

**NEIL HARBISSON**

Neil Harbisson is a British-born contemporary artist and cyborg designer/activist best known for having an antenna implanted in his skull to detect infrared and ultraviolet colors via sound waves. He is the first human to be officially recognized as a cyborg by a government body. His art investigates the relationship between color and sound, as well as the use of artistic expression via sensory extensions. In 2010 he cofounded the Cyborg Foundation with Moon Ribas.

**ASEM HASNA**

Asem Hasna was a mathematics student at the University of Damascus when the Syrian war broke out. He became a paramedic, and while on a rescue mission lost his leg when his ambulance was hit by artillery. After receiving treatment in Jordan, he became a prosthetics technician and partnered with the NGO Refugee Open Ware. He now trains others in refugee camps in 3D printing and physical computing.

**ZOLTAN ISTVAN**

Zoltan Istvan is a futurist and author of the bestselling philosophical novel *The Transhumanist Wager*, and the 2016 U.S. presidential candidate of the Transhumanist Party. He's a former journalist with the National Geographic Channel and now writes for *Motherboard*, *TechCrunch*, *Gizmodo*, and *The Huffington Post*. He appears frequently on TV and radio as one of America's leading transhumanists.

**HOMAYOON KAZEROONI**

Homayoon Kazerooni, Ph.D., is a professor of mechanical engineering at the University of California, Berkeley, where he also serves as the director of the Berkeley Robotics and Human Engineering Laboratory. He earned a doctorate degree from MIT and is a leading expert in robotics, control sciences, exoskeletons, and human-machine systems. Kazerooni is also the founder and CEO of *SuitX*, a company that provides accessible, affordable exoskeletons for the industrial, medical, and military markets.

**JONATHAN JACQUES-BELLETÊTE**

Jonathan Jacques-Belletête is an art director from Montréal. He graduated from Classical Commercial Arts in 1997, and has worked in the video game industry for 17 years. He has worked as a concept artist for EA Mobile Games, a lead artist and assistant art director for Disney and Warner Brothers, and an art director for Ubisoft. He has developed many new IP concepts, including one that landed Ubisoft James Cameron's *Avatar* license. He has been working for Eidos-Montréal since the studio was founded, and created the art direction for the critically acclaimed *Deus Ex: Human Revolution*. He's now the executive art director for the franchise and oversees the visual development of the entire *Deus Ex Universe* license, as well as art directing unannounced projects.

**TAN LE**

Tan Le is the founder and CEO of *Emotiv*, a bioinformatics company advancing the understanding of the human brain through electroencephalography (EEG). She is a technology innovator, entrepreneur, business executive, and speaker. Her company has won a number of design awards, and Le herself was named a National Geographic Emerging Explorer as well as *Fast Company's* Most Influential Women in Technology and a Young Global Leader by the World Economic Forum.

**DAVE LEVIN**

Dave Levin is a social entrepreneur and impact investor specializing in the use of advanced technology to help those who have lost everything. In addition to leading *Refugee Open Ware*, Levin serves as the co-founder, COO and CFO of *Hala Systems*, as well as a Fellow at Yale's Global Justice Program. Previously, he specialized in mobile banking and financial inclusion in the Philippines with *LeapFrog Investments* and as a Fulbright Scholar in India. He also served as strategist and speechwriter in the office of UN Secretary-General Kofi Annan on matters related to business and human rights. Levin holds an MBA from the Wharton School, a Master's in the philosophy of human rights and global justice from Cambridge University, and a BS/BA in economics and international studies from the Huntsman Program at Wharton.

**STEVE MANN**

Steve Mann, Ph.D., is chief scientist at California-based startup *Meta* and widely regarded as "The Father of Wearable Computing." His work as an artist, scientist, designer, and inventor made Toronto the epicenter of wearable technology in the 1980s. In 1992 Mann founded the MIT Media Lab's Wearable Computing project. Mann also invented the smartwatch videophone in 1998 as well as HDR (High Dynamic Range) imaging.

**LUCY MCRAE**

Lucy McRae is a science fiction artist, director, and body architect probing the frontiers of the body, health, and human adaptability. Trained in classical ballet, McRae's artistic study of technology began during her years at Philips Design, where she led the technology company's research lab. She developed stretchable electronics, an electronic tattoo, and a range of emotion-sensing dresses.

**NADJA OERTELT**

Nadja Oertelt is a documentary filmmaker and science media producer with a background in neuroscience. She creates media at the intersection of culture, technology and science as a way to engender scientific agency and literacy. Oertelt most recently comes from *Mashable* where she worked as a senior editorial producer creating science series and documentaries. For over three years, she worked at Harvard creating an interactive, multimedia, episodic, open neuroscience course for hundreds of thousands of learners around the world, and received her BS in Neuroscience at MIT. She worked for many years in visual neuroscience labs at Cambridge University, MIT, and Harvard.

