Side by Side: Transcript

*(Note from LucaM: this is **not** a script. It's just my personal edit of the subtitles file which can be found online.)*

Narrator/Keanu Reeves:
Since the late 1880s, visual artists and storytellers have used moving images to create amazing works. Movies have inspired us, thrilled us, and captured our imaginations. Film has helped us share our experiences and dreams.
Photochemical film has been the exclusive format used to capture, develop, project, and store moving images for over 100 years. It is only recently that a new technology has emerged that is challenging film's place as the gold standard for quality and work flow. Digital technology is evolving to a point that may very well replace film as the primary means of creating and sharing motion pictures.

The documentary we're doing is called *Side by Side*, and it's a documentary about the science, art, and impact of digital cinema. 100 years of photochemical filmmaking right now has reached a kind of threshold tipping point. In this conversation, in this kind of intersection of time, it's historic. We've kind of come to this place where—

Is it the end of film? Where are we today?

Martin Scorsese: It's exciting because it's a reinvention of a new medium. If the photochemical process has worked its way through our culture, we're on to another level, and how do you use it to tell a story? How do you use it to paint a picture?

Keanu Reeves: Are you done with film?
David Lynch: Don't hold me to it, Keanu, but l think l am.

Lana Wachowski: Digital cameras are the new aesthetic that's coming to cinema, and at the same time, we're going to mourn the loss of film.

Chris Nolan: l am constantly asked to justify why l want to shoot a film on film, but l don't hear anybody being asked to justify why they want to shoot a film digitally.

James Cameron: l wanted whatever l could imagine to be something that we could realize. l saw the door opening on a field of possibilities that you just couldn't do with film.

Wally Pfister: It's really sad right now to see cameras recording imagery in an inferior way starting to take over film. I'm not gonna trade my oil paints for a set of crayons.

David Fincher: There will be people who will cheapen digital. There are people who will not only kill the goose that laid the golden egg but they'll sodomize it first.

Reed Morano: If the intention is that digital is gonna replace film, l would be sad if it didn't actually exactly replicate it.

Greta Gerwig: They process digital now to make it look like film, as if film is inherently better. Just-- we like the way it looks better, which seems kind of arbitrary. It's just what we're used to.

George Lucas: Film is a 19th century invention. We are at the top of the photochemical process. This is about as far as it's ever gonna go.

Robert Rodriguez: Digital is here now, but it's gonna keep going, and you got to be a part of that. Who's gonna be a part of that, dictating where that goes?

Bradford Young: I don't think film's going anywhere. I don't think it's to the advantage of anybody to totally eliminate film. There are gonna be many of us that are gonna fight for film, that are gonna fight for the experience of shooting on emulsion.

Steven Soderbergh: We really are in the midst of some sort of revolution that threatens the status quo. This is a potentially either scary thing or a very liberating thing.

Narrator/Keanu Reeves:
One of the first steps in the production process is capturing the images in camera. The director, actors, cinematographer, and the entire production team work together to bring the script to life. The cinematographer, also called the director of photography or DP, helps the director achieve the look of the movie. The DP is responsible for knowing what equipment is needed and how it works in order to capture the scenes.

David Fincher , director (The Social Network, Fight Club, Se7en)
A director of photography looks at color and composition and angles and all of these things in terms of how the movie is being built, the quality of light off skin, the quality of light through hair, the quality of light through the window or bouncing off the floor. They're equating the building of this world in terms of energy that reflects off of objects.

K. R.: The question is about framing, sensibility, how to make people feel.

Michael Chapman, cinematographer (Taxi Driver, Raging Bull, The Lost Boys)
Bringing emotion into the light comes from being appropriate and being—somehow being--you know, the great ones are more than appropriate. They really startle you with how wonderfully evocative this look is of whatever they're doing.

John Mathieson, cinematographer (Gladiator, 47 Ronin, X Men: First Class)
That level of craftsmanship or, you know, if you will, that technical expertise-- you can't explain what you're gonna do, so there is a certain amount of a leap of faith that they have to have in you.

Vittorio Storaro, cinematographer (Apocalypse Now, The Last Emperor, Little Buddha)
To be a cinematographer is to have the knowledge of the art. Without any doubt, cinema today is a mixing of art and technology.

David Stump, VFX DP,(X Men, X2, Mars Attacks!)
Today in this era, you also have to be a bit of a technician and you have to know the equipment. And it's really important for DPs to understand the entire link of the image chain from acquisition to exhibition.

Narrator/Keanu Reeves:
The camera is a tool that focuses and measures photons of light and records them as images. With a film camera, light enters through the lens and hits a frame of film behind the lens. The film is covered with an emulsion that contains grains of silver halide crystals. These crystals react

chemically when light hits them, and the crystals change into silver metal when they are developed. A photographic image is formed on the film.

Reed Morano, cinematographer (Frozen River, Little Birds, For Ellen)
There is something about the texture and the grain structure of film that I've—personally I hold onto and it's like a comforting thing to me. And it feels more tangible.

Bradford Young, cinematographer (Pariah, Nasceu Maria, Mississippi Damned)
The halides open up and flip themselves and give a sort of textural quality. You still have some granularity in the image that keeps highlights living. It keeps blacks with a little bit more nuance and character in them.

Dick Pope, cinematographer (Secrets & Lies, The Illusionist, Happy-Go-Lucky)
I like grit and grain and texture. It gives you a variety of different opportunities.

David Stump, VFX DP,
The work flow on a film set basically means that you take thousand-foot loads of film, load it into the magazines, and that enables you to shoot for roughly ten-plus minutes per roll of film. And then it gives you a natural break in the action while someone pulls the magazine off the camera and puts a new magazine on. Then the film goes away to a film lab and is developed overnight and printed. And then the next day, you get to see dailies.

Sandi Sissel, cinematographer (The People Under the Stairs, Salaam Bombay, Meet the Browns)
There was a joy for many, many years for us to be, you know, the genies on set. You know, that's why we love dailies. We'd all go, we'd act, we'd light, we'd do what we do, we'd love what we did, and then everybody would wrap, and the next morning, it'd come back from the lab and we went, "wow, look what we got." You know, it was magic.

Donald McAlpine, cinematographer (Wolverine, Moulin Rouge, Predator)
The director of photography was a magician. He was the only one who actually probably knew what was gonna be on the screen next day. And this gave you a lot of authority and power.

Reed Morano, cinematographer
And there's a certain leap of faith that you take when you shoot film, and there's something really romantic about that--getting your dailies back and everyone being really excited to see what you got.

David Fincher, director
But I don't like the betrayal of dailies. I don't like going in and seeing and getting, you know, swept up with a performance and then seeing it go out of focus on a 25-foot screen and knowing that there's no way to retrieve that.

Robert Rodriguez, director/cinematographer (Sin City, Spy Kids, Once Upon a Time in Mexico)
What I didn't like about film was that feeling midway through the day, end of the day: "did we get anything today? I don't even remember. Did we get"-- It didn't feel like we put the flag in it 'cause you couldn't see. It's like painting with the lights off.

K.R.: But the DP would tell you, "It's not--the lights aren't off. It's in my head."

Robert Rodriguez, director
It's in his head. Well, that's great, but I'm operating the camera. I'm picking the lenses. I'm judging the performances.

Narrator/Keanu Reeves:
A digital camera does not use film. Instead, it has an electronic sensor, or chip, behind the lens. The sensor is made up of millions of tiny picture elements, or "pixels" for short. When light enters the camera, it hits the pixels and creates individual electronic charges. These charges are measured and converted into digital data that represent the image.

David Tattersall, cinematographer (Star Wars ep.1-3, Speed Racer, The Green Mile)
Grains of film, they're just constantly moving, you know? And so the result is a kind of fuzziness, whereas with the pixel count, it's a very finite, accurate, exact thing.

Narrator/Keanu Reeves:
With digital cameras and monitors, you are able to see exactly what you are recording on set as you are shooting. Unlike film cameras, you don't have to wait a day to see what you've captured. They are no longer "dailies." They are "immediatelies."

Phil Meheux, cinematographer (Casino Royale, The Legend of Zorro, The Smurfs)
You sit round the back of the set or in a tent somewhere looking at this huge monitor and making adjustments from that, which l actually quite like, because it means you're seeing the picture exactly as it is. And with the old film capture, it was overnight, and sometimes you'd go to bed and think, "l wonder lf l got that right," you know?

George Lucas, director (Star Wars ep.1-4, THX1138, American Grafitti):
Or you'd say, "l think we need more backlight," and he'd say, "don't worry. It'll look great in dailies." They know as well as anybody that you go to dailies and say, "l really think there should be more backlight in there." But if you do it on the set, you can just stand there and say, "no, more backlight." And they'd do it, and I'd say, "okay, now that's exactly the way l want it 'cause that's exactly the way it's gonna be in the movie theater."

K.R.: People speak about "thank god, l can see what I'm getting now. l don't have to wait until tomorrow. l can see if it's in focus. I know what I'm getting."

Christopher Nolan, director (The Dark Knight, Inception, Memento):
If you're watching a monitor on set and you feel that you're really seeing what you've got, l think you're fooling yourself. The audience is gonna watch that film on a screen that is, you know, a thousand times bigger than that. You know, you're watching it on a large TV.

Martin Scorsese, director (Gangs of New York, Taxi Driver, Goodfellas):
Yes, you see what you're getting. It's right there. The problem for me is that l still think you need to see rushes later. l think, in order to concentrate with the performances or just the movement, and that's-- I still think you need to see them at a special time.

Charles Herzfeld, SVP of Sales and Marketing, Technicolor NY:
The process of shooting film was the director of photography's art and secret. And today, the cinematographer is monitored on a digital shoot, and everything that they're doing can be seen, criticized, and questioned.

Joel Schumacher, director (Batman Forever, Phone Booth, The Lost Boys):
It's very destructive sometimes. I've worked with a couple of actors that insist on looking at every take. With one of the actors, l was able to talk him out of it because it was making his performances very self-conscious.

