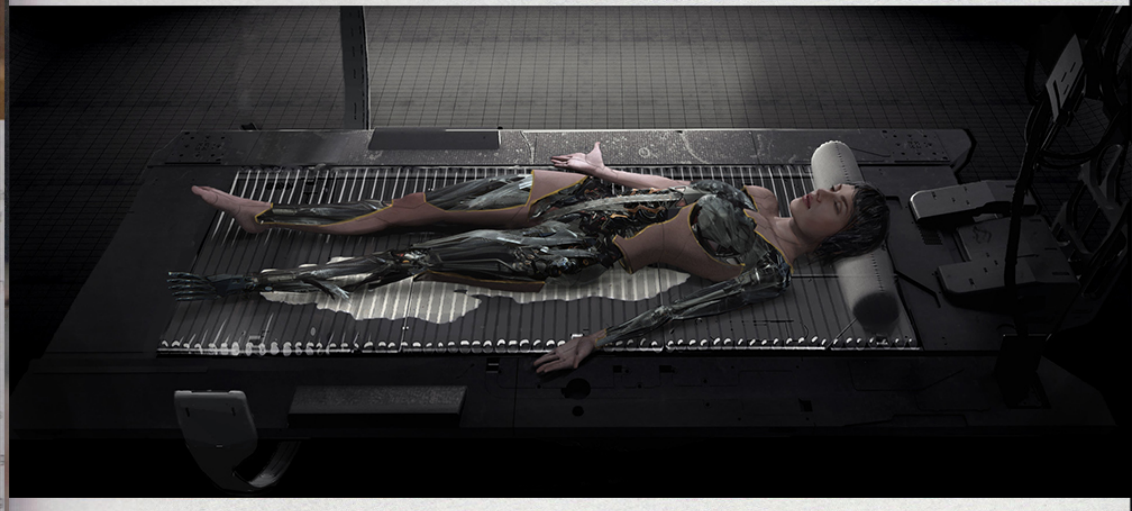
"What happens to Skinny Man is an example of what could happen to people within this world," says Daniel Henshall, who plays the character. "Skinny Man has gotten some sort of cheap enhancement in the brain, and this makes him susceptible to his brain getting hijacked. Kuze gives him a new memory, and then controls him to do his bidding."

After the Major captures him, he's confused, as if waking from a dream, and has no memory of what he's just done. "I think the furthest thing away from him is the capability to kill someone," says Henshall. "So to be told that he's done that is pretty horrific for him."

"It was incredibly interesting to be a part of, and to be able to give life to," adds Henshall. "[And] it was great to work with Scarlett and Rupert on such a weird, wonderful, and whack scenario."







CONSTRUCTING THE FUTURE

Once the world of *Ghost in the Shell* had been conceptualized, the next task was to take the designs and turn them into a believable reality through disciplines like set design, costume design, and physical special effects.

When selecting a production designer who would oversee the general look of the film, Sanders made a choice that said much about his intentions for the film: Jan Roelfs. Roelfs doesn't specialize in typical studio action/sci-fi "event" films, although he has designed in just about every genre imaginable. His credits range from Peter Greenaway's 1989 art-house hit *The Cook, The Thief, His Wife & Her Lover* to the moody science fiction film *Gattaca*, and, more recently, *Fast & Furious 6*.

Before being invited to interview with Sanders, Roelfs had heard of Ghost in the Shell but wasn't familiar with it. So he started digging into the material. "The original movie, it's stunning," he says. "The first time I saw it, I was like, 'What am I looking at?' Images stay [on the screen] for a minute sometimes, but they are so well composed. It is quite unique."

Roelfs's strong feelings about the underpinnings of design are a key factor in what sets him apart from others in his field. "It's all about emotion, it's about feelings, about connecting with each other, and the biggest thing is searching," he says emphatically. "Searching for what you want to say, what you want to tell with this script. That's more my interest, always. I don't care about design. How do you want to influence the audience? What do you want to tell them, exactly? Out of that comes an approach, and out of the approach comes a look, and out of the look comes a design. Production design is a nice word, but design itself is, for me, five steps down the line."

When it came to specific settings, such as office interiors or the Major's apartment, Roelfs took a minimalist approach. "I don't like clutter," he says flatly. "Clutter is like wallpaper. It's muddy. In film, if you stack things up against each other it becomes nothing; it becomes a texture. I prefer to have it pretty straight and bold." While many designers like to fill up a space, adding details that hint at the character's history and personality, Roelfs prefers to strip aspects of his sets down to basic shapes.

The Major's robot "shell" is a touchstone for the entire look of the film. As the ultimate cyber enhancement, so her body sets a limit on the look of other "cybers." [Vitaly Bulgarov]

A battle-damaged Major awaits repair by Hanka Corporation technicians. [Adam Middleton]

Roelfs's minimalist concept can be seen in the Major's apartment, where she goes to [literally] recharge. There's little there, but everything that appears on-screen is important. "She's living and part of a machine too," says Sanders, "so she wanted to feel machines around her. It's almost like she's in a hard drive and there's hundreds of other towers of hard drives [outside the window]. So she's very much in the machine."

Roelfs took his cues for the Major's home from the script itself. "If she is lonely, why would she live in a cluttered room?" he says. "The Major's physical needs are few; she doesn't eat the way humans do, bathe or sleep, and she has no old memories, and so no keepsakes or mementos. It's better to focus on the shape of that room. The measurements, the perspective. It's much stronger." The resulting design was made from textured concrete.

"It's literally a bunker," says supervising art director Richard Johnson. "It has interesting textures on the wall, it has a few touches of home: some seating, not much. A lot of people are going to see this thing and go, 'She lives in a prison.' Well, that's intentional. But she's never locked in. This person has enormous power. You can't contain her."



Her "bed" got a unique treatment, since she doesn't actually sleep on it. Weta Workshop built a bed made of translucent silicone tubes. "When she lies on it, it glows," says Weta Workshop's Richard Taylor, "and she is able to plug the ports in the back of her neck into the bed for downloading information." To recharge, she gets into a translucent bag-like jumpsuit, and then hangs herself in a charging station that resembles a shower. "We built the exact replica mannequin of the actress to hang in this semi-translucent suit," says Taylor.

Although Sanders didn't want to be too slavish to the 1995 anime, the bedroom shot was one exception where he did try to match the source material: "We felt if you walk away from this film and you haven't seen that, it's like if you go to *Star Wars* and nobody gets a lightsaber out. You're going to be very upset."

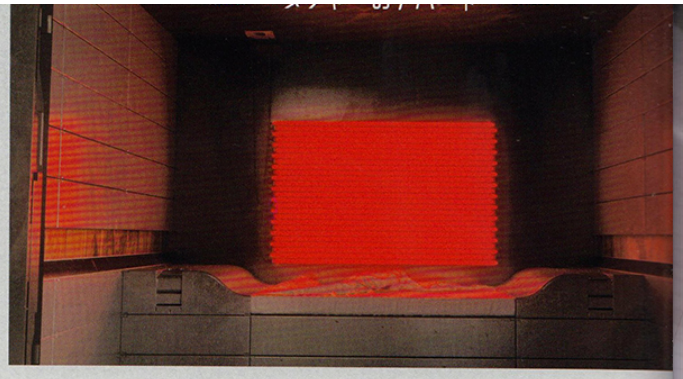
All the designers for the live-action *Ghost in the Shell* knew that their work had to honor the designs of the artists who had been involved with creating the previous entries in the saga. Yet at the same time they had to ensure that this film had its own unique style. That meant using the previous animes and TV shows as a foundation but not a template—something to build on, not emulate.

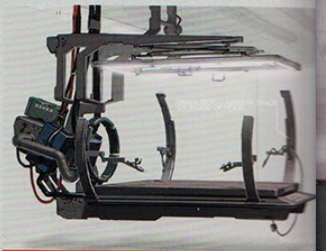
Johnson, who was Roelfs's right-hand man, says, "Not all of the conventions of manga or anime translate directly to live-action photography, but you try to stay faithful to the spirit of it, and to the art of it, to the interpretation of it, the intellect, the soul, but still bring it into a new realm." The Ghost in the Shell manga and 1995 anime remained the "bible" for many of the filmmakers—sources they would refer to if they get stuck. "But we also had to make up new concepts," says Asquith. "You'll see that throughout the Hanka sets and some of the other sets there is inspiration from the original film, but we couldn't exactly copy it."

Working under Sanders, Roelfs found himself collaborating with a director who was as committed as he was to teasing out the heart of the story: "He is searching through his cinematographer, he is searching through the costume designer, he is searching through the production designer. He is always, always searching. Which is an amazing thing."

When Roelfs watched Oshii's original anime, he analyzed the color palette and camera angles and teased out some of its symbolism. "The water element was a big thing," he observes. "In the old anime, water was always a metaphor for the flow of information. That's why it's always raining and the streets are flowing with water. So you start analyzing all that stuff and you try to fold that back into the overall design." As a result of these observations, water became a visual motif in the live-action film. The opening "shelling" sequence, where the Major's human mind is paired with her robot body, shows her in liquid, a sort of cyber echo of amniotic fluid. Later, when she wants peace, she immerses herself in the depths of the city's harbor.

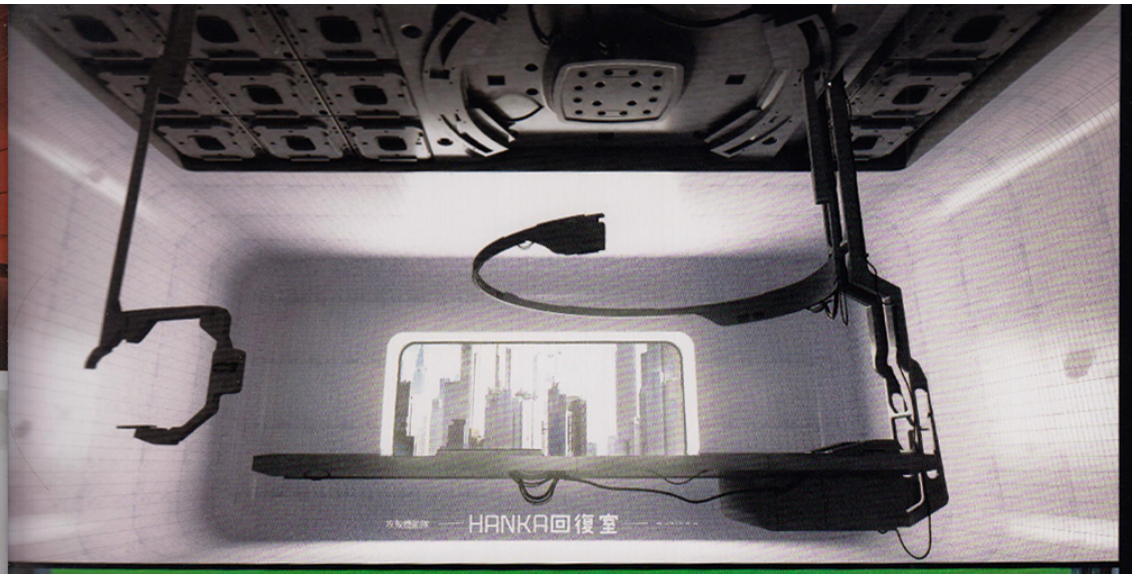
Reflective surfaces are another visual motif in the film's design and perfectly complement the water motif described by Roelfs. The Major confronts her reflection at several key moments in the film, most notably in the "shelling" sequence, where she rises toward her reflection on the surface of the water. Explains Sanders, "There's a lot of reflection in *Ghost in the Shell*—the character reflecting on herself, and a lot of dualism. There are a lot of times when she's meeting her reflection, which kind of becomes iconic. The reflection is always moving a little bit, and it's not quite what you see it to be, so there was something I liked about that metaphorically throughout the film."

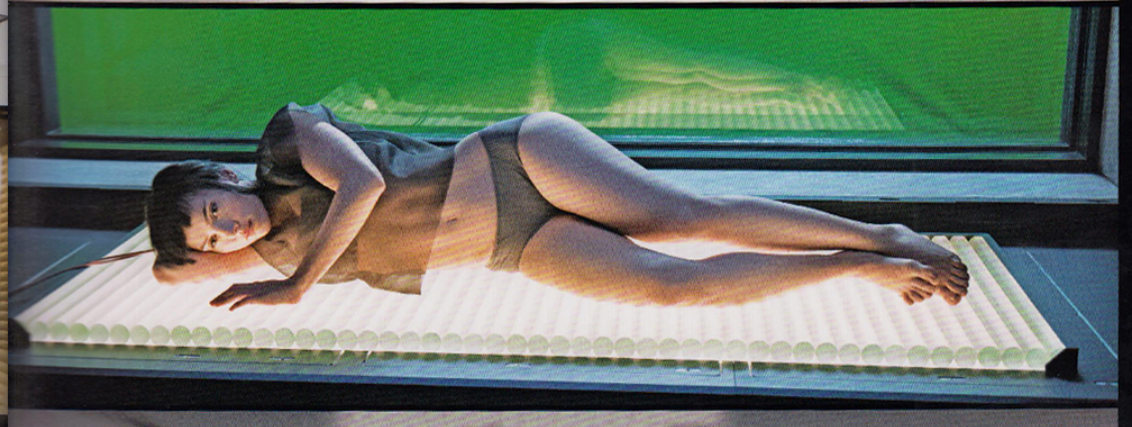


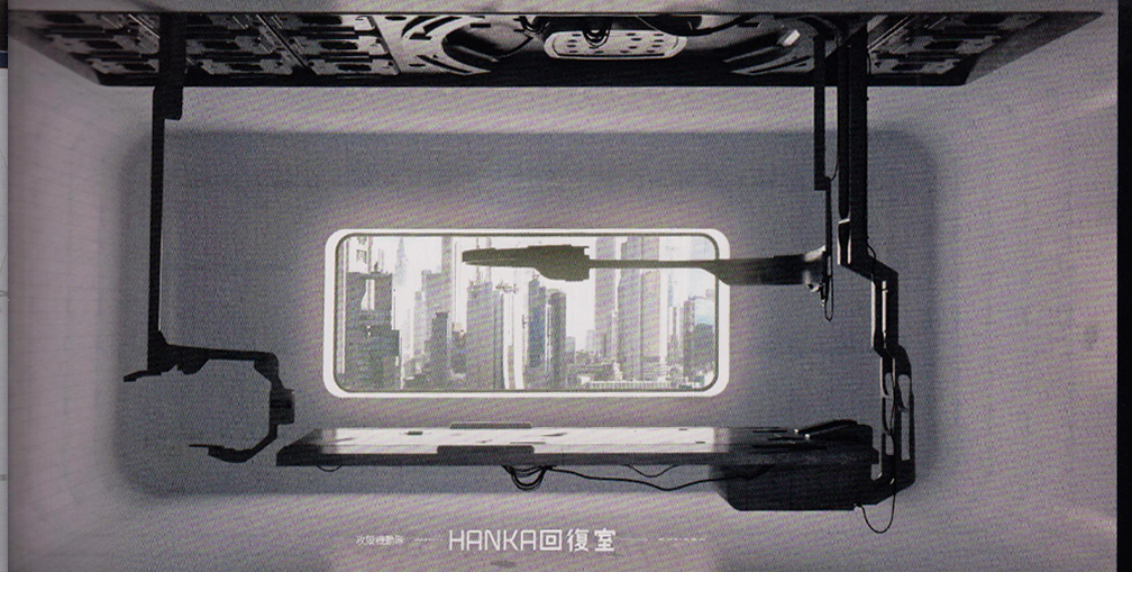


DARKER/MORE MATTE, ALTERNATIVE HOOP TRACK
/// HANKA MORGUE BED [UPDATE]







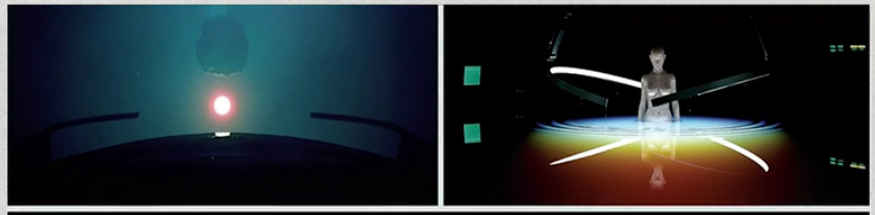


OPPOSITE TOP AND BOTTOM The Major's window is an echo of her data ports: it connects her to a giant "hard drive"—the city. [Maciej Kuciara]

OPPOSITE CENTER Scarlett Johansson is filmed on the Major's bedroom set.

ABOVE CENTER RIGHT Concept art for a foreboding Hanka examination table. [William Bennett]

TOP RIGHT, ABOVE, AND CENTER LEFT In Jan Roelfs's minimalist aesthetic, textures and basic shapes carry the focus. [Maciej Kuciara]



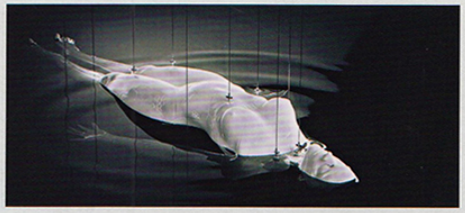


SHELLING

One of the best known elements of the Ghost in the Shell saga are the beautifully composed shelling scenes where the Major's human brain is inserted into her mechanical body. In the live-action film, the shelling sequence is a combination of practical effects photographed on a set and digital effects that are crafted to be indistinguishable from the live-action footage.

Weta Workshop built a puppet body for the Major that would look anatomically correct and realistic on camera. The body was built in layers over five months, starting with an internal skeleton comprising 1,400 individual parts. The skeleton is close to a perfect match for Johansson's build, but some creative license was taken to make the bones read better on camera.

The skeleton was 3D-printed using a variety of materials, including some that Weta had never used before. An opaque material called Vero Black forms the core of the bones; it let the designers print bones that look black under lights when they show through the puppet's translucent outer layer. Above that went a clear material, Vero Clear. "It's almost like a plastic but basically with a clear coat over the top of that," explains Weta's workshop supervisor Rob Gillies. "With a minimal amount of sanding you can get quite a transparent look, and that was kind of the look we were going for." The skeletal joints of the puppet were printed in titanium and so were strong enough to move like real joints under the weight of the muscles and tissue; this gave the figure the full range of human motion.



On top of the skeleton, 3D printed gel flesh was attached to give the body its final form. The puppet was then shot under strong lighting, so the skeleton and muscles would show through the gel. Only the small bones of the hand confounded this process, because they were too tiny for the multilayered 3D printing process. Instead, they were printed hollow using Vero Clear, then black paint was injected into the empty space inside. The result looked identical to the other bones when photographed.

"We've never printed anything this complex before at Weta Workshop," says Gillies, "or this fine in nature, so it's very exciting."

Yet the sequence also leans heavily on digital visual effects.

"For the longest time," says visual effects supervisor Guillaume Rocheron, "we discussed 'Okay, should we make it completely CG? Should we make it half-CG, half-practical?'" Eventually they settled on a ratio of about 70 percent digital to 30 percent practical, enough that audiences will not be able to tell which shots are live-action and which were created using digital effects.

