Tod Maachover
Digital Press Kit

Tod Machover
2023-2024 Full Length Biography

Called "America's most wired composer" by *The Los Angeles Times* and a "musical visionary" by *The New York Times*, Tod Machover is recognized as one of the most innovative composers active today and a pioneer in the use of AI in music. He is praised for creating music that breaks traditional artistic and cultural boundaries and for developing technologies that expand music's potential for everyone, from celebrated virtuosi to musicians of all abilities. Machover studied with Elliott Carter and Roger Sessions at The Juilliard School and was the first Director of Musical Research at Pierre Boulez's IRCAM in Paris. He is Academic Head of the MIT Media Lab, where he is also Muriel R. Cooper Professor of Music and Media and Director of the Opera of the Future Group. Machover is also Visiting Professor of Composition at the Royal Academy of Music in London.

Tod Machover's compositions have been commissioned and performed by many of the world's most prestigious ensembles and soloists, including the Philadelphia Orchestra, Toronto Symphony Orchestra, Ensemble InterContemporain, Lucerne Festival, Edinburgh International Festival, Ensemble Modern, BBC Scottish Symphony, Detroit Symphony Orchestra, San Francisco Symphony, Los Angeles Philharmonic, Boston Pops, Houston Grand Opera, Bunkamura (Tokyo), Lincoln Center for the Performing Arts, Centre Georges Pompidou, Carnegie Hall, Royal Academy of Music, Ars Electronica, Casa da Musica (Porto), American Composers Orchestra, Tokyo String Quartet, Kronos Quartet, Ying Quartet, Yo-Yo Ma, Joshua Bell, Matt Haimovitz, Renée Fleming, Joyce Di Donato, and many more. His work has been awarded numerous prizes and honors, by such organizations as the American Academy of Arts and Letters, the Fromm and Koussevitzky Foundations, the National Endowment for the Arts, the German Culture Ministry, and the French Culture Ministry, which named him a Chevalier de l'Ordre des Arts et des Lettres. He was the first recipient of the Arts Advocacy Award from the Kennedy Center's National Committee of the Performing Arts in 2013, and he was honored as *Musical America'*s 2016 Composer of the Year.

Machover is especially known for his visionary operas—as varied as they have been groundbreaking—including *VALIS* (1987), based on Philip K. Dick's sci-fi classic and commissioned by the Centre Pompidou in Paris. In September 2023, a new production of VALIS, premieres at MIT, starring bass-baritone Davóne Tines and directed by Jay Scheib (*Parsifal,* Bayreuth Festival 2023).

Machover's other operas are *Media/Medium* (1994), premiered by magicians Penn & Teller; *Brain Opera* (1996/8), based on the work of AI pioneer Marvin Minsky and which invites the audience to collaborate live and online; *Resurrection* (1999), commissioned by Houston Grand Opera and based on Tolstoy's final novel of the same name; and *Skellig* (2008), based on David Almond's award-winning novel and premiered at the Sage Gateshead. The "robotic" opera, *Death and the Powers,* premiered in 2010 and was released on SACD by BMOP/sound in 2021*; Gramophone* called the recording "an electrifying surround-sound thriller" and *American Record Guide* commended Machover and BMOP for "hit[ting] it out of the park." Machover's most recent full-length opera, *Schoenberg in Hollywood*, commissioned and presented by Boston Lyric Opera, had its hugely successful world premiere in Boston in November 2018 and its European premiere at the Vienna Volksoper in April 2022. A new production of the opera is being presented in 2023 by the School of Music of the University of Hong Kong (Shenzen), China as a centerpiece of the festival honoring Schoenberg's 150th birthday.

He is currently working on his next opera, *The Overstory,* based on Richard Powers' Pulitzer-prize-winning novel of the same name. A prelude to that opera, *Overstory Overture*, premiered in March 2023 at Lincoln Center's Alice Tully Hall, starring mezzo-soprano Joyce DiDonato, and performed by the Sejong Soloists, who commissioned the work.

In a wholly original and flourishing series of collaborative "City Symphonies," Machover invites people of all ages and backgrounds to work with him – using specially designed online tools, smartphone apps, and public workshops and forums – to create a musical portrait of their city, by combining "normal" musical resources with sounds discovered and collected in that place. He has written works in this series for and with the cities of Toronto, Edinburgh, Perth (Australia), Lucerne (Switzerland), Detroit, and Philadelphia. Upcoming City Symphonies are being planned for Chennai and New Delhi (India), Bilbao (Spain), Venice (Italy), South and North Korea, and various U.S. destinations. He is working on a new City Symphony, which is scheduled to premiere in Dubai in 2024, in addition to a Global Symphony – *Wellbeing of the World* – which will premiere at various worldwide sites in 2025.

Machover is also widely recognized for designing new technologies for music performance and creation, such as Hyperinstruments, "smart" performance systems that extend expression for virtuosi, from Yo-Yo Ma to Prince, as well as for the general public; the popular video game Guitar Hero grew out of Machover's group at the Media Lab. His Hyperscore software—which allows anyone to compose original music using lines and colors—has enabled children around the world to have their music performed by major orchestras, chamber music ensembles, and rock bands. Machover is also deeply involved in developing musical

technologies and concepts for medical and wellbeing contexts, helping to diagnose and reverse conditions such as Alzheimer's disease, or allowing people with cerebral palsy to communicate through music. His recent *Gammified* for the Kronos Quartet and *VocaGammified* for Renée Fleming are examples of powerful healing sonorities embedded in musical compositions.

In October 2022, MIT presented a program featuring three new works by Machover that explore the ways that music affects human bodies and minds. Machover's essay, "Composing the Future of Health," appears in *Music and Mind,* a collection of essays edited by Renée Fleming, about harnessing the arts for health and wellness (Penguin Random House, April 2024).

Tod Machover's music is published by Boosey & Hawkes and Ricordi Editions, and has been recorded on the Bridge, Oxingale, Erato, Albany, New World, Pentatone and BMOP/sound labels. Much of his music is also available via Apple Music, Amazon Music, and on YouTube, SoundCloud and Spotify.

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KIRSHBAUM ASSOCIATES INC.

TOD MACHOVER
Critical Acclaim

"a musical visionary"
   – **The New York Times**

"America's most wired composer"
   – **Los Angeles Times**

"Death and the Powers doesn't point the way to a new era of opera. It's there. Now."
   – **Philadelphia Inquirer**

"innovative, grandly imagined science-fiction opera"
   – **Opera News**, on the recording of Machover's "Death and the Powers"

"Perhaps the most remarkable thing about [the opera], however, is how seamlessly the technology and the music worked together, so that all that hardware and software was about the people and the story, not about itself."
   – **Wall Street Journal**, on "Death and the Powers"

"The 'future' part is embodied both in the orchestral writing, which skillfully combines acoustic and electronic music to create a remarkable range of colors and levels, and in the staging: not just the rather charming robots that grow, shrink and whiz around the stage, but the way that technology creates the playing environment, even allowing the main character's performance to influence and animate the set."
   – **Wall Street Journal**, on "Death and the Powers"

"Machover's score is hardly mere pastiche. Whether energetice or lyrical or even in the realm of parody…Machover's music always sounds like his own. Personal conviction, a rarity in so much contemporary opera, seems always at the center of this rangy, emotionally engaging score—never more so than at the very end when the music becomes a kaleidoscopic mach-up of lots of Schoenberg all at once."
   – **Musical America**, on "Schoenberg in Hollywood"

"The score that Machover created, however, crackles, quite literally, with electricity. It incorporates many prerecorded musics. Bach's "Musical Offering" runs through it in gorgeous, ghostlike shards. There are allusions to Bob Dylan and to dance music. In a central section, the voice of the stunning mezzo-soprano Lorraine Hunt is heard in wild flights of computerized fancy. The work's true theatricality is in the performances, where the three performers--drawn from the pool of assistants--wave their hands around sensors effecting the prerecorded music, causing it to surge in various ways, shaping dynamics, bringing out different layers."
   – **Los Angeles Times**, on "Brain Opera"

"The technological triumph of linking voice to stage, and the acoustical instruments of the excellent orchestra to the synthesized instruments is impressive… Mr. Machover and his students invented magical machines. Most happily, [Mr. Machover and Ms. Paulus] will introduce new generations of Mirandas to the Brave New Worlds of art and technological possibility."
>   — **International Herald Tribune**, on "Death and the Powers"

"Blending acoustic and electronic sounds, symphony orchestra and interactive computers, classical arias and ultra modern rhythms, Machover — supported by the choreographer Karole Armitage — makes images dance and sing; the music is emotional and brilliant…. "
>   — **Le Monde**, on "Death and the Powers"

"'Schoenberg in Hollywood' works splendidly as theater, and as an opera whose score allows its clever libretto to work its magic, seems likely to follow Machover's previous successes."
>   – **Classical Voice North America**

"Ultimately, all of his work is brain opera, a vast network of musical neurons enthusiastically making connections between musical traditions, past and present, not normally joined."
>   – **Musical America**, on "Brain Opera"

"Boston Modern Opera Project, under the masterful leadership of Gil Rose, gives an extraordinary rendering of Machover's scintillating, shape-shifting electro-acoustic score."
>   – **Opera News**, on the recording of Machover's "Death and the Powers"

"Machover is a remarkable composer. [His] technological inventions in giving to sounds, through electronics, new sonorities, new eloquence, have been widely and amply acclaimed. But I'd like to stress what a good opera composer he is, bringing the 'traditional', necessary skills to a far from traditional work. Machover has a command of expressive vocal gesture. He sets words sensitively, with a feeling for the natural weight, stress and length of syllables rare today. Voices and instrumental/electronic sound are well balanced. The final duet is a moving modern addition to the great line of father-daughter exchanges: Boccanegra-Amelia, Rigoletto-Gilda, even Wotan- Brünnhilde. This was a grand, rich, deeply serious new opera, presented by a team with manifold coherent accomplishments."
>   — **Opera Magazine** (UK), on "Death and the Powers"

"Tod Machover's Death and the Powers could help the principality [of Monaco] regain its reputation for artistic innovation. Although a figure of post-Boulez musical abstraction, composer Machover's music never alienates the ear. His consonant vocal lines are shown to best advantage in Miranda's heart-rending lament. I have only praise for the production of Diane Paulus."
>   — **Musical America** on "Death and the Powers"

"Machover, Paulus and their team from the MIT Media Lab used all the technical resources at their disposal to produce an evening of captivating electronic invention. Alex McDowell's design incorporates a group of agile robots ("operabots"), as well as mobile panels and a musical chandelier that represent through sensitive software the essence of the Powers personality. Any worry that the opera might be taking itself too seriously is answered by Pinsky's witty and at times lighthearted libretto. The singers and director Paulus found convincing humanity in this world of gadgetry, and they fully deserved the enthusiastic welcome of the public at the first night."

— **Opera News**, on "Death and the Powers"

"You may not have heard of Tod Machover, but he has probably changed your life, and will probably do it again. You can't say that of many experimental classical composers, but then not many of them have just premiered an opera whose lavish set is actually a complicated and unique musical instrument that can be stroked, tickled and muffled into expressing the musicality of an offstage singer in wholly novel ways…Death and the Powers is a perfect emblem for Machover's overall project. The side effects are hard to predict, but you might well see them at every rock gig or festival you go to five years from now, or every time you turn on your smartphone."

— **Sunday Times** (London), on "Death and the Powers"

"The fluidity between the music coming from the orchestra and the electronic soundscape was striking, a marvel, which comes as no surprise as sound designer Ben Bloomberg, an MIT Media Lab PhD candidate, has worked with Machover since 2007, and has been masterfully imagining and creating sonic worlds with him ever since, including work on Machover's six City symphonies as well as his robot opera, Death and Powers. Subtle amplification of voices and tasteful electronic sounds revealed a fluency of ideas that in lesser hands would hardly have made a successful marriage of multiple mediums and traditions. Machover quotes Schoenberg without being too literal, quotes Hollywood without being cheesy, and employs synths and electronica in excellent taste through a portal that welcomes all these styles and genres while maintaining an identity of its own. The score breathes and grows with the narrative and acts almost as a character in its own right. Schoenberg would smile, considering his own artistic struggles."

The Boston Musical Intelligencer, on "Schoenberg in Hollywood"

The Boston Globe

August 31, 2023

An AI opera from 1987 reboots for a new generation

At MIT, Tod Machover's 'VALIS' receives its first staged production in over two decades

By A.Z. Madonna

Composer Tod Machover in the MIT Media Lab. AI-assisted electronic musical instruments created in the Media Lab will be featured in a new production of his science-fiction opera "VALIS."

Near the end of Tod Machover's 1987 opera "VALIS," a "wild-looking" composer named Mini performs an unusual solo piece on an artificially intelligent instrument. "Mini appears to be sculpting sounds, setting off musical structures with the flick of his hand — he seems to be playing the orchestra of the future," reads the libretto, which is based on Philip K. Dick's 1981 novel of the same name.

During the opera's initial performances starting in 1987, Mini was portrayed by Machover himself, who also devised the concept of "hyperinstruments" for the opera: electronic instruments that can tell what and how someone is playing, and embellish it. "It adds things to the performance, as layers," said Machover in his office at the Massachusetts Institute of Technology Media Lab. For example, "it could be that I'm playing a monophonic line and it gets orchestrated."

So what kind of hyperinstrument did he use to set off music "with the flick of his hand" when "VALIS" premiered at IRCAM, the computer music

MIT graduate and production assistant Nina Masuelli holds an instrument she helped create that's covered in sensors, which transmits her input to an AI program to be converted into sound. This and other AI-assisted instruments will appear in a new production of Tod Machover's science-fiction opera "VALIS.

laboratory in Paris where Machover served as director of musical research in the 1980s? The technology didn't exist then, so the "orchestra of the future" was prerecorded. "The Mini solo instrument was basically faked," he said with a grin.

But in next weekend's live production of "VALIS" at MIT directed by Jay Scheib — the first new production of the opera in over 20 years — artificial intelligence is no longer the stuff of science fiction, and neither is Mini's instrument.

Machover, whose shock of gray hair lends him the appearance of the archetypal mad scientist, had been planning on reprising the role of Mini. He'd been working with the students in his group at the media lab — Opera of the Future — to develop the concepts for the production, and they'd agreed that operating a hyperinstrument by waving one's arms in the air was a bit cliché, he said.

Then, when recent MIT graduate Nina Masuelli came in with a prototype device she'd designed, Machover realized she had "an incredible sense" of the effect he'd been trying to create, and offered her the role of Mini. The "orchestra of the future," it turns out, now looks like a large clear plastic jar filled with Christmas lights.

But this is no wedding tabletop decoration: The lights are actually part

of a system of sensors connected to an artificial intelligence program designed by Manaswi Mishra, a PhD student in Media Arts and Sciences and member of Machover's group. The program pulls from a library of pre-selected sounds while Masuelli manipulates the jar, and Mishra tweaks the sonic output from his laptop.

The story of "VALIS" follows troubled protagonist Horselover Fat (an alter ego of Dick's) after he experiences a quasi-religious vision during which his head is overloaded with information through a beam of pink light. At last, he meets an angelic artificial intelligence named Sophia, who comforts him with a message of love.