K.R.: … right.

J.S.: I also am convinced that everybody's just looking at their hair.

Michael Chapman, cinematographer:
One of the great pleasures of being a cameraman was that the people--the suits and the producers--well, they all think they know how to act, they all think they know how to write, they all think they know how to direct, but they knew they didn't know how to shoot. So if they really got on you, you could say, "here, here's the meter; you do it," and that would shut them up. But now, they're beginning to think they can shoot. It's not like it used to be.

David Fincher, director:
There are cinematographers who became cinematographers because they love the voodoo of it. They love it when the director says to them, "all right, down in that corner--are we gonna be able to see that or is that gonna kind of melt away?" And they'd get to go, "just wait until tomorrow. It's gonna be amazing. You're gonna love it." And I've had those experiences. I've sat in dailies and I've gone, "oh." You know, some of Darius Khondji's work on Se7en, you would just go, "wow." But there is an equal amount of times that you'd go--I would look at it and say, "what the fuck?"

Geoff Boyle, cinematographer (Street Fighter, The Legend of Chun-Li, Mutant Chronicles, Dark Country):
Now with digital cameras, everyone could see exactly what things were going to look like. That changes the way you light it. It may even change your performance because it creates a different feeling in the whole thing. It gives us more scope to be creative. That's what's exciting. That, to me, was what the digital revolution in cameras is all about.

Narrator/Keanu Reeves:
In 1969, at Bell Labs in New Jersey, George Smith and Willard Boyle came up with the idea for the charged coupled device, and the first CCD chip was created.

Archive presentation footage: One of the things that makes the CCD unique is its ability to perform specialized functions such as acting as a camera. The image that you see on the TV screen of both of us is being produced by this small CCD camera, which is directly in front of us, here.
In the early 1970s after a visit to Bell Labs, Sony started investing in and developing products using the CCD technology.

Alec Shapiro, SVP Sales and Marketing, Sony:
The chairman and founder--Akio Morita, who was the founder of Sony--he was always enamored with Hollywood and it was his dream to design an electronic camera that could create images that were the equivalent, if not better than, 35-millimeter film.

Archive presentation footage: Record what you want, when you want, and watch--

Narrator/Keanu Reeves:
By the mid-1980s, Sony was producing its first consumer-quality CCD camcorders. In the 1990s, small, standard-definition cameras began recording digitally. They were first used cinematically when they were embraced by the Dogma 95 movement out of Denmark.

K.R.: Can you speak a little bit about--well, where did you first come into digital--

Lars von Trier, director (Melancholia, Antichrist, Dancer in the Dark)
...actually by chance because we made this thing called "Dogma 95," and we made some rules, and one of them was that the thing has to be filmed in academy 35 millimeter, and then one of them said it had to be a handheld camera also. And then l said, "but if that is the case, then we can also use video." And that was just at the same time as these cameras kind of appeared.

Narrator/Keanu Reeves:
Anthony Dod Mantle was the DP who shot the first Dogma film, Thomas Vinterberg's *Celebration.*

K.R.: Well, was the appeal also of digital video the lightness of the camera, the way that you could move it--

Anthony Dod Mantle, cinematographer (The Celebration, 28 Days Later, Slumdog Millionaire)
I'll tell you where that first hit me. l was coming home from a foot match in Copenhagen and l had a Sony PC3, which actually was the camera l ended up shooting celebration on. And l remember seeing this crowd of, like, supporters just moving across this field with an industrial backdrop. It was misty and hazy, and it was kind of gothic. l was just learning how to play with it, and l just whipped it around, and then l got this weird moment of immediacy-- of lightness and immediacy. And l looked at the image, and l thought, "my God, the amazing thing about this camera is, l caught that. Two months later, I'm shooting *Celebration* on these small cameras 'cause l wanted to be a protagonist in the *Celebration*.
The combination of the movement and the activity and the emotion--the emotional movement of that camera would probably define that film's visual language, apart from the actors and the writing and the great script. With that camera, l suddenly saw these moves, these possible movements that l didn't know in my cinema... and that became my donation to the *Celebration.*

David Stump, VFX DP :
What *Celebration* meant and what a lot of the other films of that era meant was that you just had to completely rethink the technical side of filmmaking. It brought people to filmmaking for creativity's sake. It pointed out that the mechanism of filmmaking only serves the creative.

Jason Kliot, producer (Chuck and Buck, Coffee and Cigarettes, Awake):
With DV, it came this idea that, wait a second, if we lower our budgets, we get more freedom as directors and as producers.

Geoffrey Gilmore, Film Festival Director, Tribeca FF, Sundance FF:
Shooting a film on video at that point meant it was crap. It was almost, you know, an accepted truth that you didn't shoot films that you were serious about on any kind of video format.

Jason Kliot, producer:
We just started going out there, and we were saying, "look, we're gonna make movies digitally. We're gonna give directors final cut--total creative control--but we'll make them cheaper." And our very first movie was *Chuck and Buck.* Looking at rushes, it was scary as hell. We were, like, "my god, this looks so amateurish." A lot of people actually commented on how muddled it looked.

Geoffrey Gilmore, Film Festival Director:
l remember when we were presenting it at Sundance. They were scared to death that the reaction would be "this was shot on video." The digital presentation did not look nearly, in any way, like an acceptable substitute for what film was.

Jason Kliot, producer:
Because of, um... porn and because of documentary and because of news footage, video occupies a space in your mind where you're kind of like, "I'm here. I'm in that room with them. Oh, my god, is this really happening?" And that makes *Chuck and Buck* better.

Ellen Kuras, cinematographer (Personal Velocity, Eternal Sunshine of the Spotless Mind, Blow):
People were starting to think in a completely different way about, "how could the technology and the medium help us to rethink filmmaking?"

Charles Herzfeld, SVP of Sales and Marketing, Technicolor NY:
You started to see people start to challenge the idea-- as did the group known as **Indigent.** They were creating standard-def video that would then be converted to film for theatrical release.

*Gary Winick, founder **Indigent**:*
l think as an independent filmmaker, we are in the most exciting time ever, because now we can go out and make a film on DV.

Geoffrey Gilmore, Film Festival Director:
The idea was that if you shoot digitally, it's cheap. And it absolutely helped fuel the number of films that got made. l remember, though, my first year at Sundance, we had 225 submissions total for the fiction category. You know, a few years later, it was ten times that.

K.R.: Back to, like, you know, the Sundance days or, you know, the releases of **Indigent**, people were saying, "well, that's okay for you--it's independent--but this isn't cinema. This isn't"--

Caroline Kaplan, producer (Tadpole, Personal Velocity, Pieces of April):
That was a huge thing to make a film on a video camera and go to Sundance and win best director and win best film for *Personal Velocity.* Gary's own film, *Tadpole*, ended up being sold for an enormous amount of money, and everyone that worked on it made money from that sale.

Geoffrey Gilmore, Film Festival Director:
And that's when a lot of the idea of, "wait a second. You can shoot films digitally, and it's almost like a production aesthetic," and that's when all the debate started.

K.R.: I mean, you must have heard in the late '90s "film is the gold standard."

Anthony Dod Mantle: Yeah.

K.R.: And the tools that you're playing with are what?

Anthony Dod Mantle: Debasing, threatening. I have been slapped around. If you want to--

K.R.: What do you mean, "slapped around"?

Anthony Dod Mantle: l--l mean, I've been applauded and almost executed for the same sentence.

Lars von Trier, director:
It was quite obvious for me to go to digital, because of, you know, the amount of material you could have in the camera was obvious. Since l was trying to create another way of working with actors, and that was essential.

K.R.: I imagine there was, like, a liberation for you, then, in terms of the relationship with your actors, longer takes--

David Lynch, director:
As you know, Keanu, ten minutes was maximum. It wasn't even really ten. It was nine-something, you know. And when that thing starts rolling, there's a kind of underlying feeling that it's precious stuff rolling through there, and it puts a kind of a tension on things.

Robert Rodriguez, director:
I could shoot as much as I wanted. I could get the best performances. I didn't have to worry about shooting these little bursts of film. You know, that was ridiculous, but that's what l had to do. That's how expensive it was comparatively.

David Lynch, director:
Digital--a little gizmo-- 40 minutes, and you can be running this camera and talking to the actor, starting over again. And they get down in there and they catch a thing that never would get caught if you had that giant thing there.

Darnell Martin, director (Cadillac Records, I Like It Like That, Prison Song):
I love to run the camera, especially when we're in an emotional place and magic is happening. When you go "cut," then all of a sudden, everybody gets in there, and you were at a place where it was just there, and then everything stops. And it's like, "okay, now go back to that." Now it's like, "no, just run the camera, back to one."

John Malkovich, actor (Dangerous Liaisons, Empire of the Sun, Red):
As fast as you can get back to your position, you can go again. And I've just always felt there was just way too much waiting, because movies for me, there's always that momentum problem, you know, 'cause l grew up in the theater, and that's how l was trained, and a lot of times in movies, l feel like, "can we go?"

Chris Nolan, director:
It's very tough for me to say that l need to be able to shoot a 45-minute take or something and not reload the cameras, because the truth is, the entire crew can only concentrate, the actors can only concentrate for so long, and then you need a two-minute break, a three-minute break, during which time you reload.

Reed Morano, cinematographer:
When you're running a film camera on set, everyone seems to take things a little bit more seriously. When they hear the film running--when they hear the money running through the camera, basically—everybody brings their "A" game.

Greta Gerwig, actress (Greenberg, Arthur, Nothing Attached):
The first time I'd ever heard the whir of film going through a camera, it was thrilling. Also made me very nervous because all of the sudden, each take counted in a way that l had never really experienced before.

K.R.: What about that moment after you say "action"? Like, for me, when that camera's rolling, l guess maybe it's connected to the money, but the ten-minute reel is so finite.