"A lot went into what is essentially sixty shots," says Sanders. "But every one of those went through a series of processes." Some of the graphical elements in the scene were the result of visually exploring how a human brain might communicate with a robot body. "In the shelling sequence," continues Sanders, "when the strands come together you'll see this transference of human DNA, DNA which is ultimately a code, into machine code."

TOP The "shelling" se
is an iconic piece of
the Shell lore, and th
artists went to great
to make sure the live
version was ground
aesthetic that would
fans. (Jeremy Hanna

CENTER LEFT The she
sequence is a kind o
Major emerges from
like organic life. (Vita

PAGE 65 Concept stud
on the structure of
exposed shoulders
and also reveal how
organic brain is inse
the robotic skull's br
(**TOP** Vitaly Bulgarov;
BOTTOM Andrew Bake

PAGE 66 The shelling
establishes the visu
reflection, a visual s
of the Major's dual n
Bulgarov)

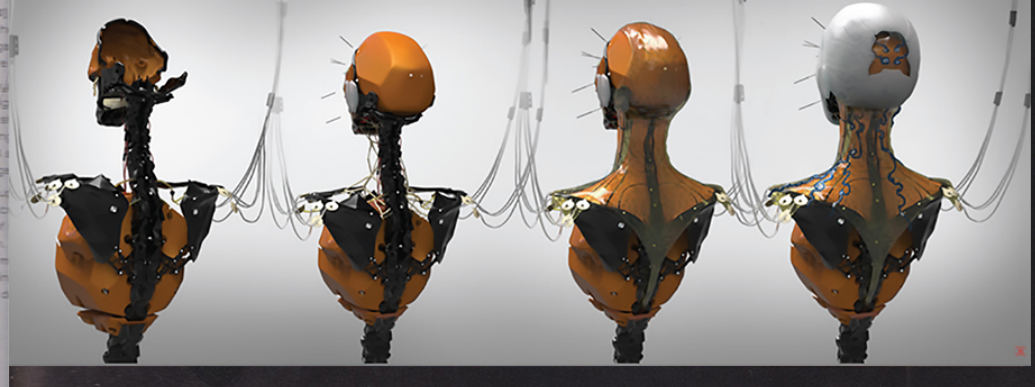
GATEFOLD (PAGES 67–70)
of studies explore th
process. (Vitaly Bulga
photograph by Steve

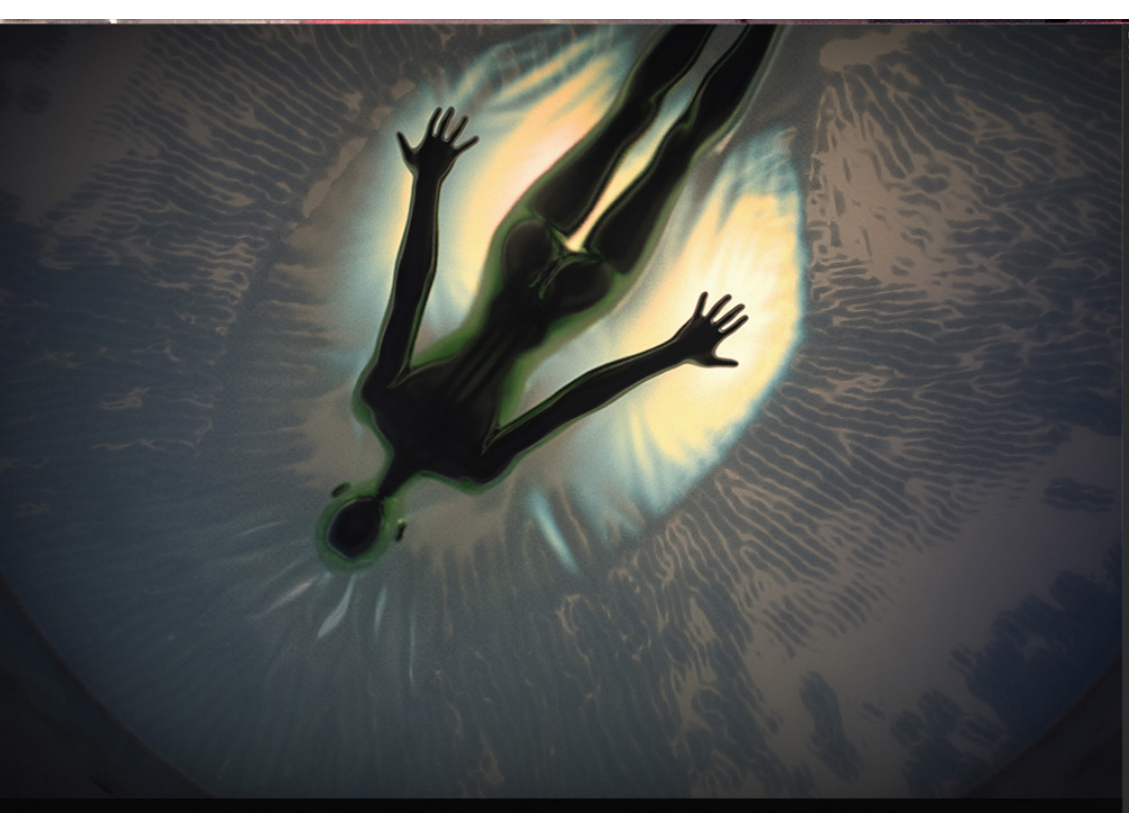
PAGE 71 The Major's cy
becomes more recog
human through this s
sequence, as ensuin
baths add flesh and
skeleton. (Vitaly Bulga

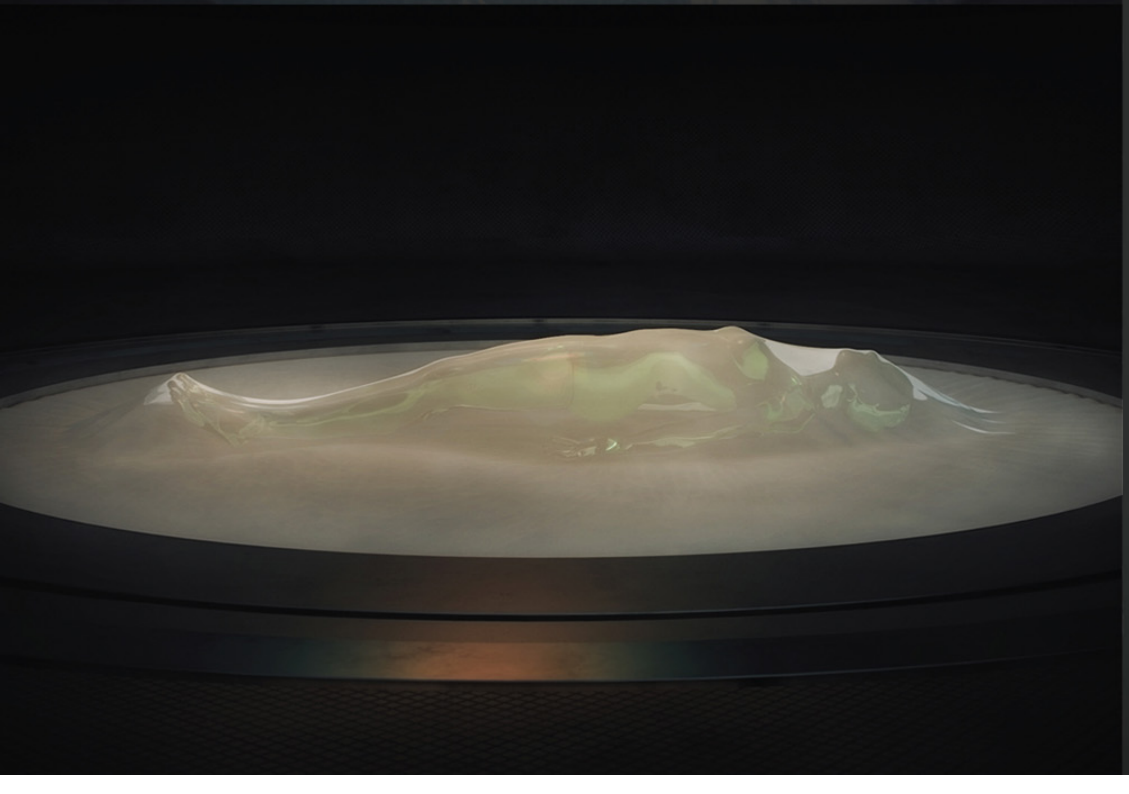
PAGES 72–73 A close-u
Weta Workshop's inc
life-size 3D model of
cybernetic skeleton.
3D and build depart
countless hours brin
Bulgarov's concept d
to life.











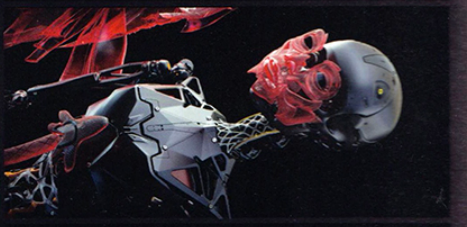

GHOST IN THE SHELL
Skin development - work-in-progress
Vitaly Bulgarov 09-20-2014











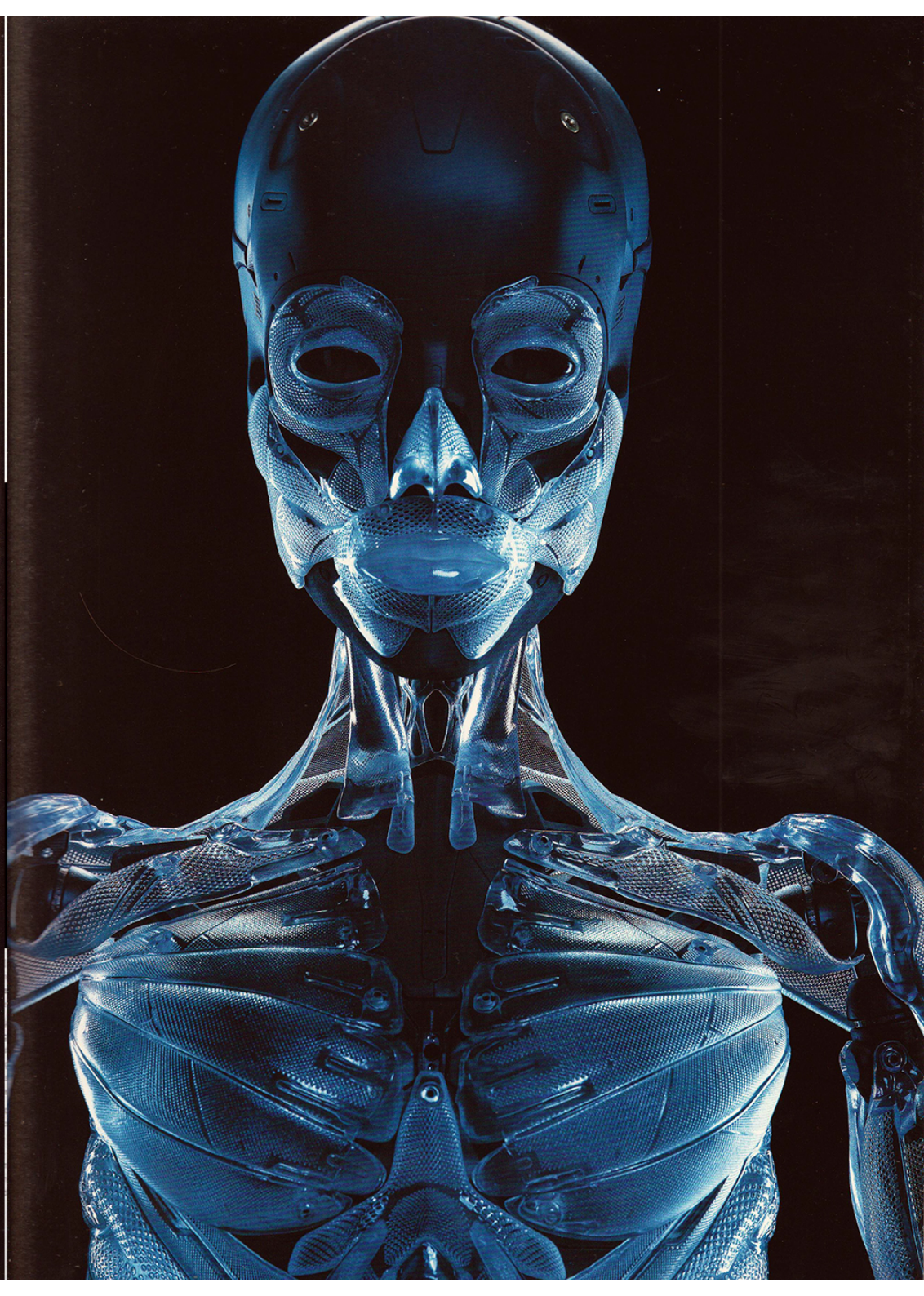




















COSTUMES

Costume designers Kurt Swanson and Bart Mueller, known in the industry simply as "Kurt and Bart," met in college in 1983 and have been working together ever since. They are longtime stylists who have considerable experience in the world of fashion. "I hope that is something we bring to costume design for film, and I feel like [fashion and film costume design are] becoming more integrated in a way," says Swanson. "So I think our past with fashion has been good for our transition into designing for film."

Mirroring the work of the concept art team, Kurt and Bart were called upon to make translucency and transparency motifs in their costumes. To get those translucent effects, the pair drew on futuristic, technical fabrics, collaborating closely with cinematographer Jess Hall, who calls the fabrics "amazingly complex." Says Hall, "They have layers of reflectivity and sheen to them. So, it was about how do those fabrics sit within the environment and within the lighting and levels of darkness? How do they read?" Kurt and Bart even took some of those materials to Rembrandt, a noted high-end New Zealand suit maker, which constructed many of the men's suits for *Ghost in the Shell*, applying classic tailoring techniques to unusual fabrics the company's tailors had never before touched.

Even when the fabrics were more opaque, they were used in unconventional ways. "We w working with nontraditional materials," says Mueller. "We'd made some suits out of old obi [geisha belt] materials, out of old kimono fabri and [Rembrandt has] been great with rolling with where we were going, and then helping us to produce it." In creating the somewhat retro costumes, Kurt and Bart decided to refer to 1980s-style silhouettes but not to get too liter about emulating them. The cultural mashups o *Ghost in the Shell* would need more variety and couldn't be restricted to a purely '80s aesthetic

The Section 9 team was given two sets of outfits: a casual look and a tactical suit for combat. In the course of researching the comb look, Mueller found an old kendo mask and glov in a Melbourne shop. "When Rupert saw it he was really, really excited about it, and so were we," says Swanson. "What was really important and something we wanted to have in the combat outfit, was this handmade element. The kendo stitching, all this hand stitching [and] hand quilting, was really exciting and inspiring for us . . . This was our first 'Aha!' moment on what the Section 9 costumes should be."

This discovery led Kurt and Bart to incorpora a deliberate contrast between the high technolog

ABOVE AND OPPOSITE Costume designs for the Major show a variety of looks, from casual to combat. (Collaboration between Rebekah Tisch and Kurt and Bart)





ABOVE The traditional wraps and head coverings of religious sects get a futuristic treatment in this concept image by Jeremy Hanna.

OPPOSITE AND BELOW The tactical gear for Section 9 incorporates a high-tech echo of traditional hand-stitched kendo suits. (Adam Middleton in collaboration with Kurt and Bart)

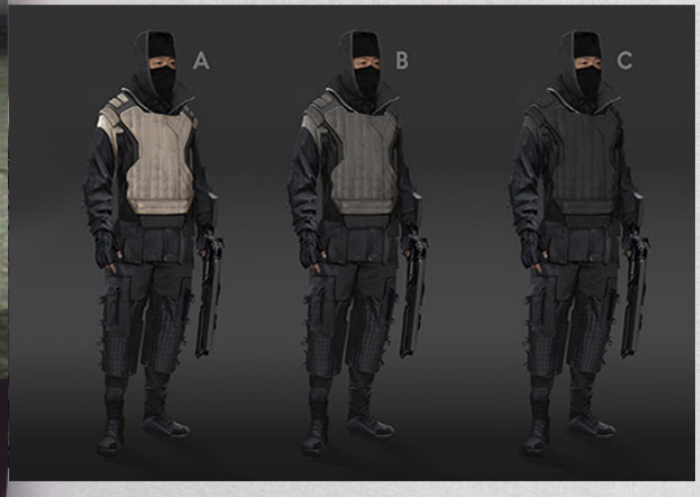
of this world, including the Major herself and her machine body, and the handcraftsmanship of her team's technical gear. That was incorporated into Section 9's body armor using shapes inspired by samurai armor. "It's the same kind of stitching, and all being done by hand in the same way that they would do it for kendo material," says Swanson.

Section 9's combat boots, however, were custom-made for the film by Adidas. The designers went back and forth with the shoe company remotely, coming up with a design that Swanson calls "very, very Adidas" while still incorporating *Ghost in the Shell*'s style through details like quilting that covers the laces. "We were really happy with it," says Swanson, "and our experience with Adidas was really fun."

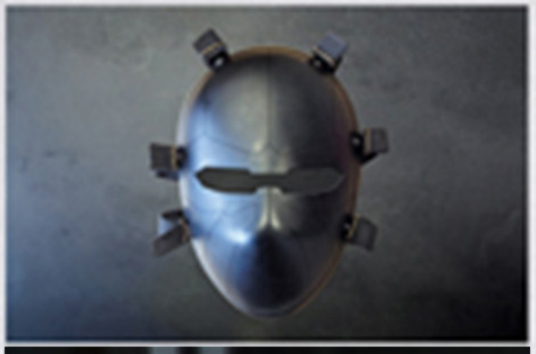
"One of the challenges of working on a project like *Ghost in the Shell* is wanting to do something new and innovative but also to remain true to the source," says Swanson. "It actually was a great way to filter and refine things. Sometimes we could go pretty far out there on a design tangent and the source would be our guide back. There is a simplicity to the original manga that is so beautiful. It's incredible how ahead of its time Ghost in the Shell was in so many ways and how timely it is now in today's modern tech world."

Sanders credits the costume duo with doing an amazing job on a difficult task. Science fiction, he says, is a hard genre for a designer, compared with a period piece where research can tell a designer which style was in vogue. "[In science fiction, the question is] 'What is fashion?' and 'How does style change?'" says Sanders. The goal was ultimately to have "an Asian infusion," with the texture of the Far East throughout, while making an international film, not an Asian film.

As part of that Asian feel, says Sanders, they decided to eschew typical Western-style men's suits. "I wanted to have something with no detail on it," he says, "so we kept stripping them back." Aramaki, he says, wears a hybrid of a kimono and a Western suit with no pockets, with a shirt underneath so the outfit would function as a suit. It's an unusual approach to adding an Asian quality to the wardrobe. "Usually in sci-fi they stick everyone in a Nehru collar and call it a day," says Sanders, "but I think we were a bit more brave."