Boston-based, France-born soprano Anne Azéma performing as Sophia in the 1987 world premiere production of Tod Machover's "VALIS" in Paris.

For bass-baritone Davóne Tines, who portrays both Dick the author and his literary alter ego in next weekend's production, a universal human experience lies at the core of the story. "A person who has received important information contends with how that information changes their life," he said, noting that the opera holds "a really amazing opportunity to share truth," which can be "something revelatory" for both the performer and the audience.

France-born, Boston-based soprano Anne Azéma, who created the role of Sophia in the original production, is looking forward to revisiting "VALIS,"
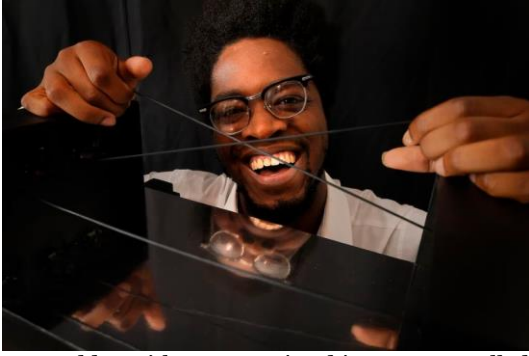
Max Addae with an AI-assisted instrument called "VocalCords.

this time as an audience member. "You recognize Tod's writing 15 miles away," said Azéma, an early music specialist who now artistic directs the Boston Camerata. When she was working on the opera, the effects of the hyperinstruments were such that she was "bathed in beauty, and carried with sound," she said.

For most people, artificial intelligence was an unknown realm when Machover was writing "VALIS," but now it's in the headlines daily. "In all my career, I've never seen anything change as fast as AI is changing right now, period," said Machover. "So to figure out how to steer it towards something productive and useful is a really important question right now."

AI image generators like DALL-E are already "creepily good" at "copying things" that already exist, said Machover, but he finds them off-putting. "It's easy to combine images and words in new ways, but not as easy to create

new meaning through doing that," he wrote in a followup email. "Why a cat needs to be cooking in the mountains, or why a Mozart symphony needs an EDM backbeat, has to be carefully chosen and orchestrated, not just thrown together."

Mishra sees most commercially available compositional AI tools as "black boxes," where humans can't interpret or easily influence the inner workings of the system after they input a prompt. "Though it's sometimes impressive, this doesn't feel like a musical instrument," he wrote in a followup email. The Media Lab's work, by contrast, focuses on AI systems "that will allow an individual musician to uniquely compose, perform, and manipulate" sound according to their intention.

Thus, the new generation of hyperinstruments: the Mini jar and "VocalCords," an interface designed by master's student Max Addae that alters the human voice by pulling on three stretchy strings attached to a device. These technologies dance on the boundary between artificial and human intelligence.

And like any instrument, the hyperinstruments still require a firm human hand, because if you don't fine-tune the AI, it might spit out something cacophonous. "Like — " and Machover screeched like the Green Line pulling into Boylston station. "That's not necessarily what I want!"

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September 14, 2023

Reimagining the Opera of the Future
By Anya Ventura

Davóne Tines (Horselover Fat/Philip K. Dick) and Kristin Young (Sophia) in VALIS.

The iconic sci-fi opera VALIS reboots for a new generation

In the mid-eighties, composer Tod Machover came across a copy of Philip K. Dick's science fiction novel *VALIS* in a Parisian bookstore. Based on a mystical vision Dick called his "pink light experience," *VALIS* was an acronym for "vast active living intelligence system." The metaphysical novel would become the basis for Machover's opera of the same name, which first premiered at the Pompidou Center in 1987, and was recently restaged at MIT for a new generation.

At the time, Machover was in his twenties and the Director of Musical Research at the renowned French Institute IRCAM, a hotbed of the avant-garde known for its pioneering research in music technology. The Pompidou, Machover says, had given him carte blanche to create a new piece for its tenth anniversary. So, throughout the summer and fall, the composer had gone about constructing an elaborate theater inside the center's cavernous entrance hall, installing speakers and hundreds of video monitors.

Kristin Young (Sophia), Timur Bekbosunov (Eric Lampton), Davóne Tines (Horselover Fat), and Maggie Finnegan (Linda Lampton) in VALIS. Credit: Maria Baranova.

Creating the first computer opera

Machover, who is now Muriel R. Cooper Professor of Music and Media and director of the MIT Media Lab's Opera of the Future research group, had originally wanted to use IRCAM founder Pierre Boulez's Ensemble Intercontemporain, but was turned down when he asked to rehearse with them for a full two months. "Like a rock band," he says. "I went back and thought, 'Well, what's the smallest number of players that can make and generate the richness and layered complexity of music that I was thinking about?'" he said.

He decided his orchestra would consist of only two musicians: a keyboardist and a percussionist. With tools like personal computers, MIDI and the DX7 newly available, the possibilities of digital sound and intelligent interaction were beginning to expand. Soon, Machover took a position as a founding faculty member of MIT's Media Lab, shuttling back and forth between Cambridge and Paris. "That's when we invented hyperinstruments," says Machover. The hyperinstruments, developed at the Media Lab in collaboration with Machover's very first graduate student RA Joe Chung, allowed the musician to control a much fuller range of sound. At the time, he says, "no serious composers were using real-time computer instruments for concert music."

Word spread at IRCAM that Machover's opera was, to say the least, unusual. Over the course of December 1987, *VALIS* opened to packed houses in Paris, eliciting both cheers and groans of horror. "It was really controversial," Machover says, "It really stirred people up. It was like, 'Wow, we've never heard anything like this. It has melody and harmonies and driving rhythms in a way that new music isn't supposed to.'" *VALIS* existed somewhere between an orchestra and a rock band, the purely acoustic dissolving into the electric as the opera progressed. In today's era of the remix, audiences might be accustomed to a mélange of musical styles, but then this hybrid approach was new. Machover—who trained as a cellist in addition to playing bass in rock bands—has always borrowed freely from high and low, classical and rock, human and synthetic, acoustic and hi-tech, combining parts to create new wholes.

The story of Dick's philosophical novel is itself a study of fragments, of the divided self, as the main character Phil confronts his fictional double, Horselover Fat, while entering

on a hallucinatory spiritual quest after the suicide of a friend. At the time of Dick's writing, the term AI had yet to achieve widespread use. And yet, in *VALIS*, he combines ideas about AI and mysticism to explore questions of existence. In Dick's vision, *VALIS* was the grand unifying theory that connected a vast array of seemingly disparate ideas. "For him, that's what God was: this complex technological system," Machover says, "His big question was: is it possible for technology to be the answer? Is it possible for anything to be the answer or am I just lost? He was looking for what could possibly reconnect him to the world and reconnect the parts of his personality, and envisioned a technology to do that."

Kristin Young (Sophia) in VALIS. Credit: Maria Baranova.

A performance for the contemporary era

A full production of *VALIS* hasn't been mounted in over thirty years, but it's a fitting moment to restage the opera as Dick's original vision of the living artificial intelligence system – as well as hopes for its promise and fears for its pitfalls – seems increasingly prophetic. The new performance was developed at MIT over the course of the last few years with funding from the MIT Center for Art, Science & Technology, among other sources. Performed at MIT Theater Building W97, the production stars baritone Davóne Tines and mezzo-soprano Anaïs Reno. Joining them also were vocalists Timur Bekbosunov, David Cushing, Maggie Finnegan, Rose Hegele, and Kristin Young, as well as pianist/keyboardist Julia Carey and multi-percussionist Maria Finkelmeier. New AI-enhanced technologies, created and performed by Max Addae, Emil Droga, Nina Masuelli, Manaswi Mishra, and Ana Schon, were developed in the MIT Media Lab's Opera of the Future group, which Machover directs.

At MIT, Machover collaborated with theater director Jay Scheib, Class of 1949 Professor of Music and Theater Arts, whose augmented reality theater productions have long probed the confused border between the simulacra and the real. "We took camera feeds of live action, process the signal and then project it back, like a strange film, on a variety of surfaces, both TV- and screen-like but also diaphonous and translucent," says Scheib, "It's lots and lots of images accumulating at a really high speed, and a mix of choreography and styles of film acting, operatic acting." Against an innovative set designed by Oana Botez, lighting by Yuki Link, and media by Peter A. Torpey PhD '13, actors played multiple characters as time splinters and refracts. "Reality is constantly shifting," says Scheib.

As the opera sped toward the hallucinatory finale, becoming progressively disorienting, a computer music composer named Mini appeared, originally played by Machover, conjuring the angelic hologram Sophia who delivers Phil/Fat to a state of wholeness. In the opera's libretto, Mini is described as "sculpting sound" instead of simply playing the keyboard, "setting off musical structures with the flick of his hand—he seemed to be playing the orchestra of the future." Machover composed Mini's section beforehand in the original production, but the contemporary performance used a custom-built AI model, fed with Machover's own compositions, to create new music in real time. "It's not an instrument exactly. It's a living system that gets explored during the performance," says Machover, "It's like a system that Mini might actually have built."

As they were developing the project this past spring, the Opera of the Future group wrestled with the question: How would Mini "perform" the system? "Because this is live, this is real, we wanted it to feel fresh and new, and not just be someone waving hands in the air," says Machover. One day, Nina Masuelli '23, who had recently completed her undergraduate degree at MIT, brought a large clear plastic jar into the lab. The group experimented with applying sensors to the jar, and then connected it to the AI system. As Mini manipulates the jar, the machine's music responds in turn. "It's incredibly magical," says Machover. "It's this new kind of object that allows a living system to be explored and to form right in front of you. It's different every time, and every time it makes me smile with delight as something unexpected is revealed."

Davóne Tines (Horselover Fat/Philip K. Dick) in VALIS. Credit: Maria Baranova.

As the performance neared, and Machover watched Masuelli continue to sculpt sound with the hollow jug, a string of Christmas lights coiled inside, something occurred to him: "Why don't you be Mini?"

In some ways, in the age of ChatGPT and DALL-E, Mini's exchange with the AI system is symbolic of humanity's larger dance with machine intelligence, as we experiment with ways to exist and create alongside it: an ongoing venture that will eventually be for the next generation to explore. Writing thousands of sprawling pages in what he called his "exegesis," Philip K. Dick spent the rest of his life after his "pink light experience" trying to make sense of a universe "transformed by information." Though the many questions raised by *VALIS*—is technology the answer?—might never be fully explained, says Machover, "you can feel them through music."

Audiences apparently felt the same way. As <u>one reviewer wrote</u>, "*VALIS* is an operatic tour-de-force." The three shows last weekend were filled to capacity, with long waiting lists, and response was wildly enthusiastic. "It has been deeply gratifying to see that VALIS has captured the imagination of a new group of creative collaborators and astonishing performers, of brilliant student inventors and artists, and of the public, wonderfully diverse in age and background," says Machover, "This is partially due to the visionary nature of Philip K. Dick's novel (much of which is even more relevant today than when the book and opera first appeared). I hope it also reflects something of the musical vitality and richness of the score, which feels as fresh to me as when I composed it over 35 years ago. I am truly delighted that *VALIS* is back, and hope very much that it is here to stay!"

Tod Machover

AI: What Does It Mean? And How Is It Making These Decisions?

Tod Machover, a pioneer of the connections between classical music and computers, considers the history, promise, and dangers of artificial intelligence.

By Rebecca Schmid

Sitting at his home in Waltham, Massachusetts, the composer Tod Machover speaks with the energy of someone half his 69 years as he reflects on the evolution of digital technology toward the current boom in artificial intelligence. "I think the other time when things moved really quickly was 1984," he says—the year when the personal computer came out. Yet he sees this moment as distinct. "What's going on in A.I. is like a major, major difference, conceptually, in how we think about music and who can make it." Perhaps no other figure is better poised than Machover to analyze A.I.'s practical and ethical challenges. The son of a pianist and computer graphics pioneer, he has been probing the interface of classical music and computer programming since the 1970s. As the first Director of Musical Research at the then freshly opened Institut de Recherche et Coordination Acoustique/Musique (I.R.C.A.M.) in Paris, he was charged with exploring the possibilities of what became the first digital synthesizer while working closely alongside Pierre Boulez. In 1987, Machover introduced Hyperinstruments for the first time in his chamber opera *VALIS*, a commission from the Pompidou Center in Paris. This technology incorporates innovative sensors and A.I. software to analyze the expression of performers, allowing changes in articulation and phrasing to turn, in the case of *VALIS*, keyboard and percussion soloists into multiple layers of carefully controlled sound. Machover had helped to launch the M.I.T. Media Lab two years earlier in 1985, and now serves as both Muriel R. Cooper

Professor of Music and Media and director of the Lab's Opera of the Future group.

As such, A.I. is another tool in his palette. Yet Machover emphasizes the need to blend the capabilities of the technology with the human hand. For his new stage work, *The Overstory Overture*, the first movement of which premiered last March at Lincoln Center, he used A.I. as a multiplier of handmade recordings to recreate the sounds of forest trees "in underground communication with one another." Machover's ongoing series of "City Symphonies," for which he involves the citizens of a given location as he creates a sonic portrait of their hometown, also

Baritone James Maddalena prepares to download himself into "The System" in Machover's Death and the Powers.

uses A.I. to organize sound samples. Another recent piece, *Resolve Remote*, for violin and electronics, deployed specially designed algorithms to create variations on acoustic violin. Based on the research of one his Ph.D. students, Manaswi Mishra, Machover is also experimenting with decomposing and re-composing music using a technology he calls A.I. Radio.

Machover has long pursued his interest in using technology to involve amateurs in musical processes. His 2002 *Toy Symphony* allows children to shape a composition, among other things, by means of "beat bugs" that generate rhythms. This work, in turn, spawned the Fisher-Price toy Symphony Painter and has been customized to help the disabled imagine their own compositions.

We spoke via Zoom about the arc of his innovations, and what recent developments imply about the act of making music.

How is the use of A.I. a natural development from what you began back in the 1970s, and what is different?

In terms of big history, I think the other time when things moved really quickly was 1984—literally, the year when the first affordable personal computer came out. Everybody could have a pretty powerful machine at home. John Chowning at Stanford had developed something called frequency modulation (F.M.), which turned out to be an incredibly efficient way of creating sound and a very intuitive way for musicians to understand how to manipulate it. Yamaha licensed the patent and made this instrument called the DX7, in May 1983.

The third thing that happened around that same time was that, like a miracle, all of the computer companies and music instrument companies decided to create a standard for all of these computers and digital instruments to talk together. And that was called M.I.D.I., or Musical Instrument Digital Interface. So, everybody could have a powerful music generation instrument, and everybody could have a way of controlling these instruments by computer.

How is the use of A.I. a natural development from what you began back in the 1970s, and what is different?

There are lots of things that could only be done with physical instruments 30 years ago that are now done in software: you can create amazing things on a laptop. But what's going on in A.I. is like a major, major difference, conceptually, in how we think about music and who can make it.

One of my mentors and heroes is Marvin Minsky, who was one of the founders of A.I., and a kind of music prodigy. And his dream for A.I. was to really figure out how the mind works. He wrote a famous book called *The Society of Mind* in the mid-eighties based on an incredibly radical, really beautiful theory: that your mind is a group of committees that get together to solve simple problems, with a very precise description of how that works. He wanted a full explanation of how we feel, how we think, how we create— and to build computers modeled on that.

