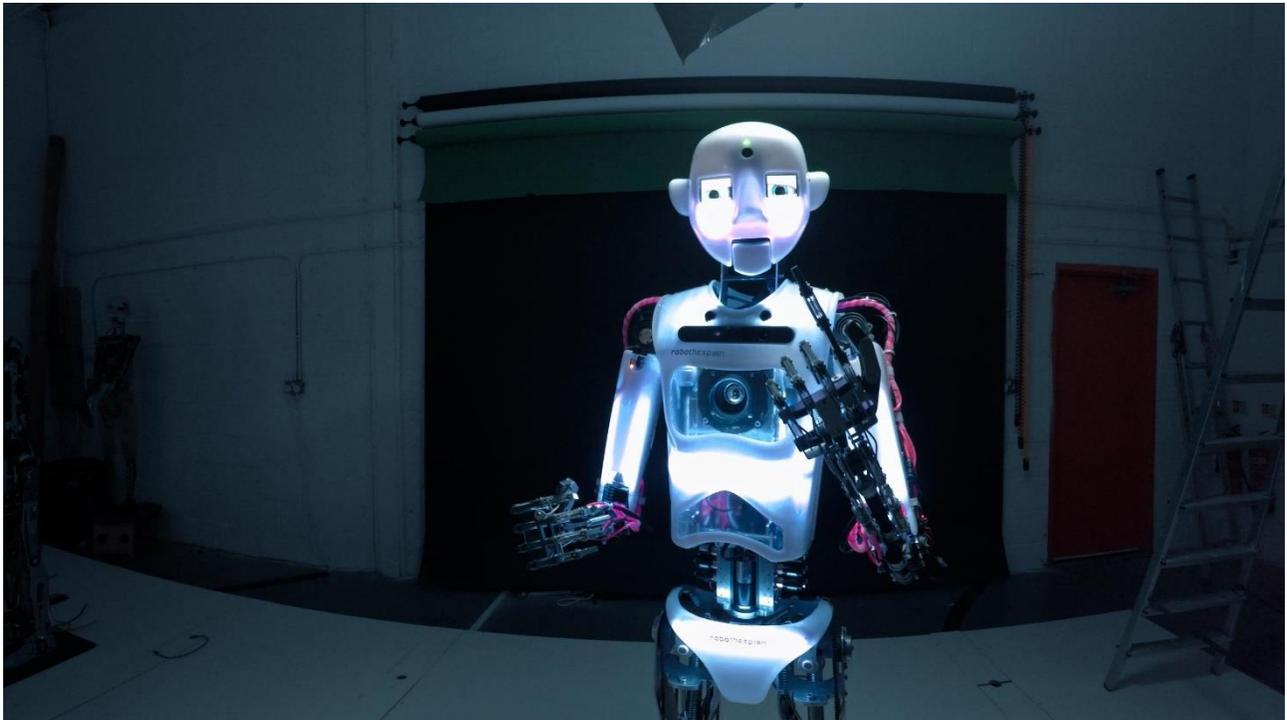


MORE HUMAN THAN HUMAN

Directed by
Tommy Pallotta & Femke Wolting



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LOGLINE

More Human Than Human explores what it means to live in the age of intelligent machines. In this personal, playful and at times dramatic quest, the filmmaker finds out how much of his creativity and human values are at stake as he builds his own robot to replace himself as a filmmaker. Will artificial intelligence (AI), infinitely smarter, interconnected and possibly self-aware, render humanity obsolete?

SYNOPSIS

More Human Than Human explores the rise of artificial intelligence (AI) and its effects on our lives. Artificial Intelligence was once the realm of science fiction and futurist visions, but it is part of our current reality. Self-driving cars, autonomous drones seeking their next target or government agencies mining our personal data, we are surrounded by smart machines already. Increasingly, we expect machines to know what we want and understand us when we talk - just ask Siri.

As we take a look at the history and current state of AI, filmmaker Tommy Pallotta, takes us a step further as he builds his own robot to see if it can replace him as a filmmaker. He and his team design, build, and program the robot to think autonomously and test if it can direct and interview him. Leading them to question, "Can AI replace us as filmmakers and storytellers?"

The complexity of tasks that smart machines can perform is increasing at an exponential rate. Where will this ultimately take us? If a robot can learn to fold a towel on its own, will it someday be able to cook you dinner, perform surgery, and even conduct a war? **More Human Than Human** instigates this debate between futurists and sceptics, about the potential of Artificial Intelligence. The filmmakers take us on a quest of understanding these innovations, opposing views and challenging our aspirations for the future of man and machine.