OPPOSITE AND TOP The costumes for the Section 6 assassins who are sent to kill Aramaki fuse sleek fashion with body armor. (Maciej Kuciara)

ABOVE A Section 6 assassin in full garb and ready for direct action. (Adam Middleton)

Roelfs's minimalist concept can be seen in the Major's apartment, where she goes to (literally) recharge. There's little there, but everything that appears on-screen is important. "She's living and part of a machine too," says Sanders, "so she

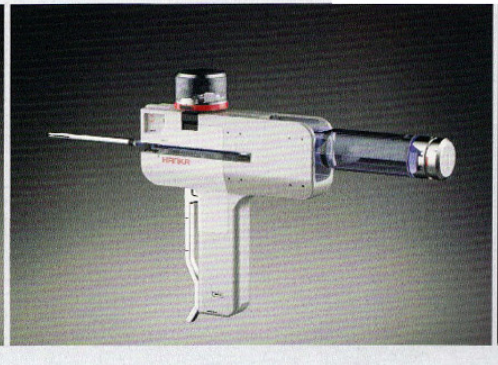


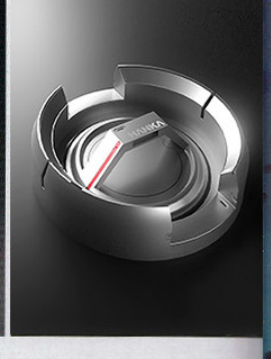




HANKA®









TOP LEFT Hanka technicians in crimson scrubs are glimpsed in a flashback scene

TOP RIGHT Final concept for Hanka technician. (Costume department)









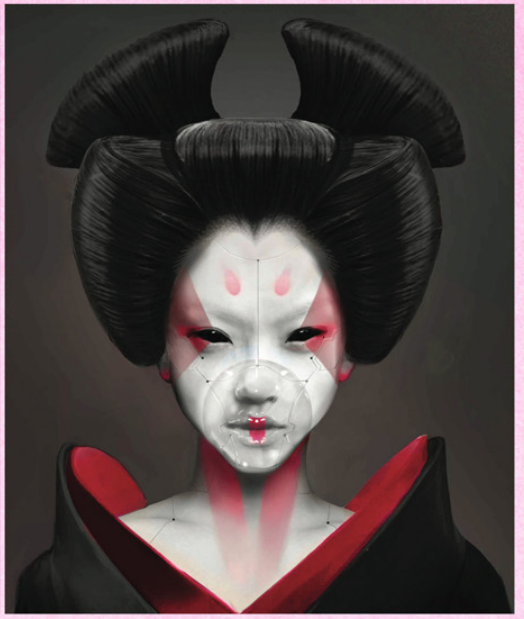
TOP The Major's hunt for Kuze takes her to the city's back alleys . . . and the Hanka brand is ubiquitous even there. (William Bennett)

OPPOSITE BOTTOM AND ABOVE Visions of the futuristic underworld. (Maciej Kuciara)

RIGHT This concept piece shows another instance where tradition is blended with cutting-edge technology to create an image that is familiar and yet somehow alien. (William Bennett)







ROBOT GEISHAS

Among the more high-profile designs for the film are the costumes that were created for the robot geishas who play a crucial role in initiating the Major's journey. In the Maciej Hotel, Osmond, a Hanka salesman, pitches the president of a West African nation on the idea of cybernetic enhancements for his nation. As they talk, robot geishas attend to them. The meeting takes a fatal turn when the geishas "glitch" and turn violent—hacked, it appears. It seems a simple enough mission for the Major—save the hostages and destroy the hacked robots—that is, until something one of the geishas says sends the Major on her own journey.

The robot geishas' outfits were among the first designs to be worked on by the costume team, and required a great deal of research. Their goal was to reinterpret the traditional geisha outfit, including well-known Japanese motifs such as a cherry blossom design. "The cherry blossom represents how short and beautiful life is," says Bart Mueller. "We wanted to use that image on this cyborg geisha, and incorporate it into a kimono." They began the design with the lines of a traditional kimono, but connected the sleeves and pushed up the collar in a way that would frame the robot geishas' faces.

The geisha costumes are made with polyester fabric created by Japanese designer Reiko Sudo and her company, Nuno. Mueller calls Sudo "a real innovator in the world of fabrics and materials. She's always developing new uses for unconventional materials." The fabric wasn't suitable for applying prints, so instead they used appliqué techniques. "We laser-cut all the flowers, and all the geishas have different imagery on them."

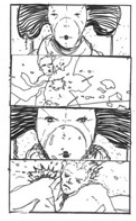
One classic element of a traditional geisha ensemble is the obi. Traditionally, these belts are painstakingly hand-loomed, says Mueller, with punch cards recording the placement of every thread for the design. Sudo connected Kurt and Bart with Shibata Orimono, a four-hundred-year-old weaving company in Kyoto that wove the obi for the robot geishas in a traditional fashion—but with an incongruously high-tech design.

"We wanted to take the traditional obi methodology but incorporate our own circuitry motif on it," says Mueller.

The geishas' costumes also include some translucent elements, including illuminated collars that add visual flair to the Maciej Hotel scene. Says Mueller, "Rupert was excited by the idea that when [the geishas] were shot up, they would explode like china, so they had this look of porcelain which was beautifully done by Weta."

Besides being a showpiece for Kurt and Bart's costumes, the geishas demonstrate the special effects handiwork of Weta Workshop. "We did complex animatronics on this, well beyond what we've done on any recent movie," says Richard Taylor. During the fight between Major Killian and the robot geishas, the geishas turn into something akin to mechanical spiders. Originally the robot geishas were slated to be entirely digital characters, with actors in green suits performing their movements on set. Those plans evolved, though, after Weta Workshop suggested that the geishas could be created with a combination of acting, stunts, special effects makeup, animatronics, and puppetry. Although it took four months to work out the methodology and build the necessary gear, around 80 percent of the robot geishas' performances were shot live. Some additional digital cleanup was used to fix things that didn't look perfect in live-action shooting, such as visible evidence of wirework.

GHOST IN THE SHELL



LEFT Storyboards by Rupert Sanders depict the hacked robot geisha turning on a Hanka Corporation representative.

OPPOSITE A photo of Weta Workshop's robot geisha model with some digital augmentation by artist Adam Middleton.

TOP Robot geisha makeup studies by Rebekah Tisch.

While the geishas aren't depicted in an entirely traditional way— after all, no traditional geisha's head would open up like a mechanical flower—they are performed by flesh-and-blood actresses, including Tokyo native Rila Fukushima, known to Western audiences for her role in *The Wolverine*. Fukushima plays the Red Robe geisha, whose mysterious plea for help sends the Major on her quest. "I actually traveled to Kyoto to meet with real geishas a couple of times," says Fukushima, "just to feel how they move, how they talk."

Weta Workshop created masks that mirrored Fukushima's own features, but with obviously synthetic textures. "Each mask has different makeup and a slightly different texture," she says. She found looking at them "a little creepy . . . because it's my face, but it's too symmetrical. It was really weird to see my face right in front of me. But I love the mask."

The internal mechanisms of the geishas were built for real as well. "They are fully working, fully articulated," says Taylor. "All the faces open up, different components within the face work." Some gears and parts of the mechanism are 3D-printed, others are cast bronze. "We have eight milling machines and thirteen 3D printers in our company," says Taylor. "We're leaning on digital technology to build the analog puppet that wraps around the analog technology. It really is quite crazy when you actually are amongst it and you're watching the technologies required, from just old-school hot glue guns and hammers right through to the most advanced computer-control seven-axis milling machines, all to build a robot that's a puppet."

When it's time for the geishas to show their mechanical innards, the mechanisms audiences will see are driven by electric rotary motors. As such, they are self-contained; there's no cable running to controls and a puppeteer. Weta's technicians wrote code to control the motors and loaded it onto driver boards inside the automatons.

Watching the finished scene, audiences will see a geisha grab Osmond and drag him across the floor and up a wall. It's a stunt performer playing the geisha, with Michael Wincott playing the man she drags. Both were suspended on wires, and in postproduction the stunt performer's arms were replaced with elongated, multi-jointed "spider geisha" arms.



ABOVE A robot geisha reveals the tongue-like instrument it uses to hack into victim's neck ports. The device was added by Ku after he hollowed out the geisha's origin mouth mechanism. (Dane Hedgwick)

OPPOSITE Costume concepts for the robot geishas by Rebekah Tisch.

BELOW A concept piece shows the damag done to a robot geisha following the Mac Hotel shoot out. (Nick Keller)















ABOVE The robot geishas are portrayed on-screen with a combination of actors in makeup, Weta Workshop animatronics, and visual effects. Richard Taylor and costume project supervisor Flo Foxworthy can be seen here assembling a geisha costume.

OPPOSITE The mechanisms underlying the robot geisha's skin were meticulously designed. Rupert Sanders wanted them to be reminiscent of the inner mechanisms of a typewriter. (Nick Keller)



OPPOSITE This incredibly intricate robot geisha head is testament to the unparalleled level of craftsmanship that the Weta Workshop team put into the piece.

ABOVE LEFT AND RIGHT Once the geishas are hacked, they become lethal. That's where the Major and Section 9 come in. (Dane Hedgwick with Adam Middleton)

PAGES 92–93 Controlled by Kuze, this robot geisha assumes an almost spidery form and is able to climb walls while manhandling its captive. (Dane Hedgwick)







MACIEJ HOTEL

To accommodate the action and stunts that would be shot on the Maciej Hotel set, the set itself had to be big, and it had to be strong, says Richard Johnson, "because guys were going to run off walls and run across tables." Multiple tabletops and upholstered seating units had to be built, because they would be shot up over the course of the scene, and the set would periodically have to be re-dressed with versions that had more bullet holes.

One moment in the fight scene taught the prop department a vital lesson. Sanders had planned a beat in the fight choreography where one character would break a water pitcher over another's head. Initially the plan was to do only one or two takes of the moment, four at most, so that's how many pitchers were fabricated. But the plan unexpectedly changed and ultimately twenty-eight takes were needed to capture the shot. "So all of a sudden, this prop had to be mass-replicated within three days' time over a weekend," says Johnson. "That was a crazy scramble just for this one prop. So going forward, we learned that we need two dozen of these things, minimum."

Another detail in the Maciej Hotel required the visual effects team to step in and create a moment that would have been impossible to shoot solely using live-action. Borrowing an image from a different scene in the 1995 anime, Sanders asked for an enormous fish tank installed in one of the Maciej Hotel's walls to be added to the sequence. "It was always just tatami walls that would be shot up," says Richard Johnson, "and then we went, 'Nah, we've seen enough of those. Let's put something more interesting back there.'" In the final film, the tank would be shot, shatter, and send water and fish pouring out. Building such a huge fish tank for real would have been impossible in the time available, so the production team put a green screen on the set where Sanders wanted the tank to be. Sanders, says Johnson, knew before he even made the change that the fish tank would have to be digital, not practical. "It will make for a much more interesting look in the room, and it will reflect the original story," says Johnson.

ABOVE The gang that shoots up the Maciej Hotel, complete with extensive prosthetic cybers created by Weta Workshop.

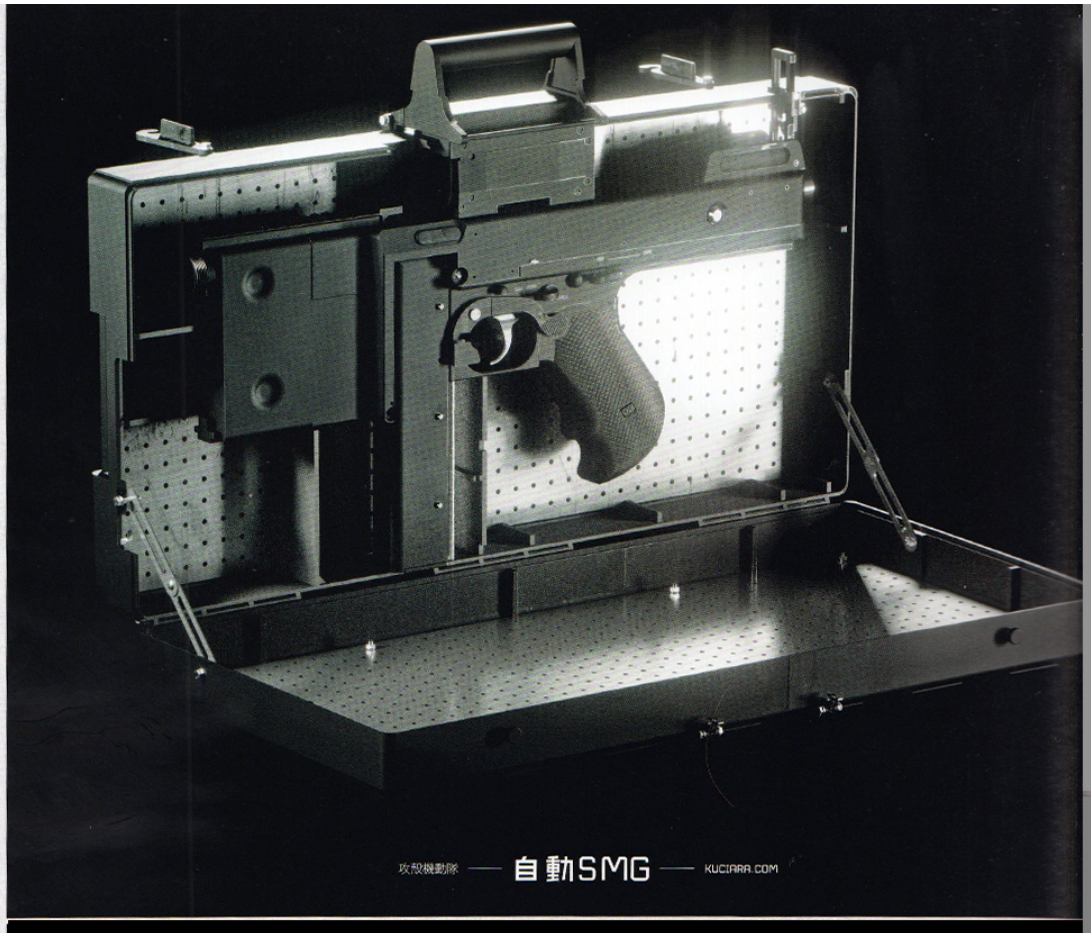
OPPOSITE TOP RIGHT The Maciej Hotel set where the film's first action sequence takes place.

RIGHT Maciej Kuciara illustrated this concept for the interior of what came to be known as the Maciej Hotel, a designation made in honor of the artist's contribution to the movie.

PAGES 96–97 This concept image of the meeting room at the Maciej Hotel shows the aftermath of the robot geisha attack. Lighting gives a modern sheen to such traditional Japanese design elements as tatami mats and screens. (Maciej Kuciara)





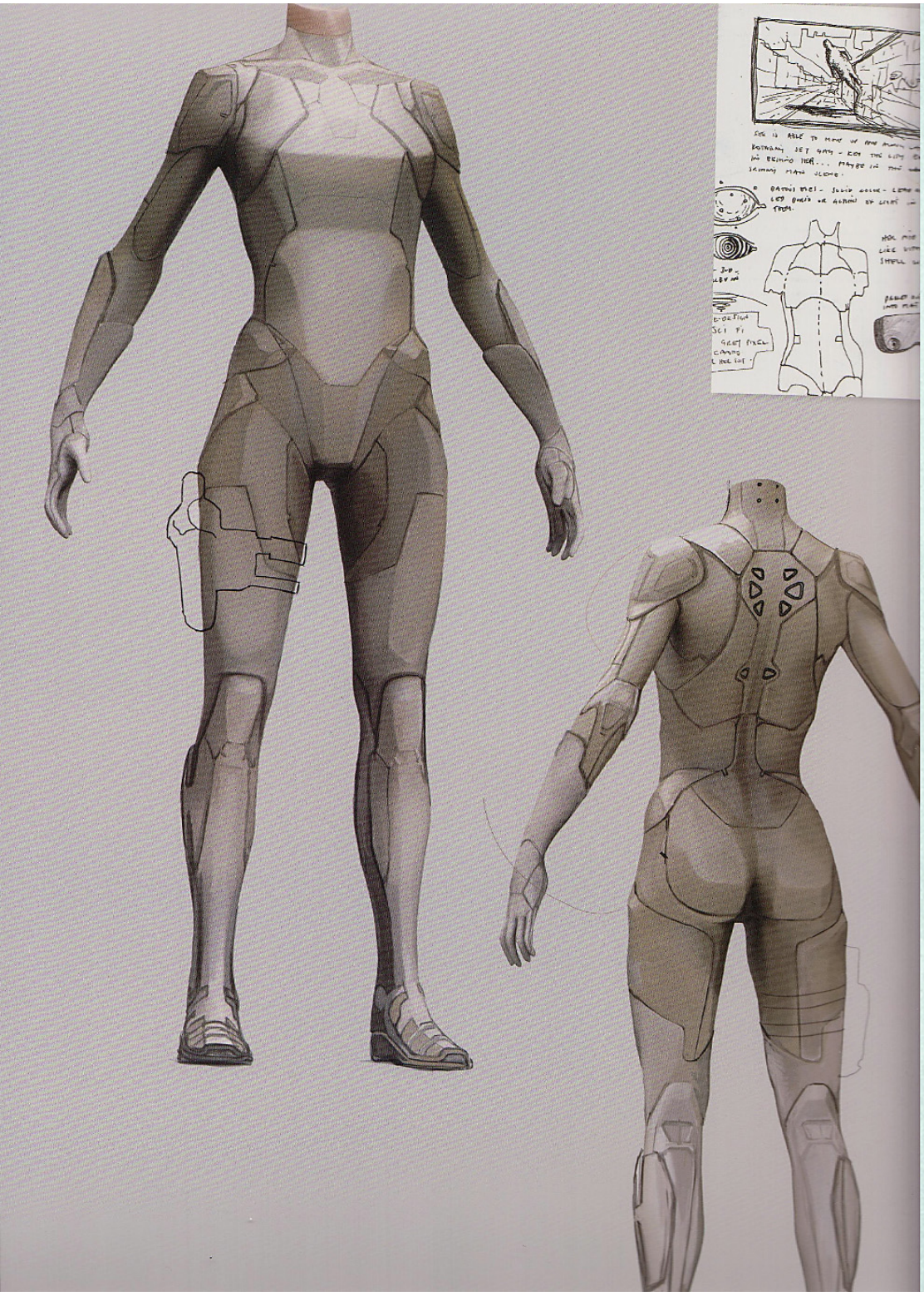








TOP Maciej Kuciara designed this fan-pleasing nod to the anime version of Ghost in the Shell: a submachine gun concealed in a briefcase.
ABOVE A fierce-looking law enforcement weapon designed by Jeremy Hanna, Leri Greer, and the Weta Workshop team.
OPPOSITE TOP AND BOTTOM Gun concepts for Section 9 by Maciej Kuciara, Leri Greer, and the Weta Workshop team.







THERMOPTIC SUIT

Another of the critical costumes to be created was Major Killian's tactical "thermoptic" jumpsuit, which fits her like a second skin and, in the film, lets her become invisible, or nearly so. "There was a lot of back-and-forth on what this should be," says costume designer Kurt Swanson. "I think in the anime and the manga it's not really ever explained what it is, but I think the most important thing for us was it was a suit that she wears, and I know in the anime that just because it's flesh-colored, it almost looks like she's naked." Weta had to develop some of the materials for the suit, which would give it some translucency. "That was really important," says Swanson's design partner, Bart Mueller. "We wanted it to look like the material it was made out of would actually allow it to perform the function of invisibility."