Little by little, A.I. moved away from that dream, and instead of actually modeling what people do, started looking for techniques that create what

people do without following the processes at all. A lot of systems in the 1980 and 1990s were based on pretty simple rules for a particular kind of problem, like medical diagnosis. You could do a pretty good job of finding out some similarities in pathology in order to diagnose some- thing. But that system could never figure out how to walk across the street without getting hit by a car. It had no general knowledge of the world.

We spent a lot of time in the seventies, eighties, and nineties trying to figure out how we listen—what goes on in the brain when you hear music, how you can have a machine listen to an instrument—to know how to respond. A lot of the systems which are coming out now don't do that at all. They don't pretend to be brains. Some of the most kind of powerful systems right now, especially ones generating really crazy and interesting stuff, look at pictures of the sound—a spectrogram, a kind of image processing. I think it's going to reach a limit because it doesn't have any real knowledge of what's there. So, there's a question of, what does it mean and how is it making these decisions?

What systems have you used successfully in your work?

One is R.A.V.E., which comes from I.R.C.A.M. and was originally developed to analyze audio, especially live audio, so that you can reconstruct and manipulate it. The voice is a really good example. Ever since the 1950s, people have been doing live processing of singing. The problem is that it's really hard to analyze everything that's in the voice: The pitch and spectrum are changing all the time. What you really want to do is be able to understand what's in the voice, pull it apart and then have all the separate elements so that you can tune and tweak things differently on the other side. And that's what R.A.V.E. was invented to do. It's an A.I. analysis of an acoustic signal. It reconstructs it in some form, and then ideally it comes out the other side sounding exactly like it did originally,

but now it's got all these handles so that I can change the pitch without changing the timbre. And it works pretty well for that. You can have it as an accompanist, or your own voice can accompany you. It can change pitch and sing along. And it can sing things that you never sang because it understands your voice.

I'm now updating the *Brain Opera* using R.A.V.E. We did a version in October with live performers. For that particular project, I wanted a kind of world of sounds that started out being voice-like, and ended up being instrumental-like, and everywhere in between. The great thing about A.I. models now is that you can use them not just to make a variation in the sound, but also a variation in what's being played. So, if you think about early electronic music serving to kind of color a sound—or add a kind of texture around the sound, but being fairly static—with this, if you tweak it properly, it's a kind of complex variation closely connected to what comes in but not exactly the same. And it changes all the time, because every second the A.I. is trying to figure out:

How am I going to match this? How far am I going to go? Where in the space am I? You can think of it as a really rich way of transforming something or creating a kind of dialogue with the performer.

And you're manipulating material yourself rather than just feeding the algorithm and seeing what comes out the other end, right?

Yes. We use some existing models but also build our own sometimes. We're working hard right now to build models where you can customize every aspect, and where customizing is easy enough that you don't have to be an M.I.T. graduate student. Most models now are kind of like black boxes. What comes out is a big surprise. That's amazing, but it's hard to personalize them to the degree you'd want to, although we do a pretty good job with R.A.V.E.

Soprano Joélle Harvey in Machover's "Powers."

The next models are called diffusion models. I find they work best if you're building up a library of sounds. For instance, for this first version of Overstory that we did in New York in March, where I was trying to build the sound of a forest with all its variety, I could have done it by hand. I made a lot of recordings out in the woods. I also made a lot of sounds from scratch in my studio. We live on an 18th-century farm here, and so we have an old barn that is filled with wood. I spent a day scraping and had lots of recordings. I fed all of those into a model, and from that we made spectrograms. And then with the spectrograms, you could go in and say, make the frequency higher, or more percussive or denser. You can give it words, or actual frequency information. And then it transformed these sounds. You could make many variations, which were really interesting but still in the family, and many of them would have taken a lot of time to do by hand with studio techniques. I wanted a language like trees that communicate under-ground, and it worked really well for that.

For commencement at M.I.T., I created a segment for my City Symphony for Boston. We have this incredible mayor [Michelle Wu]. She's really shaking everything up; she played Mozart's 21st Piano Concerto with the Boston Symphony Orchestra under Andris Nelsons. I ran the Mozart and the sounds of Boston through this diffusion model. And in this three-and-a-half minutes, there were these incredibly interesting hybrids. I'm pretty imaginative, but I wouldn't necessarily have thought of these particular cross-pollinations of Fenway Park and a piano solo, or the sound of traffic and the orchestra.

The other thing I'm really interested in—and I think that this technology will allow us to do it—is to create a piece of music where I would take all of the material from a composition and break it apart: Here's the baseline. Here's a chord. Here's a texture. And say, here's a toolkit with a thousand elements; you can take them apart and put them together the way you want, like LEGO bricks. What's even more interesting is to put them in a form where this A.I. system, let's call it A.I. radio, can actually enable switching channels: With just a few dials, you might be able to change the way the piece develops. Every time, the A.I. system makes it play out a bit differently.

One term we use in computer programming is a "branch." So, you can imagine a piece of music where the A.I. system says, now it's going to grow in this direction or that direction. The possibility of having this core of material that develops differently each time is very real. Maybe the tempo is different, or the intensity, or the sound of the orchestration. The added dimension is that it's quite possible to add a few dials to this A.I. radio, so that if you're listening, you could be the one who says, "I'm kind of anxious today. I'd really like to hear a version which is as chill as you can make it." Or "I want to hear a version that is as intense and as wild as possible." You can imagine a bunch of variables that would be interesting and intuitive, but all related to that piece, not just random.

Does all of this raise copyright issues?

There are enormous problems with sucking in other people's music. And the crazy thing about these A.I. models, of

course, is that it's almost impossible now to track what's in them. It's much more complicated than sampling because most of the legal cases ask: "Can you tell what the sample was? Can you audibly hear it? Is it fair use, or is it ripping off someone's idea?" In these A.I. models, there are thousands and thousands of bits of audio. Once they turn into a model, and then start playing things back, either live or with these various prompts, right now it's impossible for an outsider to go back and trace what's in there. So, if they've taken my entire oeuvre, let's say, and put it into someone else's model, and it's generating something that sounds kind of like my music, that's really dangerous. It's likely that fairly soon there will be ways of tracing what goes into a model. Maybe you will have to tag material when you create it. In fact, it's already happening. For our admissions applications to the media lab this year, we were not sure if some were written by a machine. I'm assuming that by next year a place like M.I.T. will have to have some way of tracing whether a human being wrote something. It's a really odd moment.

How could A.I. help support your endeavor to facilitate amateur creativity?

One thing I've spent my career doing is trying to reduce some of the barriers for somebody who didn't take years of lessons or isn't naturally gifted to be part of a musical experience. You can do that by making Guitar Hero, or you can do that with Hyperscore, where you can draw music. We're very careful to try to ensure that the activity you're doing is meaningful— that you're not being led to think that you're doing something you're not really: You're getting closer to the music and, hopefully, with something like Hyperscore, where you're drawing your own composition, it really allows you to express something you care about.

The problem with these systems is that they are already full of music, and there is no barrier for pushing a button and saying, "Oh, make me something." And so the question is, what is a person doing? You could do an enormous amount without really putting much of yourself into it. And is that what we want?

I've invested a lot of time in trying to make it possible for people to interact meaningfully and creatively with music. Now our machines are producing all this amazing stuff, and they don't have any music training. The machines don't really have any knowledge about how it works—what harmony is, or what rhythm is. And maybe that's not a good thing. We need to put context and knowledge back into these systems before they become so prevalent and so closed off that you can't shape them anymore. So, we're trying to work really fast.

The more serious issue is that machines don't care about anything: The only reason music matters is because it's a way of a human being reaching out to somebody else and saying, this is something that I've observed or felt, or something that I'm thinking. It has meaning because it's related to my life, or to yours. A machine has no investment like that, and it never will. And if we can't build these systems so that I can shape them—or anybody can shape them with something they care about— then it's dangerous. But I think that something really powerful is happening.

The New York Times

March 6, 2023

Translating the Music of Trees Into the Sounds of Opera

The tech-forward composer Tod Machover has made a chamber opera of Richard Powers's novel "The Overstory," featuring Joyce DiDonato.

By Thomas May

The composer Tod Machover and ths soprano Joyce DiDonato. Machover's chamber opera, "Overstory Overture," stars DiDonato and is an adaptation of Richard Powers's novel.

Musical themes abound in the work of the novelist Richard Powers, often intertwined with science and social issues. The parallel decoding of Bach and DNA ("The Goldbug Variations"), the saga of an interracial family of classical performers unfolding against the events of the Civil Rights era ("The Time of Our Singing"): A signature of Powers's novels is the virtuosity with which he weaves these strands into

Machover's score.

narratives that seem both surprising and inevitable.

With his 12th novel, "The Overstory," which won the Pulitzer Prize for fiction in 2019, Powers draws on the findings of dendrology (the study of trees) and contemporary environmental anxieties to hint at a music that is always present but largely unrecognized — that of nature itself, as represented by the lives of trees.

Powers said in an interview that his "preoccupation with the more-than-human world, the living world beyond the human" had pushed his work in a new direction for "The Overstory," which he called "the most operatic of my novels." It is told on a large scale, with an extended cast of characters, wide geographical scope and a long time frame.

The composer Tod Machover sensed this operatic potential as soon as he read it and was especially drawn to its relevance. "The subjects Powers brings together here are so important," Machover said in a phone interview from the Massachusetts Institute of Technology's Media Lab, where he directs the Opera of the Future group.

"I've always wanted to write a theatrical work with many strands that come together in an unusual way."

Machover's first pass at the material, "Overstory Overture," a brief chamber opera featuring Joyce DiDonato, premieres on Tuesday at Alice Tully Hall at Lincoln Center. The work, which was conceived both as a prelude to a full-scale opera and as a stand-alone piece, was commissioned by the string orchestra Sejong Soloists — their largest contemporary commission to date — and will be performed under the young conductor Earl Lee.

Machover — a composer, inventor, educator and researcher into the interface between music and technology — has developed novel approaches to electronics and is a trailblazer in the applications of artificial intelligence to music. "Overstory Overture" blends electronic and instrumental sonorities with DiDonato's voice and acting to portray the book's protagonist, the dendrologist Patricia Westerford. Four closely woven scenes distill not only her trajectory but also the novel's larger themes of communication, environmental devastation and what Machover described as "the necessity of getting outside yourself and of recognizing connections we take for granted."

This isn't the first operatic adaptation of Powers's fiction. When the Belgian composer Kris Defoort's reworking of "The Time of Our Singing" had its premiere in Brussels in 2021, it made for "a lovely closing of the circle," Powers said, taking his music-centered narrative and "putting it back into musical form."

But the challenges posed by "The Overstory" are different. Powers said several composers had expressed a desire to adapt it to the opera stage but he chose Machover because of a longstanding admiration for his music and a thematic affinity. He noted that works like Machover's "Death and the Powers: The Robots' Opera" (2010) examine issues of technology and its

DiDonato.   Machover.

human ramifications that are very close to concerns in his earlier novels.

"It was interesting to me that both Tod and I, who had explored human-machine interdependence, have now shifted attention to the interdependence between humans and other living things," Powers said. A fan of DiDonato, he added that he was "completely delighted" when he learned that she would create the role of Patricia Westerford — "the heart and soul of the whole book who ties all the rest of it together."

Rather than become involved in creating the libretto, Powers said he preferred it to be done by "people who know how to target the viscera and the minds of people inside a concert hall in real time." Machover turned to the British writer, actor and director Simon Robson, with whom he had collaborated on his opera "Schoenberg in Hollywood" (2018).

For this first part of the project, Robson compressed Powers's delineation of Patricia throughout the sprawling novel into a sequence of scenes that evoke mythic archetypes as she comes to understand the hidden language of the forest. The soul and moral compass of the novel, she suffers with the trees the assault of "petrochemical props, chainsaw and machete" before finding peace in a new connection — which Machover sees as "what a different kind of synergy between a human being and the trees might feel like."

Powers's novel resonated strongly with DiDonato, she said, because of her multiyear, global touring project,

"EDEN," that addresses climate change and our place in nature. She also has a longstanding connection to Machover: Her first leading role came in his 1999 opera "Resurrection," based on a novella by Tolstoy. "That was the first time I was able to make my mark as a complete artist," she said in an interview.

Finding a vocal language for Patricia was collaborative, "totally a Tod Machover experience," she said. "We looked for what kind of sounds we could create from me and in conjunction with the electronics and the acoustic instruments as well."

The process was playful. "But it had a deep level as well," she added, "because both of us are passionate about this topic. Patricia is discovering these sounds that the human ear hasn't heard before."
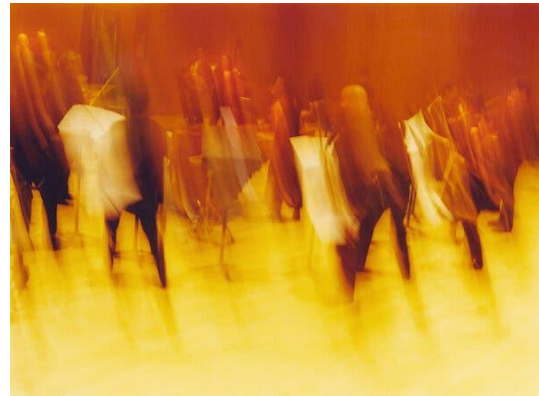
The orchestra — string players, a marimba and a bass drum — rehearsing. The ensemble becomes a metaphor for the forest.

The orchestral ensemble — 19 string players augmented by a five-octave marimba and a low bass drum — becomes a metaphor for the forest. The electronics play a multifaceted role: sonic fragments recombine to mimic chemical signaling, the process used by the trees to communicate and interact, even to warn of the harsh human threat. Patricia's decoding of this plant language is based on the work of the scientific pioneer Suzanne Simard, who also was an inspiration for James Cameron's "Avatar."

Yet for all the technological intervention, it's melody, the most natural of musical elements, that is accorded critical importance here. "I tried to make the melodic line very present — one big development from beginning to end," Machover said. Plans for a larger-scale "Overstory" opera are still being put in place, but "Overstory Overture" maps out a musical language that he expects to incorporate.

"There is a music in words," Powers said. "When I write, I try to use that music to support the semantic underpinnings of the story." When a composer like Tod Machover adapts this to a musical form, "he is also exploring that equivalent from the other side — to take the meaning of the words and put them back into a soundscape that will embody that meaning."

Tod Machover

MAR 1, 2023

'Overstory Overture' – Tod Machover's Upcoming Music Magic at Lincoln Center

By Lois Silverstein

Composer and Innovator Tod Machover breathes vitality and brightness out of his very being. Abundance and color spring from his first words. Alert and active, he spoke with me from his farm and studio in Massachusetts. He drove from his state-of-the-art Media Laboratory at M.I.T. in Cambridge, where he is the Director of the Opera of the Future group as well as a professor.

He is in the midst of rehearsal for the upcoming opening of "Overstory Overture," an opera filled with his innovative and characteristic technological explorations, based on Richard Powers's Pulitzer Prize-winning novel "The Overstory."