More than just an exposé on the pro and cons of this new technology, the filmmakers' journey takes them to the world's leading AI experts and robot pioneers confronting them with the existential questions that artificial intelligence begs us to ask such as: What are the values and ideas these scientists built into their creations? Has the artificial intelligence revolution taken us to the verge of witnessing the birth of a new species? Why are humans so driven to create a new species that might make themselves obsolete? How are our lives changing by these smart machines, what do they give us and what do we lose?

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DIRECTORS STATEMENT- TOMMY PALLOTTA

I was 14 years old when I first saw the movie *Blade Runner*. Growing up in a suburb of Houston near NASA, space travel and technology were as common as cowboys and pickup trucks. My neighbors were astronauts and engineers and the future couldn't happen soon enough. The promise of technology was that we would work less and have more leisure time.

Blade Runner was a stark contrast to the happy techno-utopia that I imagined in the shadow of NASA. I was drawn to the dystopian view of our near future and started to read Philip K. Dick, who wrote the novel the movie was based on. From that moment on, I have been fascinated by the way technology touches our lives and has been a theme in all of my work.

I ended up reading every Philip K. Dick book and short story I could get my hands on. He wrote about 121 short stories and 44 novels, he has had 11 films based on his work that include: *Blade Runner*, *Total Recall*, *Minority Report* and *A Scanner Darkly*. I am especially close to *A Scanner Darkly*, directed by Richard Linklater, because I produced this film based on the novel. **More Human Than Human** is very much inspired by the spirit of Philip K. Dick and the themes explored in his stories.

The themes of *Blade Runner* and Philip K. Dick's entire body of work, moral philosophy, philosophy of the mind, and artificial intelligence are also our themes. I want to examine the future implications of artificial technology and robotics on environment and society looking at the past, present, and future. We explore the growing influence of technology corporations, the continued expansion of the military industrial complex, and the effects on the workforce. I am fascinated by this moment in time, because I see we are in a paradigm shift from carbon-based life forms to silicone-based life.

The Tyrell Corporation is a corporation from the 1982 Ridley Scott film *Blade Runner*. The company's motto is 'More human than human'. Robots (replicants) produced by The Tyrell Company are supposed to lack empathy. But replicant Roy (Rutger Hauer) is eloquent in his rage, grief and fear. Roy even saves the life of Deckard (Harrison Ford), who, like other noir 'heroes', doesn't seem to care about the morality of his job--hunting down and executing illegal replicants. The title of our documentary explores the theme of the film, the question, "what does it mean to be human?"

Making this film had everything to do with my daughter Zoë... Computers have become not only ubiquitous but so intimate with us that it has fundamentally changed all of our relationships. So I think the idea started to form in my head about creating a time capsule for my daughter about this pivotal moment in time when we started to co-exist with intelligent machines, and how that started to change everything. As a child I thought the future was going to be bright. We are going to have all this great technology and it is going to fix all of our problems. Now that I'm approaching 50, I realize that that's the same thing that they have been selling us my entire life. And that it's never really happened...

So I started to really question, what is it about this dream of technology that is so seductive to us? Why would we aspire to build something that is better than ourselves?

We are the top of the food chain, we are the only animals that don't have to worry about getting eaten, we take what we want from our land and from everything around us. And yet we might build the one thing that can surpass us. Why would we do that? Why would we risk it? If Elon Musk and Stephen Hawking are warning us that A.I. is an existential threat, then why do we continue to pursue that? And so that was the question that I wanted to discuss.

The emergence of robots and artificial intelligence raises many philosophical and economical questions. How can we ensure we'll be able to control a world in which robots might increasingly be better at certain tasks and work? How will we ascertain that we reap the benefits – prosperity, humanity and freedom - of our technological developments? Or do we lose our autonomy and finally become some sort of robot ourselves – a biotech link carrying out commands in a giant network of mobile devices? If robots become equally intelligent the existential question must be asked: what does it mean to be human?

MORE HUMAN THAN HUMAN
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DIRECTOR'S STATEMENT- FEMKE WOLTING

In 1999 I directed together with Bruno Felix a two-part documentary for the VPRO about the future of television and the internet called "It's The End of TV As We Know It." It was an incredibly optimistic time, when people with energy and money were creating this new digital infrastructure. But even before the film was released, the internet bubble burst, many companies went bankrupt and a long internet winter set in. Newspapers wrote: surely all these crazy ideas were nothing more than a hype, the internet connectivity would take many more decades to become real. The critics were proved wrong. Ten years later most of the predictions people made in the film had been realized and many new revolutionary developments were on their way.