The suit is made of silicone and was built by Weta Workshop, which had never done a full-body silicone costume before—nor had any other studio, Swanson believes. "I think it's new technology, at least for a costume," he says. "But it's performed really well, and it looks really beautiful." The costume includes tactical gloves, which are constructed of many tiny, hand-cut elements. "We've had the luxury of having some really talented people helping us to make these things," says Mueller.

Given its invisibility function, the thermoptic suit ultimately had to be a combination of practical and digital effects. The goal for the creative team was to create a look for the suit's cloaking ability that was as close to the anime as possible, but at the same time it needed to be an original take on invisibility. Invisible people have been a staple of movie storytelling since the earliest days of cinema, so an Invisible Man style would seem trite. At the same time, the anime gave the suit a specific stylized look, reminiscent of a color aberration.

In this version, when the Major's suit is turned on, she doesn't vanish entirely. "We're assuming that the thermoptic technology is not so perfect that you become completely invisible like in Harry Potter," says visual effects supervisor Guillaume Rocheron.

In fact, the inspiration for the thermoptic effect isn't invisibility so much as military camouflage. The digital effects team drew on military techniques that use mirrors to hide objects, and on camouflage patterns. There are glitches that sometimes give the suit away; the idea being that the suit's technology doesn't always work perfectly because it is very advanced, and, as such, a bit finicky.

OPPOSITE Early concepts for the thermoptic suit explored a more geometric style. (Rebekah Tisch and Andrew Baker)

OPPOSITE TOP RIGHT Director Rupert Sanders's early notes and sketches on the thermoptic suit.

TOP LEFT Concept art reveals the segmented design of the thermoptic suit. (Rebekah Tisch)

ABOVE Scarlett Johansson wears the final version of the thermoptic suit, manufactured by Weta Workshop.

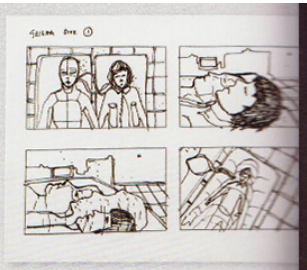
STORYBOARDS AND PREVIZ

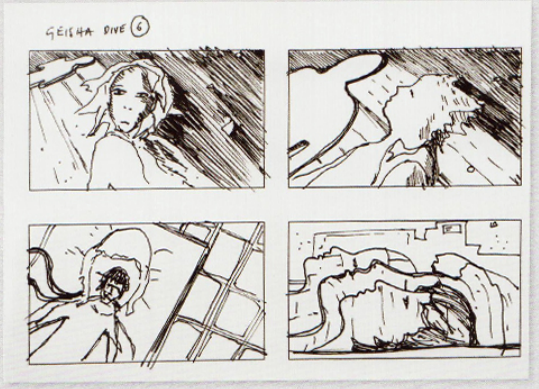
With filming imminent, storyboarding became a crucial step in planning *Ghost in the Shell*'s complex shoot. At its simplest, storyboarding turns the script into drawings that guide the cinematographer's camera placement and the director's choices about how much "coverage" (different views of the scene) to shoot. Storyboards let the production team see how the scene is supposed to cut together and serve as a kind of visual checklist for directors, letting them know which shots they need to capture in their shooting day.

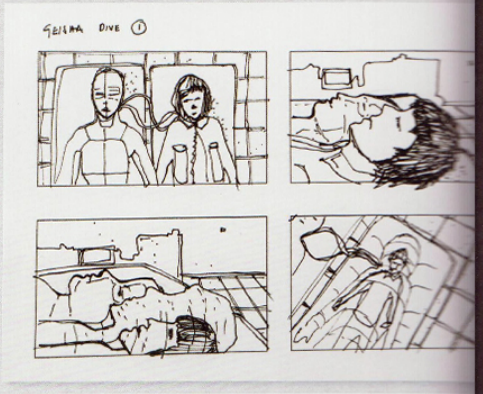
"Sometimes the director has a very precise and exact request that he wants for a scene," says storyboard coordinator Elise Brown. "So he will go through that with the artist to make sure that his vision is seen exactly the way he wants it to be seen." Sometimes, though, the storyboard artist gets to suggest ideas for shooting. In that case, says Brown, "The director will say, 'You know what, go ahead and just show me what you've got. Show me what you can see in this scene.' Then we bring it back to the director and he'll then give critiques. He'll ask for some changes, or rein things in, or go in another artistic direction."

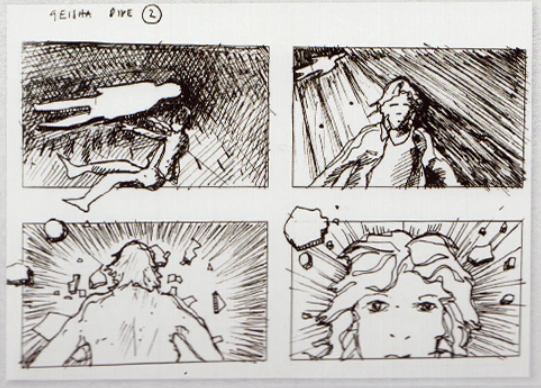
Another tool available to the director is previsualization, or "previz" for short: a technique that takes the idea of storyboarding to another level. Previz involves the creation of a simple animated version of the shoot that not only shows which images are to be shot by the camera, but also creates views of the entire location or soundstage, plus the set, vehicles, dollies, cranes, lenses, and cameras, each programmed with real-life capabilities. So if the director is asking for a shot that would make the camera bump against the ceiling of the stage, or would require a lens that doesn't exist, previz will reveal that. Previz is especially useful for planning elaborate action sequences with a lot of moving parts or scenes where digital visual effects are to be combined with live-action photography. *Ghost in the Shell*, of course, has a wealth of both these things. The film wasn't fully previsualized, as some heavy visual effects films are, but previz was used for some crucial sequences, especially the climactic battle between the Major and a robotic assault tank.

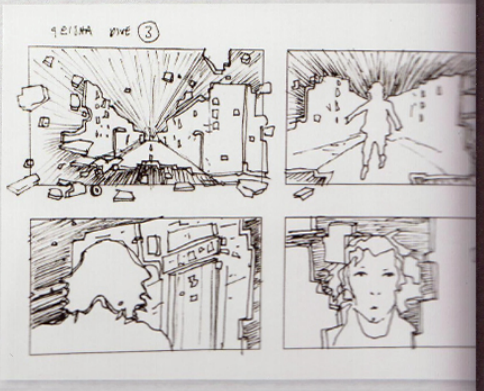
Previz supervisor David Scott observes that the distinct style of the 1995 anime influenced the previz artists. "The wonderful thing about the original Ghost in the Shell," says Scott, "is just how very elegant the photography is. You don't have a lot of very crazy kind of camera moves, and swooshing and sweeping and all that kind of stuff. It's very classical in terms of the framing, so we've really tried to embrace that." Even when a shot was to be rendered with digital imagery instead of photographed, they planned on eschewing elaborate "virtual camera" moves that are impossible with physical gear. "An artificial-looking camera would sort of take you out of [the story] a little bit," says Scott. "So we're trying very, very hard to keep our photography very, very natural."

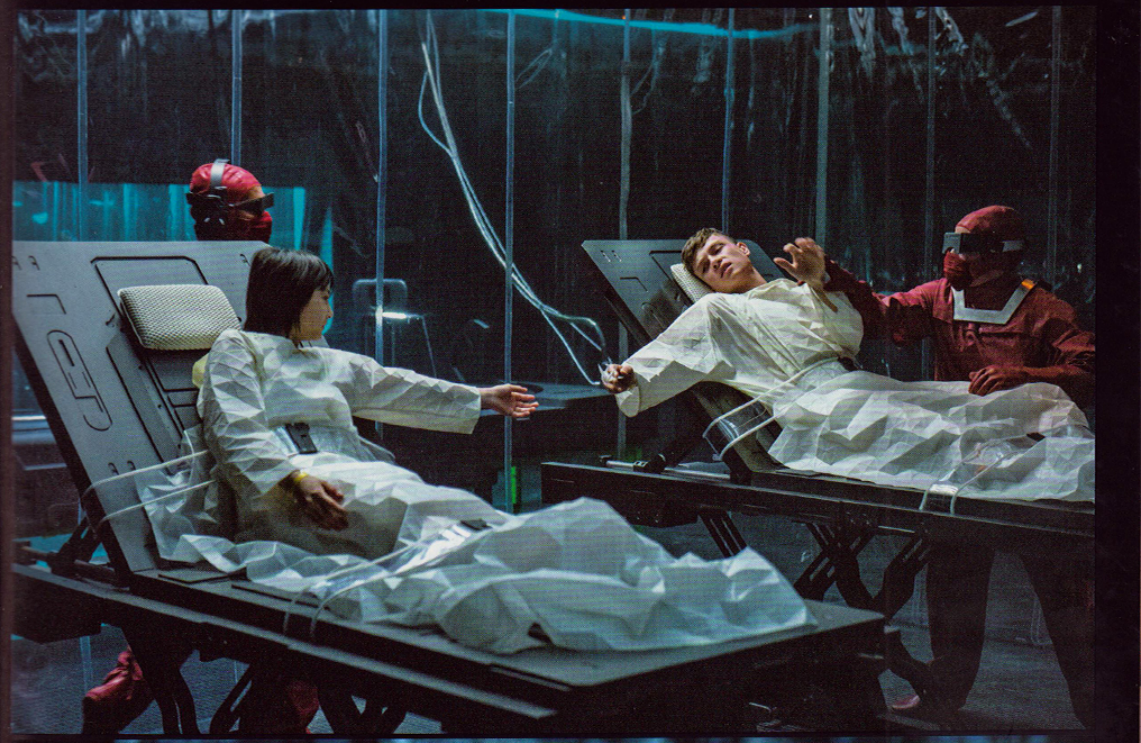












ABOVE AND BELOW Rupert Sanders's storyboards flesh out a key flashback scene from *Ghost in the Shell*.

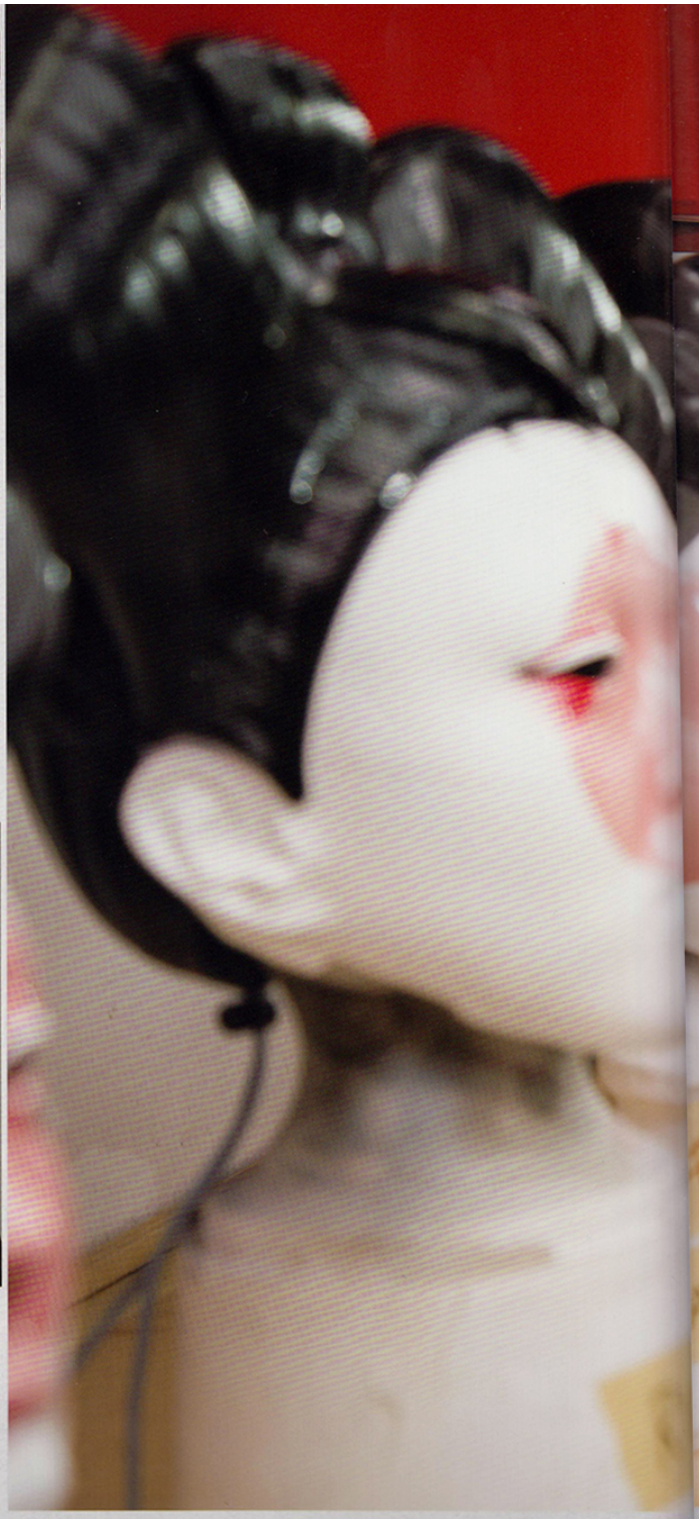
OPPOSITE On-set photography from the final version of the flashback scene.

PROSTHETIC MAKEUP



With almost every principal character and most background players sporting cyber implants, the prosthetic makeup team had a massive job on their hands—and not much time in which to create the makeup before shooting began. Prosthetic makeup can be designed in advance but can't really be perfected and built without access to the face or body of the actor who will wear it. Once the actors are set, the makeup team makes a life cast of each actor, which they can then use to construct pieces that will fit him or her perfectly. It can be a time-consuming process made more difficult by the fact that actors are usually hired relatively close to the start of shooting. Once the life casts are done and the prosthetic prototypes are ready, testing begins. "We have to test the makeups, get them approved, usually redo something and then get that approved, and then start manufacturing," says Jason Docherty, prosthetics supervisor at Weta Workshop. Almost every actor required a life cast, so they had to be made all over the world, wherever the actors were at the time. Prosthetic makeup artists were hired at each location to carry out the work.



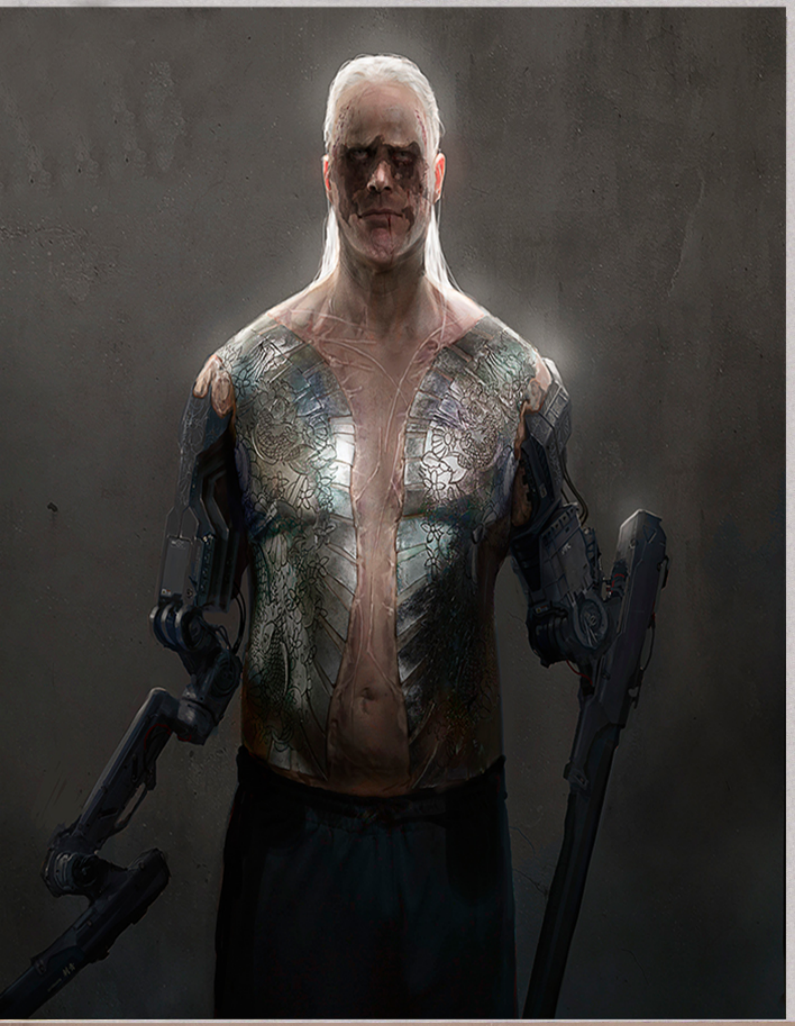




TOP LEFT Prosthetics artist Jason Docherty takes a life cast of Boma actor Tawanda Manyimo.

ABOVE A closer look at the robot geisha hairstyle, arranged in a futuristic take on the classic Shimada hairstyle of seventeenth-century Japan.

RIGHT Life casts of Rila Fukushima were turned into a series of masks that the actress wore when portraying her robot geisha character. Paint supervisor Dordi Moen can be seen putting the final touches on one of the pieces.



Two of the specialists tasked with turn
early-twenty-first-century actors into cy
enhanced denizens of a parallel future wo
were makeup and hair designer Jane O'Kane
and special effects makeup designer Sarah
Rubano. The pair sat across from each other
their Wellington office for eight months. "We
joined at the hip, working out every tiny detail
this creative and colorful world," says Ruban
As life casts came in from far-flung locales, t
prepared hair and makeup designs for approv
including the cyber enhancements embedded
almost every character in the film, from Cutt
the yakuza gang.

However, even after prosthetics were approved, there was still the problem of manufacturing them. Silicone prosthetics, li
those used around the cyber eye implants of
Section 9 team, are lifelike but fragile, and d
survive being removed from an actor's skin.
time an actor's makeup was applied, a fresh
prosthetic was needed. Those prosthetics ha
be ready to go when actors arrived for make
at the start of a shooting day, and sometime
had to be replaced during the same day. Alth
multiple identical copies could be needed on
one shooting day, each prosthetic had only o
mold, and silicone needs time to set. That li
production to outputting three runs in a day,
perhaps four if there was a crunch. "We man
tured pretty much all the way through the fil
says Docherty. "When they're shutting down
set, we're still manufacturing makeup."