On March 7th, the first section of the opera opens in Lincoln Center at Alice Tully Hall, starring Joyce DiDonato and the Seong Soloists, an internationally known and highly applauded chamber orchestra that commissioned this work. We cannot help but anticipate a rich, mind-expanding, and emotionally satisfying experience. Machover exudes creative life.

Beginnings: From Cellist to Machine/Human Dialogues

Machover started his musical career as a cellist, playing chamber music and, in high school, rock. All the while he played Bach, for example, he kept hearing new melodies in his head. Since he also loved language and has always loved to read, words and phrases kept emerging as well.

As he began creating songs for solo piano, violin, soprano and choirs, baritone, and youth chorus, he began to delve into creating larger dimensions of sounds and words. Was opera in the wings? Sure enough. Machover widened his explorations, and his musical landscape began to express an innovative dialogue between human beings and machines.

"Ab ovo," opera appeared, and what an array. In all, he created new textures and palettes of sound. Human beings and machines. That was the key. When we meet Machover in his music, we discover a modern-day Balboa inventing a brand new landscape.

After initial training at Juilliard, between 1973-1978, Machover went on to train with modern composers Roger Sessions and Elliott Carter. He was then invited to be Composer-in-Residence to Pierre Boulez's new Institute de Recherche et Coordination Acoustique /Musique(IRCAM) in 1978 in Paris. What followed was Machover's explorations with digital synthesizers and his adventurous scoring of keyboard and percussion compositions.

As he worked, Machover began to develop technology to augment keyboard instruments and percussion and strings, and over time, he aimed toward developing musical instruments for non-professionals. Everyone could be a musician, he thought, and make music; why not? No doubt this was an early step toward his creation of "hyper instruments" – Hyperbow, Hypercello, and Hyperpiano, which he developed later.

A Schoenberg-esque Creative Process

He began to create stage works, including "Valis "(1987), an opera based on Philip K. Dick's notable science fiction novel, "VALIS" "Media/Medium" (1994) for magicians Penn and Teller; "Resurrection" (1999) based on Tolstoy's last novel; "Death and the Powers"(2010), an opera that included live electronic and robotics that was developed by M.I.T. Media Lab. He included film and live electronics in "Schoenberg in Hollywood" in 2018, commissioned by the Boston Lyric Opera.

Many prestigious soloists, such as Yo-Yo Ma, Joshua Bell, Joyce Di Donato, Renée Fleming, and the Kronos Quartet, have commissioned and performed his compositions, among various others.

He has also been awarded numerous prizes and honors from the American Academy of Arts and Letters, the French Cultural Ministry and the German Cultural Ministry, Musical, Musical America's 2016 Composer of the Year, and many others. The list is extensive.

Being an explorer, Machover said he likes to begin his composition experience by imagining it "in toto," that is before he makes any sound. "Before" is the operative word here; although he has no hard and fast prescription for his composition process, he likes to enter it in silence and "see" the work from beginning to end.

"Usually," he said, "melody arises first, but not always. Harmony and rhythm follow. New things begin to occur, then," and generally, he follows them. In other words, he interacts with what arises.

The whole process remains dynamic and interactive. He creates and then engages in the rising energetic flow. As it continues, which it usually does, it propels even more energy, and out of this, a new landscape emerges with its own distinctive and unmistakable identity.

"I am a bit like Schoenberg," Machover says. "Familiar motifs and patterns occur, but then I engage with them, and they shift and change, and almost invariably, become new doorways to their own geography."

He describes the experience as a subtle and nuanced process, intense and immersive, especially as he deepens his engagement with the literature he reads and explores.

As other musicians entered into the work, he said, of course, additional layers began to emerge.

"That I love too," Machover said. "The pieces grow as they become more distinct and more multi-colored." Clearly, the whole experience exhilarates him.

Nurtured in the Arts, Fascinated by Invention

Tod Machover was born to gifted parents, Wilma Machover, a notable pianist and music teacher "extraordinaire," and Carl Machover, a notable and innovative computer scientist. Each of his parents contributed not only their knowledge of their respective arts to their son, but

their own open attitudes toward innovation and creation.

Undoubtedly, their support and encouragement helped to further Machover's own inventiveness. His original "City Symphonies" illustrate this. What are "City Symphonies"? Portraits of notable cities in sound. They are created by people of all ages, with various backgrounds, to create a musical portrait of their city, i.e., Toronto, Detroit, Lucerne, and Edinburgh, among others.

He sets up public forums and workshops and offers people online tools such as smartphones, assorted apps, and more conventional musical resources to help design a soundscape of their city. Which they do. What a remarkable human and social invention.

In almost all his work, Machover fuses one language, poetry or prose, with another sound. In a way, he is like the innovative god, Hephaestus, forging new ideas as he merges the familiar and the new.

When I asked him how he sees the next years in his musical geography, he spoke of how he is drawn to exploring more natural things, what he calls "the soft side of experience."

Rather than staying riveted to the clear sharp edges of technological experience but not dismissing them at all, he aims to blend them with this other natural dimension. He spoke with thoughtful enthusiasm at the prospect.

I asked him if his mother, classically trained Wilma Machover, who passed away two years ago, would have liked his work. He said that she was, of course, always a great fan while he was growing up, then shyly admitted he believed she would. She was a great fan of innovation, as was his father, Carl, a well-known visionary graphics and computer innovator.

At M.I.T., Machover offers a class on Creativity and aims to help his students cultivate their own confidence and trust in their creative process.

"My Lab is an up-to-date technological quasi-planet, and my home is an 18th-century farmhouse. I live in a blend of many worlds."

We can look forward to more new, nuanced, and subtle creations through the imaginative adventures of this American musical voyager.

npr

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Editors' Picks

Toward New Musics: What The Future Holds For Sound Creativity

By Tod Machover and Charles Holbrow

In his brilliant, provocative 1966 essay, *The Prospects of Recording*, Glenn Gould proposed elevating — pardon the pun — elevator music from pernicious drone to enriching ear training. In his view, the ubiquitous presence of background sound could subversively train listeners to be sensitive to the building blocks, structural forms and hidden meanings of music, turning the art form into the universal language of the emotions that it was destined to be. In a not-unrelated development, Gould had somewhat recently traded the concert hall for the recording studio, an act echoed by The Beatles' release in 1967 of *Sgt. Peppers' Lonely Hearts Club Band*, an album conceived and produced in a multi-track recording studio and never meant to be played in concert. And while Gould's dream of a transformative elevator music never quite panned out, it is clear that from the 1940s through the '60s — from Les Paul and Mary Ford's pioneering use of overdubs in *How High the Moon*, to the birth of rock and roll with Chuck Berry's "Maybellene" in 1955, and on to Schaeffer, Stockhausen, Gould, The Beatles and many more — a totally new art form, enabled by magnetic tape recording and processing, was born.

Today we are at a similar crossroads. Music streaming — and, in general, music distribution and networking via the Internet — has become the "elevator music" of our time, offering endless songs and sounds, all supposedly adapted to our tastes and primed for making social connections. But many of the current trends are not promising, and can even be seen as leading to the downgrading of music's potential. Algorithmic curation is still primitive and often proposes paler — not bolder — versions of music we supposedly like. Current machine-learning techniques for music generation produce generic, composer-less pieces that sort-of sound like something, but never sound *great*. And it could be argued that the vast potential of the Internet as an artistic medium has not yet resulted in a new kind of music, as potently different in form and content from what surrounds us as magnetic tape music was from live

performance. In fact, it seems as if the Internet and streaming have changed everything about music except music itself.

The key to harnessing the power of streaming to create something really new might be to turn the medium's ubiquity and fluidity into an advantage. Can we meaningfully allow for a given piece of music to morph and evolve with different impact on each hearing? Can this mutability engage artists' imaginations in new ways? Can listeners – or even the entire environment – play important collaborative roles in building such a "living music" culture? Several current projects at the MIT Media Lab, where we work, explore various forms that dynamically streamed music might take.

The current paradigm – unchanged in the streaming era – is to treat a static recording as the terminal and canonical version of a composition. But a mastered, unchanged, "finished" recording is actually a limited representation of a composition. It is, also, not always what artists actually want. John Cage and many others invented numerous open forms to allow for multiple compositional (not merely expressive) interpretations, and Pierre Boulez famously revised most of his pieces from year to year, often without leaving a "definitive" version. After The Beatles stopped recording together in the early 1970s, John Lennon told George Martin that he was unsatisfied with their catalog and wished to re-record *everything* the band ever released (especially "Strawberry Fields," apparently). And of course, prior to Edison's first phonograph in 1877, every single music performance was unique by necessity and could never be repeated without variation.

When recorded music was primarily distributed on physical media, finalizing a recording was an essential step. Now that music is primarily distributed over the Internet, this constraint has been lifted. Music can now, again, be less about the master recording and more about the dialogue between artist and medium, artist and public, or music and the world itself. Labels and artists have begun to scratch the surface of what is possible. Consider the now-common pattern: An artist releases a song, and if that song starts to get traction on social media, it is quickly followed by an acoustic version, a music video and then countless club remixes. This is a first-step example of how a recording can change after it is first released, but it is currently the only option available within the narrow confines of popular streaming platforms.

In the future, artists will push the concept of evolving music much further. Instead of releasing a static recording, artists could release music that is dynamic, fluid and open for reinterpretation, remixing and reimagining. This would undoubtedly develop in numerous, well, streams — some of which we are currently working on.

A first example experiments with an open-form approach to music production. Conventional pop songs today layer tens, hundreds, or even thousands of different sounds together. Before that song is released, the relative loudness level of all parts is finalized in a studio in the "mixdown" process, during which the structure of the song, the instrumentation, and all the additional audio effects are locked into place, resulting in a final arrangement. In the conventional workflow, a mix engineer is responsible for every tone, level and effect configuration for all the separate parts. The techniques we are currently developing enable the engineer to share control over the mixdown and arrangement with intelligent algorithmic processes. The most obvious use for this kind of music production software would be to train AI agents to perform some of the simpler parts of the mixing process; for example, a software agent could be taught to set the balance between the main vocal part of a song

and the background. It might also help a musician or engineer prepare a song for release more efficiently. It does not enable a kind of music that is fundamentally different from the original model provided.

The more exciting potential comes from working toward an idea where music is not the output of such a system, but is in fact the system itself. From this perspective, we could imagine and create a whole range of musical experiences that would not fit inside today's streaming music paradigms and techniques.

To go beyond this "smart mix" model, Charles is working on an "Evolving Media" environment, through which a music composition changes as time passes. In particular, he's is creating a feedback loop that causes a recording to permanently update itself based on how it is consumed and shared on the Internet. To make this possible, he is re-designing multiple existing technologies, from the software that we use to record, synthesize and mix music; to the cloud servers that stream content to listeners; as well as the playback apps on listeners' devices — interconnecting them all in a single, iterative platform, allowing for:

- Notation and annotation by the artist to be bundled like enhanced, hyperlinked liner notes.
- Compositions could be updated or revised, either by the artists or algorithmically.
- It becomes much more practical for other artists to remix, cover, and collaborate.
- The system leaves behind a history of the song's evolution, a record of that song's compositional process.
- This "procedural" content could produce "infinite compositions" that evolve forever.
- It could be that, as with Snapchat, only the current state of the evolving composition would be available to listeners or collaborators, then gone forever, making forward evolution an essential — and only partially controllable — part of the composition itself.

Another example of an evolving, collaborative composition process is represented by the *City Symphony* series, developed by Tod and his colleagues in the MIT Media Lab's Opera of the Future group. Started as a collaboration with the Toronto Symphony Orchestra in 2013, these projects develop a sonic portrait of a city using both "musical" and "found" sounds, and invite the creative participation of anyone who lives in that place and wants to contribute. Using the shared experience of locale as a unifying element, the symphonies have established unusual dialogue between very diverse members of each community,
from Perth to Lucerne to Edinburgh, and
fromPhiladelphia to Miami to Detroit,
all pulled together through Tod's compositional vision. Special mobile apps were developed for each city that allow the public to record sounds that they would like to contribute to the project. All sounds are tagged geographically and form a growing sonic map of the city. Constellation software automatically analyzes, organizes and color-codes the collected sounds, arraying them to be mixed by anyone online with mouse or finger. These "city mixes" are in turn uploaded to be shared and further morphed, creating an ever-changing city soundscape that can be incorporated into the final symphony. Numerous other apps and online tools have been specially designed for each city — such as Media Scores and live online collaboration sessions — to facilitate creative public participation. The next series of City Symphonies, currently in development, will extend the city model to countries, such as a first-ever collaboration between citizens of South and North Korea, and a "world trade" symphony for Dubai that will continue to evolve - publicly and via streaming - far into the future.
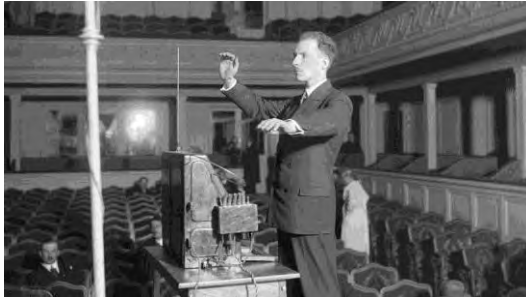
"Russian Invents Electric Apparatus Which Mysteriously Reproduces Music," read the original caption to this photo. Seen here is Leon Theremin, the inventor of the eponymous instrument being demonstrated-- one of the first electronic music creation devices — in 1927.

Although tools are currently being developed here at the Lab to intelligently automate making sonically meaningful connections between collected clips in a massive database, and between "noisy" and "musical" sounds, something normally done manually and impossible to accomplish at scale, the Media Lab's "Cognitive Audio" project takes an even more radical approach. Musician/scientists Ishwarya Ananthabhotla and David Ramsay are working on a system that allows the generation of constantly evolving compositions, based on the intriguing sounds surrounding us that we may not even notice. Using cutting-edge research in psychoacoustics, auditory scene analysis and auditory memory-recall, their software can take hours of recorded ambient sounds from the found environment and then automatically select and edit the sounds which we are likely to find most interesting and might most want to remember. Then, by measuring our mood through preference tests and biometric readings fed through machine learning algorithms, the system produces constantly streaming audio experiences that turn the everyday into an emotional, personalized, musically relevant, memory-enhancing journey.

All of these projects make us wonder: Which features of a composition could best be modified, while retaining important aspects of the original music's DNA? How quickly should this new kind of media change? Which network signals should feed into our compositional systems to update the media content? And perhaps most importantly, what might the dangers be? (Questions that, not for nothing, are spiritually similar — although pushed to a new extreme — to what any artist might ask themselves about a work in progress.) Feedback loops of this kind are often used in the design of web pages, where they optimize for "engagement." What are the implications when these kinds of feedback loops are applied to music?

Conventional advice for musicians is to push as much content to social media streams as possible. This might be good advice for musicians, but it is definitely even more beneficial for the online media platforms that monetize our attention. Suppose that, instead of constantly pushing out new media, artists were able to spend more of their time refining existing work. Music is not the only space that stands to benefit from shifting the focus away from creating new content toward maintaining, cultivating and healing what exists already.