Richard Linklater, director (A Scanner Darkly, Slacker, Dazed and Confused):
It's almost an athletic thing, like, "focus, focus. uh." You know, like, that's good for the-- That's just atmosphere, though, you know? l mean, if you want that, you can create that, right?

Danny Boyle, director (The Beach, 28 Days Later, Slumdog Millionaire):
l thought it would make a difference to actors. l don't think it does -particularly to actors. l think actors just infinitely adjust to whatever they--whatever way they have to tell it, they'll tell it.

K.R.: They didn't ask for a break? They didn't say, "hey, can we stop?" [laughs]

D.B.: You're on digital now.

K.R.: Yeah, but my first experience with that was just, you know, there was no "cut." You know, l worked with Richard Linklater on a film called *A Scanner Darkly...*

D.B.: Oh, yeah, yeah, yeah.

K.R.: And it was just like--

D.B.: You could just go on.

K.R.: Yeah, l was just, like, "can we please stop?" [laughing] "stop."

D.B.: No, we don't have to.

*K.R.: B*ut l want to.

David Fincher, director:
Robert Downey actually came up to me, and he said, "l can't work like this. l never get to go to my trailer. l never get my shit together. I'm on my feet 14 hours a day. I'm shooting all the time." He actually left mason jars of urine on the set, just, like, over in the corner and stuff. Just--he would go off and he would pee, and then he'd bring it back. And that was his, like, form of protest.

Danny Boyle, director:
I'd previously worked on celluloid only, really, and been thrilled, you know, to arrive at the holy grail of celluloid. It was, like, amazing. So l made the first few films on celluloid. l made a very big Hollywood film, *The Beach*, with Leonardo Di Caprio and a big crew, and it didn't suit me at all. l felt it was too much away from me, really, somehow. And so l then saw *Celebration*.
It wasn't so much the film. It wasn't even the look. It was the camera operating, that movement of the camera. And so l got in touch with the guy who shot it, Anthony Dod Mantle, and l said, "well, I feel like I'm not doing the right thing anymore. Can we do something together digitally?" Which--l didn't really know what l was saying by saying that. It was kind of like a new word, in a way.
Then we came up with the script, *28 Days Later*, and we shot it on consumer cameras. But l remember Anthony saying to me, "It's all very well working in this format, you know," but he said, "I'll never get an Oscar." [laughs]
There was a sequence in it at the beginning where the character, Cillian Murphy, wanders round a deserted London. And we would not have been able to achieve the film on film, because we had to stop traffic. We didn't have the money to do it, so what we would do is, we'd just hold the traffic briefly, but because we were on these cameras, we could use ten of them 'cause they're so cheap, and he could walk through Central London--an area of it--and we had ten cameras on it. So you'd only have to stop the traffic for a few minutes, and then you would actually have ten shots. That was an enormous advantage.

Anthony Dod Mantle, cinematographer:

Well, l placed cameras around--not coincidentally and not badly and not loosely. l try to control every angle, and l know roughly where it's best, when it's gonna be used. But that said, you can let it run a bit, and because it's digital, you get something.

Danny Boyle, director:
lf you were in a wide shot with a small figure in it, they were just, like, two or three pixels. l mean, there was nothing there. There was just the color. Quality-wise, if you put it up against an exact copy of it on film, the film would be immeasurably superior, but you could shoot illegally and surreptitiously without people knowing. You could do unconventional things. And the rhythm of film, which has been passed on since it began and crews have learned-- you interrupted that.I loved that freedom, and l got the taste for it then. And l knew once we'd shot that sequence, that l was gonna work on it now. That was what l wanted to work on.
It makes the editor's job extraordinary 'cause they're often plowing through masses and masses and masses of material.

Narrator/Keanu Reeves:
In the 1970s and '80s, electronics companies began working on solutions to replace film editing. For over 100 years, editing meant physically cutting and connecting pieces of film.

Tom Rothman, Chairman CEO, Fox Filmed Entertainment:
When you used to go to an editing room, they brought in the trim basket, they took the film out, they looked at it through the Moviola, and then you slapped it together like this--you remember, the white gloves--and they were incredibly fast at it.

Martin Scorsese, director:
I'd find the frame, I'd—you know, sometimes splicing to the point of, you know, getting your fingertips bloodied, you know, and that was really the blood in the film. So, l mean, you really had it, and now it's, you know, pressing little buttons.

Archive presentation footage : Now this is the floppy disk that we're all familiar with.

Narrator/Keanu Reeves:
Early editing systems used multiple magnetic disks, tape machines, and laser disks to store and read digitized film. Most of these systems were enormous and very costly.

Phil Meheux, cinematographer:
The first thing that happened, really, that changed everything, l think, was the digital editing machine, which meant our dailies had to be converted from film into tape. So that started a whole thing going.

George Lucas, director/producer:
We started a picture editing system that was all digital. We had the first edit droid working in 1980,and eventually, we sold the system to AVID.

Narrator/Keanu Reeves:
By the late 1980s, AVID had developed digital editing into a compact, cost-effective, computer-based system.

Craig Wood, editor (*Pirates of the Caribbean, 47 Ronin, The Ring*):
When l first saw the AVID as a demo, the image quality was blocky and tiny, and l said, "this is gonna be really good when they get the image quality right in about five years' time.

Walter Murch, editor (Apocalypse Now, The English Patient, Cold Mountain):
Why not try it on the AVID? And, you know, I'm also one of those early adopter people. I like to leap into the unknown. I remember on *The English Patient*, l suddenly really looked at the image and said, "oh, no." [chuckles] "how am l gonna be able to do this?"

Derek Ambrosi, editor (Premium Rush):
When I'd work with older editors, they'll often talk about the time when computers were starting to come in and say, you know, they were very resistant to it because they weren't familiar with computers. They were just scared that they didn't know enough about it. If you pushed this button or if you accidentally turned it off wrong or turned it on wrong, that everything would be gone, whereas that could never happen if you actually physically had the film in your hand.

Robert Rodriguez, director/editor (Machete, From Dusk Till Dawn, El Mariachi):
They thought, "that's not editing. Editing is... [gestures]" So when you're editing a movie on film, that's just the technology. The art form is the manipulation of images to tell a story.

Anne Coates, editor (Lawrence of Arabia, Erin Brokovich, The Golden Compass):
It was extremely difficult for me to learn because l hadn't used a computer. l thought a mouse was something that ran across the floor. l mean, l was that ignorant. [chuckles] But l learned, and l kicked the machine quite a bit, but once I'd got going on it, l was okay, and l liked it.

K.R.: There's no film in the editing bay. It's all a kind of--

Chris Lebenzon, editor (Alice in Wonderland, Armageddon, Top Gun):
It's drives, and it's quiet. You know, l don't hear--l used to hear... [imitates whirring sound] you know, the reels on the benches. It was a very noisy, kind of bustling atmosphere, and now it's very quiet. It's almost like, you know, l can burn incense... [laughs] and light candles.

Darnell Martin, director:
Digital brings you speed, and it almost challenges you in the sense of, "can l think that fast? Do l need time to breathe?"

Anne Coates, editor:
Sometimes these young editors, who were very interesting and doing extremely interesting work--but they don't always have the time to sit, just sit back and think about what they're doing. And l think that if they work on film, they have probably trained their minds to do that a little bit more. And so it's a different way of thinking, really.

Craig Wood, editor:
Film taught you a discipline that is gone a little bit from the computer because once you put the scissors in, you've then got to join it back together with sticky tape, and it bumps through the machine, so you were much more decisive about it.

Lorenzo di Bonaventura, producer (Transformers, Salt, Man on a Ledge):
Has editing gotten better because there's infinite choice? I'm not so sure. In fact, I'm pretty sure there's a lot of movies that have gotten worse because you manipulate it to death. We may have lost something.

Anne Coates, editor:
The cut in *Lawrence of Arabia* where he blows the match out...Well, that was a dissolve in the script. And if you'd been on a digital as we are today, we would have only ever seen it as a dissolve. In

those days, the film was butted together like that, just with a direct cut, and so, when we saw it, we thought, "wow, that's fantastic." It just worked. It just was magic, you know, when you feel that feeling.

Walter Murch, editor:
Digital is this unbelievably malleable plastic of imagery and sound, and that's seductive, because that's what we do, you know? We are sculptors of images and sound. It's not that you can't do it with film. It's just that it's harder to do that and make it look good.

Narrator/Keanu Reeves:
As digital technology continued to grow, computer-generated images, or CGI, were appearing more and more in movies. Visual effects, or VFX, have been part of filmmaking since the earliest years. Camera tricks, lighting techniques, elaborate models, and lab processes have all been used to alter reality and enhance the movie-going experience.

John Knoll, VFX Supervisor, ILM (Avatar, Pirates of the Caribbean, Star Wars ep.1-3):
On many films, there are a number of things that are depicted that you can't just go out and shoot, so the images you need to see need to be manufactured in some way.

Tim Webber, VFX Supervisor, Framestore (Avatar, The Dark Knight, Children of Men):
Being a visual effects supervisor calls on you to understand a huge variety of different aspects of the world around us at any one time. You've also got to understand the physics of the way light reacts to different surfaces. You've got to understand animation. You've got to understand the way people move, creatures move. You have to be an artist and a technician at the same time, you know, and that's an interesting combination.

Dennis Muren, VFX Supervisor, ILM (Star Wars, E.T., Jurassic Park):
Originally, when effects were done, or for the first 100 years that effects were done, they were done, you know, with models and with film cameras, and they were very sort of limited, what they can do. But a lot of time and energy-- and people put a lot of work into being able to make the *Star Wars* films.

Adam Valdez, VFX Supervisor, MPC (The Lord of the Rings, Chronicles of Narnia, Starship Troopers):
When l started doing this about 22 years ago, the environment l learned in was a physical one. It was a stage, miniatures, cameras, lights, everything. The great thing about making real stuff is, you get to use all of your senses and your physical perceptions. And to stand there with three other people and critique a model or talk about how cool something looks under real lighting is pretty satisfying.
And all of this photography would end up in an optical printer in the end. That's a large device that actually compresses layers of film together and creates new exposures of film so that you can combine layers of images into the final one that you see in the movie.