**ERICA ORANGE**

Erica Orange is the executive vice president and COO of *The Future Hunters*, one of the world's leading futurist consulting firms. She evaluates emerging cultural, technological, economic, political, demographic and environmental trends for Fortune 500 companies, trade associations and public-sector clients. Orange is a frequent speaker on a wide range of global trends and has authored numerous white papers on cutting-edge, future-focused topics. She also tracks major disruptive technologies, and the enormous advancements in science, to understand how both are shifting our current understanding of our own biology.

**SAMANTHA PAYNE**

Samantha Payne is the cofounder of *Open Bionics*, an award-winning robotics company creating affordable bionic hands for amputees. Payne has been recognized by *Fast Company*, *Bloomberg*, and *Marie Claire* magazine as a tech innovator.

**WILL ROSELLINI**

Will Rosellini is an IP expert, serial entrepreneur, and former minor league baseball player. He has three companies in progress, all of whom focus on repairing the nervous system using active electrical devices that will ultimately hook directly into the virtual world to increase health, happiness, and wealth.

**STEVEN SANCHEZ**

Steven Sanchez suffered a spinal-cord injury in 2004 that left him disabled. Since then he has been on a quest to walk again. In 2006 he tried STEM cell injection surgery, followed by intensive rehab, where he learned how to walk with leg braces. Then Sanchez found the answer he was looking for in exoskeleton development. He worked with UC-Berkeley grad students in 2012 to give feedback and test a new robotic exoskeleton. Those students went on to found *SuitX*, where Sanchez now works with the team to test and innovate the suit, and demonstrates it to audiences around the world.

**NATASHA VITA-MORE**

Natasha Vita-More, Ph.D., is a designer who explores the intervention of biological limited lifespans, selective enhancement, and related socio-political issues. She prototyped the *Whole Body Prosthetic*, which includes omni-directional existence of the *Substrate Diverse Person*. She has been featured in more than 24 televised documentaries and introduced the idea of a "Super Olympics" at the *SportAccord* Convention for Olympic and non-Olympic sports in St. Petersburg, Russia.

**ANNA WEXLER**

Anna Wexler is a Ph.D. candidate in the Department of Science, Technology, and Society at MIT, and a visiting scholar at the Center for Neuroscience and Society at the University of Pennsylvania. She studies the ethical, legal, and social implications of emerging neurotechnologies, with a particular focus on the use of do-it-yourself brain stimulation for cognitive enhancement. Wexler is a former science writer and documentary filmmaker who co-directed and co-produced the feature documentary film *Unorthodox* (2013).



Courageous is Turner's first-ever brand studio with global opportunities for marketers across the company's multi-screen brands CNN, HLN and *Great Big Story*. Launched in June 2015, the studio's unique approach is anchored in brand journalism, the discovery of great stories and the production of powerful branded content. From concept development to production to multi-platform distribution, *Courageous* leverages its distinct point-of-view, while delivering on business objectives for advertising partners. Turner, a Time Warner company, creates and programs branded news, entertainment, kids and young adult, and sports media environments on television and other platforms for consumers around the world.



Deus Ex: Mankind Divided, the sequel to the critically acclaimed *Deus Ex: Human Revolution*®, builds on the franchise's trademark choice and consequence, action RPG-based gameplay, to create both a memorable and highly immersive experience. The year is 2029, and mechanically augmented humans have now been deemed outcasts, living a life of complete and total segregation from the rest of society. Players will once again take on the role of Adam Jensen, now an experienced covert agent, and will gain access to his new arsenal of customizable state-of-the-art weapons and augmentations. With time working against him, Adam must choose the right approach, along with whom to trust, in order to unravel a vast worldwide conspiracy. Available August 23, 2016 on PS4®, Xbox One®, and Windows PC.

HUMAN X DESIGN

A CONFERENCE ON HUMAN AUGMENTATION

August 3, 2016 | New York

Presented by



SCHEDULE

Human by Design is a one-day conference that explores the world of human augmentation with two goals: First, to bring together the top minds to debate, question and challenge what it means to be human; and second, to develop an Ethical Framework that can serve as a way forward for future augmentation guidelines.