Critics of streaming media point out that popular music tends to sound more and more similar, as artists optimize their music for these platforms. The algorithms that curate our social media feeds rarely promote the best or the most interesting music — rather, they promote the most *similar* music. Counter-critics point out that even if the mainstream is homogenizing, streaming platforms also enable countless subgenres of more obscure music to flourish in the fringes of the mainstream. Both are correct, but both also miss a more important issue. As media on the fringe and in the mainstream is increasingly optimized, curated, and discovered by algorithms, we devalue the human role in all these aspects of music creation and consumption. Isn't making, discovering,

and listening to music as a human the only true value of music?

There are many ways that music in this new century can achieve the kind of paradigm shift that was made possible by magnetic tape in the last one. Will the time come soon when we will look back on the 21st century and identify the *Sgt. Pepper's,* Chuck Berry, or Luciano Berio of the Internet age? With luck, it could still be the artists, not the platforms, that best illustrate how a new art form emerges. When this happens, will the new art form — vastly collaborative, grown from our minds and from our surroundings, partly conscious and partly mystifying, made of signals as much as from strings — approach the provocative power of Glenn Gould's final vision from 1966:

"In the best of all possible worlds, art would be unnecessary. Its offer of restorative, placative therapy would go begging a patient. The professional specialization involved in its making would be presumption. The generalities of its applicability would be an affront. The audience would be the artist and their life would be art."

The New York Times

April 10, 2018

How a Philly Cheesesteak Goes From the Grill to Carnegie Hall

By Michael Cooper

Tod Machover, who uses **found sounds in his "city symphonies,"** records a cheesesteak sizzling on the grill at Pat's King of Steaks in Philadelphia.

"Can I get one with whiz, no onion?" a hungry young man called into the window of **Pat's King of Steaks**. The counterman deftly spatulaed a sizzling skein of thinly sliced steak onto a roll and then applied a lacquer of Cheez Whiz to create a classic Phillly cheesesteak.

Taking it all in with a digital recorder and high-end binaural microphones one day in February was the composer Tod Machover, who writes symphonies about cities around the world and brings some of their most characteristic sounds into the concert hall.

Mr. Machover was nearly finished with **his latest work, "Philadelphia Voices,"** which the Philadelphia Orchestra and the conductor Yannick Nézet-Séguin will perform at Carnegie Hall on Tuesday, but he was not quite satisfied with an earlier attempt to capture the sizzle of a cheesesteak. So he went back for a second helping.

Field Recording at Pat's

This time the steak really sang.

KIRSHBAUM ASSOCIATES INC.

Then, after a brief sound-gathering detour in the heart of Philadelphia — the beating Giant Heart exhibition that young museumgoers walk through at the Franklin Institute — he raced through traffic to get back to the Kimmel Center, the home of the Philadelphia Orchestra, which commissioned the work. He was due to present his score to Mr. Nézet-Séguin for the first time.

"I got a really good recording today, finally, of Pat's cheesesteak," the composer told the maestro. "I put my head near enough to sear my hair!"

It was a big day for Mr. Nézet-Séguin: The Metropolitan Opera had just announced that morning that he would become its music director next season, two years early — a post he will hold in tandem with his job in Philadelphia. But he was all business, going over the "Philadelphia Voices" score and the logistics of how to perform it, asking who would join the orchestra to play Mr. Machover's digital recordings on the keyboard.

"It's not rocket science, but you need to be on the money," Mr. Nézet-Séguin said.

Cutting — and Mixing — the Steak

Before he wrote "Philadelphia Voices," Mr. Machover spent months making field recordings like the one at Pat's and collecting a library of 8,000 sounds that Philadelphians submitted to him through a special smartphone app. "I really am committed to listening to every single thing," he said, estimating that he had collected more than a hundred hours of recorded sounds.

Mr. Machover stands at the intersection of composition and computation — he has been a professor of music and media at the Massachusetts Institute of Technology Media Lab since it was founded in 1985 and was the first director of musical research at the contemporary music center founded for Pierre Boulez in Paris. To help organize his library of Philadelphia sounds, he used software developed at M.I.T. called Constellation, which can analyze hundreds of sound files by volume, frequency and shape, then visually display them.

"Philadelphia Voices" is the latest in a series of Machover symphonies inspired by cities. His Detroit piece, "Symphony in D," featured the sound of a Henry Ford engine. His work about Lucerne, Switzerland, "A Symphony for Lucerne," evoked the city's interconnecting water systems, from the nearby Alps to Lake Lucerne to the Reuss River to the fountains that dot the old town.

For Philadelphia he was trying something new: a big choral work with texts written by young poets about democracy, Philadelphia's innovations, its struggles, the gerrymandering that dilutes the political power of black residents, the city's block party traditions and its sometimes arcane parking rituals. It was to be sung by more than 200 people from several choirs with ties to the city and its surroundings: the Westminster Symphonic Choir, the Keystone State Boychoir and Pennsylvania Girlchoir, and the Sister Cities Girlchoir.

Mr. Machover was initially unsure about the cheesesteak.

"In each of these cities, I've tried to stay away from the kind of obvious: the bagpipe in Edinburgh or the didgeridoo in Australia," he said. "But if you find those things with the right angle it's really important. So when I went home and actually listened to the cheesesteak recordings, I realized how very beautiful they were."

He decided to give the sandwich a solo, accompanied by percussion.

Cheesesteak, Meet Orchestra

Last Wednesday, the night before the premiere, the orchestra and chouses gathered in the Kimmel Center for a rehearsal.

"We need to fine-tune a few moments," Mr. Nézet-Séguin told the small invited audience. "The first moment, actually, is about the cheesesteak."

Mr. Machover looked on from the seats, surrounded by graduate students from

the M.I.T. Media Lab who helped bring the piece to life. His edited recording began to play, and a few musicians from the orchestra slowly added textures that mimicked the sounds **of Pat's —** with metallic percussion instruments evoking clanking spatulas and a rainstick suggesting the sizzling steak.

Finally, it was time for the premiere on Thursday. The audience listened attentively as the local choirs evoked more than two centuries **of their city's** history and struggles. Midway through the piece, the performers grew quiet. A set of 40 loudspeakers brought in for the piece played the final moment of the **Philadelphia Eagles' Super Bowl victory** in February. A few members of the audience cheered.

Then the listeners grew silent as a mysterious new sound began to unfurl. As it grew clearer, there were murmurs of recognition and then a few chuckles. The cheesesteak was a hit.

Tod Machover

The Boston Globe

September 5, 2018

Schoenberg at the movies
By Jeremy Eichler

"The Enigma of Modern Music Arrives." So declared a rather ominous headline in Musical America on Nov. 19, 1933, above an image of the composer Arnold Schoenberg, his wife, and their baby daughter, posing on the decks of the Ile de France. Schoenberg's face bears a distant expression masked by a duly enigmatic half-smile. He had escaped Hitler's Germany, yet he had done so, as he later put it, "feeling the wrench in my very bones."

The great atonal pioneer was in fact among the first of Europe's artistic luminaries to flee the Third Reich and find refuge in the United States, ultimately settling in Los Angeles, where

he lived until his death in 1951. Having been forced out of the most respected musical teaching post in Germany, the composer fashioned a poignant second act in a very foreign City of Dreams, a place that his fellow émigré Bertolt Brecht described as a "mausoleum of easy-going." In Schoenberg's life, it was a period — full of musical, political, and spiritual convulsions — that could one day become the stuff of a great historical novel. Already this fall, it arrives in the form of a newly minted opera.

"Schoenberg in Hollywood," a work by Boston-based composer Tod Machover, will receive its world premiere Nov. 14 at Emerson College's Paramount Center. A

commission of Boston Lyric Opera, the piece — which the composer describes as "quirky, unusual, highly personal" — is at once an earnestly admiring tribute and an unconventional biographic fantasia, one that imagines Schoenberg looking back on his own life through the celluloid conventions of his adoptive home.

At first blush the topic may seem a departure for Machover, who leads the Massachusetts Institute of Technology Media Lab's Opera of the Future group and whose most recent opera, "Death and the Powers," featured singing robots. But Machover grew up immersed in Schoenberg's music and later studied with two of the composer's leading American torchbearers, Milton Babbitt and Roger Sessions. Even as his compositional voice went its own way, Machover developed a deep appreciation for what he called, in an e-mail exchange with the Globe, "the deep expressivity of Schoenberg's music, its richness and diversity and freshness . . . the combination of overwhelming emotion with powerfully rigorous — but always imaginative and non-academic — intellect."

Over the years, as Machover learned more about the extraordinary life behind the notes, his interest in the composer only deepened. "Schoenberg's journey," he says, "emerged for me as one of the great stories of our time and one that I wanted to tell."

A few years ago, after receiving a green light from BLO's general and artistic director Esther Nelson, Machover turned to a longtime creative partner, the British theater director Braham Murray, as director. Murray in turn conceived of a dramatic scenario that could serve as a vehicle for bringing Schoenberg's life to the stage. As a point of departure, the opera would incorporate a real-life event, one of the most fabled cultural collisions in the history of modern music: the 1935 meeting of Schoenberg and Irving G.

Thalberg, the legendary executive and producer at MGM.

It was a moment when many emigres of illustrious reputation were making previously undreamed of concessions to simply get by in Depression-era America. Stravinsky would later write a "Circus Polka" for elephants. One of Vienna's most illustrious orthopedic surgeons allegedly took on work as a Los Angeles masseur. And Schoenberg, who was teaching long hours, was persuaded by friends to consider the financial freedom that might come with a well-paying commission for a Hollywood film score.

And so he agreed to a meeting at MGM. For his part, Thalberg hoped the great enigma of modern music would consent to create the score for his next would-be blockbuster, an adaptation of Pearl Buck's novel "The Good Earth." Apparently the meeting got off to a rocky start after Thalberg mentioned having recently heard Schoenberg's "lovely music" on the radio. "I don't write 'lovely' music," the composer shot back. And things did not improve from there.

Schoenberg attacked the quality of most film music, and complained about the numbing uniformity of the dialogue. If he were to write music for a new film, he told Thalberg, he would insist on complete control of its entire sound world — including the actors' lines. Schoenberg seemed to be hoping they would declaim the script in the expressionist speech-song style of his own "Pierrot Lunaire." Surely that was a bridge too far for Thalberg, but he nonetheless insisted that Schoenberg go home with a copy of the screenplay, and a request to think more about it.

Here is where "Schoenberg in Hollywood" departs on its own dramatic journey.

As the opera's librettist, Simon Robson, explained in a phone interview, "because Schoenberg just had the meeting with Thalberg, and the new language of cinema was on his mind, and at the

same time he is finding a new home, we wondered, what would it be if he were to relive his life to date — but in movie conventions? To see his life *as* a movie?"

And so, after depicting an imagined version of the Schoenberg-Thalberg meeting, the opera "plays back" or alludes to various episodes of Schoenberg's life: his birth into a Jewish home during a hope-filled moment in European Jewish history, his conversion to Protestantism as a young composer, his "emancipation of dissonance," his discovery of the 12-tone method, his rise to world fame, his confrontations with anti-Semitism, and his bitter journey into exile. And, in what is perhaps the opera's most unconventional move, these dream-like episodes are presented through the prisms of classic Hollywood film styles, from silent movies to film noir to westerns.

Robson concedes there is a deep paradox in presenting the life of Schoenberg, the archetypal high-modernist, through the conventions of an avowedly populist medium like film. Yet in his view, the gesture is of a piece with a central tension that animated Schoenberg's own life and work: how to retain the purity of one's own artistic ideas while at the same time communicating them to a wider public. According to the opera's creators, "Schoenberg in Hollywood" aspires to do both. And that will also apply to the staging's visual language.

"The opera goes back and forth," explained Karole Armitage, the veteran choreographer who stepped up to direct "Schoenberg in Hollywood" after Murray, its original director, passed

away suddenly in July. "There's this internal world, looking back at a life — almost like Noh theater, when you come back as a ghost and are remembering your history — and then there's a side that's just full of the energy, excitement, and dynamism of American popular culture. It's this mixture of meditation and street energy coming together."

For Machover, the score also represents a delicate balancing act, a search for "a musical language that could be poised on the razor's edge between accessibility and complexity." The composer wanted to avoid what he called "pastiche," but he has drawn deeply from Schoenberg's own music for a culminating sequence. It occurs after the opera's madcap dash through various film styles seems to sputter out in exhaustion. None of these genre conventions, the libretto suggests, can ultimately contain the once-in-a-century uniqueness of Schoenberg's art. A final scene, entitled "Schoenberg's Vision," tries to summon its dimensions and convey them to an audience that will surely have entered the theater with varying degrees of familiarity with Schoenberg's work.

"I hope," said Machover, "that audiences are tantalized, challenged, and delighted by this music, and go away with some tunes to hum — maybe even some of them in 12-tones. I also hope that audiences will leave the opera admiring and loving Schoenberg as much as I do. He is one of the greatest composers who ever lived and — in my view — the public still does not realize the breadth of his achievement or the richness of his legacy."

Toronto Symphony rehearsing
in Roy Thomson Hall.

A Toronto Symphony, Tod Machover's participatory orchestral opera

BY MICHELA BARONE LUMAGA
PHOTO COURTESY OF TOD MACHOVER

'Social media and electronic communications make it possible to connect to everybody; we need to build every possible tool that we can so that there is much more fluid communication between people listening to music and people making it,' Tod Machover, interview in his MIT Media Lab office, April 2013

Some ATS contributors.

While disciplines such as architecture and design are exploring how to surpass ancient practices of conventional design modalities, others, like music, have already successfully opened their creation doors to the public, cross-pollinating with different artistic fields, transforming and refreshing their means through collective sharing practices.

Tod Machover, Professor of Music & Media at the MIT Media Lab and Director of its Opera of the Future group, is the composer of *A Toronto Symphony* (http://toronto. media.mit.edu) a crowd-sourced, collaborative orchestral opera. Machover, whose work lies at the intersection of participatory art and technology, has devoted part of his research efforts to creating tools and objects which allow untrained people to create pieces of music. He explains in a BBC interview that music has always been tied to technology, beginning with prehistoric man's discovery that banging on stones would create a more precise and piercing sound than just clapping the hands. It is therefore a logical step, he believes, to investigate methods that employ technology as a medium to shorten 'the distance between the ones that listen to music and the ones that are making it'.

In this recent project, a piece commissioned by the Toronto Symphony Orchestra, he created, during a 15-month period, a participatory and collaborative music composition involving the citizens of Toronto. He began by requesting sounds of the city through a specifically designed blog, then ventured into the urban territory himself, recording soundscapes in distinct areas of the city. He then asked members of the Toronto Symphony Youth Orchestra to replicate and reinterpret these sounds, transforming them into acoustically playable morsels. He also recorded the voices of elementary school children and incorporated these sounds into the composition by playing them during the performance, commented on by the orchestra. *A Toronto Symphony: Concerto for Composer and City*, premiered at Toronto's Roy Thomson Hall

on March 9, 2013, is a music piece that represents a multifaceted portrait of a city painted by the citizens with natural sounds and musical notes; it values the importance of a place as generator of site-specific artwork. Peter Oundjian, Music Director of the Toronto Symphony said: 'I think this piece is perhaps the most collaborative piece of music every made.'

Michela: How did the project in Toronto start, and what were the turning points while developing it?