Jonathan Fawkner, VFX Supervisor, Framestore (Avatar, Sherlock Holmes, V for Vendetta):
The visual effects department was literally sandwiching one piece of film next to another piece of film, and that really introduces a huge amount of degradation.

George Lucas, director/producer:
In 1978, we had just finished *Star Wars*, we'd done some digital shots in there which were very, very crude. You know, the diagram of the Death Star and that kind of stuff. But l knew a lot of guys that were working in the digital field, so l started a computer division, and we developed the Pixar computer for I.L.M.

Dennis Muren, VFX Supervisor, ILM:
Archive footage: I'm right now in one of our three computer rooms that we have here at I.L.M., and what we have here are thousands and millions of cycles of computing power going by every single second. So l kind of pushed the stuff--at least as much as l could-- here at I.L.M. with this graphics group that we had.

John Knoll, VFX Supervisor:
The exciting thing about it was, it didn't feel like there were a lot of rules. It really did seem like, kind of, the wild west.

Tim Webber, VFX Supervisor:
It started to become possible to scan in film and bring the film into the computer and make changes to that.

Jonathan Fawkner, VFX Supervisor:
The massive advantage to digitizing your film was that you wouldn't get any degradation. Once it's digital, those are ones and zeros, and they just stay as ones and zeros all the way down the pipe.

Tom Rothman, Chairman CEO, Fox Filmed Entertainment:
Digital became important from an effects point of view. The first path through the system was in the effects arena, okay? It was using digital technology to realize visions.

John Knoll, VFX Supervisor:
Okay, if you can take a piece of film and you can turn it into numbers, you can manipulate those numbers and then put it back onto the film, boy, there-- there's no limit to what you could do. The entire world is wide open.

George Lucas, director/producer:
The first real image that we did that was completely digital was in Young Sherlock Holmes.

Dennis Muren, VFX Supervisor, ILM:
We had a character made out of stained glass, but the glass actually had to look like it was real, not like a graphic of any sort. And it took us six months to do seven shots, which was pretty complicated but amazing that we got it done in that amount of time.

James Cameron, director/producer (Avatar, Titanic, The Terminator):
George was always very progressive about digital, and it was just something about that--the effects community just got comfortable with it really early on. Now we were still shooting on film. We weren't shooting with digital cameras yet, but all of the post processes were starting to fall into line.

Kid on set: How did you go into the computer?

K.R.: So l would have my hand, and then they would take a picture of it, and then in a computer, they would do an animation of, like, a silver hand, and then they would show you on a movie screen. [both laugh]

Lana and Andy Wachowski, directors/producers (The Matrix Trilogy, Speed Racer, Cloud Atlas):
(Lana): Our experience on the trilogy--what was really interesting was that you realized you were really creating these images in post. You couldn't shoot the image, you were making the image in the computer.

K.R.: Middle to late '90s, l guess, it's standard-def. It sounds like it's visual effects, kind of, was the way to get in.

George Lucas, director/producer:
We had a problem at I.L.M. doing our effects. We had to convert from film to digital in order to do it. We could save a huge amount of money just by not having to convert anymore. Film is cumbersome, so l just said, "I'm gonna take my money and my time. I'm gonna fix it." And we went to Sony and we said, "we would like to help you-- work with you to build a digital camera."

John Knoll, VFX Supervisor:
He was bound and determined that *Star Wars episode II* was gonna be shot digitally. We need to get that all worked out and get our pipeline figured out for doing full-on production with the digital cameras.

Narrator/Keanu Reeves:
One of the problems with early digital capture was resolution. Resolution is dependent on many factors, but in the most basic terms, it is the number of pixels a camera can record. The more pixels you have, the higher the resolution and the more detail an image will have.
A typical standard-definition, or SD, camera usually had a resolution of about 720x480 pixels.

Alec Shapiro, SVP Sales and Marketing, Sony:
Really, the turning point was in the year 2000 when we came out with the F900 camera, which was our first high-definition camera. Before that, whatever you were looking at really looked like video.

Narrator/Keanu Reeves:
High-definition cameras record a resolution of about 1.920 pixels across-- just under 2K.

David Stump, VFX DP (X-Men, X2, Mars Attacks):
In 2002, we did *Attack of the Clones.* It was the first major feature that was shot high-definition. What George did on the Star Wars movie was take an experimental HD camera and apply it to a feature-film paradigm. That was unthinkable at the time. It meant that he went around the entire film community, but it more deeply meant that he went around film itself. It became a really, really polarizing time for a lot of people in Hollywood.

George Lucas, director/producer:
They got up and had a big meeting, saying that l was the devil incarnate, that l was gonna destroy the industry, that l was gonna destroy all their jobs, that this is inferior, that he says he shot *Attack of the Clones* digitally, but he didn't. We have word that he actually used film cameras, that he's not shooting digital. He's lying to everybody.

Geoff Boyle, cinematographer:
When the F900 came out, l thought, "the images on that are just truly appalling." l don't think that was a cinematic camera at all.

Tom Rothman, Chairman CEO, Fox Filmed Entertainment:
The early years, l didn't feel that digital capture or digital reproduction was the same. They would always say, "see, you can't tell the difference," and l could tell the difference.

Alec Shapiro, SVP Sales and Marketing, Sony:
We'll be the first to admit that the F900 wasn't designed like a film camera. Of course, George Lucas said after he shot Star Wars that he wouldn't shoot another film on film again. And that created, you know, quite an uproar in Hollywood.

David Stump, VFX DP:
Digital technology and digital cameras looked like a threat to people's existence and way of thinking and way of working.

Alec Shapiro, SVP Sales and Marketing, Sony:
Filmmaking is an art, and to the traditional filmmaker, it looked like we were messing around with art.

David Tattersall, cinematographer:
You know, they would say, "why are you going backwards?" you know? But there's a lot to be said about the necessity to kind of lean back to be able to spring forward.

Martin Scorsese, director:
See, I remember George Lucas pulling together everybody about ten years ago at a conference he gave at the ranch up in San Francisco, and when objections arose about the idea that digital will put an end to the art of cinematography, he pointed out it's just another tool, and this is true.

Robert Rodriguez, director:
When people saw George Lucas's tests--they said, "that's--that's--no, that's not gonna work." It was that same sort of closed-minded, "we're gonna wait ten years to adopt this." I wasn't gonna wait that long. I said, "I'm following Obi Wan. Obi Wan knows what he's talking about. He knows what time it is. He always does. I can tell that this is gonna be the beginning of something big, and I want to be there for that."

K.R.: But the image sucked.

R.R.: The image wasn't bad, but the image wasn't as good as film. But it allowed me to do something you could not have done on film. I picked up my *Sin City* book, and I went, "I know how to do this now.
My God, if I shoot this digital, I can make it look just like this book."

Sin City would not exist if I had shot that on film. I couldn't have--I wouldn't have even thought to do it. I was able to do things that pushed the art form. Technology pushes the art, and art pushes technology.
When Sin City came out, it hit people like a brick in the head 'cause they had no idea what they were looking at. Instead of hiding from it under a rock and hoping it goes away, you ended up doing something that people then realized was possible. You know, I was just so amazed-- the richness that it had. I didn't know it was even possible, but the systems got better for color timing it and for working in that color space.

Narrator/Keanu Reeves:
After the movie is shot, edited, and VFX have been added, a colorist or color timer at the lab makes adjustments to the look of the movie. In the traditional photochemical method, the negative is developed, and a print is made.

Don Ciana, color timer, Technicolor:
Timing goes back to the days when, you know, there was only black and white.
(archive footage: These scenes show the darkroom operations of the laboratory in the old days.)
The guy that had my job, he used to look at the negative and decide how long it would have to stay in the bath. *(archive footage: lf at first it wasn't right, dunk, dunk again.)* So it was time. It was time-related.

Narrator/Keanu Reeves:
With the advent of color film, the timers became more involved in the creative process. At the lab, the color timer, DP and director determined the look for the final prints that will be seen by the public in the theaters. The only adjustments that can be made photochemically are color balance between red, green, blue, and brightness.

Terry Hagar , color timer, Technicolor:
Our job, basically, is to achieve the vision of the director and the director of photography and make it happen on a piece of film.Like, l would sit with the director or the director of photography, and they would say, that looks a little bit too red to me" or "too blue," and we would manipulate it in our mind as to how much to change it or to make different cuts balance with each other.

Andrzej Bartkoviak, cinematographer (Trespass, Speed, Devil's Advocate):
Well, the timers on the film, they got to deal with pretty much from the head, you know, by the intuition, you know.

K.R.: yeah.

A.B.: It was hard. It was very hard. So, you know, there was a lot of art and labor involved in it. You know, those people really work hard to achieve that.

Steven Soderbergh, director/cinematographer (Ocean's Eleven, Che, Contagion):
I still found it very, very frustrating, the timing process--that you're kind of talking over the thing while it's running and trying to keep up with the cuts and saying, "I don't know. That looked a little cyan to me," or something, and the guy is, like, trying to write it down--write the footage down as it goes by, and you can't stop and--that just seemed crazy to me.

Narrator/Keanu Reeves:
Digital color correction tools were first used for shorter pieces such as commercials and music videos.

Stefan Sonnerfeld, DI colorist (Collateral, 300, Alice in Wonderland):
l used to do tons of music videos, and we came up with some of the craziest and, l think, groundbreaking visual images, and it was just an amazing ability to come into a room like this and manipulate something to create images that people had never seen before.

Narrator/Keanu Reeves:
Digital color correction began replacing traditional photochemical methods of color timing.