LEFT Concept art for a gangland killer with weaponized sword arms who tangles with B during the film's bar shoot-out sequence. (A Middleton)

BELOW Another take on the character known set as "Samurai Arms." (Jeremy Hanna)

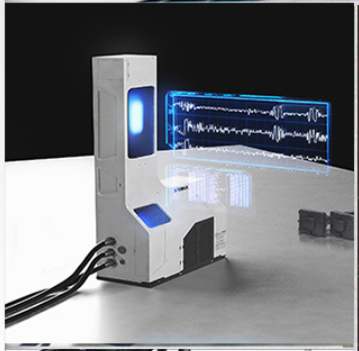
OPPOSITE Concept designs for the cyber-augme gang members provided challenges for the We Workshop team that had to bring them to life o screen. (Greg Tozer)

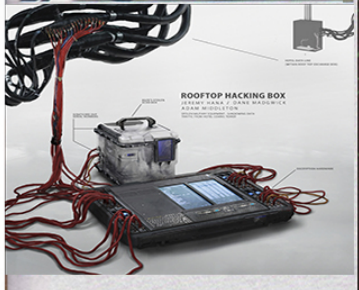














E TOP The very existence of cyber
ements depends on the ability to form data links
rain. This monk's cable was given the same kind
nments as some Asian devotional art. [Leri Greer]

E BOTTOM LEFT A "stimulation hood" takes the
t of virtual reality goggles and adds cyber inputs
ability to deliver inhaled drugs. [William Bennett]

E BOTTOM RIGHT Concepts for CyberHighSimulators,
helps deliver a virtual buzz via a neural
tion. [William Bennett]

king is a tool for law enforcement as well as for
s. This piece of equipment lets the Major enter the
netic brain of a hacked geisha. [Jeremy Hanna]

LEFT Concept design for a futuristic lie detector.
iddleton]

hen tech goes mobile, so does hacking gear.
ftop hacking box is used by the Major during
el Hotel mission. [Dane Madgwick, Jeremy Hanna,
m Middleton]

host in the Shell fans will recognize this nod to
anime: a cyber hand designed for lightning-
ng. [Adam Middleton]









WELLINGKONG

ABOVE Wellington, New Zealand's business district had to substitute for Hong Kong back streets in both daytime and nighttime exterior shots.

OPPOSITE TOP A concept by Ash Thorp that helped define how the live-action footage captured in Wellington would be augmented to make it part of the world of *Ghost in the Shell*.

OPPOSITE BOTTOM A scene from the Wellington shoot.

While early design and visual development were under way, the production was still searching for a home. London was an early choice, but the necessary facilities proved unavailable in the time frame the film needed. Berlin was next in line, but the German capital didn't work out either. "It's always hard," says Sanders. "You're putting a lot of pieces together when you're making a film like this. Ultimately the biggest piece is you're wrangling a budget, and it's an ambitious film. The budget level wasn't huge for the scale of the film we're trying to do. In the end it was a budget call, really. Where can you put the most on the screen for the money?"

The answer was Wellington. Wellington was home to Weta Workshop, which was already working on concept designs for the project. Having ready access to the company would be a big plus. "I think there was a little of 'Oh, you should come work in our empty stages down in Wellington,'" laughs Sanders. "Before I knew it, we were there."

Sanders, for his part, prefers shooting amid the textures and details of real streets to shooting on backlots, and he would get the opportunity to shoot some key scenes in Hong Kong, giving the film what he calls "a nice textural layer." Before the location shoot, production designer Jan Roelfs and his team carried out visual research on modern-day Hong Kong using online photos, and in the process discovered that the cityscape depicted in the 1995 anime was rapidly disappearing as older buildings are demolished to make room for new ones. But there were still parts of the city standing that would be familiar to fans of the original anime. "Hong Kong for me was key to this movie, extremely key," says Roelfs. "We were able to shoot some spectacular stuff there, and that set the tone."







Because shutting down the streets of Hong Kong would not always be an option, some scenes that appear to be set there were actually filmed closer to home. In what proved to be one of the biggest urban exterior shoots ever undertaken in New Zealand, Wellington authorities consented to let the production team use three city blocks near the city's waterfront for shooting on weekends. The *Ghost in the Shell* art department transformed the area into a facsimile of Hong Kong, importing street signs and other graphic elements. So successful was the gambit that the filmmakers began calling the location "WellingKong."

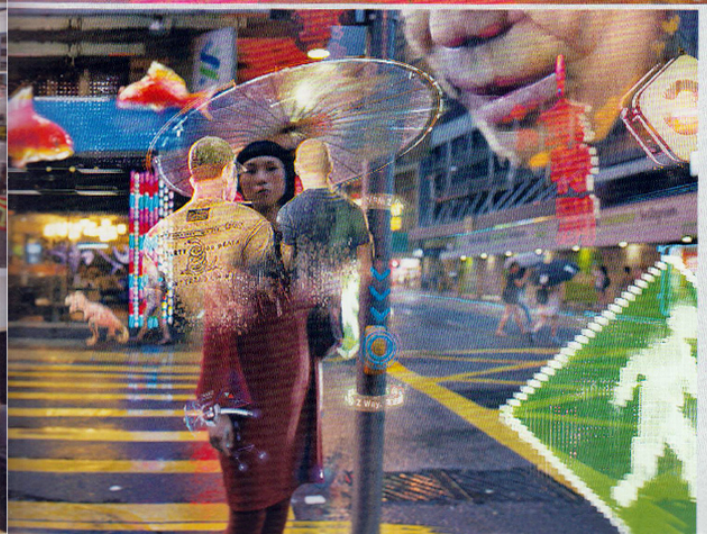
Cinematographer Jess Hall used a large gray fabric sheet draped over the street to block sunlight and simulate the look of an overcast day in Hong Kong. "[There were] some mirrored buildings, which is quite a feature of Hong Kong as well, and the angle that the sun came down on the street lent itself very well to creating refractions off the glass, which is very much something that you see in Hong Kong," says Hall. "You also see it in New York; it's a feature of those kind of vertical cities." Wellington is not as vertical as Hong Kong or New York City, so the architecture needed to later be extended upward using digital effects.

Producer Ari Arad says the Wellington shoot adds an all-important element of realism to the film. "The best way to make a heavy VFX movie look real is to mix and match 'real' with all sorts of different visual effects techniques," he says. "There is going to be a lot of real in these shots."

In fact, that combination of real photography and special effects is one of the hallmarks of *Ghost in the Shell*. One of Sanders's mandates for the effects teams, both practical special effects and digital visual effects, was that he wanted to shoot as much "in camera" as possible, even if he was certain that digital effects would be added to the footage later. "Otherwise," says visual effects supervisor Rocheron, "we would have filmed pretty much the whole film with actors with tracking dots on their face and blue [performance capture] suits, and we try to avoid that as much as possible." Visual effects, says Guillaume Rocheron, are good for creating scale, and building worlds, but in addition to that, Sanders wanted something that felt "tactile." Shooting it for real, says Rocheron, gives viewers "something to hang onto that is going connect them to what they're looking at."







ABOVE Concept art shows the kind of Hong Kong-flavored street scene that Wellington had to simulate. (Ash Thorp)

LEFT An MPC visual effects test adds solograms to a scene shot on location in Wellington.

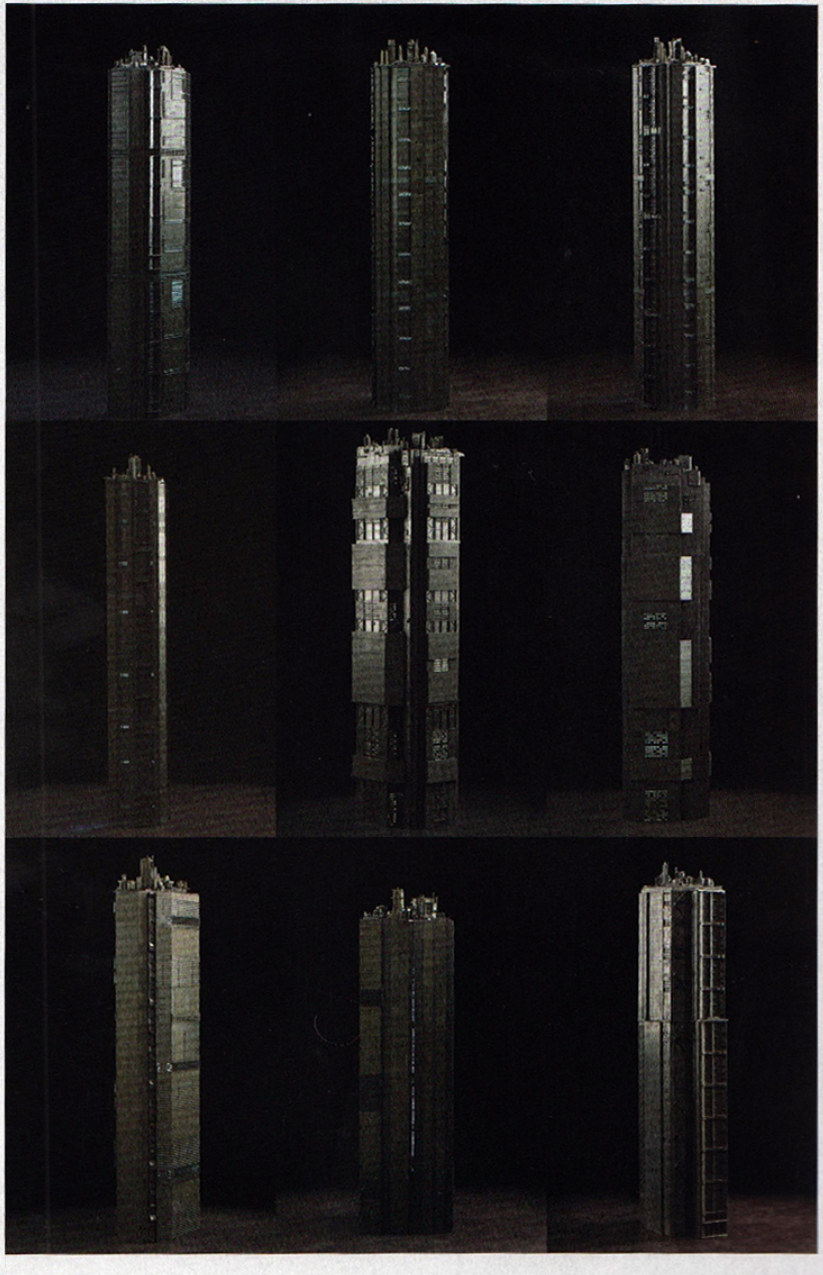
OPPOSITE CENTER An overhead view of the crew setting up to shoot the Skinny Man attack scene.

OPPOSITE BOTTOM Rupert Sanders examines one of the practical skyscrapers built by Weta Workshop for the city's futuristic skylines.

PAGES 114–115 Note the lack of paper in these concept street scenes by concept artist Ash Thorp—no litter, no billboards, no signage—and instead a reliance on solograms.


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PAGES 116–117 The city skyline suggests data storage. It's crammed with information, even at a distance. (Jan Urschel, MPC)

ABOVE AND OPPOSITE Miniature high-rise buildings designed and built by Weta Workshop that, when combined into a skyline, echo the look of a mainframe computer.





SOLOGRAMS

There's no better example of *Ghost in the Shell*'s blend of digital effects and real-world locations than the ubiquitous "Sologrames" seen throughout the film—holographic images that look solid at a glance. Sanders describes them as "virtual, augmented reality holograms where objects on different scales exist, animate, and interact with an environment." Some are giant advertisements in the form of human figures as big as skyscrapers, others are simple street signs, or displays seen on office desks. "In an augmented reality," explains Sanders, "everyone sees the city differently, so it's a great opportunity to say 'Okay, you can have a giant basketball player dunking at sixty stories, but he's integrated in the world. You can have a one-hundred-foot face on the side of a building selling you an enhancement. But I really want them to feel they exist and they sit in that environment very well."

Sanders uses the Sologrames to evoke some of the colorful, "carnival-esque" feel of *Innocence*, the second Ghost in the Shell anime. "You can have a little bit of that sensory overload when you're out in the streets. The technology there should feel quite overwhelming." At any size, the Sologrames handle many of the functions for relaying information that are handled by paper signs in our world (an early design mandate determined that there would be no paper in this futuristic universe). But that meant that even the most banal wall sign would have to be designed as a three-dimensional object, with depth and color. Sologrames were therefore created using digital visual effects, since there was no reasonable way to shoot them "in-camera."

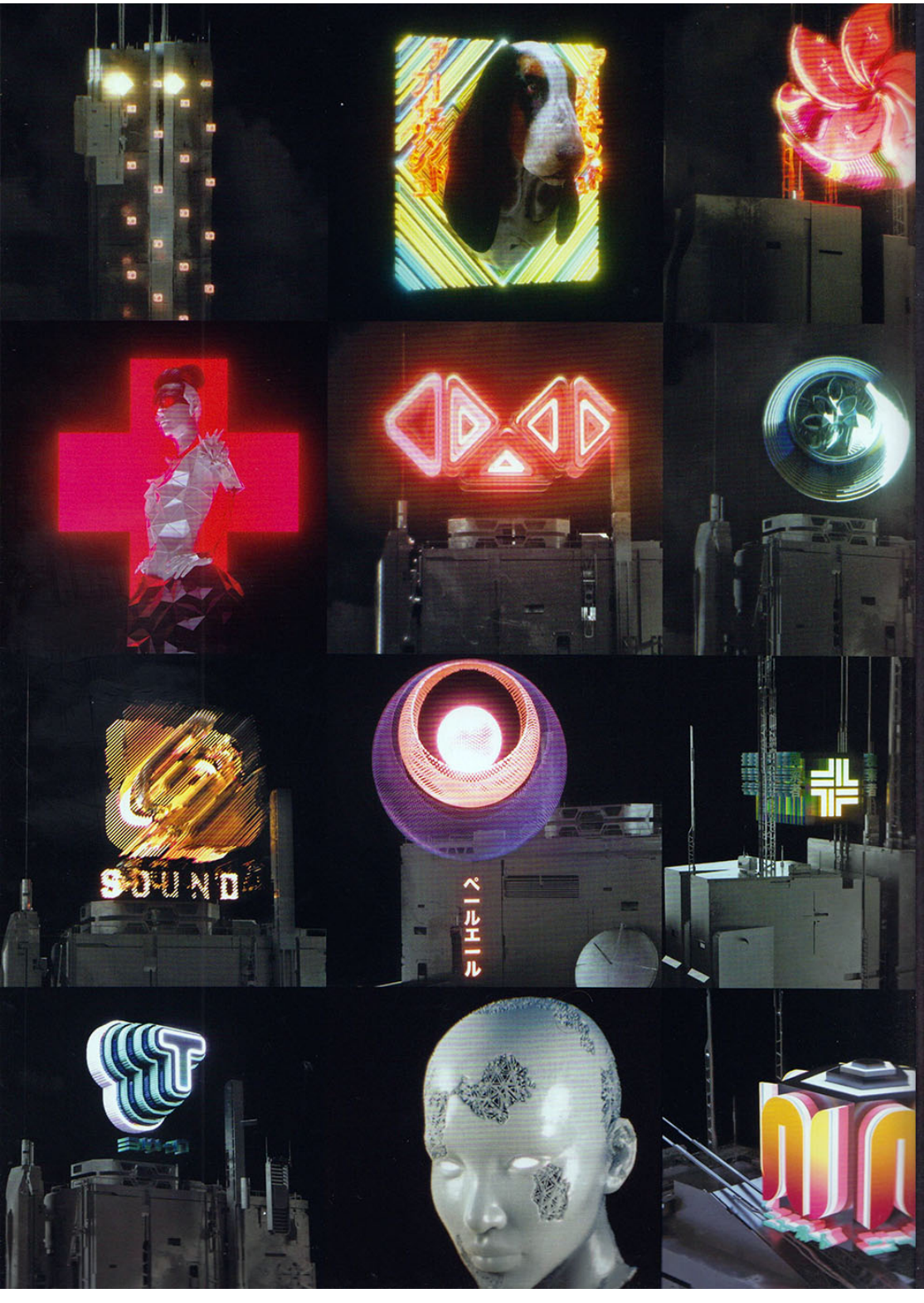
"Every time we look at our visual effects shots we say, 'It's not a *Star Wars* hologram,'" visual effects supervisor Guillaume Rocheron says with a laugh. The Sologrames were designed to appear much more solid than the noisy, shaky images traditionally seen in science fiction, but not so solid that the audience would think a real giant was standing between skyscrapers. "If you were to fly through them or get too close you'd realize they're made of a lot of little cubes," says Rocheron. "But the goal was to make them look completely photographic, if viewed from a distance." Some "glitches" were built into the Sologrames by the VFX team so the audience would be able to tell that they're seeing a projection.

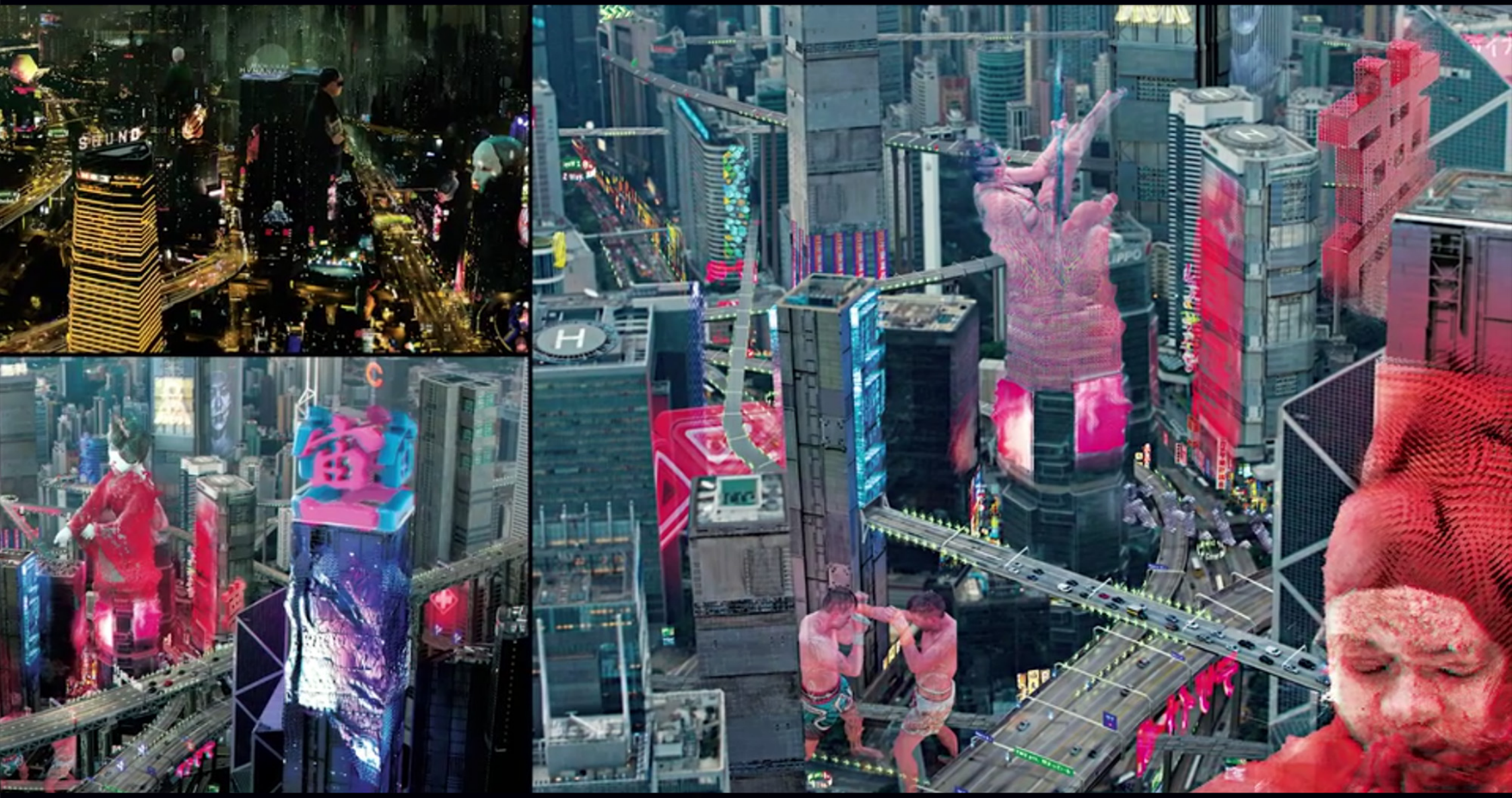
The Sologrames use computer graphics, but that doesn't mean they're entirely computer-generated. Some were captured in live action using cutting-edge "videogrammetry." Digital Air, a Swiss company that specializes in visual effects and camera technologies, was brought on board to provide a synchronized eighty-camera array that would be set up around an actor to capture views of the subject from many angles. Those views were then digitally combined to make a kind of virtual hologram that could then be inserted into a scene at any size and from any angle. "So when you see these characters on the buildings," says Rocheron, "they're not animated. These are real live-action characters that have been projected into a space to make them look like advertising billboards of the twenty-first century."

