



QUANTOPIA
THE EVOLUTION OF THE INTERNET

PAUL D. MILLER AKA DJ SPOOKY

World Premiere

COMMISSIONED BY INTERNET ARCHIVE; A HEWLETT 50 ARTS COMMISSION
FUNDED BY THE WILLIAM AND FLORA HEWLETT FOUNDATION. PRESENTED
IN ASSOCIATION WITH YBCA.

PRODUCED BY SOZO ARTISTS

QUANTOPIA: The Evolution of the Internet

Movement I: Mimesis - De Revolutionibus

Movement II: Diegesis - Roots, Routes, Rights

Movement III: Elpis - Polygon Chaos

Composed by Paul D. Miller aka DJ Spooky

Visual design by Greg Niemeyer, Roger Antonsen and MEDIUM Labs

Featuring performances by DJ Spooky, Classical Revolution and San Francisco Girls Chorus, conducted by Valérie Sainte-Agathe

Classical Revolution string quartet is:

Charith Premawardhana, violin

Victoria Perenyi, violin

Carl Larson, viola

Joey Chang, cello

San Francisco Girls Chorus is:

Valérie Sainte-Agathe, Artistic Director

Kelsey Greenberg

Valentina Kornach

Eleanor Murphy-Weise

Sadie Habas

Sarah Liu

Asha Sager

Eva Jackson

Maggie Lu

Eliana Schiller

Allegra Kelly

Eva Melin-Gompper

Sophia Zuzga

MEDIUM Labs is: Pax, Founder; Aja Duniven, VR/AR Creative Lead; Alex Rideout, Lead VR Developer

Video director: Greg Niemeyer

Color editor: Lisa Esters

CGI editor: Oliver Moldow

Additional network animator: Brian Lo

Archive researcher: Leilah Talukder

Company stage manager & production manager: Annie March

Project manager: Andi Wong

Thanks to the production crew at Yerba Buena Center for the Arts

Produced by Sozo Artists, Inc. with additional support from Sozo Impact, Inc.

Producers: Rika Iino & Annie March

Commissioned by Internet Archive; a Hewlett 50 Arts Commission funded by the William and Flora Hewlett Foundation. Presented in association with YBCA.

Special thanks to Brewster Kahle and Wendy Hanamura of Internet Archive.

Worldwide Representation for Paul D. Miller aka DJ Spooky: Sozo Artists, Inc.

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Greg Niemeyer's visual design features media preserved in the Internet Archive. Tower Records footage courtesy Center for Sacramento History (CSH).

Please stay for a brief post-performance discussion, moderated by Wendy Hanamura, Director of Partnerships, Internet Archive.



Artist Statement: An acoustic portrait of the Internet
By **Paul D. Miller aka DJ Spooky**

"All is Number" -Pythagoras

The mathematician, philosopher and philologist Gottfried Wilhelm Leibniz famously wrote, "music is the pleasure the human mind experiences from counting without being aware that it is counting." It's a simple and elegant way of summarizing how much we as human beings use numbers to navigate the world that surrounds us. When I came up with the title *Quantopia*, I wanted to figure a way to show how much numbers influence all aspects of our data driven society - in a song.

The first message on ARPANET was sent by Dr. Leonard Kleinrock's team at UCLA to Stanford Research Institute on October 29, 1969, and the volume of data was literally a couple of bytes that made up the letters "L-O" – it overwhelmed the system and the computer crashed because it couldn't handle the data. The full term was meant to be LOGIN. 2019 marks the 50th anniversary of the Internet and the 30th anniversary of the Web. Both came into existence in an open source, academic environment (UCLA, Stanford, CERN) where knowledge was meant to be shared and made more robust by the way it was exchanged. From there, the Internet as we know it evolved along lines that eerily resonate with the mathematics of the Law of Exponential Growth, or what Raymond Kurzweil would call the "Law of Accelerating Returns" that also mirrors evolutionary, biological processes. Kind of complex, right?

Today, according to the International Telecommunication Union, around 55.1% of the world's population, more than 3.1 billion people, have access to the Internet. More will be joining in huge numbers over the next couple of years. As we move further into a world that is defined by information and how it shapes and molds all aspects of modern society, the Internet and its ancillary effects have resulted in the most complex systems architecture humanity has ever made.

"Quantopia" is a riff on "Quantified Utopia" – a remix of two powerful terms. Plato first conceived of Utopia in his opus *The Republic* as a Socratic dialog, one of the foundations of Western philosophy. Utopia has a root term in "topos" - same root for "topology" or landscape. A dialog is a conversation, and of course, the Internet and the Web are the biggest conversations humanity has ever had. I wanted to make an acoustic portrait of the sheer impact of the Internet on our society over the last 50 years, and explore in sound the fact that sound – like the fiber optic cables, satellite signals, wireless networks, and data centers that hold the modern world together - it's all about pattern recognition.