Tod: The project started because the Toronto Symphony Orchestra contacted me about one year and a half ago, asking me if I wanted to be the curator of their New Creations Festival. The music director and the people who run it are creative and open-minded, and orchestras in general are promising these days because they are in an urban scene, and they should represent a place to bring people together. But they are also ocean liners instead of smart cars – very large and very conservative – and they have a social and financial model which is from 100 years ago. So now they are starting to think about how they might change. When Toronto came to me, I knew we could try something interesting and we decided to make the festival around the future of the orchestra. And they asked me to make a new piece.

One of the issues that interests me is that nowadays the general public is much more willing to participate in music projects and to make songs themselves. However, social media is still primarily a marketing tool, and is not currently a very good way to connect people with very different backgrounds. So I went back to Toronto and tried a different model of participation, investigating how we could make a real, in-person discussion first, and then scale collaboration. My intention was to invite the entire city of Toronto to participate. My other goal at the beginning was to make something that would satisfy my creative instincts, so that it would feel my piece,

INTRO CITY SOUNDS VOICES CITY MUSIC IMAGINING THE CITY CITY SOARING TORONTO DANCES CODA

Tod Machover.

but also that it would feel like everybody's piece in a balanced way.

At the very beginning, I made a picture of my imagined piece – no sound, only graphics – where shape, texture and colour gave a sense of what the piece would look like and proposed three ways of collaboration: yours, mine and ours. And then I asked the people to send me sounds. I found somebody who had a very good understanding of Toronto community groups and people to help connect me to the many diverse communities in the city. I started travelling a lot and having personal meetings while designing a mini-project for every different group of people. For example, I challenged 70 bands that were playing at an indie rock festival, inviting them to make an original composition that I would incorporate into the symphony.

My constraints were that their composition had to be no longer than 5 seconds. So during the festival the bands performed these five seconds that were later integrated into the final piece. This is an example of how we adapted for each subgroup.

Another big thing was that we got the whole Toronto school system involved. I taught the kids and teachers Hyperscore [a computer-assisted music composition program intended to make the creation of music readily accessible to experienced musicians as well as those without any musical training] and each student worked three months on a piece that represented some aspect of Toronto to them. So there is a section of the symphony made out of kid's pieces with my glue.

In the autumn of 2013, I realized that we needed better tools to let people take

A Toronto Symphony | City Soaring
by Tod Machover
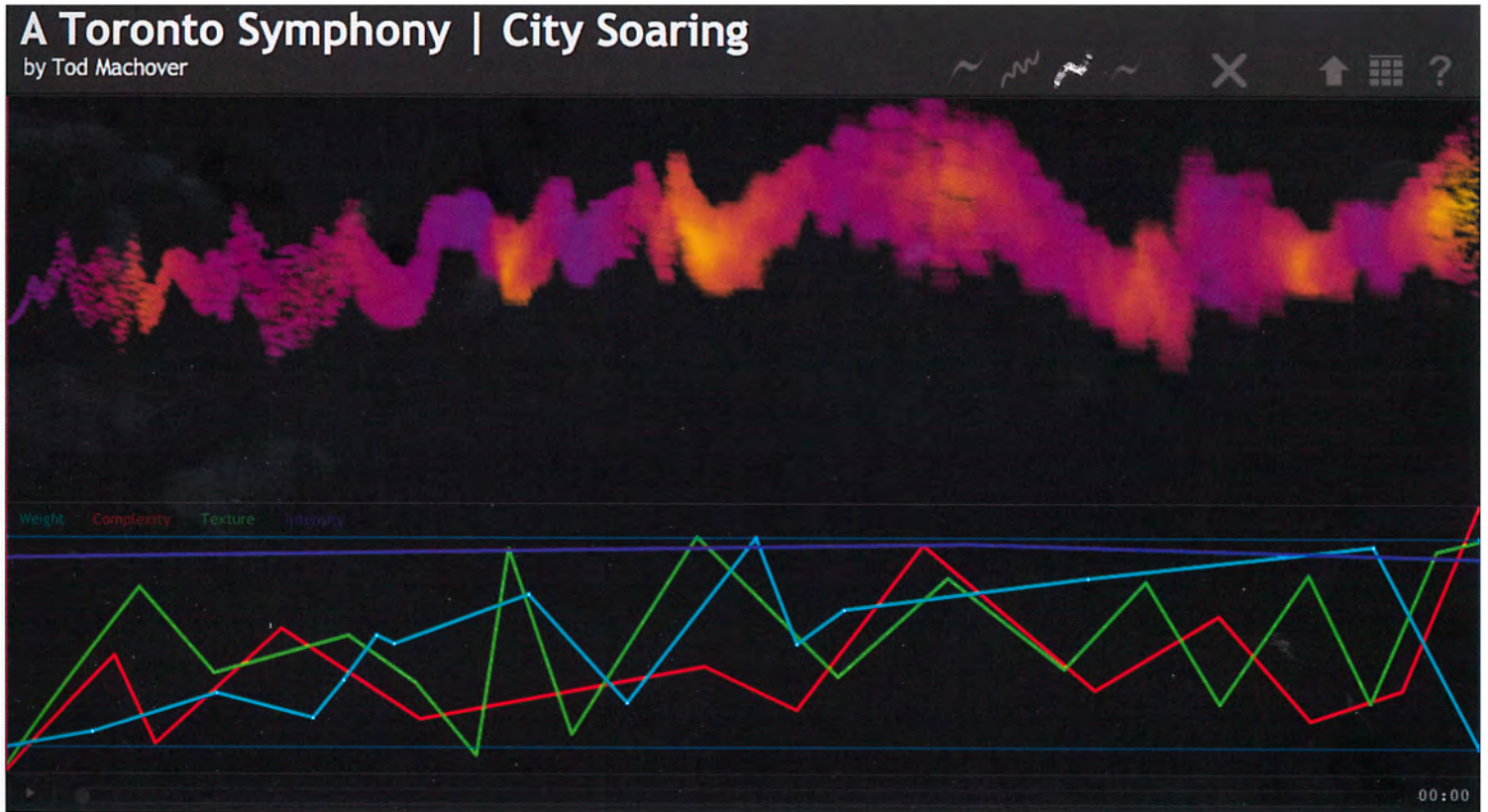
Media Score - City Soaring

Tod capturing Toronto's soundscapes.

my music as it was emerging and play with it further, so we made a series of apps that we launched in December. We developed two music app versions: *Media scores* [http://opera.media.mit.edu/projects/media_scores/] and *Constellation*, a graphic digital diagram made of multiple coloured points (each one a sound of Toronto), a very simple jagged line and virtual brushes; the user can change texture, intensity and pace, record and share his piece. Public participation happened also when I posted the then-unfinished Finale section – called *Toronto Dances* – online, inviting users to make their own complete version. That was the part of the symphony when everything get synchronized so it was a fun way for people to experiment with how all the diverse elements of the symphony could fit together.

So, with all of these techniques we engaged many different people in very different ways, and I was also able to discuss the work's shape and development with many people from different backgrounds and contexts. For the basic idea of the shape of the piece I always thought about a journey in three parts; the first part is someone like me coming into Toronto, listening and trying to understand the city. The second part is the traveller going away and imagining – or re-imagining – the city from afar. And then in the third part, everything comes together, a kind of co-existence of complexity and order that I observed in the city of Toronto itself. The final composition is about 35 minutes long – a real symphony – and is a blend of Toronto's sounds, my own music, and the multiple contributions of many collaborators from Toronto.
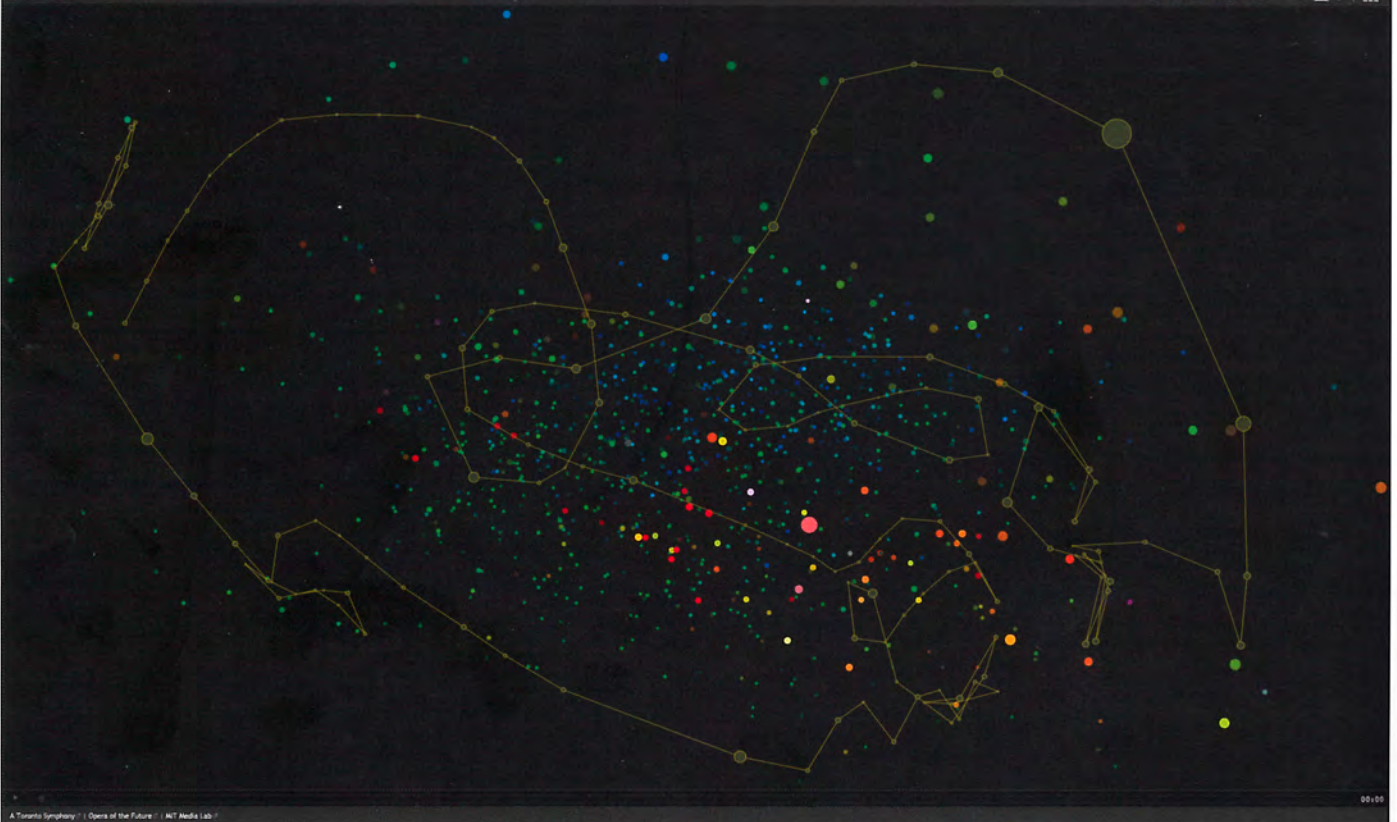
Graphic Visualization of *Constellation*,
the application built for ATS

Tod with Peter Oundjian,
Music Director of the
Toronto Symphony.

Michela: When you create a new tool for making music, what are your strategies to make it easy and accessible to people? How do you reach people's hearts and keep them focused on, for instance, writing a music piece?

Tod: The environment, the task and the tool have to be something which is easy to understand. But, I think even more importantly, people have to see a goal which is important and realizable, beautiful and emotionally motivating, so they care about it. You can't ask somebody to participate in making a thirty-minute symphony as an abstract idea. The two extreme responses from the public are: I can't commit the time needed and I can't understand the boundaries (what you are really asking). And usually whenever I make a mistake, it is the latter one of those. It might be a great idea, but they don't quite get what I am asking.

What made the big difference in *A Toronto Symphony* was the added dimension of contributing to something larger than oneself, to the city and community that everyone shared. So one thing I did was to promise that I would listen to everything and I would use as much as possible, and I made it clear to everybody where their contribution would fit in. I was very careful to show where their things were, through displaying the name, or the picture, along with the sound. I do think that we created a true sonic portrait of Toronto that felt important to everyone who helped to make it, and which sounded beautiful and worthwhile to those who listened, co-creators or not. ■

Tod Machover's VALIS — Futuristic Sturm und Drang

By Aaron Keebaugh

A scene from MIT's Opera of the Future and Media Lab staging of *VALIS*.

Huddled beneath the couch cushions and coffee table, Horselover Fat trembles in fear over what he had just experienced. Moments earlier, waves of pain shot through his body, engulfing him in a pink light that revealed all that can be known about the nature of the universe. But was the experience real or imagined? Maybe it was result of stress over a friend's suicide? Or a bad drug flashback?

These epistemological questions are the dramatic drivers behind VALIS, Tod Machover's 1987 operatic tour-de-force, which explores notions of knowledge as madness or as illumination, the result of gradual self-awareness. Via a new production by MIT's Opera of the Future and Media Lab at MIT Building W97 this past weekend, the work came across as both searching and valedictory, unearthly yet eerily grounded in common, everyday experience. For Horselover Fat, the alter ego of science fiction writer Philip K. Dick, the power

to overcome delusion may lie in learning to accept it.

Dick's original novel was as much autobiography as it was fantasy. Relayed through a streamlined libretto, the opera gives us the protagonist wrestling with the truths of his unearthly encounter, filtered through a vision that falls somewhere between Gnosticism and Romanticism. Horselover Fat, the name for the part of the story's anti-hero who experienced the pink light, is transformed into a Parsifalian wanderer, both innocent fool and afflicted wise man. As he comes closer to the "truth," he sinks deeper into despair over the vast emptiness of existence. Even tender memories of his dead friend, Gloria, do not ease his pain. And a cynical psychologist, Dr. Stone, tries to convince Fat to embrace his visions as real — there's no need to see them as true.

Yet it turns out that, by diving deep into his delusion, with all of its magical thinking, Fat finds a way out of his perceptual maze. He meets an '80s-style rock duo, Eric and Linda Lampton, who preach to him about VALIS, a kind of extraterrestrial intelligence system. Things grow even more bizarre (in the world of Philip K Dick, that is always possible) when he meets Mini, who "performs" on a cosmological jar-like instrument and Sophia, an alien artificial intelligence. Ironically, it turns out that the extraterrestrial possesses the warmth of a true companion and can soothe Fat's agony. He has always been whole, Sophia tells him, making him realize that a saving love has always been inside of him. After that revelation, Fat, his quasi-religious pilgrimage completed, finally rediscovers the self that he has repressed.

Machover saturates this age-old trope in sounds that are equal parts otherworldly and familiar. The composer wrote this opera during a period in which he split his time between working at Pierre Boulez's IRCAM and MIT's Media Lab, where he still serves as professor and music director. *VALIS* is filled with sounds that buzz, drone, and echo as if they are wafting through a large chasm. Yet, in contrast, the vocal writing is attractively melodic, reflecting both traditional opera and contemporary synth-pop influences.

The chief ingredients in this imaginative soundscape are instruments that Machover's graduate students developed specifically for this production. Nina Masuelli played "The Jar," a glass AI instrument that invents wild sonorities on the fly from anything that it senses. Max Addae added his own psychedelic twist with what he calls "VocalCords," a box of loose strings hooked up to a computer that allows him to bend sound itself. Both instruments were charismatic ingredients in the staging: they generated as much allure as they did mystery. Dramatically, they effectively underscored the scenes where Fat struggles to escape the prison of his consciousness.