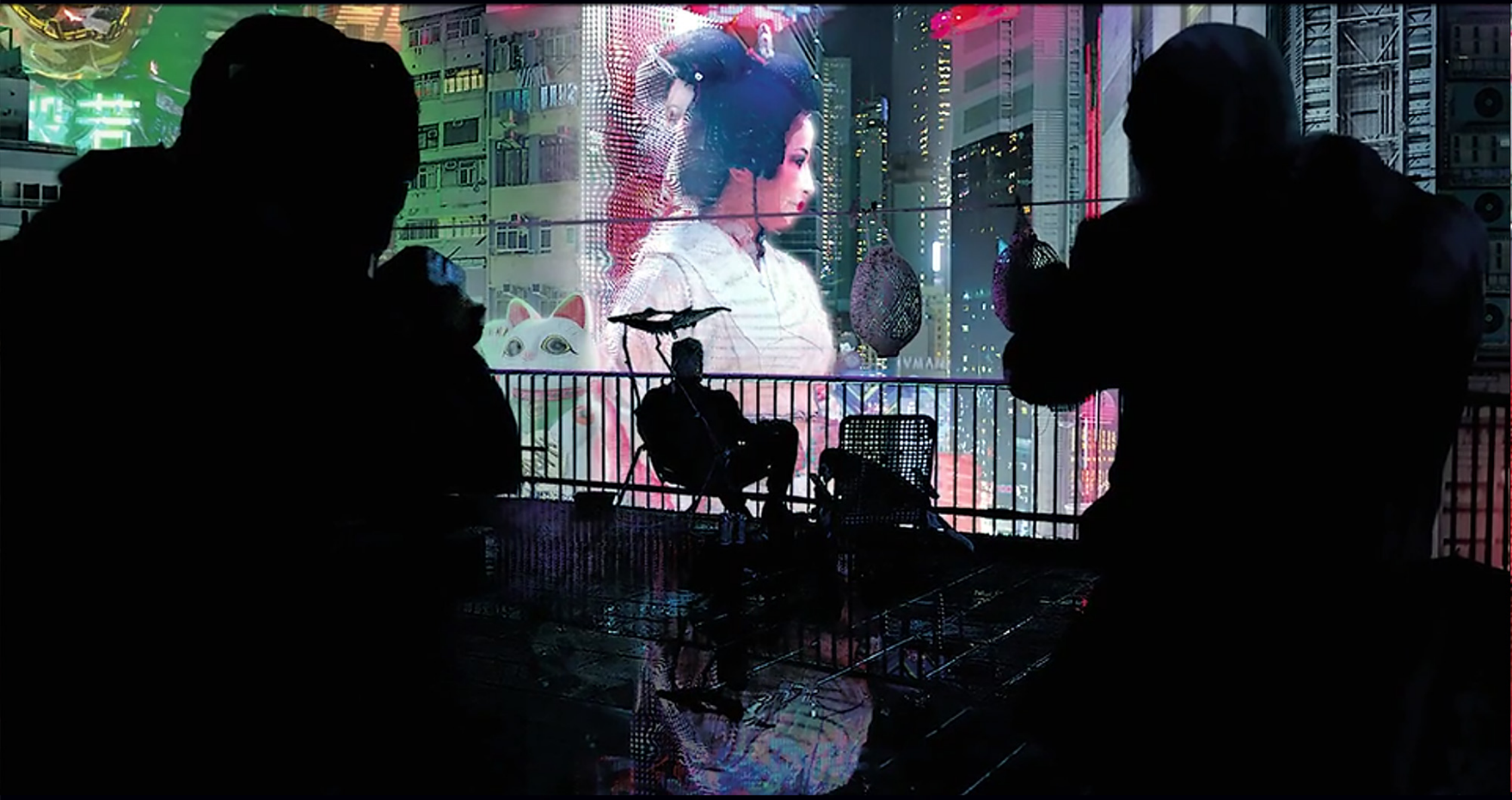
OPPOSITE AND TOP Sologrames take animated signage off giant video screens and into three dimensions. They can be as tall as buildings or small enough for a desktop. (Ash Thorp)

FOLLOWING PAGES Sologram concepts show the variety of ways they are used and the numerous graphic styles they can represent. (**PAGES 122–125** Ash Thorp, **TOP, PAGE 126** Mark Kolobaev, **BOTTOM, PAGE 126, PAGE 127, PAGES 128–129** Marco Gorlei, MPC)


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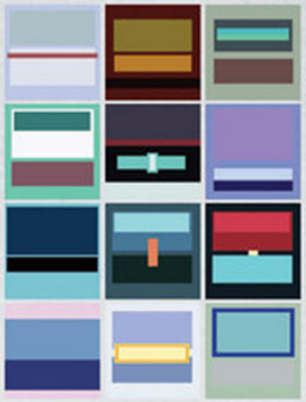


CINEMATOGRAPHY

For his director of photography on *Ghost in the Shell*, Sanders had chosen an old friend, Jess Hall. They were students together at Saint Martin's School of Art in London, where Sanders studied graphics and industrial design while Hall studied film. When Sanders switched plans and focused on directing, he asked Hall to shoot his first short, a Sony test commercial (used to try out ad concepts before a campaign goes public). Sanders later became an accomplished director of commercials, moving up to major studio features with *Snow White and the Huntsman*, while Hall worked mostly in independent films, shooting character-driven features such as *Son of Rambow* and *The Spectacular Now*.

"We were actually going to shoot a different film together," says Hall. "It was also set in the future and had some similar themes, and that didn't quite happen. Then he handed me the first *Ghost in the Shell* script. I was thrilled because I'd actually been a massive *Akira* fan growing up, and the idea of having a chance to shoot *Ghost in the Shell* was kind of like a dream." Hall came on board around two years before production started, which meant that he could contribute to visual development, giving both himself and Sanders a leg up. He and Sanders stayed close throughout production, sharing a house in Wellington. "It was almost like a religious retreat where we could discuss nothing but *Ghost in the Shell*," says Sanders. "We really lived and breathed it. It got a bit much after a while. There was no escape; we were on this tiny windswept promontory on this island of New Zealand—there was nothing to do but *Ghost in the Shell*!"

THIS PAGE Each aspect of the *Ghost in the Shell* world had a distinct color palette, including the rich reds of the city streets.



ABOVE Swatches created by cinematographer Jess Hall that determined the color palette for *Ghost in the Shell*.

BELOW Cinematographer Jess Hall confers with director Rupert Sanders onboard the vessel standing in for Batou's boat, as actors Scarlett Johansson and Pilou Asbaek share a joke in the foreground.

OPPOSITE TOP Careful lighting on colored cabling provides both a touch of menace and a dash of color to this shot of the Major.

OPPOSITE BOTTOM Rupert Sanders on location for the Skinny Man ambush sequence.

For every film, Hall sets out to create a unique visual language, using the elements of composition, camera movement, and color. The color palette of the anime, he says, is very distinctive: "In some of the scenes in the anime, in the lab, it's a series of grays and violets bleeding into the highlights, and then some soft yellow." In addition, he says, the tone of the Major's skin in the anime has a very particular hue. "It's not a skin tone that you see . . . in normal film stock emulsion or straight replication of a digital camera either," says Hall. "And I started to think about, well, wouldn't it be interesting . . . if we could get some of that on Scarlett, and how would I achieve that?" In order to get these lighting elements just right, Hall created an entire technical platform, including a specialized camera, lighting, and custom lenses.

He also pulled his favorite images from the anime, created a custom twenty-six-color palette derived from those frames, and programmed those colors into the production's set LED lighting. "We built a very high level of control within the dimming desk, so that we could call up each color on each fixture, desaturate the colors, and basically create a kind of palette that was extremely complex and subtle," says Hall. "It was secondary colors, colors that you don't often see in cinema, actually. Subtle hues: gray, gray with blue, gray with violet. Extremely subtle variations. It took a lot of development in order to actually be able to capture them."

Hall and Sanders also agreed to eschew a typical film technique: relighting for each camera setup, even when the scene continues in the same set or location. Relighting can make each shot look more carefully composed, but it also slows down shooting and can limit camera movement within the shot. Normally, each lighting setup is geared for a predetermined camera position. If the director then decides to move the camera, the lighting could be wrong. "Rupert said to me very early on, 'I want to be able to move through an environment,'" says Hall. In shooting, this required Hall and his team to build a look he calls "Ghost-cam."

Sanders explains the concept as turning the camera into a kind of floating witness. "We talked about [Wim Wenders's] *Wings of Desire* a lot, and the floaty cameras," he says, "and that felt to us like how the camera should move." Throughout the film there are elaborate digital sequences that Sanders calls "the real ghost cams," tracking shots that show the city in all of its Sologram-ridden splendor. We are first introduced to the Major in one of these shots, which ends with her standing atop the Maciej Hotel, moments before she has to perform a death-defying dive to save







its denizens from hacked robot geishas. "Again, it's the shell and the ghost," says Sanders. "The shell is very [mechanical], very solid, and the ghost is what makes us human, it's the instinct, it's the soul. So there's the two: the hard city and the floating souls."

There are several all-digital aerial shots in the film, ranging from thirty-five seconds to just over a minute. "It's rare when you get a visual effects shot that is not necessarily about action," says Rocheron. Even though these shots don't feature fighting or explosions, they presented a range of major challenges to the VFX team.

"We had to rebuild Hong Kong [digitally]," says Rocheron, "then put our miniatures into it, then modernize the architecture and put in elevated highways and traffic and Solograms and all these things. But what makes [these shots] particularly difficult is they are made for you to look at every single detail, every single element of the shot." The *Ghost*-cam visual effects shots are so detailed, in fact, that they were among the first shots started by the team and yet were among the last to be delivered.

The *Ghost*-cam concept also carried over into the live-action shoot, especially in terms of







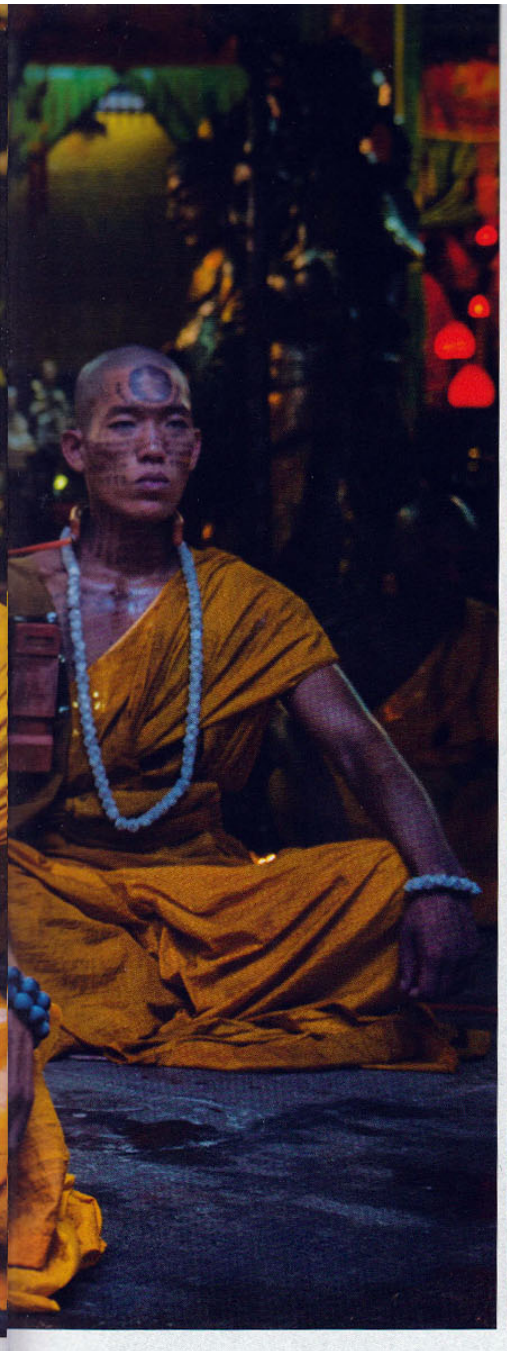
the Major, who is caught between worlds and is in a kind of "third space," not quite human or quite robot, that gives her an unusual perspective. "I wanted that perspective to be felt in the film," says Hall, who gave her scenes a subtle, fluid camera movement. To accomplish that without relighting for each shot, Hall relied heavily on practical lighting built into the set. "It was good for the actors, for performance," says Hall. "It was good for the camera movement; it was good for the director to be in the scene and not waiting for big lighting turnarounds. And it also feels more realistic, I think."

LEFT Takeshi Kitano as Aramaki. Aramaki's office features a background pattern inspired by circuitry.

TOP Rupert Sanders directs Takeshi Kitano on the Aramaki's office set.

ABOVE Aramaki is old-school and eschews cyber enhancement, an outlook reflected by the earthy tones of his office.









ABOVE LEFT Acclaimed musician Tricky, of Massive Attack fame, plays the Major's spiritual guru.

TOP RIGHT Concept art depicts the kind of cluttered, multicultural melting pot vibe that the creative team attempted to replicate on set.

ABOVE RIGHT A piece by Weta Workshop's Adam Middleton shows an augmented fishmonger going about his business.



ACTION!

The task before supervising stunt coordinator Guy Norris was clear: Update the decades-old action of the manga and anime versions of Ghost in the Shell for a 2017 audience. "Every sequence for us has been very difficult in that way," says Norris. "There's a certain tone and feeling with the original manga, and we're trying really hard to bring that across . . . [but] the rules of *Ghost in the Shell* are very different from a contemporary action piece." For example, twenty-first-century audiences are used to the over-the-top action of superhero movies. But while the Major has enhanced physical abilities and, in fact, most of the characters have some sort of cyber enhancement, none of the characters have comic book–style superpowers, not even the Major. The action style is therefore closer to reality. The Major can leap higher and punch harder than a human, but she can't fly or punch through concrete. She has limits, and the fight scenes reflect that.

Richard Norton, Johansson's fight trainer, says, "Every punch and every kick and every move has to be motivated by story and by character. Guy's a real stickler on that."

The word "choreography" is routinely applied to the design of fight sequences, because there are preplanned moves, just as there are in a dance routine. That idea runs deeper, though, for Norris and Norton. "To me, action is very much like musical beats," says Norris. "It's like an orchestral piece." In fact, Norris views the director as a conductor and pays careful attention to pacing, so he doesn't set off all his "dynamite" at once.

THESE PAGES Director Rupert Sanders on set with Scarlett Johansson. Though an action movie veteran, Johansson had to acquire a raft of new skills for *Ghost in the Shell*.



"Certain scenes have different rhythms, and inside of each sequence you have different rhythms," continues Norris. "You want to hit high notes in some sequences; you want to continue some along. To me it's very much like music, and if you treat it like that, the performance can become very dance-like."

Because Johansson is in so many of the film's action sequences, her training began six months before shooting, under Norton's supervision. Says Norton, "Our pitch to Scarlett was, 'If we can get you doing at least 80 percent of the fight, that's gold for the director. There's no compromise on camera."

Thanks to her action-movie background, Johansson was already physically adept and no stranger to using weaponry. However, the demands of playing the Major required her to get additional training in firearms, fighting, and even gymnastics, since her fight moves would be acrobatic. As Norton notes, although the Major is smaller in stature than male counterparts like Batou, "we still have to believe that someone [her] size can do that amount of damage to these larger guys [she's] fighting."

The Major's fighting technique encompasses escrima, silat, krav maga, kali, tae kwon do, kung fu, and kickboxing moves. Wire work was used to allow Johansson to leap farther than a human could, but it was handled subtly so that the audience is led to believe that a human being could pull off the Major's moves if she were strong, fast, and flexible enough.

"It wouldn't be Ghost in the Shell without the crazy fight sequences and gunplay," says Johansson. "It's been exhausting and really empowering at the same time, to be able to be as physical and able as I have been on this film. I feel that I now have a set of skills for life. It's kind of allowed me to get over a lot of the fears that I've had, of just being out of control, and just realize that, 'No, you're in control. You've got this. You can be bad, and you can make it look badass too.'"

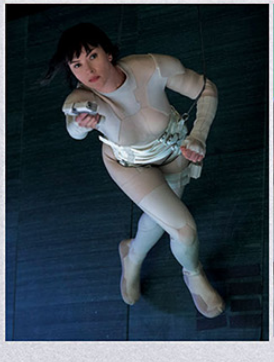
Norton drilled her on footwork, ensuring she would appear balanced and in control while moving, and on specific moves that she would need to know by name as they were added to the fight choreography. Norton also taught her to take the time to spot her target, be it for a shot or a punch, and to fight with intent. "Since you're the lead," he warned her, "they'll often [film you in close-up]. If we see your chin down, and your eyes narrowed, and you have the confidence of a real fighter, then that's gold."

The process built up her confidence in her skills—and in Norton. Eventually she began referring to him as her "blankie" (as in "baby blanket"). "I said, 'Scarlett, I've trained fifty years to be a black belt killer,'" recalls Norton. "'You start calling me a blankie in front of these guys, that's the end of it for me!'"

Johansson's work ethic and commitment paid off in the film's big fight scene in a yakuza bar, triggered when the Major and Batou go looking for a back-alley cyber surgeon and get in over their heads—or so it seems. "It was probably the biggest stunt sequence [in the movie]," says Guy Norris. "[There were around] thirty-five stunt performers and special-skill people, with dancing girls behind in glass dancing booths that were shattered during the whole fight and shoot-out." Batou winds up in a gunfight with a bar full of yakuza while Major Killian, in the next room, has to fight handcuffed to a stripper pole. Johansson did all of her fighting in the pole scene, Richard Norton says. "That's fantastic, because there was every expectation she might do 40 or 50 percent," he adds. The fight lasts more than a minute, with Johansson performing all the stunts herself, including wire work and backflips. "That's nothing but training," says Norris. "That's learning the choreography and drilling it constantly."