Today we see a similar kind of optimism and energy around AI. At the same time I notice the same kind of skepticism. People think technology won't develop that fast, they assume that it will be managed properly. Others don't really want to think about it. During the research of this film, talking to scientists and engineers, my views on the digital revolution began to change. I realized that the developments that are taking place right now are going to have dramatic consequences for mankind. While I am fascinated to see a robot that can think like a human, I ask myself, what will be the implications if this actually becomes reality? It's great that computers are getting smarter and can communicate with each other, but how do we keep a grip on matters that we already barely understand?

Internationally leading thinkers and entrepreneurs warn us for the inherent dangers of powerful technology. 'Success in creating AI would be the biggest event in human history,' said Stephen Hawking. 'Unfortunately, it might also be the last, unless we learn how to avoid the risks'. Artificial intelligence will evolve to a point that it will be smarter than us. Will we be able to control these machines, and if not, what will be the consequences? No one really knows. Because the rapid technology growth and our increasing dependence on it in every field from financing systems and warfare to industry, it is hard to get the big picture. What are we creating? What will this revolution mean for us?

The time and the urgency are here to make a film about a development that is taking place right now, but mostly hidden from our view, in computer labs, universities and private companies like Google. A while ago I spoke to Robert Epstein, a well-known AI-scientist. He asked me how old I was. Most likely, he said, I would be seeing the moment that machines will outsmart humans. He said, being 62, he would be too old, but our children would be living in a different world. I have a daughter of 8 years old. I wonder, is she going to be a radar in a smart machine? Is she going to be connected 24/7 to computers and internet like in the film 'Twelve Monkeys', and do the chores that computers can't do? Who is going to be in charge; will we be operating the computers and the internet or will we be taking orders from them? And I wonder, how do I prepare her for this new world. What things should she learn, what skills will not be replaced by computers and might give her opportunities for interesting jobs in 20 years' time?

But when I look at our present day lives, I ask myself whether the future isn't already in progress. We are working on computers every day, my photos and music are in the cloud, I communicate through skype, YouTube teaches me to mend my bike, my oven autonomously bakes my cakes, when my computer or Wi-Fi fails, I'm in disarray. An ever growing part of my life is lived through the net. Our ambition is to make a film that asks questions about the far future, and about our lives today.

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FILM SUBJECTS

DAVID HANSON

David Hanson is a roboticist and founder of Hanson Robotics. The company has captured the imagination of the world with uncannily humanlike robots endowed with remarkable expressiveness, aesthetics, and interactivity.

JOHAN HOORN

Johan Hoorn is a researcher and developer of social robotics at the Vrije Universiteit Amsterdam. He develops artificial intelligence, but also looks at the impact of robots on the user.

GEORGE ZARKADAKIS

George Zarkadakis is a writer with a PhD in Artificial Intelligence and the Digital Lead of Willis Towers Watson. He is interested in the impact of AI in the workplace, as well as in the cross-section of science and humanities.

DANIEL H. WILSON

Science fiction author, Daniel H. Wilson, who has written the best-selling book *Robopocalypse*, holds a PhD in Robotics from Carnegie Mellon and a Masters in Artificial Intelligence and Robotics.

DR. ALBERT CHI

Dr. Albert Chi is a trauma surgeon at Johns Hopkins Hospital. He performed the surgery in which he redirected amputee Les Baugh's nerve ending so Les could work in unison with a set of robotic arms.

BRIAN CHRISTIAN

Brian Christian holds degrees in philosophy, computer science, and poetry from Brown University and the University of Washington. His book *The Most Human Human* takes the recent and breathtaking advances in artificial intelligence as the opportunity to rethink what it means to be human, and what it means to be intelligent, in the twenty-first century.

ROBERT EPSTEIN

Robert Epstein is an American psychologist, professor, author, and journalist. He earned his Ph.D. in psychology at Harvard University in 1981, was editor in chief of *Psychology Today*, a visiting scholar at the University of California, San Diego, and the founder and director emeritus of the Cambridge Center for Behavioral Studies in Concord, MA. Dr. Epstein is also the creator and former director of the Loebner Prize Competition in Artificial Intelligence.

GARRY KASPAROV

Garry Kasparov is a Soviet-born chess master who became the world chess champion in 1985. Kasparov was the youngest world chess champion (at 22 years of age) and the first world chess champion to be defeated by a supercomputer in a competitive match.