We worked with Internet Archive's "WayBack Machine" to look for open source archival material to think of "DJ-ing the Web" based on open source/shareware as a core component of the cultural impact of the Web. The Archive is a way of engaging information overload by playing with fragments. We live in an era of the "Quantified Self" – a place where most aspects of contemporary life are informed by the invisible and deeply connected power of numeracy. But the idea of a civic society based on information even reflects some of the most powerful issues of digital governance. That's why I translated the *Universal Declaration of Human Rights* into binary code, and had the chorus sing it. Like Plato once envisioned – society too is made of patterns. I wanted to explore the radical changes the Internet has unleashed in our time. This is just the beginning.

Artist Statement
By **Greg Niemeyer**

"There is only one holistic system of systems, one vast and immane, interwoven, interacting, multi-variate, multi-national dominion of dollars, petro-dollars, electro-dollars, multi-dollars!" -Paddy Chayefsky, Network, 1976

We created the visuals for *Quantopia*'s three movements in three ways. For Movement I, we researched the Internet Archive for social concepts that resonate with core technical concepts of the Internet. For example, the protocol, originally a social concept in diplomacy, is also key element to connect machines with different operating systems. The Internet is a mirror of existing social, commercial and political structures.

For Movement II, we developed a Network Simulation instrument. It shows networks as creatures with emergent behaviors, which we must encounter on their own terms. We show networks growing, transforming and collapsing. Networks sharply shift yet stay the same, all at once.

For Movement III, we built a VR [virtual reality] instrument. With that, DJ Spooky remixes networks from the inside out, both musically and visually. The instrument introduces an immersive network perspective. That perspective gives us a way to see and shape the vast and complex networks we are part of, with overview and detail at the same time.

Together, the three views of the Internet show the forces of the Internet as two paradoxical poles, the pole of empowering connectivity and the pole of quantification. It's up to us to find our path through that system with our own values, our own judgements and our own actions.

To experience the Network Simulation and *Quantopia* VR in person, please visit our Network Paradox exhibit at Catharine Clark Gallery in San Francisco.

Greg Niemeyer, Roger Antonsen and MEDIUM Labs, San Francisco, January 25, 2019

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WHO'S WHO:

Paul D. Miller aka DJ Spooky (composer) is a composer, multimedia artist and writer whose work immerses audiences in a blend of genres, global culture and environmental and social issues. Miller's work has appeared in the Whitney Biennial; The Venice Biennial for Architecture; the Ludwig Museum in Cologne; Kunsthalle, Vienna; The Andy Warhol Museum in Pittsburgh, the Miami/Art Basel fair, and many other museums and galleries. Miller's award-winning book "Rhythm Science" was published by MIT Press 2004, and was followed by "Sound Unbound," an anthology about electronic music and digital media, in 2008. "The Book of Ice," an experiential visual and acoustic portrait of the Antarctic, was published in 2011 by Random House. "The Imaginary App," Miller's fourth book, was published by MIT Press in 2014. Miller has collaborated with a vast array of artists, ranging from Metallica to Chuck D; Steve Reich to Yoko Ono. His large scale, multimedia performance pieces include "Rebirth of a Nation," "Terra Nova: Sinfonia Antarctica," which was commissioned by the Brooklyn Academy of Music for the Next Wave Festival 2009, and "Seoul Counterpoint," written during his residency at Seoul Institute of the Arts in 2014. Miller was the first Artist in Residence at the Metropolitan Museum of Art, where he premiered his work "A Civil War Symphony" in 2013. In 2014, Miller was named a National Geographic Emerging Explorer, an honor recognizing visionaries at the forefront of global problem solving. djspooky.com Twitter: @djspooky

Greg Niemeyer (visual designer and video director) is a data artist and new media specialist. Born in Switzerland, Gregory Niemeyer studied Classics and Photography. He started working with new media when he arrived in the San Francisco Bay Area in 1992. He received his MFA from Stanford University in New Media in 1997. At the same time, he founded the Stanford University Digital Art Center. In 2001 he was appointed at UC Berkeley as a Professor for New Media in Art Practice. He co-founded and directed the Center for New Media, focusing on the critical analysis of the impact of new media on human experiences. His current work focuses on mediations between individuals, communities and environments: When do technologies dehumanize us, and when do they help us deepen human experiences? gregniemeyer.com

MEDIUM Labs (visual design) is a Virtual Reality production company located in downtown Boulder, Colorado that specializes in creating virtual and augmented reality apps, incredible 360° video, augmented reality video installations, mixed reality videos and cutting-edge experiences. mediumlabs.com

Roger Antonsen (visual design) is Associate Professor of Computer Science at the Department of Informatics at the University of Oslo in Norway, and Visiting Scholar at UC Berkeley, California. With a PhD in mathematical logic and proof theory, and the author of the book "Logical Methods: The art of abstract and mathematical thinking", he is considered a logician, mathematician, computer scientist, public speaker, author and artist. Through his numerous projects, he creatively combines mathematics and computer science with entertainment, philosophy and engaging visualizations. He received the Best of Show Award for 2D Art Work at the Bridges math/art conference in 2018. Antonsen is also an award-winning science communicator; his 2015 TED talk, "Math is the hidden secret to understanding the world", is one of the most popular TED talks on mathematics. His visuals for Quantopia may also be experienced at the Catharine Clark Gallery in San Francisco until February 16th. <https://rantonse.no/> Twitter & Instagram: @rantonse