Along with the many fights and falls she had to perform throughout the film, Johansson also







ABOVE After infiltrating Kuze's lair, the Major is overwhelmed by his minions.

OPPOSITE The Major's strength and agility aren't at superhero-level, but they're beyond those of a normal human, so in some action scenes Scarlett Johansson's fight moves were enhanced using wirework.





OPPOSITE Scarlett Johansson trained to perform the Major's iconic rooftop jump herself, without a stunt double.

ABOVE Director Rupert Sanders examines a scale model of his star in mid-jump.

BELOW The Major makes her escape from Hanka.

had to pull off a live-action version of one of the most iconic shots from the original anime: the Major's high dive off a roof at the start of the film. To make the scene as dynamic as possible meant getting Johansson to do a fall herself, and although no human could actually perform the Major's death-defying dive, she could simulate enough of it that the audience would get the sense that she was actually falling.

Norris and the stunt team spent weeks teaching Johansson to do a high fall. Initially she was just required to fall backward a foot or so, but one foot became three, three became six, and eventually ten or twelve. "Because of her physical awareness in the air, she became very good," says Norris. "She knew where her body was in the air and what she had to do to change [her position]. It could be something very simple like lift her head slightly higher or arching her back or pointing her toes, which would vary her [position]."

The dive sequence was split into three parts. The initial shot showed the beginning of the dive, with Johansson performing a blind fall backward in close-up. In a second segment, the Major is seen in mid-dive, a section filmed with Johansson on wires. A third segment has her performing a rotation and landing on her feet. The entire sequence was captured using a high-speed camera so it could be played back in super-slow motion. Norris says that having Johansson on camera throughout greatly added to the realism of the scene, which would have been lost if the film had cut to a wide shot of a stunt performer.

The goal of making *Ghost in the Shell*'s action reflect character and advance story, along with a focus on giving the director the freedom to shoot and edit as he pleased, would inform dozens of stunts, large and small, throughout shooting.





YAKUZA BAR

When the Major and Batou infiltrate a yakuza bar in their pursuit of the hacker behind the attacks on Hanka, Killian soon finds herself in a situation that's dangerous, even for a cyborg. Chained to a pole and threatened with torture by "Tony," the yakuza back-alley cyber-implant surgeon, and his men, the Major finds herself cut off from Batou, who has his hands full with a dozen or more gunmen in another room.

"It's technically absolutely incredible," says Pete Teo, who plays Tony, of the bar sequence. "Visually, it's going to be absolutely stunning, because Rupert is so exacting in terms of how he frames, and how the lighting is done." Tony's minions in the scene have all been enhanced—they're largely Tony's twisted handiwork—and Teo calls their look "freaky and cool." Some have wires protruding from their eyelids, some have mechanical jaws, others samurai swords for arms.

With the casual lingo of an action-movie veteran, supervising art director Richard Johnson calls the scene "your basic go-to-the-bar-and-shoot-the-place-to bits. There was breaking glass, breaking bar props, breaking walls, breaking furniture. It's a big deal to do that stuff." Sometimes the details of an action scene aren't given to the art department until just days before the sequence is to be shot, and the department has to make preparations in haste. "You've got to work with [the] stunts [crew], who choreograph the action, and you've got to see what they need and when they need it," Johnson says.

On *Ghost in the Shell*, says Johnson, the art department had to be extra careful because of the super-clear images captured by the Alexa 65 camera used by director of photography Jess Hall. "The columns are made with real tiles," he explains. "[The camera] can see the difference between real tile and fake tile. It can tell the difference between real wood and fake wood. It can see the difference between rubber tile and not-rubber tile. So as you work with these stunt guys and they ask for all these rubberized things, it means the craftsmen have to work to a much higher standard because in the past the cameras couldn't detect the difference in materials. Now they can."

ABOVE Cyberia notwithstanding, the life of a low-level gang member is still long hours in close quarters, as this image by William Bennett shows.

BELOW Concept art by William Bennett shows futuristic vending machines at the bar.

RIGHT An intimidating barkeep illustrated by Cane Hadgwick.



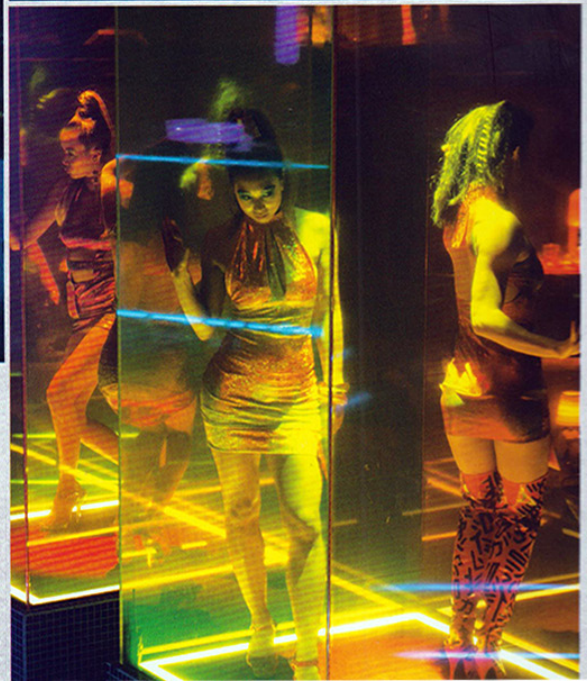






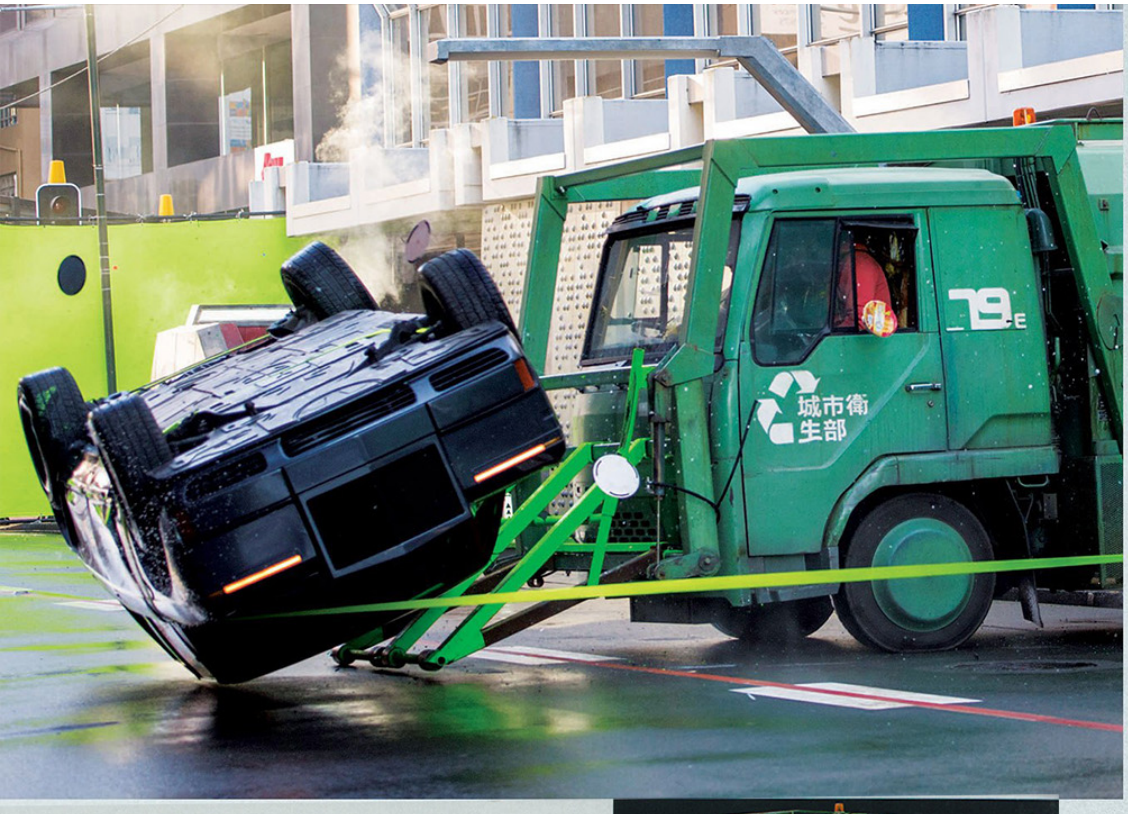






ABOVE Pete Teo as Tony, flanked by two minions. The bar incorporates some of the translucent elements that form a running visual motif throughout the film.

RIGHT Batou and the Major find that pursuing their investigation inside the bar is especially dangerous.



SKINNY MAN ATTACK

The Skinny Man attack and chase sequence contained an extremely technically challenging moment for the stunt team: A garbage truck T-bones the Rolls-Royce carrying Dr. Ouelet, sending it rolling sideways. The Rolls had to land in a precise way to support the action choreography, and the scene would be shot amid real storefronts in Wellington. Simply ramming a car and filming the result would be too dangerous and unpredictable. Instead, Norris's team wrapped a cable around the car, as if it were a giant yo-yo. Then, when the car was rammed, the cable would unwind until it was played out, stopping the car in a designated landing spot. Even that was not left to chance, but was rehearsed off-site with "donor cars" of similar size and mass to the Rolls. Since the cars were real, they'd be smashed on their first take, so each rehearsal totaled a car.

In years past it might have been enough to simply see the crash and cut to a shot of Juliette Binoche acting dazed inside the wrecked car. Given the level of action the filmmakers were trying to achieve on *Ghost in the Shell*, though, such a shot would seem weak. Actually showing Binoche inside a rolling Rolls would be much more dynamic, but putting her through the actual collision would be too dangerous. So Norris and his team developed a plan to put a car on a "rotisserie rig" surrounded by green screen that would let them roll the car sideways while it was suspended in midair, like a chicken on a spit (hence the name). Binoche would spin 90 degrees—just from vertical to horizontal—and visual effects would make it seem as if she went a full 360 degrees as the car rolled over.

"We showed [Binoche] a test of it with the stunt person in it," says Norris, "and she said, 'I'll go.'" However, the first take was useless because she was laughing so hard at the sensation of being spun around! After the initial trial run, though, Binoche was able to focus on delivering her performance. "Again," says Norris, "it's all about designing the action around the characters, so right in the middle of this crash you cut to her and see what it would feel like from her perspective. It worked really well." Meanwhile, the visual effects team shot a 360-degree panorama of the location as it appeared at the time, then replaced the green screen from the shots filmed with the rotisserie rig with the location background, so when Ouelet tumbles, we see the real cityscape out the window, even though the car interior was shot on a soundstage.

When the Major confronts the Skinny Man during his assassination attempt on Dr. Ouelet, Kuze's puppet activates his thermoptic raincoat and tries to escape. As the Major gives chase, it becomes a battle of wits, finishing with a brutal fight between hunter and hunted. However, the live-action version of this familiar scene from the 1995 anime is far from being a simple retread of this fan-favorite sequence.

Stunt coordinator Tim Wong promises the fight between the Major and Skinny Man is bigger and better than in the anime. "If you look at that sequence in [the 1995 anime], the moves are actually quite basic, and the fight between Major and the Skinny Man ends quite quickly," he says. "So we added in a few more blows and a few more beats, and a bit more wire work, but then, as well, we pay homage by using one or two of the actual moves that they used in the anime."

The last part of the Skinny Man sequence involves hand-to-hand combat between Skinny Man and the Major in a few inches of water. Within the story, the fight takes place on a warm day, but it was actually quite cold in Wellington on that shooting day. Supervising stunt coordinator Guy Norris says, "Everyone was wet, everyone was freezing, but if you look at the picture, it looks hot and balmy."









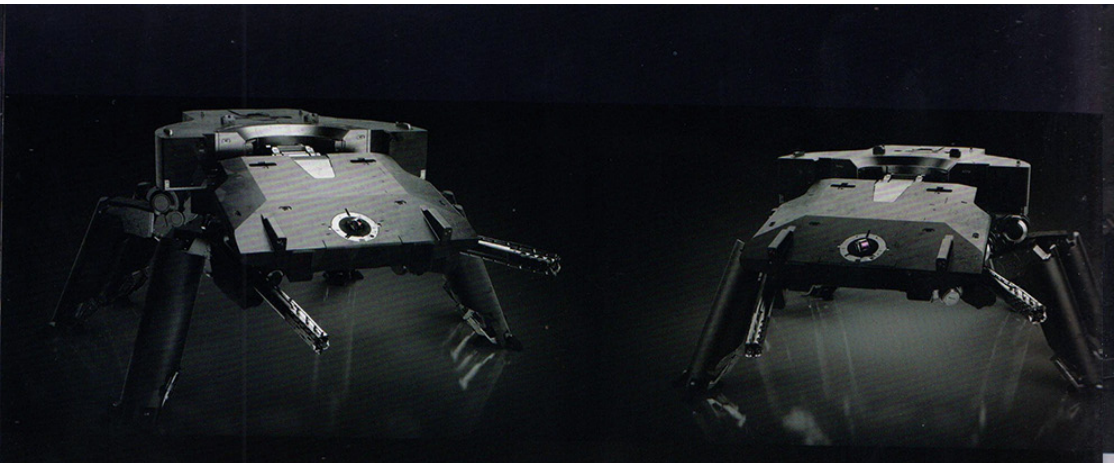
TOP The collision of Dr. Ouelet's Rolls-Royce and a garbage truck had to be carefully planned and rehearsed, because it was filmed in the streets of Wellington with functioning businesses on either side of the street.

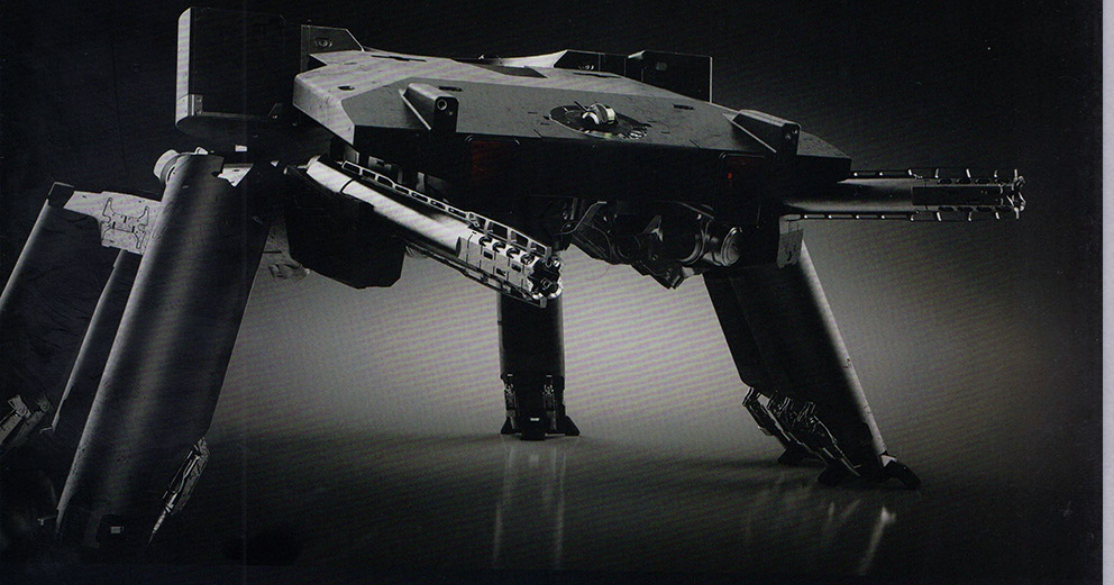
CENTER Concept art of the garbage truck by Ash Thorp with graphics by Adam Middleton.

ABOVE This Section 9 car has a handy compartment that allows quick access to a submachine gun.

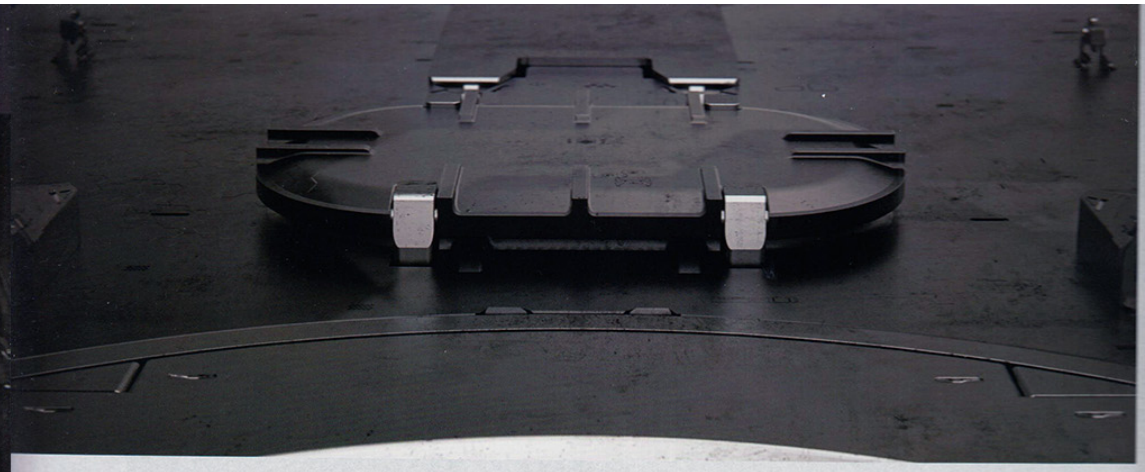
OPPOSITE During the fight between the Major and the mind-hacked assassin, wirework was needed to show the impact of her blows on the killer. The city background would be added digitally in postproduction.


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TANK BATTLE

The climactic battle between the Major and a "spider tank" required "a good half of the energy and resources" of the art department, says Richard Johnson. In the 1995 anime, the scene takes place in a museum, and the tank (which has its own thermoptic shield) destroys a "tree of life" wall display that shows man on top, the last and greatest product of evolution. The Major faces it alone, without any weapons or the slightest hope of making a dent in it, and bravely draws the tank's fire, getting it to run out of ammunition. Then she literally tears herself apart trying to get into the tank, leaving herself broken and all but helpless.

The live-action film features an alternate riff on this epic showdown, complete with a spider tank that will satisfy fans of the anime. But the setting is different: a causeway that houses a pagoda that will unlock the last missing piece of the Major's identity—and her connection to Kuze.

"We took a bus terminal causeway where trams and buses come together in Hong Kong, and re-created a quarter of it down in Wellington, where we could fire a lot of guns and blow a lot of stuff up," says Johnson. As in the yakuza bar sequence, all the destruction and detritus it entailed had to be preplanned, in detail.

Since it was an outdoor set, the shoot became subject to one variable no one can control: weather. "'Windy Wellington' certainly earned its name," says visual effects producer Fiona Campbell Westgate. "It was the beginning of winter and there were winds as high as 140 kilometers per hour." (That's 86 mph, Category 1 hurricane strength.) It was cold and wet as well, with sideways rain. There was no working outside in those conditions, but even when the gale died down, it was cold and windy. Too windy much of the time, it turned out, for principal photography.