Jay Scheib's inventive production contributed mightily to the sci-fi atmosphere as well, seesawing between incorporating elements of live theater and reality television. Serving as cinematographer, Scheib gave us footage of Fat and other characters in close-ups. Scenes featuring live video — projected onto small TVs and a large overhead screen — delivered an intimate view of mental confusion and collapse. Traumatic images of Gloria ingesting handfuls of pills were as heartbreaking as they were disturbing. On top of it all, visual strobe effects and walls of silver shocked the senses — like taking an ice bath after an acid trip.

The fine cast of singers powerfully conveyed the narrative's deep emotional tensions. Davóne Tines made Horselover Fat into a sympathetic presence, his firm tenor capable of steering a nimble course between madness and solace. Kristin Young's resplendent singing as Sophia provided a perfect counterweight to David Cushing's basso-profundo gravitas as Dr. Stone.

Timur Bekbosunov and Maggie Finnegan made for a wildly humorous pairing as the Lamptons, each performer reveling in the vocal flourishes of characters whose imaginations often ran into rowdy outer reaches. Gloria was played by two singers who neatly balanced the other: Rose Hegele sang with soaring beauty while Anaïs Reno latched onto the opportunities to make the most of her role's soulful, down-home qualities.

Keyboardists Julia Carey and Emil Droga joined percussionist Maria Finkelmeier to create a wonderfully weird play of rhythm and electo-acoustic textures. Machover conducted every shift in the soundscape's accent and meter with an energy that enlivened the ensemble's efforts –though he was hobbled by a few technical glitches.

All of this hallucinogenic *sturm und drang* made *VALIS* into one of the early highlights of the Boston season. Let's hope Machover, Opera of The Future, and the Media Lab have more up their futuristic sleeves.

Tod Machover

Night After Night

March 14, 2023

Starting over.

By Steve Smith

...One more encounter of real stature and substance came last Tuesday, March 7, when mezzo-soprano **Joyce DiDonato** joined the string ensemble **Sejong Soloists** in the world premiere of *Overstory Overture,* the newest operatic work by **Tod Machover**, at Lincoln Center's Alice Tully Hall. I've always admired Machover's ingenious electroacoustic works, including his operas—especially ***Death and the Powers***, a 2010 one-act with a libretto by Robert Pinsky.

DiDonato, among the most charismatic and compelling artists currently working in opera, has shared a connection with Machover ever since she appeared in ***Resurrection***, his 1999 Tolstoy adaptation, at Houston Grand Opera. That she also considers herself an **activist**, in deed as well as in word, made *Overstory Overture* a fitting sequel to her own recent exercise in seed-planting, ***Eden***.

The half-hour monodrama, derived from **a novel by Richard Powers**, introduces Patricia Westerford, a scientist whose career suffered in the wake of her insistence that trees communicate with one another. The piece is meant to stand alone, while also serving as the first glimpse of a larger opera based on the novel. Previewing the opera and its creators for ***The New York Times***, Thomas May writes insightfully about Machover, DiDonato, Powers, and how they came together.

The opera wasn't staged, precisely, but its participants were smartly directed by choreographer Karole Armitage, who made subtle but effective use of the Sejong string players and conductor Earl Lee. Two more musicians lent extra drama to the sonic landscape: Ji Hye Jung, on marimba and bass drum, and Albert Cano Smit, on digital sampler. Ben Bloomberg's sound design and Peter Torpey's lighting created a vivid impact with relatively economical resources.

Joyce DiDonato, Tod Machover, Earl Lee and Sejong Soloists, Alice Tully Hall

DiDonato was a characteristically intense presence, singing beautifully and trenchantly in soaring high notes and robust low ones. (I'd have appreciated projected titles; text from Simon Robson's libretto was provided in the program, but following it would have meant looking away from the stage.)

Two formal reviews have appeared, both filled with insights. A *Musical America* account by David Patrick Stearns is behind a paywall, but you can read the text on Machover's **Facebook page**. A second review, by Anne E. Johnson, is accessible to all on ***Classical Voice North***

America, the online publication of the Music Critics Association of North America.

It was a privilege and a pleasure to witness the new work's birth; I look forward to seeing how it grows outward and upward. I also admired the concert's first half: an Adagio by Michael Haydn; the Violin Concerto in D minor (not the famous one in E minor) by Felix Mendelssohn, with Stephen Kim as the poised soloist; and Anton Webern's early, sumptuous *Langsamer Satz.*

That's the kind of fare I'd always associated with Sejong, listings for whose concerts I used to write regularly for *Time Out New York.* But the ensemble also presents a steady stream of recent and new pieces, some of which – including the Machover mini-opera – it commissions. A page from last week's program detailed upcoming U.S. and world premieres from Avner Dorman, Unsuk Chin, Texu Kim, and Augusta Read Thomas. It's mighty impressive.

laureate Bjørnstjerne Bjørnson, the five-act *Hulda* (1885) is nothing if not ambitious, requiring a ballet troupe in addition to massive choral and instrumental forces, plus 15 soloists. It is full—if not completely full—of excellent music in its composer's trenchantly reflective, minor-key mode; and the orchestral interludes, half-hour ballet and extended choruses come over with majestic power, even boasting the odd touch of Norwegian colour, after the ceremonial manner of Grieg's *Sigurd Jorsalfar*. The intense Entr'acte to Act 5 and the luminous chorus 'Le lac sourit' that follows it, in praise of nature's beauty, linger in the memory.

Despite these incidental attractions, *Hulda*'s drama of warring clans lands with the dull thud of a stone axe. Franck's failure to articulate the librettist Charles Grandmougin's cardboard cut-outs, or to provide them with anything better than academically correct music, proves lethal. Given that the wronged revenger Hulda herself—a Viking Lady Macbeth—dominates the stage, it's a deadly flaw that she scarcely sparks into life, except during the radiant, spiritually elevated duet with her tenor lover Eiolf, shortly himself to fall victim to her serial plotting. The rest are ciphers, though several of the singers—notably Irina Jae Eun Park as Eiolf's cast-off mistress, Jin Seok Lee and Katerina Hebelková as the clan's *pater* and *mater familias*, and Jongsoo Yang in the tiny cameo of Aslak's accidentally-slaughtered youngest son—create living, breathing people from Franck's snaking vocal lines and perfunctory ensembles.

While Joshua Kohl's Eiolf passes muster, neither he nor Meagan Miller's unwieldy and monochrome *Heldensopran* Hulda do much with the text; and although Fabrice Bollon brings a sure sense of style and pacing to the table, his perfectly adequate Freiburg forces don't shine in Südwestrundfunk's marginally over-resonant and shallow recording. The German-only online libretto translation, oblique notes and skimpy English synopsis hardly help the cause. With Palazzetto Bru Zane planning to record *Hulda* (starring Jennifer Holloway) in May 2022, this Naxos issue may soon be superseded. Meanwhile it leaves the impression that Franck's grand opera is curiously tangential to his superb—albeit currently unfashionable—achievements in symphonic, chamber and solo instrumental music. CHRISTOPHER WEBBER

Death and the Powers, Machover

Joélle Harvey (*Miranda/Voice of Robot Four*), Patricia Risley (*Evvy/Voice of Robot Three*), Doug Dodson (*The United Way*), Hal Cazalet (*Nicholas/Voice of Robot Two*), James Maddalena (*Simon Powers/Voice of Robot Leader*), David Kravitz (*The United Nations*), Tom McNichols (*The Administration*), Boston Modern Orchestra Project, *c.* Gil Rose. BMOP/sound 1082 (one SACD)

Technical problems largely account for the delay in this disc's release, but the wait has been worth it, for this recording will satisfy both those wishing to revisit Diane Paulus's memorable production of Tod Machover's boundary-pushing, thought-provoking opera and those hitherto unfamiliar with the work. Though the opera's most recent outing, in Dallas, was captured on Blu-ray in 2014 and released the next year, the composer had no control over that sound mix. Here, the opposite is true, and these audio-only studio sessions, with virtually the entire original cast, were recorded in September 2011, just six months after the first American performance in Boston. (The opera's premiere, in September 2010, occurred in Monaco.)

I was lucky enough to see this opera staged, in Chicago in April 2011—with all the male singers featured on this recording but neither of the female ones, alas—and, among other things, was struck by the work's seemingly effortless melding of technology and music, a preoccupation for Machover, who in earlier years worked closely with Pierre Boulez. Not for nothing was this roughly 90-minute one-acter also then called *The Robots Opera*, a name subsequently dropped. So I am curious what music lovers without memories of Paulus's production, with its roaming mechanical devices and intense lighting effects, will make of this exclusively audio rendering. Yet with enough attention paid to the poet Robert Pinsky's thoughtful libretto (provided complete in the accompanying booklet), along with a bit of background reading, I suspect that much of the work's haunting sci-fi enchantment should prevail.

But without careful attention to Pinsky's text (fastened to a narrative by him and Randy Weiner), much will be lost, for *Death and the Powers* is primarily an opera of ideas—often harrowing ones. Simon Powers (the stalwart baritone James Maddalena, much associated with the operas of John Adams) is the ostensible protagonist, an immensely rich man who seeks immortality though technological interface—or, as some would have it, our inevitable robot future. Into this dubious otherworld, known as The System, he draws his wife, Evvy (Patricia Risley,

mezzo-soprano), ward-cum-protégé, Nicholas (Hal Cazalet, tenor), and independent-minded daughter, Miranda (Joélle Harvey, soprano). There are the obvious parallels to the *Faust* story, with man's inventions substituting for the supernatural. But this music drama is considerably more than a recapitulation of classic material: its achievements are very much its own.

Praise for Pinsky's text should not imply anything lacking in Machover's music. His writing blends traditional instrumentation for 15 players with electronic cadences to create an imaginative and effective soundscape, alternatingly soothing and urgent. Highlights include Miranda's heartfelt short aria 'I miss having a father' and the climactic duet between her and a reconstituted Simon, 'One last time', with its soaring lines, verbal patter and grand declamations. This immediately precedes a coolly dispatched epilogue, the latter part of a clever framing device that also opens the opera.

In addition to the superb cast—all the singers fully inhabit their roles—musical values are upheld by the conductor Gil Rose and his Boston Modern Orchestra Project, who have participated in all live performances of the opera thus far, save those in Dallas, and whose BMOP/sound label has brought welcome attention to new and neglected American scores. This release stands with the best of them.

DAVID MERMELSTEIN

Ian Bostridge—Tormento d'amore

Excerpts from *L'Orfeo* (Sartorio), *Eliogabalo* (Cavalli), *Il Corispero* (Stradella), *Il Tito*, *L'Argia* (Cesti), *Le avventura di una fede* (Caresana), *La Stellidaura vendicante*, *Il schiavo di sua moglie* (Provenzale), *Il Totila* (Legrenzi), *Siroe, re di Persia* (Vinci), *Il faraone sommerso* (Fago), *Il Farnace* (Vivaldi). With Cappella Neapolitana, *c.* Antonio Florio. Warner Classics 0190295037079 (one CD)

Admirers of Ian Bostridge may be surprised by the repertoire of his new CD, although he has recorded the title role of *Orfeo* (with

Emmanuelle Haïm, 2004); indeed, by the time these words are in print he will have undertaken a short European tour with

MACHOVER: *Death and the Powers*

CD Harvey, Risley; Maddalena, Cazalet, Dodson, Kravitz, McNichols; Boston Modern Opera Project, Rose. English text. BMOP/sound 1082

IN THE PROLOGUE to Tod Machover's innovative, grandly imagined science-fiction opera, three robots in a posthuman world attempt to understand the concept of death. "Why did the human creators / Command a performance on a theme / Impossible to comprehend?" one of them sings, recit-style, to the accompaniment of a subtly shifting digital soundscape. Although no answer is forthcoming, they dutifully proceed to enact the story that follows.

The opera, which received its premiere in Monaco in fall 2010 and was a finalist for the 2012 Pulitzer Prize in Music, brings us into the world of Simon Powers, a wealthy and cultured billionaire. He has devised a way to endure after his death by assimilating himself into his physical environment via The System, an invention reminiscent of various hypothetical A.I. scenarios whereby human consciousness could be uploaded into a computer. Because the story (with a literate, imaginative libretto by poet Robert Pinsky) is about human versus machine-like existence, the music appropriately combines the acoustic with the digital, and it's here that Machover, deftly deploying his trademark "hyperinstruments" in conjunction with a conventional chamber orchestra, is wizardly. The score bursts with both acoustic and electronic imagination in a distinctive, perpetually morphing synthesis that guides us through the complex tensions and transformations in the plot. Machover's adroit, sometimes cacophonous manipulations provide aural representations of visual elements the stage directions can only hint at (e.g., "Simon gradually transmogrifies into The System"). At the same time, in this most forward-looking of works, he manages to pay homage to classical operatic tradition with attractive, lyrical melodies and, in one passage for Simon's wife and daughter, beautiful duet writing.

Baritone James Maddalena is magnificent as Simon, a Master-of-the-Universe type who has transcended mortality. With a cavernous, penetrating resonance in his lower range and a weighty, dramatically pulsating sound in higher passages, he has the vocal heft and sheer charisma to make himself credible as a new type of omnipotent, posthuman entity. (He also gets an assist from some remarkable digital voice-processing technology.)

The lithe mezzo Patricia Risley, as Simon's wife, Evvy, is practical but concerned as her husband prepares for his transition: "If you were frightened, I would be less worried. Will you go insane, out of nature, in this machine?" Later, Evvy performs a remarkable, dreamlike scene with Simon, who is now "The System, inhabiting The Chandelier." They start by sharing a memory of dancing outside together. The sound is murky, as if through a haze—an electronic pad of sound with solo acoustic instruments subtly mixed in. The scene concludes with an erotic encounter, beginning with Risley's entreating reiterations of the phrase "Touch me." She proceeds to give a spellbinding rendering of an extrahuman sequence of foreplay, arousal, climax and afterglow. It's safe to say this is the only sexual interaction between a human and a light fixture in operatic history.

Tenor Hal Cazalet, as Nicholas, Simon's protégé and assistant who builds robots in his lab (and gradually morphs into one himself), spends much of the role in his upper register, where he has a blazing, urgent sound and a directly communicative delivery. Soprano Joélle Harvey sings Simon's daughter Miranda, the emotional heart of the piece. She starts as a loving, somewhat frightened daughter: "Daddy, is it you in there?" she sings plaintively. "And can you hear me?" Harvey has a heartbreaking catch in her voice that allows us to feel the trauma of watching a loved one transform into a distorted being. Her centerpiece aria, "I Miss Having a Father," is an oasis of sweetness amid the turbulence, and it would work quite well as a standalone solo number.

The climactic, penultimate scene between Miranda and her father has a decidedly different tone: Simon, in a tirade against humanity, implores his daughter to leave "the bondage of meat" and join him in The System. Maddalena is persuasive and powerful, but Harvey is now confident and soaring, retaining an appealing lightness in her secure upper register as she passionately defends the corporeal human world. The music builds cataclysmically, ending with Harvey singing the word "Live!" on a sustained high B that gradually fades away. It's an epic battle of wills between father and daughter, between the virtual and the real—or, as one might see it from the perspective of 2022, between the universe and the metaverse. It's also one of many triumphs in this piece for the composer, librettist, singers and chamber orchestra.