8:45–9:30 AM	Breakfast
9:30 AM	State of the Union by Erica Orange
9:45–10:00 AM	Human Intermission: Meet Dave Levin and Asem Hasna
10:00–11:00 AM	Panel: Is Augmentation a Human Right? Moderator: Arthur Caplan Panelists: Adam Arabian, E. Christian Brugger, Steve Mann, and Natasha Vita-More
11:00–11:20 AM	Break
11:20–11:45 AM	Human Intermission: Meet Jonathan Jacques-Belletête, Joel Gibbard, and Cathrine Disney
11:45 AM–12:45 PM	Panel: Selective vs. Therapeutic Augmentation Moderator: Anna Wexler Panelists: Michael Chorost, Neil Harbisson, Homayoon Kazerooni, and Samantha Payne
12:45–2:15 PM	Lunch
2:15–2:30 PM	Human Intermission: Meet Steven Sanchez
2:30–3:30 PM	Panel: The Future of the Far, Far Next Moderator: Erica Orange Panelists: Zoltan Istvan, Tan Le, Lucy McRae, and Will Rosellini
3:30–3:50 PM	Human by Design: An Ethical Framework for Human Augmentation Moderator and Author: Nadja Oertelt
3:50–4:00 PM	Conference Wrap-Up

SESSIONS

HUMAN INTERMISSION: MEET DAVE LEVIN AND ASEM HASNA

Dave Levin, founder of Refugee Open Ware, speaks to Syrian refugee and expert of 3D-printed prosthetics, Asem Hasna as he tells his personal story of finding purpose in the trials of war. When the war in Syria broke out, Hasna wanted to serve his country in a nonviolent way, so he trained to be a paramedic. While on a rescue mission, he lost his leg when his ambulance was hit by artillery. After receiving treatment in Jordan, he became a prosthetics technician and partnered with the NGO Refugee Open Ware to provide 3D printed upper limbs to refugees in camps. Currently seeking asylum in Berlin, Asem now trains other refugees in 3D printing and physical computing.

1

PANEL: IS AUGMENTATION A HUMAN RIGHT?

In the shadow of some recent high-profile medical cases being battled in U.S. courts comes the increasingly relevant question: Do we own our bodies? If the answer is yes, then is that right of ownership inalienable to the point that we can augment it without limits? These core questions will be debated in a panel discussion featuring the top thinkers on both sides of the issue. This discussion explores the morality and ethics of human augmentation with Christian ethicist and moral philosopher E. Christian Brugger, transhumanist philosopher Natasha Vita-More, augmentation pioneer and former DARPA researcher Adam Arabian, and Steve Mann, chief scientist of California-based startup Meta and victim of the first cyborg hate crime. Their discussion is a launchpad for the day's conversations and the issues surrounding human rights and augmentation.

HUMAN INTERMISSION: MEET JONATHAN JACQUES-BELLETÊTE, JOEL GIBBARD, AND CATHRINE DISNEY

The Deus Ex Universe has long been recognized for being at the forefront of the discussion on transhumanism and bionic augmentations, but up until recently it was only fiction. Through a newly formed partnership with Open Bionics, an award-winning startup, Eidos-Montréal's team of artists provided the designs for two prosthetic arms, inspired by the Deus Ex Universe. Jonathan Jacques-Belletête, executive art director on the Deus Ex franchise, and Joel Gibbard, CEO and co-founder of Open Bionics, discuss this partnership and the challenges of designing outside of the limitless world of video games. Demoiing the arm is Cathrine Disney, an interdisciplinary designer and the first adult woman to wear the bionic Titan arm, created through this partnership.

2

PANEL: SELECTIVE VS. THERAPEUTIC AUGMENTATION

Although permanent body augmentation is often regarded only in the context of corrective prosthetics, we are also in the age of the voluntary cyborg. For thousands of years, humans have sought to permanently modify themselves with tattoos, piercings, and implants—pushing the boundaries of the human body. But now technologists seek to enhance the capability of human anatomy without a pre-existing condition. On this panel, well-known contemporary artist and cyborg activist Neil Harbisson joins author and "cyborg memoirist" Michael Chorost, 3D-printed prosthetic CEO Samantha Payne, and roboticist and UC–Berkeley professor Homayoon Kazerooni. They will discuss and debate the issue of medical vs. non-medical augmentation as well as the onset of cyborg culture.

HUMAN INTERMISSION: MEET STEVEN SANCHEZ

Steven Sanchez suffered a spinal-cord injury in 2004 that left him disabled. Sanchez shares his personal story starting with a glimpse of his life before his traumatic injury right through present day. He brings us inside his journey to walk again and the great efforts to find technologies to help him do just that. His dreams have been realized with the aide of an exoskeleton suit that he will demo during this intimate discussion.