Jill Bogdanowicz, DI colorist (J.Edgar, Gran Torino, Ray):
My job is to be able to make sure that the creatives get everything that they want, so the cinematographer gets a palette or the contrast that he wants, and, of course, the director gets the

feeling that he wants throughout the movie, and make sure that we can see all the actors' eyes and see all of the emotion that he wants to see.
I can now start building what we call "power windows." In a power window, l can change any kind of hue l want. If l just want those trees over on the left, l can pick the color that l want of those trees and l can isolate it. Now l can change those trees to any color l want.

Tim Stipan, DI colorist (Black Swan, The Wrestler, Che):
The cinematographer and the director come in and we spend a couple weeks grading the film and giving it that look, you know, to make it look beautiful – however they want it to look. l have this great feeling that l can do just about anything you ask me to do within reason.

K.R.: Who invented this process?

Jill Bogdanowicz, DI colorist:
You know, it was the same technology that people used for music videos to create all those cool looks. And, basically, what happened is over the last, whatever, ten years, it's just evolved to become a lot more streamlined. *O Brother, Where Art Thou?* was really the first movie where basically every single frame was a visual effect. So it was all color timed digitally for the look.
So it was the first D.I. It was just kind of--you know, Roger Deakins is sittin' in the room saying, "l can't get what l want in photochemical because every time l color time it this nice golden color, l lose all my blue skies. What am l gonna do?"

(*conversation in the studio :*
It seems a little bit yellow, doesn't it?
Oh, yeah, the trees were a little bit more brown.)

So he came in and did testing--actually, l got to sit with him and showed him, " Okay, we can key it. What we can do is, we can basically affect everything in the image except for the blue in the sky." And also, they were wearing overalls, all right, so the blue in the wardrobe. But everything else, like the green trees that are not in the palette that you want, we can de-saturate them and make them brown-gold."
So out of necessity of the look for the movie and then other people kind of catching on, saying, "ooh, l could use that in--" you know? It just became, you know, more and more popular.

George Lucas, director/producer:
Timing is a very frustrating process on photochemical. It's just very crude. It's very--you can hardly do anything. That's the whole thing about D.I. When l could go in and circle little things and make a face a little bit redder and, you know, bring out the background or bring--l just was in heaven. I said, "This is amazing. l can do anything to fix this movie."

Ellen Kuras, cinematographer:
And what l find interesting now looking back to the beginning experimentation of a lot of cinematographers like myself, going from a film original into the digital world, seeking more control over the image and being able to manipulate the image more, is that now, we actually have less control because we then give away our negative or give away our product. Anybody can take it after that and can manipulate it.

Tim Stipan, DI colorist:
The colorist is a really important aspect of the final product. I'm the one that's pushing these buttons to make your film look a certain way. Yes, I'm getting the direction, but it's a lot of my own intuitiveness to crank that a certain amount and to push that into a certain direction. So I'm kind of like the last person that really gets to touch it.

Stefan Sonnerfeld, DI colorist:
It started off as being very adversarial between cinematographers and colorists because it was like, "oh, well, he shouldn't be determining what the look of the film is. I do that."The beauty of these projects these days is, it's a team.

Reed Morano, cinematographer:
I think it could take power away from the DP, but l think it's your job as a cinematographer to try your best to see it through to the end, and l think they would do everything in their power to make sure they're present at the D.I. and that they supervise that so that their vision that they originally intended was executed.

Michael Ballhaus, cinematographer (Gangs of New York, Goodfellas, The Departed):
On *The Gangs of New York*, they offered me to do a D.I., but because everything was built for us, what we had on screen was exactly what we wanted. We didn't have to have a D.I. to change everything. What I'm trying always to do with--in camera and with lighting and with filters and with lenses but not later in the D.I. Okay, if you have a special story where you need to change the reality, then a D.I. is something wonderful, because you can do whatever you want with the image, which can be great, which can be wonderful.

Tim Stipan, DI colorist:
Once we get done digitally color-correcting your movie, we make a brand new negative and then make a print of that negative. Then we look at the print versus the data in a side-by-side fashion. And then we dial in the print to match the data to make the print look exactly the way it should.

K.R.: How do you feel about—when you do all of this work and you have it pristine and you're gonna have some prints that are perfect and then some prints-- l mean, do you have to kind of let it go once you create it?

Tim Stipan, DI colorist:
Honestly, the truth of the matter is, is that when you go to a theater and you watch that print that you spent weeks laboring on, every theater looks different. They have the luminance on their projector at a different level or, you know, there's so many variables.

Martin Scorsese, director:
The real auteur, ultimately, of a picture, if you want to use the word, is the projectionist. The sound can be loud or low, you can see the head of the actor or not 'cause he can frame you out 'cause he's busy. He's got things to do.

K.R.: [laughs]

M.S : You know, a film will come up and one reel will be blue; another reel will be brown because of the projector light, you know. But we got to enjoy that. I thought it was part of the film.

Steven Soderbergh, director/cinematographer:
It's always a huge disappointment now for me to see a film print. Like, it's depressing. It's not sharp. It doesn't have any snap. It's shaking. It's dirty. I hate it.

Jost Vacano, cinematographer (Das Boot, Total Recall, Starship Troopers):
I put in a tremendous amount of effort to make my images the way l have them in mind, and l create them, and l have them on the finished product in the camera. But what happens afterwards?

George Lucas, director/producer:
The quality of film is terrible in a theater, and anybody in Hollywood, they say, "Oh, it's not that bad a camera. No, it's not that"--they never go into a theater and see it in a real theater.

James Cameron, director/producer:
Titanic played so long in theaters that we actually just-- our prints fell apart. They literally just dropped out of the projectors in pieces.

George Lucas, director/producer:
So we were struggling to try to get quality into the theaters, and out of that came the fact that if it was digital, you'd have a brilliant thing. You wouldn't have scratches. You wouldn't have tears.
(TV news archive footage: Hype surrounding this movie has been overwhelming.)
In 1999, we were able to project *Phantom Menace* digitally. We had two theaters in New York, two theaters in L.A., and that was the first time that a major Hollywood movie had been projected digitally.

David Tattersall, cinematographer:
There were actually four digital projectors in the country--just four--in '99. By 2002, there were still only 150. The post flow was already there. It was all digital, and the rest of the industry was going there. Sound had already gone there.

K.R.: Editorial had gone there.

D.T. - Editorial was--yeah. The camera was lagging behind, you know?

Narrator/Keanu Reeves:
New companies began to develop high-definition cameras, and other Hollywood films followed Lucas's lead. Michael Mann's *Collateral* used the Thomson Viper, an HD camera that outperformed film at shooting in dark environments.

Dion Beebe, cinematographer (Collateral, Green Lantern, Chicago):
Michael wanted to see into the night. And that, at that point, was really, you know, best done with these digital cameras tweaked up and pushed till we sort of pushed the boundaries of what the digital was capable of.

Stefan Sonnernfeld, DI colorist:
Collateral was interesting in that it was supposed to look exactly the way it looked. When you look outside at night, you don't see black night. You see an aura around the city of green and magenta and purple lights, and there's this, like, haze in the sky, and you just see all these crazy colors. And the only way to really capture that, at that time, was digitally.

Chris Nolan, director:
You've got a lot of sort of nighttime photography going on now that's using the different sensitivity of, you know, CCD chips. They see a little more of the U.V. spectrum. So you've got filmmakers trying to use that to give a different aesthetic to nighttime lighting, but to me, it's still, at the moment, retaining that flavor of video.

David Stump, VFX DP:
The Viper was the first camera that really told me that the digital age was ratcheting up in intensity, and l could see the footrace in cameras coming.

Narrator/Keanu Reeves:
In 2005, Panavision, an established force in the film camera business, made a serious push into digital with a large sensor single-chip camera.

Bob Harvey, SVP Worldwide Sales, Panavision:
We started looking at this as a real format, and we decided that the best thing we can do is design what l like to call "a film camera that takes tape." and that's when we started drawing out the Genesis.
Genesis is a full-frame, 35-millimeter chip that allows depth of field to be very similar to film, and we could use all of our 35-millimeter lenses, which totaled in the thousands, literally. And we went to work--partnered up with Sony on it. They designed the electronics and we put it together. And we introduced the first full-frame digital camera for making feature films.

Geoff Boyle, cinematographer:
The Genesis was hyped to hell because it was from Panavision, and it was Sony designing a system for Panavision. The good about it was, it took Panavision lenses. It was a 35-mil-slze sensor, and of course, the Viper had been a small 2/3 inch sensor. People wanted the same depth of field and the same look that they got with 35 mil, which, of course, is what you got with the Genesis, and it gave pretty good images.

Bob Harvey, SVP Worldwide Sales, Panavision:
We were very careful to design it for film crews so that the transition--if there was going to be one--would be easy for the people making movies. Dean Semler, who was an academy award-winning cinematographer for *Dances With Wolves*, shot *Apocalypto* down in Mexico, where the temperature was 100 degrees and the humidity was 200, and never had a second of downtime. He felt that it was like a film camera.

David Fincher, director:
It's 35 pounds. The fucking camera is this big, and on the top of it, it looks like a film magazine.

Geoff Boyle, cinematographer:
The recorder attached to it the same way that a mag would attach to it--so on the top or on the back.

David Fincher, director:
If I want to see what just got shot, does it play back off that? They said, "No, you would never touch that. It's like your original negative."I said, "Let me see if l got this straight: you guys spent how many millions of dollars developing a camera with Sony, and l can't play the HD back to look at it because that's the 'negative'?"

James Cameron, director/producer:
Where we were in '06, '07 was, we had the color space and we had the resolution, but we didn't have the dynamic range. So you had to be careful. You had to be careful on the set.

Geoff Boyle, cinematographer:
Dynamic range is vital. Dynamic range is more important than anything for me. I mean, that's what really slows me down when I'm shooting digitally.

Jost Vacano, cinematographer:
If you have sort of a range between dark and bright in film like this. Shooting digital, you don't have wide range which film has between the blacks and the lights. So whatever is up here is cut off, and whatever is down there is also cut off.