WILL JACKSON

Will Jackson is the Director of Engineered Arts Ltd, based in Cornwall UK and is the creator of RoboThespian, a full sized humanoid acting robot. Will formed Engineered Arts Ltd in 2004 and employed the talents of many local artists and engineers to produce a number of bespoke commissions for UK science centers and museums.

HOD LIPSON

Hod Lipson, Columbia University professor in robotics and Director of the Creative Machine Lab, specializes in self-replicating and self-reflecting robots. He has also written a recent book about autonomous vehicles.

NICK BOSTROM

Nick Bostrom is Professor in the Faculty of Philosophy at Oxford University and founding Director of the Future of Humanity Institute and of the Programme on the Impacts of Future Technology within the Oxford Martin School. Bostrom has a background in physics, computational neuroscience, and mathematical logic as well as philosophy.

JUSTINE CASSELL

Justine Cassell is Associate Dean for Technology Strategy and Impact in the School of Computer Science at Carnegie Mellon University, and Director Emerita of the Human-Computer Interaction Institute.

GUS NEWMAN AND JUDITH NEWMAN

Gus is a 15 year-old boy with autism who has found comfort in using Siri to answer his continuous questions about the weather, sports and trains. Gus's mother, New York Times journalist Judith Newman, considers the technology a blessing as it never tires of her Gus's questions and is always patient.

EUGENIA KUYDA

Eugenia Kuyda, CEO of Luka, created a memorial bot after her close friend Roman was struck and killed by a car. By cataloging all of Roman's past text, voicemails, video and pictures, it becomes possible to continue to "communicate" with Roman.

ENIKO SZABO

Eniko Szabo has been working as a bike courier for over 10 years and had to make the change to working with algorithmic management.

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ABOUT THE FILMMAKERS

TOMMY PALLOTTA - Director/Producer - Tommy Pallotta is a visionary storyteller who creatively blends technology with filmmaking, animation and interactivity. Microsoft Research recognized his penchant for innovation where he lead a research team to create and design interactive, animated storytelling experiences. Pallotta also directed the first machinima music video, *In the Waiting Line*, and the rotoscoped MTV Breakthrough video *Destiny*, both for the band Zero 7. He has produced several short animated films that garnered numerous awards, including *Snack and Drink*, which is now part of a permanent collection in the New York Museum of Modern Art. Tommy first connected Richard Linklater with animation when he produced the award-winning feature film *Waking Life*. He followed up with Philip K. Dick's *A Scanner Darkly*, starring Keanu Reeves and Robert Downey Jr. He then directed the Emmy nominated transmedia thriller, *Collapsus* and co-directed the feature documentary/ animation hybrid: *Last Hijack*. The interactive companion of *Last Hijack* won an International Digital Emmy Award.

FEMKE WOLTING - Director/Producer - Femke Wolting, together with Bruno Felix, is the founder and managing director of Submarine, an independent film and transmedia production company in Amsterdam and LA, spanning features, documentaries and animation. Femke has produced among others award-winning documentaries such as *Meet the Fokkens*, and internationally distributed animation series such as Mattel's *The Wellie Wishers* for Amazon. She produced Peter Greenaway's last feature film, *Eisenstein in Guanajuato* that premiered in competition of the Berlinale Film Festival and most recently she produced Brian Knappenberg's acclaimed film *Nobody Speak: Hulk Hogan, Gawker and the trials of a free press* which premiered at Sundance 2017 and that premiered worldwide as a Netflix Original in 2017. She is currently producing Oscar-winning director Roger Ross Williams' film *American Jail* for CNN and the BBC about the prison industrial complex. Since 1999 Femke Wolting has directed documentaries, such as *It's The End Of TV As We Know It* – a feature documentary about the future of television; the award-winning film *Sneakers* - about the rise of the sports shoe and *Viktor & Rolf: "Because We Are Worth It"*, which followed a year in the lives of avant-garde fashion designers Viktor & Rolf. She won an Emmy for *Last Hijack*, a film that Femke produced and co-directed with Tommy Pallotta, and that premiered at the Berlinale Film Festival 2014.