3

PANEL: THE FUTURE OF THE FAR, FAR NEXT

Today's cutting-edge prosthetics and augmentation methods allows human bodies to run faster, jump higher, record interactions, and control technology with our minds. But what's next? What is the vision for human augmentation in the future and how far are we from that reality? In this exciting look forward, medical technology entrepreneur Will Rosellini, science-fiction artist and body architect Lucy McRae, presidential candidate for the U.S. Transhuman Party Zoltan Istvan, and bioinformatics entrepreneur Tan Le offer a glimpse of the road ahead. Their insights show the deeper implication not only for developers and makers, but also for doctors, lawmakers, and society at large.

AN ETHICAL FRAMEWORK FOR HUMAN AUGMENTATION

Nadja Oertelt, author and moderator, presents the collaborative efforts of a diverse board of experts carefully selected by conference organizers following an international search for leading thinkers in the fields of human augmentation, bioethics, and technology. The creators collaborated to develop the framework, unaffiliated with the conference organizers and sponsors, both of whom had no input on the final document.

BIOS



ADAM ARABIAN

Adam Arabian, Ph.D. PE is a technical director of multiple nonprofits and a professor of engineering at Seattle Pacific University, focusing on supporting refugee and underserved communities globally. He performed cutting-edge research and development for commercial prosthetic devices and was lead engineer on the early development of the DARPA RP2009 prosthetic arm and was director of R&D for Orthocare Innovations.



E. CHRISTIAN BRUGGER

E. Christian Brugger is the Cardinal Stafford Professor of Christian Ethics at John Vianney Major Seminary in Denver, Colorado. He has a Ph.D. in moral philosophy from Oxford and master's degrees in philosophical and theological ethics from Seton Hall, Harvard, and Oxford Universities. Professor Brugger has published over 200 articles in scholarly and popular periodicals and appeared on PBS covering numerous topics on ethics.



ARTHUR CAPLAN

Arthur Caplan, Ph.D. is the founding head of the Division of Bioethics at New York University Langone Medical Center and currently serves as the ethics advisor to Department of Defense/DARPA on synthetic biology. Caplan has authored and edited 32 books and over 600 papers in peer-reviewed journals. His most recent book is Replacement Parts: The Ethics of Procuring and Replacing Organs in Humans (Georgetown University Press, 2015). Caplan has received numerous awards for his work in healthcare, biotechnology, ethics and science and is a regular commentator on bioethics and health care issues on various national and international media outlets.



MICHAEL CHOROST

Michael Chorost, Ph.D., is the author of groundbreaking "cyborg memoir," Rebuilt: How Becoming Part Computer Made Me More Human (2005) about getting a cochlear implant. It won the PEN/USA Award for Creative Nonfiction. His second book, World Wide Mind (2011) is about the science of enabling direct communication from one brain to another. He also writes for Wired, New Scientist, and Slate, among others.



CATHRINE DISNEY

Cathrine Disney is an interdisciplinary designer, researcher, curator, and material innovator captivated by biological engineering and exploring the blurring boundaries between emerging technologies and the human body. Disney is due to start an MA in Material Futures in September. She was born with a congenital amputation, which led her to answer an open invitation to join a design workshop to re-design the human hand run by Open Bionics, a robotics company. Disney is the first adult woman to wear the bionic Titan arm, created by Eidos-Montréal and Open Bionics. After becoming frustrated by using prosthetics with limited functionality as a child, she is excited to break new ground in the world of artificial limbs.



NITA A. FARAHANY

Nita A. Farahany is a professor of law and philosophy at Duke University and the principal investigator of SLAP Lab (Science, Law, and Policy Lab). In 2010, she was appointed by President Obama to the Presidential Commission for the Study of Bioethical Issues, and continues to serve as a member. She is a widely published scholar on the ethical, legal and social implications of the biosciences and emerging technologies, as well as a frequent commentator for national media and radio shows. She is the recipient of the 2013 Paul M. Bator award given annually to an outstanding legal academic under 40. Farahany holds an AB (Genetics) from Dartmouth College, and an ALM (biology) from Harvard University, and a JD, MA, and Ph.D. (philosophy) from Duke University.



JOEL GIBBARD

Joel Gibbard is the CEO of Open Bionics, a company he cofounded with Samantha Payne. In 2013, he also founded the Open Hand Project. Gibbard started work on robotic hands as a teenager. Since then he's designed hundreds of prototypes and assembled a team of engineers to help him bring his vision of affordable bionics to fruition. Gibbard has shared his ideas at TEDx and the Hello Tomorrow global summit and has pioneered a movement of affordable and open-source bionic prosthetics.