Wally Pfister, cinematographer (The Dark Knight, Inception, Memento):
I just don't feel it has the latitude that enables me to do what l want to do. You can't overexpose it by five stops and still have something in the image. You can't underexpose it by four stops and have a trace of something in the image. I think it's fun to play in those areas.

Narrator/Keanu Reeves:
In 2005, Jim Jannard, the founder and owner of the multibillion dollar sunglass and sports apparel company, Oakley, set out to create a new cinematic and affordable digital camera.

Jim Jannard, founder Red Digital Company:
Digital wasn't paying enough respect to film. It wasn't as good as film, and to me, everything in the world can and will be made better. The only question is when and by whom.

Ted Schilowitz, Red Digital Cinema
There was a technological movement towards the eventual replacement of film. What was happening from some of the major manufacturers is, they were creating video-level tools, essentially HD tools, and sort of trying to push that into the world of cinema, and what we saw was that that wasn't anywhere close to good enough.

Jim Jannard, founder Red Digital Company:
We wanted to set a high enough target so that it was meaningful. That's the nature of RED. We want to help send film to the retirement home and have it feel good about what took its place.

Narrator/Keanu Reeves:
In 2007, the RED ONE was available to the public. This new generation of digital cameras could now shoot more resolution than HD, an increase in pixels from about 2K to 4K.

Steven Soderbergh, director/cinematographer:
When l saw the RED, l really felt l should call film on the phone and say, "I've met someone," 'cause l really thought, "this is--okay, this is the future." The resolution, the curve, the way it saw light--I just felt, "this is the new thing" and was insistent that we shoot *Che* on it.

Vilmos Zsigmond, cinematographer (The Deer Hunter, Deliverance, McCabe & Mrs. Miller):
Digital at the beginning was very bad. Everybody knew that. Then came the RED camera, which was a little bit better than the previous ones. At least it was cheaper. Okay, it's cheap, but it's not good enough, and l actually experienced the limitation of that.

Geoff Boyle, cinematographer:
Well, you know, it had problems. It crashed occasionally, to put it mildly. It's a computer, but then again, RED ignored everything about normal film camera bodies and built what they thought was right.

Steven Soderbergh, director/cinematographer:
Even with the war stories of being out in the heat and having ice packs on it and all that stuff, none of that bothered me because the get was so significant. In this case, not having to lug film magazines up and down this ravine for days on end in 100-degree weather and being able to shoot onto a flash card and change magazines in 15 seconds. That alone was huge for us. It resulted in a better movie.

David Fincher, director:
l really love what Jim Jannard's doing. l love what that company's about, and l love the tack that they took. It's very much no-holds-barred, like, "let's roll up our sleeves, let's get in up to our eyeballs, and let's figure this shit out."
The RED ONE is 9 pounds, and put a lens on it, 14 pounds. On *Social Network*, l went to him and l said, "l got to shoot these tiny boats. They're, like, the thickness of potato chips, and l can't add 13 pounds of camera out on the side of this. You know, I'll topple this boat." And he said, "Okay, what do you want me to do?" I said, "You got to take one, you got to bore it out, you got to--whatever it is you have to do. You've got to figure out a way. You got to give me the indie car version of the RED ONE."
This was on a Friday. On Sunday, he called me and he said, "We'll make the bodies out of carbon fiber." I said, "when can l have it by?" He goes, "It's on my desk." And l went down and l picked up two, and they were 5 pounds--5 1/2 pounds.

Steven Soderbergh, director/cinematographer:
That never existed before with film cameras--this sort of immediate call-and-response between the people who were shooting and the people who were creating the cameras.

Danny Boyle, director:
l was desperate to make something that had all the fresh air in it, and of course, when you go to India--in Mumbai, especially--it's got life. It's just coming screaming at you all the time in every way.

Anthony Dod Mantle, cinematographer:
Danny comes with an idea--rage. He comes with an idea with speed, energy, youth, and that's all l really need in the script. And then running, and that's it, and then off we go to India.

Danny Boyle, director:
It's just the most wonderful place to work for a different kind of film, and we wanted a camera that would somehow try and catch a bit of that.

Anthony Dod Mantle, cinematographer:
It's about finding a camera. The task is there. It's clear. My job is then to find--with all my anarchic and conventional experience--I've just got to find the tool.

Narrator/Keanu Reeves:
Cameras like Silicon Imaging's SI-2K have been able to go places and get shots that would have been very difficult with film or earlier versions of high-definition cameras.

Geoff Boyle, cinematographer:
It's a sensor with a computer on the back of it. So do you make your computer look like a film camera, or do you say, "Oh, to hell with that. Take this ethernet cable and connect it into a laptop. And that's what the SI camera was.

Ari Presler, CEO, Silicon Imaging:
At that point, there were no other cameras small enough, and Anthony wanted to be able to run in the streets and track the children as they were running and be at the same height level as the kids. So they took MacBook pros and put them into a backpack to use for their capture and recording system.

Danny Boyle, director:
Film cameras, even when they're off the legs or off the steadicam or off the crane, they're still connected to the cameraman's body. He's either--well, you know--he's either chasing you down the

street or he's got it here or they turn it round and he runs backwards and things like that. With this--with this SI-2K, you could do that. It was no longer connected to the cameraman's body. He could do different things with it during the scene, literally just improvising during the scene.

Narrator/Keanu Reeves:
In 2009, *Slumdog Millionaire* won the Academy Award for best cinematography. It was the first time the award was given to a movie shot almost entirely on digital cameras.

K.R.: So you're at the academy awards. Do you feel like that film--

Anthony Dod Mantle: Yeah.

K.R.: Did that film make digital acceptable in the mainstream now?

Anthony Dod Mantle, cinematographer:
The success of *Slumdog* with the critics and with the audience symbolizes something of an epoch. It perhaps puts--hammers the stake a little bit further into the ground as far as acceptance of digital formats.

Danny Boyle, director:
It was the first real acknowledgement, on a large scale, of digital, and l was very pleased for Anthony for that, because l think he felt it was some acknowledgement that he would never arrive at because he'd chosen to specialize so much in the digital world. You know, that'll be, l think, looked back on as, "there you go; that was where it changed."

James Cameron, director/producer:
Avatar was gonna be my next movie after *Titanic*, so l converted into thinking about 3-D in '99. I knew immediately that the only way to shoot 3-D--that the future of shooting 3-D was digital. We were starting to experiment with putting two HD cameras side by side. I thought the results were pretty cool. Then Vince Pace and l built the fusion camera system.

K.R.: You've decided to put one camera here and another camera on top. And what happens in here, then, to marry these two? Because stereoscopically, you need the two images to exist, right?

Vincent Pace, CEO, Cameron/Pace Group:
Correct.
One of the problems that we have with the larger cameras is the fact that if we were to put them side by side--like your two eyeballs, right?--you couldn't put those cameras physically in that same position. They would run into each other. So we use a reflective mirror, and then that allows us to overlay the two camera systems-- If you imagine from a physical standpoint--where there is no limitation on how close we get the eyes together, and that's really important for 3-D.

Narrator/Keanu Reeves:
To create 3-D, two cameras work as a pair, just like our two eyes. They capture images from slightly different angles, providing a sense of three-dimensional depth and distance.

Vincent Pace, CEO, Cameron/Pace Group:
I have a joke with most of the people around me that l long for when the world was flat because it's not only the camera systems duplicate. Everything duplicates down the chain, right? So lensing,

control over lensing. And a lot of people say, "well, then it's twice as hard," and that's an incorrect statement. It's more than that, because these two cameras have to operate like Siamese twins. They have to mimic each other perfectly. l think when films are done right and when it really works is when it feels like I'm there, I'm in this journey, I'm immersed in the story line. The fun part for me is to really get these tools in the creative hands, the people really that can take it places where you never imagined before.

James Cameron, director/producer:
Avatar came out, and I'm really proud of those images. They looked gorgeous, and it was followed up by *Alice in Wonderland* and *How to Train Your Dragon.* Boom, boom, boom. Three films in the marketplace, one after another, and all of them were huge hits. The three of them were the top grossing films of the year. So all of a sudden, you know, the doors were just blown wide open on the whole thing. People really saw the potential of this as a market.

Lorenzo di Bonaventura, producer:
This consumption of films has increased our audiences' both appetite for them and, now, knowledge of them, so therefore, it's getting harder and harder to impress them. It's one of the reasons why I think 3-D is taking off. It's just a new way of looking at a film.

Martin Scorsese, director:
The actor is like a piece of sculpture or something, only it's moving and it comes out, and, like, it's a combination of theater and film and music and everything.

Wally Pfister, cinematographer:
l hate 3-D. l put on those glasses, l get sick to my stomach. It's dark looking through them. The whole 3-D phenomenon, it's a marketing fucking scheme, isn't it?

Dick Pope, cinematographer:
I can safely say, as a viewer, I'm totally uninterested in it. I'm without any interest whatsoever. l think it's a fad. I think it will burn out.

Joel Schumacher, director:
The studios are not wise to just slap 3-D on everything. With *Avatar*, there's a reason that film is in 3-D, because it is taking you on an experience. It isn't something that was added on for money or a joke or a gimmick. It's there because it was created that way.

James Cameron, director/producer:
Avatar is two completely different forms of filmmaking combined. We only use lenses for about 1/3 of the movie, which is all sets and, you know, just normal stuff--lighting, normal live action. We used virtual lenses for the other 2/3. We never shot in a real jungle. We had to create the jungle. It was all computer modeling-- every blade of grass, every bug buzzing around-- not one foot of film shot in a real jungle.
You have this idea that you could home in on a mathematically perfect model for creating reality if you just throw enough computing power at it and you just throw enough software at it. Guess what we found? it didn't work. It required that l, the artist, and people who were trained in photography and looking at how light interacted with things to figure out how to write the code to make it look "real."