"The upper floor where a lot of the action took place was twenty-four feet in the air," says Johnson. "Ultimately, it proved to be difficult to film because of these winds at night, so we had to duplicate the upper level at the last minute, inside, on a stage."

The stage had scant space for such a large set, and the logistics of fitting it in were daunting. Then, after the builders had rushed to make the set by the due date, it had to sit idle for a few days after the crew ran out of lights. Such shortages, Johnson says, happen all the time on film shoots: "Movies are finite things. There's not every resource in the world available. So sometimes you're waiting on actors, sometimes you're waiting on lights." In the end, the main outdoor set was used for stunt shots and the principal actors did a lot of work indoors because it proved very difficult to record dialogue outdoors in the wind. Such switches happen often in today's movie shoots, says Johnson. "You just rely heavily on green screen when you're inside," he says.

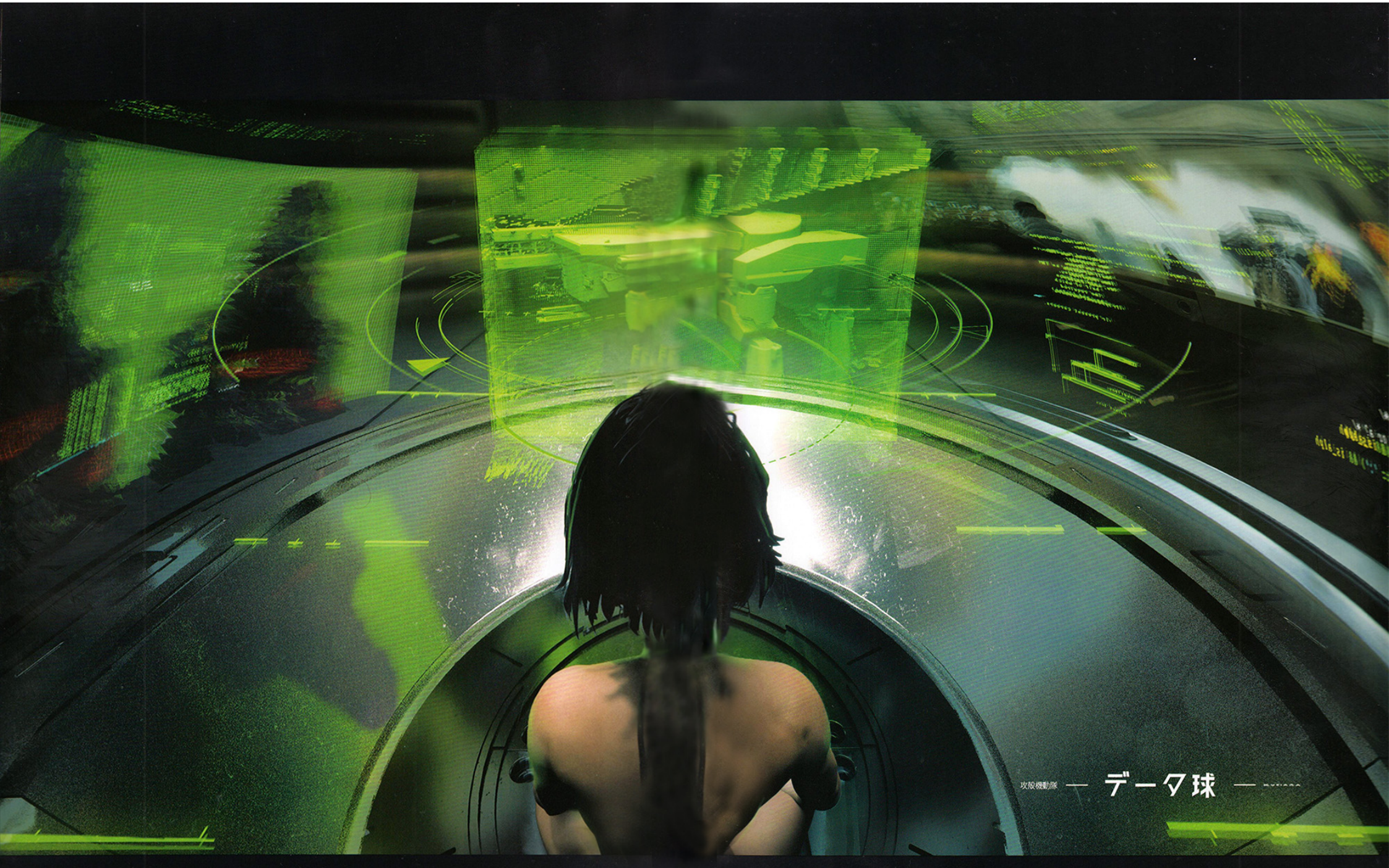
As for the tank itself, concept designer Vitaly Bulgarov updated the look of the version seen in the anime, giving it a retro-future look that fit with the overall vibe of the film. "Vitaly's amazing with detail and textures," says Sanders. "We were definitely inspired by the original and it was something we thought people would expect in there, and we wanted to arrive at it in a slightly different way, and again bring the emotion to it. It was taking that concept and updating it, not do something that's too expected."

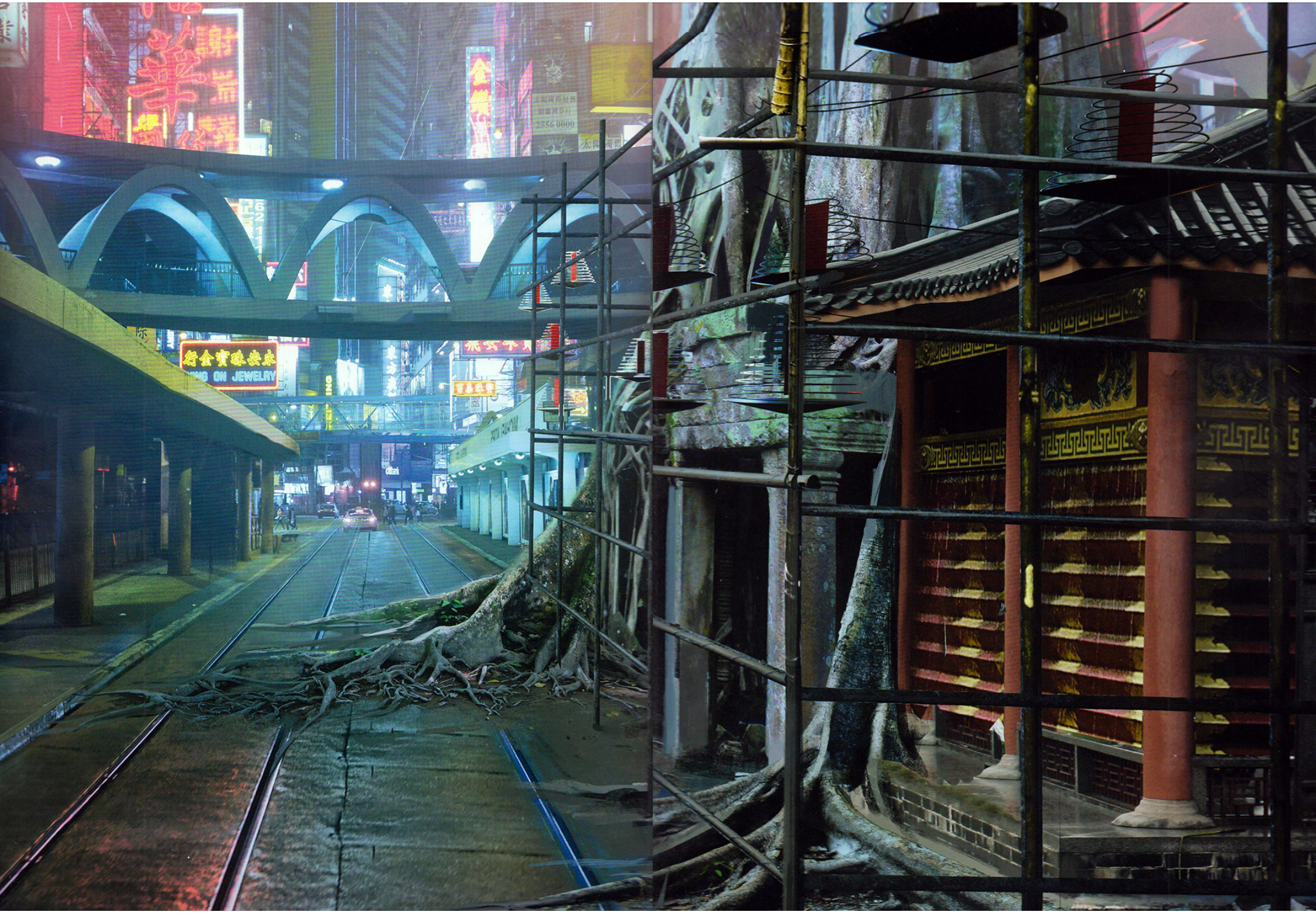
Much of the tank sequence was achieved using digital effects, and the VFX team studied the anime to get a sense of how the animators had given personality and a feeling of emotion to something as inexpressive as a tank. "The anime does a really beautiful job at this," says visual effects supervisor Guillaume Rocheron. "When you see the tank move, you really get a sense of when it is a little bit annoyed, or is a little bit urgent, or is a bit more calm." Duplicating that concept was tough for the VFX team, says Rocheron, because they were working in live action. "We can't make it as stylized as it is in the anime because we have to somehow respect the laws of physics."

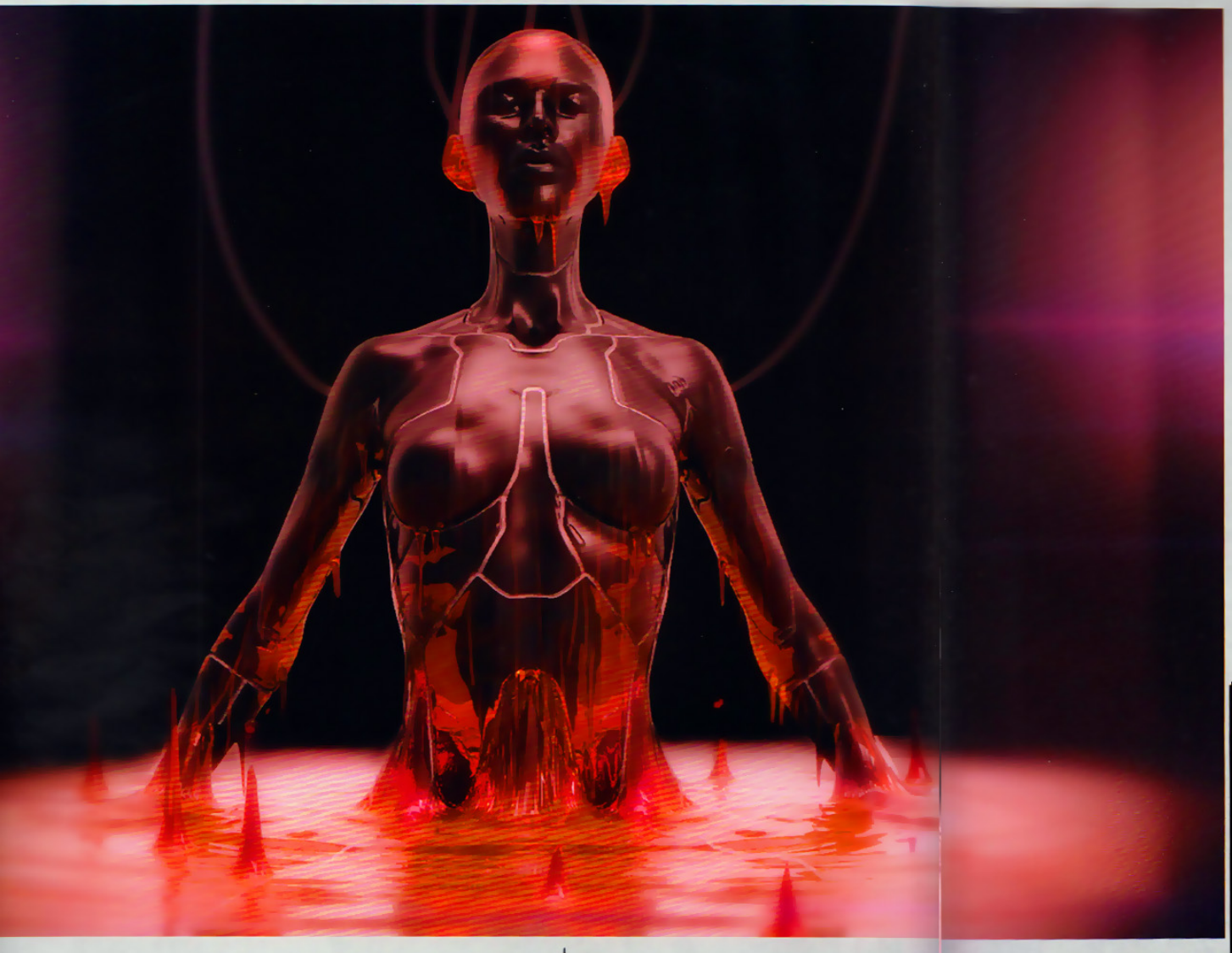
PAGES 150–151 The utilitarian pool of water where the Major subdues the killer is surrounded by another dense cityscape. (Maciej Kuciara and Adam Middleton)

OPPOSITE AND ABOVE The "spider tank" the Major must fight in the climactic sequence is a formidable weapon, but its intelligence is limited. (Vitaly Bulgarov)

PAGES 154–155 An early concept depicts the "hologlobe" in the Major's apartment. (Maciej Kuciara)


攻殻機動隊
データ球


永安珠寶金行
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CONCLUSION

By the end of the film, the Major's search for herself is over, but she has evolved into something (or someone) greater. Has the Ghost in the Shell saga done the same? Creator Masamune Shirow has said that there is no such thing as a definitive Ghost in the Shell, and that the story should adapt to the form in which it's told. For Mamoru Oshii, director of the 1995 anime, Rupert Sanders's live-action version has fulfilled Shirow's wishes. "I believe this film is going to be great," he says. "[It] will become the most gorgeous film made in the series so far."

Producer Avi Arad hopes that this film will redefine how people think of "comic book" movies, as the 1995 film redefined anime. "I think we're finding an interesting line between a dreamier, more imaginative, visceral world than a lot of other comic book movies have done," says Arad. "I think we're going to surprise people."

It's been a long and sometimes difficult journey. Having had a hit with his debut film, Sanders could have opted for easier fare, perhaps an entry in an already established movie franchise. Instead he chose a labor of love that took years to complete. And he says he's proud of the people he worked with and the film they created.

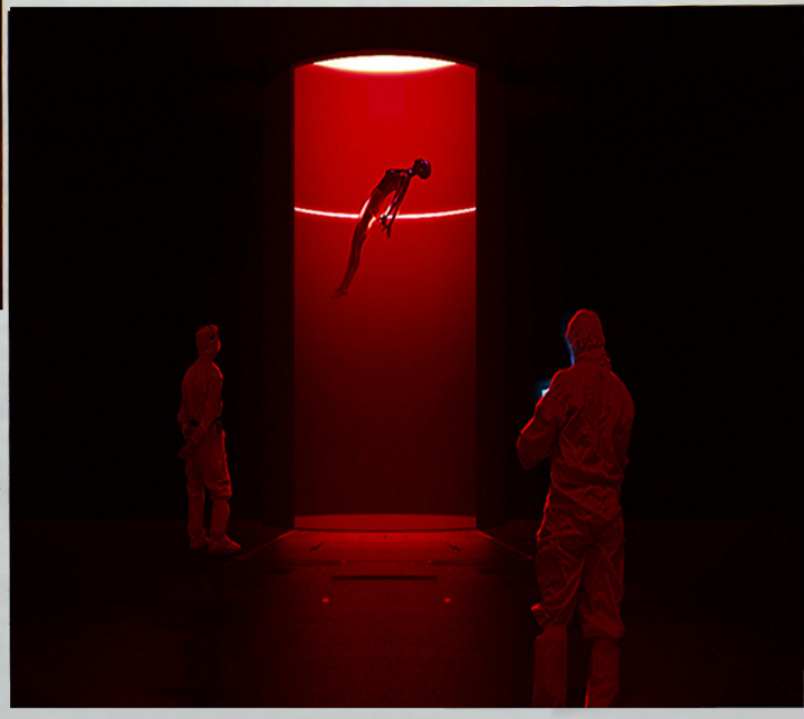
"It was hard for all of us," he says. "It was a very tough and complex shoot. Part of what's amazing about what I do is I get to work with very talented people. And I'm proud the finished film is so emotional."

Scarlett Johansson's hopes for the film are focused on how movie fans will respond to the experience as a whole. "I hope the audience shares the same compassion that I have for this character," she says. "And I hope they willingly go on this ride with me, you know, because it's definitely a ride."

For the ever-eloquent Richard Taylor of Weta Workshop, *Ghost in the Shell* was not just any movie, but a philosophical exercise that allowed him and his team to flex their creative muscles like never before. Having been attached to the project from its very early days, seeing it come to fruition has been a true odyssey for him, and one that has been profoundly satisfying for the entire team at Weta Workshop.

"This movie has the opportunity to hold a mirror to humanity like no other," says Taylor. "This movie may inspire some, it may terrify others, because we've all had this niggling contemplation in the back of our minds, the thought of 'What is technology going to mean to the human race going forward?'

"It's extraordinary to think that this film may become the seminal statement on what that integration of humanity and technology really means for us as a human race, through this incredible world of *Ghost in the Shell*."



PAGES 156–157 The concept for the causeway setting suggests natural and artificial worlds in conflict. (Maciej Kuciara)

ABOVE The Major's unfinished body during the shelling sequence. (Andrew Baker)

RIGHT Hanka techs watch the Major go through the birth-like shelling process. (Jeremy Hanna and Ben Hawker)

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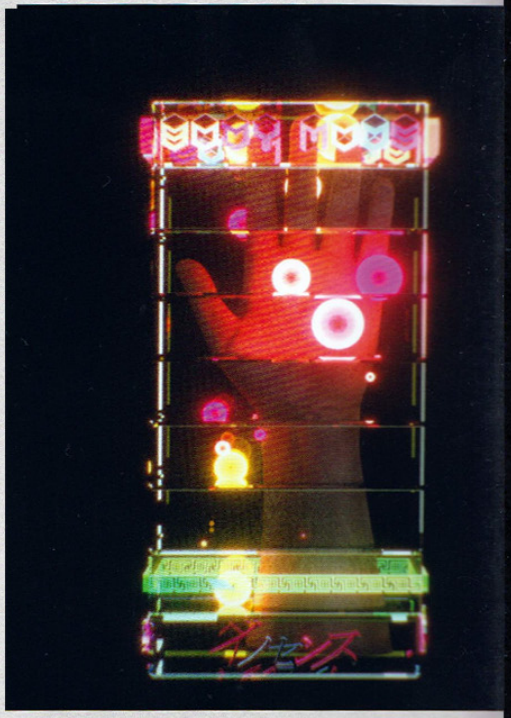
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ABOVE A sologram incorporates a human hand with the same kind of circuitry-inspired pattern details seen throughout the film. (Ash Thorp)

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