BRUNO FELIX - Producer - Bruno Felix co-founded Submarine, one of the leading transmedia production companies from the Netherlands, with Femke Wolting in 2000. Spanning film, animation, non-fiction and interactive genres, Submarine boasts a roster of award-winning productions created in collaboration with an extensive network of international creatives. Bruno Felix seeks to push the boundaries of visual culture with projects that exploit new forms of storytelling, such as the ground-breaking animated documentary *My Second Life* or the transmedia experience *Collapsus*. He has worked with renowned directors such as Douglas Gayeton, Tommy Pallotta and Peter Greenaway. Previously, Bruno was responsible for developing a new media strategy for Dutch Public broadcaster VPRO and was Director of VPRO Digital, a media research lab exploring the influence of digital technology on production and consumption of diverse media formats.

HARRY WATERS - Composer - Harry Waters is a pianist/songwriter and composer. His piano style is influenced by the New Orleans greats Dr. John and Professor Longhair. Growing up in London he played the songs of Led Zeppelin, The Grateful Dead and The Allman Brothers Band and has performed with Marianne Faithful, Ozric Tentacles, Tom Jones, Nick Cave and Dean Ween, as well as fronting and recording an album of jazz as The Harry Waters Band. He has toured in his father's band, Roger Waters, for the last 15 years, for The Wall and The Dark Side of the Moon tours, and most recently Desert Trip alongside The Rolling Stones, Bob Dylan and Neil Young.

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ADDITIONAL THOUGHTS

We are now at a time where AI to most people feels like an abstract subject that doesn't really concern them. But we are at the start of a revolution that will change our lives dramatically over the next decades. Our work, relationships and society are changing more rapidly than ever before. Technology is changing the very fabric of our existence more radically than we imagined.

For a moment, let's take one step back: Artificial Intelligence – what do we mean by that? Alan Turing defined it as 'If a machine behaves as intelligently as a human being, then it is as intelligent as a human being'. Artificial intelligence is not a synthetic brain floating in a case of blue liquid somewhere. It is an algorithm – a mathematical equation that tells a computer what functions to perform. Algorithms are to the 21st century what coal was to the 19th century: the engine of our economy and the fuel of our modern lives. Without algorithms, your phone wouldn't work. There would be no Facebook, no Google, and no Amazon. Algorithms schedule flights and then fly the airplanes, and help doctors diagnose diseases. "If every algorithm suddenly stopped working, it would be the end of the world as we know it," writes Pedro Domingos in *The Master Algorithm*. In the world of AI, the Holy Grail is to discover the single algorithm that will allow machines to understand the world.

But according to the Swedish philosopher Nick Bostrom of Oxford University, Artificial Intelligence forms one of the greatest existential risks to mankind. "With this technique we are doing unprecedented things with potent capabilities that surpass our human imagination. Once it gains human and then superhuman intelligence how would you control it, how would you make sure it was human-friendly and safe? When we create the first super intelligent entity, we might make a mistake and give it goals that lead it to annihilate humankind, assuming its enormous intellectual advantage gives it the power to do so."

Physicist Stephen Hawking argues that super intelligent machines don't have to be super evil to pose a threat. "The real risk with AI isn't malice but competence," physicist Stephen Hawking argued recently. "A super intelligent AI will be extremely good at accomplishing its goals, and if those goals aren't aligned with ours, we're in trouble. You're probably not an evil ant-hater who steps on ants out of malice, but if you're in charge of a hydroelectric green-energy project and there's an anthill in the region to be flooded, too bad for the ants. Let's not place humanity in the position of those ants."

It is hard to imagine, but scientists predict that within 15 - 30 years the ordinary home computer will have evolved into a human intelligent machine. Growth in technology and computer power is exponential. On the one hand Artificial Intelligence is a triumph of the human mind. But on the other hand, we need to examine the social and ethical consequences and prepare us for what's coming.

In **More Human Than Human**, we investigate the revolutionary emergence of robots and artificial intelligence: an invasion not to be denied anymore, of which the consequences are gigantic and hard to predict. What first seemed science-fiction now has become reality.

The question remains – how can humanity learn to deal with this reality, and steer new dilemmas and challenges in the right direction?

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CREDITS

Submarine Amsterdam presents

In co-production with SubLA, Savage Film, VPRO

A film by Tommy Pallotta and Femke Wolting

MORE HUMAN THAN HUMAN

Written & directed by

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Femke Wolting

Producers

Femke Wolting

Bruno Felix

Tommy Pallotta

Co-producer

Bart Van Langendonck

Director of Photography

Guido van Gennepe NSC

Sound

Eddy de Cloe

Editor

Chris van Oers

Supervising editor

Simon Barker

Composer

Harry Waters

**Conversations with
(in order of appearance)**

Will Jackson

Daniel H. Wilson

Garry Kasparov

Nick Bostrom

Gus Snowdon

Henry Snowdon

Judith Newman

Brian Christian

Eugenia Kuyda

George Zarkadakis

Robert Epstein

Mark Thielen

David Hanson
Justine Cassell
Johan Hoorn
Eniko Szabo
Hod Lipson
Billy Crudup
Richard Linklater
Albert Chi