Chris Nolan, director:
What l find is, the manipulations that the digital media like to do--they are seductive, but ultimately, they're a little bit hollow. The analogy l would always use is, I remember this summer when Chips

Ahoy, or whoever—they came out with these chocolate chip cookies that were like they just came out of the oven, and they were soft. It was like, "Oh, this is amazing. It's a soft cookie." And then after a couple of months, you're like, "Oh, no, this is some horrible chemical crap that's giving this bad illusion that fools you at first."

Martin Scorsese, director:
My big concern is that the image ultimately with CGI-- l don't know if our younger generation is believing anything anymore on screen. It's not real.

K.R.: You're presenting a complete unreality and making them feel like it's real, whereas, before, it was captured in reality--

James Cameron, director/producer:
All right, you've—I'm betting you've been on a couple of movie sets. When was it ever real? There was a kind of a wall there and nothing over there. There was 30 people standing around. There was a guy with a boom mic. There's another guy up on a ladder with his ass crack hangin' out. There's fake rain. Your "street night exterior New York" was a day interior Burbank. What was ever real?

Lana and Andy Wachowski, directors/producers:
We're free of the old technology of capturing those images--camera, film, lens-- exposure. It gives you more control, more choice, more ways to access what you're imagining in your head.

Jonathan Fawkner, VFX Supervisor:
Computers will only get better and better. You'll be able to produce anything you want, completely realistically and ultimately, if you've got enough time, the world is your oyster.

Adam Valdez, VFX Supervisor:
We've had to try to outpace the audience's imagination, do something they haven't seen before, and every year, it has to be even more and more real. The artists and the filmmakers are constantly trying to up the amount of spectacle and realism, and so that really puts us in the position of--like never before--really having to wed technology and art.

James Cameron, director/producer:
That's what's great about the digital technology is that it sort of doubles in everything about once every two years. Once you've set your mind on that path, it all becomes very simple. It's just gonna be a matter of time, 'cause digital is gonna continue to improve.

Narrator/Keanu Reeves:
Camera companies like RED, Arri, Sony, and others are constantly developing new products and continue to make advances in dynamic range, resolution, and color.

James Cameron, director/producer:
l love it that all of these manufacturers are competing against each other to make great cameras. Make them smaller, make them faster, cheaper, better sensors.

Geoff Boyle, cinematographer
The dynamic range of a digital camera, up until recently, has been limited to, really, a maximum of ten stops. But you don't see that problem in the Epic or the Alexa. The dynamic range was much better than I was used to with digital

Glenn Kennel, Chief Technology Officer at Arri:
Up until the mid-'90s, for Arri, it was all photochemical. We saw the digital technology maturing to a point, though, where we began investing in digital technology. The sensor that we use now in the Alexa camera allowed us to offer a camera that we can proudly promote as a feature-film camera.

Bradford Young, cinematographer:
The Alexa takes all of that we were excited about in terms of low-budget filmmaking and then brings the sort of textural quality that film has, you know? It brings that familiarity in terms of color space.

Dick Pope, cinematographer:
And the only reason l was really interested in using the Alexa was because it was made by Arriflex, and l had heard that it was like shooting film but with a digital format.

Vilmos Zsigmond, cinematographer:
If l am pushed to shoot on digital, I could take the Alexa, and l could probably get good results.

Ted Schilowitz, RED Digital Cinema:
This is the new RED, which is called an EPIC. So this is, believe it or not, 60% more resolution than a RED ONE.

David Fincher, director:
When Jim Jannard showed me the EPIC, you looked at it, and you said, "Wait a minute. What does that do? How does that free you up as a – as a storyteller?"

Ted Schilowitz, RED Digital Cinema:
This camera creates these beautiful, rich, very natural or very stylistically wonderful colors. We've taken and digitally projected 4k images on a gigantic screen, and it is absolutely mind-blowing.

Lana and Andy Wachowski, directors/producers:
(Lana) The delivery system of cinema is going to change, and that's almost--kind of more exciting in a way for me, besides the actual cameras. Because the very ancient system of putting a can of film on a truck, driving it to a city, unloading it. That's being replaced.

Tom Rothman, Chairman CEO, Fox Filmed Entertainment:
The old way of having to ship giant film cans around is very, very expensive, so the business realized that there was a tremendous possible savings in digital delivery and digital projection.

Phil Meheux, cinematographer:
We all want that pristine print. We all want the first print off the negative, but we, you know, we can't have that, so you have to copy it. And the advantage of a DCP is, there's no real copying. Once it's scanned, it doesn't get copied again. It's cloned, so it's exactly the same thing.

Wally Pfister, cinematographer:
I'm getting more impressed with digital projection, as much as, you know, I'm not big on technology, l think digital projection has come a long way.

Alec Shapiro, SVP Sales and Marketing, Sony:
In the last two years, we've installed 10,000 digital projectors into cinemas. The conversion is taking place globally. We're probably 50% or more there, and the rest of the conversions will happen very quickly.

James Cameron, director/producer:
They produce gorgeous pictures, and you had a steady building of a wave. That's why we're gonna be up to 100,000 digital screens by 2015.

David Stump, VFX DP:
The business model for printing film is endangered, and ultimately, l hope that that doesn't take film with it.

Barry Levinson, director (The Bay, Young Sherlock Holmes, Rain Man):
As a kid, I went to the movies. And you sat down, and there was, like, a big red curtain, and then that curtain parted. And there was--the movie was going to begin, right? And you went, "Oh, my gosh. Whoa, this is special." Well, that's my childhood image. It's not as special anymore. It's another thing.

Michael Chapman, cinematographer:
In a way, cinema was the church of the 20th century, because everybody would come to this large, dark room and sit and look up at this thing, which would tell you an enormous amount of how to dress, how to act, how to behave with women, how to be a hero.

Danny Boyle, director:
There's something extraordinary about seeing that actor's face as 40 feet high, and at 40 feet high, there's something mythic about it that's beyond your everyday life.

Phil Meheux, cinematographer:
I think cinema should be a huge, big expansion. It should be 80 feet wide, and you should envelop the audience in the screen.

K.R.: … 'cause that's cinema.

P.M.: Yeah, that's cinema.
And the sound all round you and everything. I mean, why people want to watch movies on their computers,l shall never know.

Greta Gerwig, actress:
l see people watch movies on their iPhone in the subway all the time, and I'm like, "No!" [both laugh] Who am l to say that it's bad? It doesn't have to be bad.

Bradford Young, cinematographer:
Late at night, my wife's asleep and l can't sleep, and l pull up Netflix on my iPhone, put on some good headphones and watch a film that close to my face. Like, there's something interesting about that. You can interact with things very privately now, and l think, "what's missing?" If l want to cry without people seeing, I'm gonna put on the Steel Magnolias, you know, and I'm gonna cry. And if my wife wakes up, I'll just hit pause and put it under a pillow. l mean, there's something interesting about that that l feel like we didn't get a chance to experience before.

Lena Dunham, actor/director (Tiny Furniture):
If you get asked on a date, nobody's like, "let's go to the movies" anymore. I don't even feel like that's going on. l feel like--people are like, "Let's, like, watch something on Netflix streaming on my bed"-- which might just be, like, 24-year-old guys' way of getting you to sit on their bed--but l think that that's what's happening.

Michael Chapman, cinematographer:
l can get any Jean-Luc Godard movie. l can get any movie from the past, anything. And Netflix will send it to me, and l can just sit down and watch it.

K.R.: But you're not gonna see all the detail. You won't be able to feel it like you would be able to feel--

M.C.: My big-screen TV is plenty big. l mean, you can go to theaters to make out with girls and things like that, but that-- you know, I'm way past that age, so...

K.R.: Sure.

M.C.: Believe me.

K.R.: There's so many different ways to watch a movie. That shared experience aspect, too, it's--you know, that's shifting from the "going to the movies."

Lana and Andy Wachowski, directors/producers:
(Andy) Well, it's also becoming much larger virtually, you know? *(Lana)*Communal space will definitely expand virtually, so we'll start watching movies together in these sort of virtual worlds, and that will be inevitable.

K.R.: How do you have the pheromones get exchanged virtually?

(Andy) How do you--

[all laugh]

K.R.: How do you bleed and sweat and be comfortable and uncomfortable--

(Andy) You do all that in the theater...

[laughter]

(*Andy)* In your trench coat?

K.R.: No, but laughing together and crying together.

(Andy) And in some way, the virtual experience is more rewarding because there's an actual dialogue going on.

Danny Boyle, director:
Someone who's 20 years old does not care about the loss of cinemas as a communal space, you know? They're interested in how they want to tell their story and get it out to friends on facebook or whatever it is. You got to go with it, you know? And if you become unable to deal with it, then that's fine, because that means your time is finished, and, you know, it's time for other people to take it on.

Donald McAlpine, cinematographer:
The kids 30 and under have seen endless digital images-- on their computer, on their television--and that, to them, is their film.

Lars von Trier, director:
l just had hoped that, you know, these little cameras would make kind of a revolution where you would say, "fuck film school." Just do it ourselves. There's a lot of talent and stuff that could be freed by less respect.

Marin Scorsese, director:
Everyone is interpreting that reality--or what they think is reality-- through an image, through a lens, you know? And some people are really—some kids are really good at it, l got to tell you.

Lena Dunham, actor/director:
Without digital video culture, l don't think l ever would have been making movies because l came at it from--as a writer, and l always thought that you have to have a certain kind of knowledge, you have to be--basically, in my head, l was like, "you've got to be a dude who knows how to operate machines to do this job." Like, l think l would have been scared to step into that role if it had involved, you know, like, getting a huge camera and getting 15 lighting technicians together. It was like l was able to experiment with making movies in this really small, private way, which was what l needed to do.

K.R.: What about the 5Ds? What about the DSLRs?

Geoff Boyle, cinematographer:
These cameras were designed at the request of A.P. and Reuters so that their news stills photographers could shoot news video for their websites. That's it. Then people came along and went, "Ooh, l like the look of that. I'm gonna use that." And it can work, but l hate them being used as movie cameras.