Classical Revolution (string quartet) is a chamber music insurgency founded in the fall of 2006 at Revolution Cafe in San Francisco's Mission District. In their first year, the organizers began to receive invitations to perform at other local hot spots such as Amnesia and the Red Poppy Art House, soon to be followed by the Legion of Honor and de Young Museum, and larger venues like Yoshi's SF and Herbst Theater. In its 10th anniversary year, Classical Revolution undertook a cycle of Beethoven's 9 Symphonies, performed at venues around San Francisco including the de Young Museum, Fort Mason's Cowell Theater, and a performance of the *9th Symphony* at Grace Cathedral in front of a 1,000 person audience. Classical Revolution is active in over 20 cities around the world, with chapters all over the US, Canada, and Europe.

Valérie Sainte-Agathe (artistic director, San Francisco Girls Chorus), has conducted the San Francisco Girls Chorus since 2013, including in dozens of performances across the Bay Area and on tours to New York, Washington, DC, Oregon, and the Nordic countries. Prior to joining SFGC, Sainte-Agathe served for 12 years as Music Director of the Junior Opera of the Opéra National de Montpellier, where she trained hundreds of young singers ages 6-25. Sainte-Agathe has participated in numerous recordings, including her debut album with SFGC, *Final Answer*, which was released in February 2018 and eight albums with the Orchestre National de Montpellier and the Festival de Radio France. She is a recipient of Victoires de la musique (French equivalent of the GRAMMY Award) and a two-time recipient of the Orphée d'Or Award. A Martinique native, Sainte-Agathe received a Bachelor's Degree in Choral Conducting from Université Paul Valéry in Montpellier, and a Diplôme d'Etudes Musicales in Piano, Chamber Music and Theory from the Montpellier Conservatory. She holds Master's Degrees in Management from the University of Montpellier and in Cultural Project Management from Université Paul Valéry, and has also studied Piano Performance at Colorado State University.

San Francisco Girls Chorus (chorus) is now in its 40th season. The five-time GRAMMY Award-winning San Francisco Girls Chorus (SFGC) is one of the nation's leading youth arts organizations. Under the leadership of Artistic Director Valérie Sainte-Agathe, SFGC regularly presents an acclaimed local subscription series, travels across the country and around the world as a cultural ambassador for San Francisco, and collaborates with leading arts organizations including Kronos Quartet, San Francisco Symphony, San Francisco Opera, New Century Chamber Orchestra, and San Francisco Film Festival. Recent concert highlights include debut performances at the Kennedy Center in Washington, D.C. with The Knights and Carnegie Hall with the Philip Glass Ensemble. In February 2018, SFGC released *Final Answer*, its newest album featuring Kronos Quartet on Philip Glass' Orange Mountain Music label. More information on SFGC's concert activities and acclaimed Chorus School for girls and young women ages 4 to 18 can be found at sfgirlschorus.org.

The Internet Archive (commissioner) is a non-profit digital library founded by Brewster Kahle in 1996 with the mission to provide "Universal Access to All Knowledge." The organization seeks to preserve the world's cultural heritage and to provide open access to our shared knowledge in the digital era, supporting the work of historians, scholars, journalists, students, the blind and those with disabilities that impact reading, as well as the general public. The Internet Archive's digital collections include more than 45 petabytes of data: 330 billion web pages, moving images (2.8 million films and videos), audio (4.5 million recordings, including 180,000 live concerts), texts (20 million texts including 3.5 million digital books), software (200,000 items) and television (1.6 million news programs). Each day, more than one million visitors use or contribute to the Archive, making it one of the world's top 300 sites. The Internet Archive is creating new models for digital conservation by forging alliances with more than 600 libraries, universities and national archives around the world. The Internet Archive champions the public benefit of online access to our cultural heritage and the import of adopting open standards for its preservation, discovery and presentation. archive.org

The William and Flora Hewlett Foundation is a nonpartisan, private charitable foundation that advances ideas and supports institutions to promote a better world. For more than 50 years, the foundation has supported efforts to advance education for all, preserve the environment, improve lives and livelihoods in developing countries, promote the health and economic well-being of women, support vibrant performing arts, strengthen Bay Area communities, and make the philanthropy sector more effective. The foundation's Performing Arts Program makes grants to sustain artistic expression and encourage public engagement in the arts in the San Francisco Bay Area, to give California students equal access to an education rich in the arts, and to provide necessary resources to help organizations and artists be effective in their work.

Sozo Artists, Inc. (producer) is an international creative arts agency delivering fresh, accessible and unforgettable experiences to engage and enlighten audiences. Sozo empowers groundbreaking, risk-taking artists of the highest caliber and develops creative content relevant in today's dynamic, diverse world. By building artistic and cultural bridges through bold, perspective-changing works, Sozo aims to catalyze the possibility of a trusting and understanding society into a reality. Sozo offices are located in New York City, Oakland, CA and Los Angeles, CA. sozoartists.com