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Rob Rusher

Additional sound

Jasnai Jansen

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Sound editing & mix

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Additional material by

Apollo 11 launch / NASA

This is Mission Control 1970 NASA: Houston Mission Control Center During Apollo 13 / NASA

VIC-20 - The Wonder Computer of the 1980s TV Spot / Commodore

Garry Kasparov versus Deep Blue (1997) / IBM

Furby TV Advert 1999 / Hasbro / Tiger Electronics

Big Dog / Boston Dynamics

The New SpotMini / Boston Dynamics

Will a robot take your job? / CNN

AI-powered robots to replace 30 percent of jobs by 2030 / Arirang News

Stephen Hawking - 'AI could spell end of the human race' - BBC News

Interview with Elon Musk (2014) / MIT AeroAstro

What's new Atlas / Boston Dynamics

Microsoft Data Center / Microsoft

Amazon's Eighth Generation Fulfillment Center / Amazon Robotics

Photographs and video Roman / Eugenia Kuyda

Khitrovka tour from GQ and Roman Mazurenko / GQ Russia

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Tesla driving demonstration / Tesla

Cambridge Analytica - What We Do / Cambridge Analytica

President Donald Trump arrives at White House / KJRH -TV | Tulsa | Channel 2

Cambridge Analytica - how big data shaped the US election / Channel 4 News, Cambridge Analytica, MSNBC, CNN

Google Data Center / Google

Facebook scraps A.I. chatbots after they created their own language / CBSN

Atlas / Boston Dynamics

Amputee Makes History with APL's Modular Prosthetic Limb (2015) / The Johns Hopkins University Applied Physics Laboratory LLC

Theses Advanced Drones Will Change the Battlefield / Office of Naval Research Science & Technology

Nuclear Test Film - Operation Greenhouse / Department of Energy

Nuclear Test Film - Damage and Destruction / Department of Energy

Interview with the Lifelike Hot Robot Named Sophia / CNBC

THE JETSONS (1962/1963) / Director: Joseph Barbera, William Hanna / Producer: Hanna-Barbera
METROPOLIS (1927) / Director: Fritz Lang / Producer: Erich Pommer
BLADE RUNNER (1982) / Director: Ridley Scott / Producer: Michael Deeley
STAR WARS: A NEW HOPE (1977) / Director: George Lucas / Producer: Gary Kurtz
THE TERMINATOR (1984) / Director: James Cameron / Producer: Gale Anne Hurd
THE DAY THE EARTH STOOD STILL (1951) / Director: Robert Wise / Producer: Julian Blaustein
THE MECHANICAL MAN (1921) / Director: André Deed / Producer: Milano Film
TARGET EARTH (1954) / Director: Sherman A. Rose / Producer: Herman Cohen
AVENGERS: AGE OF ULTRON (2015) / Director: Joss Whedon / Producer: Kevin Feige
THE MATRIX (1999) / Director: Andy Wachowski, Larry Wachowski / Producer: Joel Silver
I, ROBOT(2004) / Director: Alex Proyas / Producer: Laurence Mark, John Davis, Topher Dow, Wyck Godfrey
HER (2013) / Director: Spike Jonze / Producer: Spike Jonze, Megan Ellison, Vincent Landay
ALICE CARES (2015) / Director: Sander Burger / Producer: Janneke Doolaad
1984 (1956) / Director: Michael Anderson / Producer: N. Peter Rathvon
MINORITY REPORT (2002) / Director: Steven Spielberg / Producer: Jan de Bont, Walter F. Parkes, Gerald
R. Molen, Bonnie Curtis
2001: A SPACE ODYSSEY (1968) / Director: Stanley Kubrick / Producer: Stanley Kubrick
THE SIX MILLION DOLLAR MAN (1974) / Director: Kenneth Johnson / Producer: Kenneth Johnson
FRANKENSTEIN (1931) / Director: James Whale / Producer: Carl Laemmle jr.
TAXI DRIVER (1976) / Director: Martin Scorsese / Producer: Julia Phillips & Michael Phillips

Additional music

If I Only Had A Heart

Composed and written by Arlen H. & Harburg E.Y.

Performed by RoboThespian

Original song published by EMI Catalogue

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