K.R.: Why?

G.B.: It's not good enough.

K.R.: But they're inexpensive. People can make movies--

G.B.: If I'd been at art school and I had a Canon 7D or a Canon 5D, you know, it would have been wonderful.

K.R.: What are you shooting on tonight?

(film student): 7D. On the Canon 7D for my second-year grad film.

K.R.: l guess it's the most accessible, it gives you a lot-- you can capture, but it's not super expensive, it's--

Shurti Ganguly (NYU graduate student):
l wanted to shoot with the 7D or the 5D primarily for budget reasons and because we are given a week in which we have to shoot our film. And the amount of time that we would lose in terms of, like, changing the film, checking the gate, and being cautious-- then l would probably not be able to film half the scenes I'd want to.

Lana and Andy Wachowski, directors/producers:
(Andy) It's become this very cheap way for us to tell our stories about ourselves. *(Lana)* It takes these art forms out of a rarefied environment and allows more people to make art.

David Lynch, director:
Everybody and his little brother has a piece of paper and a pencil, but how many great stories have been written on that piece of paper? Now the same thing's gonna happen in, you know, cinema.

Richard Linklater, director:
There used to be that encumbrance, you know, where filmmakers were guys who—you know, people who just sat around coffee shops saying what great films they would make if "the man" would ever give them a chance. It was kind of great when, like, the day came that it was, "well, go do it."

K.R.: Everybody can make a movie now. Movies everywhere. That's a good thing.

Lorenzo di Bonaventura, producer:
l don't think so, actually. There's less good. There's more bad. Because everybody's able to do whatever they want to do. There's democratization of it-- fantastic--but l think my kids will suffer. They will not have the quality that we had growing up 'cause there isn't somebody there – there isn't a tastemaker involved.

K.R.: Wow.

Is it the end of film? What do you think?

Martin Scorsese, director:
l think celluloid is still gonna be a choice.

Chris Nolan, director:
A transition starts with people offering a new choice, but it finishes with taking the old choice away, and l don't think technically we're ready to do that yet.

Vilmos Zsigmond, cinematographer:
Well, we have 100 years of experience, basically, shooting on film, and film is still around. Nobody but George Lucas said, you know, that film is dead. And he said that 20 years ago, and film is not dead, because people still like to shoot on film because it really has an incredibly beautiful look.

Michael Chapman, cinematographer:
Who cares, you know? 20 years from now, they won't be saying, "It looks like film." They'll be saying, "look at what l can do with my digital."

Wally Pfister, cinematographer:
l will be one of the last guys shooting film and Chris Nolan will be one of the last directors shooting film, but I'm certain we'll be using digital technology within the next ten years.

Reed Morano, cinematographer:
l hope five or ten years down the road film still exists. I mean, I still plan to shoot on film.

Tom Rothman, Chairman CEO, Fox Filmed Entertainment
Is it the end of film? Yeah, I guess it is, and I think in five years, film will be--film will be the exception. l really do.

Bill Russell, Vice President of Cameras, Arri:
Film production peaked in 2007. Our factory, at that time, was working at 110% to produce film cameras.

K.R.: Then what happened?

B.R.: Then the world changed. New purchases are all digital.

Narrator/Keanu Reeves:
Film cameras can last for decades, and they will still be available and in use. However, all major manufacturers have ceased development of new film cameras. They no longer make them.

Danny Boyle, director:
We will have to say "good-bye" to celluloid. It will go away, I'm afraid, and it'll be kept for special occasions, l think, but it's gonna change.

K.R.: Once that option is gone...

Greta Gerwig: Right.

K.R.: Once the young people don't have that experience—

G.G.: I think we're living through its total transformation. l mean, l think, in general, people's fear is that it's just gonna be endless noise and no one will be able to tell what's good or bad, and no one will be able to make good things and that good things will just get lost.

Martin Scorsese, director
That's a danger, I think, in the continuation of our culture. What do you go back to when you need to go back to the well?

K.R.: …right

M.S.: Where do you get the nourishment culturally, artistically, intellectually? Where do you get it?

Narrator/Keanu Reeves:
An important step in the movie-making process is archival: storing the final complete movie and the materials used to create it.

Geoff Boyle, cinematographer:
Nobody takes archiving seriously. They go, "Oh, I'll save it on hard drive," and they put the hard drive on the shelf. And a year later, you load it, and it goes, "tick, tick, tick," 'cause they stick. If you don't fire them up all the time, they stick. If you do fire them up all the time, they wear out and go, "tick, tick, tick."

Michael Goi, cinematographer, President of the American Society of Cinematographers:
Since the early 1950s—since the advent of commercial television, there have been 80 formats of video to date. 80 formats of video, okay? And most of them cannot be played anymore because the machines simply don't exist.

David Fincher, director:
When we make a movie, we have two digital copies of all of the dailies. Well, when you box those up to be stored, you have to put a reader in with the thing. l have archival tape formats for music videos and commercials that l did in the 1980s, and there's no machines that can play them.

Chris Nolan, director:
There are no archival formats worth anything in the digital realm that you would put any stock in, so there are all kinds of issues that simply haven't been dealt with yet.

Martin Scorsese, director:
The only way you can make sure that a film or anything of a moving image is gonna be around, maybe, 60 to 70 years from now--interestingly enough, ironically enough--is celluloid.

Gary Einhaus, Chief Technical Officer, Kodak:
Film is unique because film is a capture medium and a storage medium. So if you really want to go back and if you've stored it under the right conditions, 100 years later, all you have to do is shine light through it and you'll be able to see it. It will never be format-obsolete.

Ed Stratmann, Assistant Curator of Motion Pictures, George Eastman House:
There was a conference in 1909 where they put together the standard for film. Well, that hasn't changed in 102 years. If l have a film in my nitrate vaults, l can pull it out and run it on a projector today, even though it may have been made in 1895.

Steven Soderbergh, director/cinematographer:
If the point, ultimately, of archiving is the faithful reproduction of the original product, filmmakers now-- l, as a filmmaker, now have a better chance of something l made being shown properly 50 years from now than l ever have in history.

K.R.: People keep saying, "we don't know what's going to happen in that 50 years," we don't-- "no one's gonna be able to read the information" or "It's going to decay" or "you have to migrate it or it'll die."

S.S.: Yeah, sure. You will. And some of those things are true.All of them are better scenarios than film.

George Lucas, director/producer:
All of everything in this whole world ls stored digitally.

K.R.: Yeah.

G.L.: So, yeah, it doesn't—you know, there's problems with it, right? But they're gonna solve those problems. I'll guarantee that. There's too much digital information out there not to figure out a foolproof way to store it forever.

Lana Wachowski, director/producer:
Archaeology always improves, so as the way that we lose things change, the way that we invent to find them changes.

K.R.: So you're not worried about it all disappearing?

L.W.: If things are important to human beings, we figure out ways to preserve them, always been true. Yes, we lose stuff, but that's part of life.

Geoffrey Gilmore, Film Festival Director:
We might get to the stage where a print of a film is so rare that it's almost like an art object that we can go back and say, "this is actually a print of a film and it's the only one in the world."

Geoff Boyle, cinematographer:
100, 200 years from now, there won't be a trace of us left, and there won't be a trace of anything we make now. So where are we? We're fucked.

David Fincher, director:
l don't believe for one second that digital imaging or digital technology will ever take away the humanity of storytelling, because storytelling, in and of itself, is a wholly human concern.

Bradford Young, cinematographer:
Art is very primordial. Science is also very primordial, so l kind of see all of these things as just, sort of—they're very harmonious things that always have to push on one another.

George Lucas, director/producer:
We are at the top of the photochemical process. This is about as far as it's ever gonna go. When you're using digital, you're at the very bottom again. So you should jump over and help build that, 'cause the more people that use it, the better it gets.

Vittorio Storaro, cinematographer:
Unless you are participating with the revolution, we we will be lost in past. We can't count ourselves out and say, "We don't care. It's up to you guys." No. So we have to be in.

Greta Gerwig, actress:
Then everyone will have access to both the means of production and watching anything that's ever existed instantly.

Barry Levinson, director:
As digital continues to change the nature of storytelling, we'll also continue to change in ways that I don't even know l could understand, but all things do that, and this becomes a giant revolution.

David Lynch, director:
People love great stories. They like to get into a world and have an experience. And how they get there-- it doesn't really matter.

Martin Scorsese, director:
One shouldn't even think, "We've stopped and now we've reached digital. This is it." No, no. Think about where the entertainment impulse--where the need is going to go.

K.R.: Do you feel, technologically, with where you are--do you feel free?

James Cameron, director/producer:
I'm not sure l ever want to feel that we've arrived, technologically. I always want to feel there's something we can do better.

Joel Schumacher, director:
The people who have come before us gave the world new ways to dream, and l think it's our job to continue that and to try to give people new ways to dream.

Michael Ballhaus, cinematographer:
Everything comes down to one thing: if you do something with your heart--if you do something that you are convinced of and feel about it, it doesn't matter what you use.

♪ Saturday in the city ♪

♪ I've been walkin' the beat ♪

♪ feelin' gritty ♪

♪ gettin' revved up ♪

♪ for the picture show ♪

♪ with a feeling ♪

♪ that we'll never know ♪

♪ just a cowboy ♪

♪ shootin' up at the sky ♪

♪ he's fightin' the change ♪

♪ there's a tear in his eye ♪

♪ a toast to all ♪

♪ our favorite films ♪

♪ in the safe ♪

♪ we find our way home ♪

♪ neon lights ♪

♪ wind's in your eyes ♪

♪ let's give it a whirl ♪

♪ try it on for size ♪

♪ as we were standin' ♪

♪ side by side ♪

♪ together ♪

♪ the mountains we could climb ♪

(Walking the Beat
Written by Brendan Ryan, Billy Ryan
Performed by Brendan Ryan, Billy Ryan)