Boston Modern Opera Project, under the masterful leadership of Gil Rose, gives an extraordinary rendering of Machover's scintillating, shape-shifting electro-acoustic score.

—*Joshua Rosenblum*

MACHOVER: *Death and the Powers*
James Maddalena (Simon/Robot Leader), Joelle Harvey (Miranda/Robot 4), Patricia Risley (Evvy/Robot 3), Hal Cazalet (Nicholas/Robot 2), Doug Dodson (United Way), David Kravitz (United Nations), Tom McNichols (The Administration), Boston Modern Orchestra Project/ Gil Rose
BMOP 1082 [SACD] 86 minutes

Tod Machover (b. 1953) has devoted his compositional career to the broadening of boundaries of human performance with technology. Following studies at Julliard with Carter and Sessions, at Boulez's behest he became the first director of Music Research at IRCAM. As Professor of Music and Media at MIT he has developed musical technology to extend expressive capabilities for performers (Hyperinstruments), to make composition and notation more accessible (Hyperscore), and to assist in the diagnosis and care of medical conditions.

He has directed much of his compositional attention toward opera, seeking to draw audiences closer to the "human and physical" aspects of performance with technology. In *Death and the Powers* (2010), the lead character's disembodied voice determines the actions of an intricate stage apparatus, which includes a robot chorus. The complex stage technologies would not show up in an audio-only recording, so Machover made refinements and oversaw this recording to ensure it captured the essence of the work.

Death and the Powers is framed with a prologue and epilogue that resemble a modern ritual play, with robots performing a story of humans from the "Organic Age", despite not understanding its meaning. This story follows billionaire Simon Powers as he forgoes his humanity to upload himself to "The System", a computerized mainframe that he believes will make him functionally immortal. He is supported by his wife Evvy and his young assistant Nicholas, whom he rescued from terminal illness by giving him cybernetic enhancements. Only his daughter Miranda has reservations about his decision. His consciousness becomes one with his home and the objects inside, including a futuristic chandelier, which in the staged version is his main avatar. Chandelier-Simon seduces Evvy to The System in a bizarrely erotic encounter, and Nicholas grad-

ually becomes more and more mechanical until he is also absorbed into the mainframe. In this new state, Simon is drunk on his perceived freedom and power, ignorant of the catastrophic effects they are having on the world outside. World leaders—almost robotic in their dispositions—arrive, joining Miranda in imploring him to cease his careless actions and curb the global disasters, to no avail. Simon makes a last-ditch attempt to bring Miranda into The System, declaring the cause of humanity's ills to be its flawed humanness itself. She counters: the flaws, suffering, and mortality of being human is what makes life worth living. Each devoted to their beliefs, their duet reaches a white-hot peak before the picture dissolves and the opening robot actors are left confused by the notion of death.

As is the case for much of Machover's work, the chamber orchestra forces are bolstered by synthesizers and electronics, which seem to balance well with each other. The electronics lend mystery and space to the music. They are also integral to the moments and conditions of transformation, whether by distorting Simon's words when he is part of The System, or even more strikingly when he enters it. As genuinely memorable and musical his mischievous, grotesque techno-babble may be, though, nothing comes close to the intense climax of the father-daughter duet at the end.

Poet Robert Pinsky has written a great libretto. It is artful yet perverse, elegant yet provocative. It flows well and feels right when sung. It is dense with detail but never confusing. The pacing of text and music is perfect—the forward movement doesn't flag for a second. I must give special praise to the singers, particularly James Maddalena, who, as Simon, fully gives himself over to the excitingly bizarre distortions and mannerisms of the character. Joelle Harvey as Miranda more than holds her own as his foil.

Though the opera was composed a full decade ago, its narrative feels particularly timely for 2021. Pandemic, economic, and environmental disasters have caused pain and suffering worldwide; and the Zuckerbergs and the Musks of the world are throwing their billions toward consciousness-altering technologies. For many people, life has never seemed this fragile. Yes, it is difficult to not be seduced by Simon and his scientific ambitions, with all of the strange electronic music and sounds to enhance them. But it is Miranda's message—an honest love letter to humanity—that res-

onates most. Needless to say, this opera had quite an effect on me. I've listened from start to finish three times already and I find new things to appreciate each time. Machover and BMOP have hit it out of the park with this one. Full libretto and informative notes are included.

FARO

Tod Machover

November 25, 2021

Tod Machover: Death and the Powers

By Michael Beek

The idea that a billionaire might pour funds into a techno-pursuit of immortality seems even less like fiction now than in 2011, when Tod Machover's *Death and the Powers* premiered Stateside. With a cast including robots and a cyborg, and a score combining orchestra with specially devised electronic 'hyperinstruments' to dazzling effect, the opera's themes are nonetheless fundamentally familiar: as Simon Powers eschews corporeality to morph into The System, questions are raised about mortality, human connection and social responsibility.

Of course humans already have systems – including family. Protégé Nicholas facilitates Powers's transformation and wife Evvy is literally seduced by the machine. But daughter Miranda worries about the morality of cheating death while abandoning 'the poor, the children, the starving'. Positing a potentially bleak future, the story is framed as a human ritual from the 'organic age'. It's an intriguing conceit, depicted with passionate commitment by the singers and Boston Modern Orchestra Project under Gil Rose.

Machover and librettist Robert Pinsky ultimately leave judgements to us. But their alertness to danger underpins the project, as characters representing the UN and other organisations wryly assert the need for 'something more than poetry' if we are to resist such brave new worlds.

Tod Machover

January 2022

MACHOVER Death and the Powers

By Laurence Vittes

Tod Machover's science-fiction opera about robots and humans, set to a libretto by Robert Pinsky, was designed with a spectacular visual apparatus in mind, and after productions in Monte Carlo, Boston and Chicago, was nominated for the 2012 Pulitzer Prize. Now what had been an electrifying theatrical experience has been released as an electrifying surround-sound thriller.

The story, about a dying billionaire who downloads himself into his environment, is thoroughly operatic in pace and style, with German Expressionist overtones and a comprehensive score that includes an intoxicating love duet and occasional references to the past, such as Offenbach's Olympia and Richard Strauss's Marschallin. Presumably, since the opera takes place in the future, there may also be references to music not yet written as of 2022.

James Maddalena's Simon Powers is a creation unto itself, eloquent in the beauty of his power and, when filtered electronically, his pain. In his booklet note Thomas May describes the mezzo-soprano's climactic aria as 'one of opera's most memorable transcriptions of female orgasm', which it makes fair claim to be in Patricia Risley's spellbinding delivery and the extremely detailed 3D sound.

As striking as the visuals must be, Machover's arsenal of music stands triumphantly on its own, fusing and defusing technoflash from the composer's MIT Media Lab with rich writing for Gil Rose's Boston Modern Orchestra ensemble. The sound is so immersive that it is not only a purer form of the opera, as the booklet notes point out, but provides a unique perspective when played back on surround sound headphones such as Apple's AirPods Max.

THE WALL STREET JOURNAL.

November 20, 2018

'Schoenberg in Hollywood' Review:
Grandiose Fantasy

In this world premiere of Tod Machover's opera, a composer living in exile hopes to bring his music to the masses by scoring movies.

By Heidi Waleson

Jesse Darden as Irving Thalberg and Omar Ebrahim as Arnold Schoenberg in 'Schoenberg in Hollywood'

Tod Machover's "Schoenberg in Hollywood," given its world premiere by Boston Lyric Opera at the Emerson Paramount Center last week, is about an **artist's longing for relevance.** The composer Arnold Schoenberg fled **Hitler's Germany** and took refuge in Los Angeles in 1935, where he lived until his death in 1951. The real Schoenberg did have a meeting with the movie producer Irving Thalberg (brokered by, of all people, Harpo Marx); the project, a **soundtrack for "The Good Earth,"** quickly fizzled. However, in Simon Robson's libretto (based on a scenario by Braham Murray, who died in July), the composer is tempted to bring his thorny, challenging music to millions through the movies—and more. Reflecting on his unfinished opera **"Moses und Aron,"** he wonders if those biblical brothers—Moses, the uncompromising prophet, and Aron, the salesman dedicated to giving the people what they want—could be metaphorically joined, and thereby save the world.

It's a grandiose fantasy, but so are the movies. In "Schoenberg in Hollywood" the fun is in the journey, even if the greater goal remains unrealized. Schoenberg, with the aid of two UCLA students, tries out his idea by imagining the events of his life as depicted in different film genres—silents, noir mysteries, Disney cartoons, musicals and westerns. Mr. Machover's ingeniously original music weaves those influences and others, like a Lutheran chorale for the hero's early conversion from Judaism to Christianity, together with sly quotes from Schoenberg's own scores—a bit of "Verklärte Nacht," a snippet of "Pierrot Lunaire."

The wit and dexterity with which this is accomplished makes the forbidding patriarch of musical modernism a genial, even playful figure who even jokes about his own unpopularity. One of the highlights, "The Schoenberg Follies: A Bad Revue," has Schoenberg, in song-and-dance mode, riffing on "Singin' in the Rain" ("I'm killin' tonal music") against the backdrop of some very angry reviews about his compositions.

The first section of the fantasy is the tightest: Schoenberg's struggles against the confines of tonality correspond with the strains in his first marriage, and the arc builds musically to the conflagration of World War I and his wife's death. Some scenes, like a Marx Brothers parody dealing with anti-Semitism, are overly talky; the poignancy of Schoenberg the refugee, even with the inclusion of the Shema Yisrael prayer as he reconverts to Judaism, has less impact than the earlier comedy. And Schoenberg's final revelation—a declaration of "Unity / Follow me"—is unclear. He rejected Thalberg's offer—what did he choose? Can an artist change the world? The opera doesn't say.

The performing forces were small but potent: Baritone Omar Ebrahim was a forceful presence as Schoenberg; tenor Jesse Darden and soprano Sara Womble were properly bright-voiced as his "new world" UCLA students, who nimbly played all the other roles; and David Angus crisply led the 15-member orchestra, with electronics woven in. The films by Peter Torpey, central to the opera's concept, ranged from silent movie title frames and stills of Schoenberg's accomplished amateur self-portraits to fuzzy footage of World War I aircraft, jittery home movies, and the saturated colors of American westerns. Simon Higlett designed the efficient set; Nancy Leary, the quick-change costumes. Director Karole Armitage's choreographic expertise showed in the dance-like movements of the characters, their interaction with the films, and the continuous flow of the 90-minute opera.
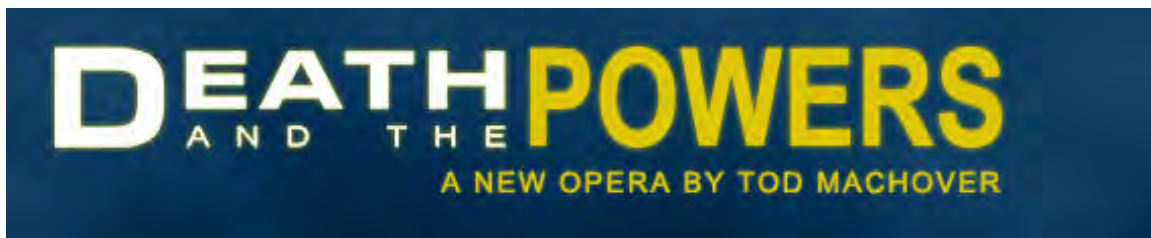
Death and the Powers

By Andrew Porter

Tod Machover, born in 1953, 'learnt opera from the inside' as Toscanini did, playing cello in the pit—Toscanini in Parma and then La Scala, Machover at the Canadian Opera. His composition teachers included Dallapiccola, Roger Sessions and Elliott Carter. In 1978 he joined IRCAM, where his first opera, Valis, after the novel by Philip K. Dick, had its premiere in 1987. Operas with sci-fi plots—by Glass, Bussotti, Anthony Davis, even Tippett—were prominent in the '80s.

Overcoming prejudices—against the genre, and against operas in which electronic technology is used not just for special effects (as in Musgrave's Voice of Ariadne, Birtwistle's Mask of Orpheus)—and knowing from other works that Machover is a remarkable composer, I got round to Valis at last, in 1989, after it had been revised and recorded. And

heard what I called 'one of the brightest and most intelligent of new American operas ... no monotony or meagreness of sound ... well-shaped, carefully paced acts ... variety of texture, tone, intensity'. Death and the Powers, 23 years after Valis, is even better. It was given four performances, in the course of three days, in the admirable 1879 Salle Garnier at Monte-Carlo (big enough to have held the famous French Rings under Gunsbourg yet intimately communicative). It goes to Boston in March, Chicago in April. The libretto is by Robert Pinsky, who has been America's poet laureate. Simon Powers (baritone), a rich, powerful tycoon and inventor nearing the end of his days, defeats death by shedding his mortal attributes and transferring his personality and character into 'the system'. During the course of the

opera—seven scenes, some 90 minutes without interval—his third wife Evvy (mezzo) and his assistant Nicholas (tenor) follow him there. His daughter Miranda (soprano) hesitates, and in a radiant finale—high Bs shining steadily above a sequence of troubled, troubling chords—is reluctant to abandon the world of suffering humanity. The opera is enacted in some distant future as a 'ritual' by robots—which have the ability, fortunately, to present themselves as living, vivid personalities. After a brief prologue they do so. The drama done, in an epilogue they resume robot form, asking puzzled questions: 'What is Death? ... Why choose to suffer—whatever that means?' Excellent questions, the Robot Leader says, and awards Human Rights Credits to the enactors.

Questions asked in Anna Karenina by Levin—'Why do I live?', 'How ought I to live?'—underlie Machover's dramatic works. Tolstoy scorned the operas made from his novels, with much romance and little questioning. In some operatic versions of Anna Karenina Levin is simply omitted (though not in those contemplated, never composed, by Janáček and Britten). Alfano's Risurrezione, an opera not without merit, is essentially The Prince and the Pauper, with a soprano role that Eugenia Burzio, Giuseppina Cobelli, and Mary Garden embraced; also Magda Olivero, who declared that not even Callas at her greatest could produce the shivers that Cobelli's Katusha sent down her spine. Machover's Resurrection (Houston, 1999), a more 'serious' opera, was compromised (if memory serves; though memory holds mainly young Joyce DiDonato's wonderful outpouring of unforced, beautiful tone as Katusha) by the endeavour to reach and stir a 'conventional' opera audience. And we were stirred.

There's no Richard Rodgersy, C-major compromising in Death and the Powers. Machover's technological inventions in giving to sounds, through electronics, new sonorities, new eloquence, have been widely and amply acclaimed. The band of only 15, the Boston Modern Orchestra Project, conducted by Gil Rose (September 25), could fill the theatre with rich 'grand-opera' sound when appropriate. But I'd like to stress, not so much the sonic and scenic marvels created by the Massachusetts Institute of Technology's Media Lab (whose Opera of the Future Group is directed by Machover), as what a good opera composer Machover is, bringing the 'traditional', necessary skills to a far from traditional work. He has a command of expressive vocal gesture. He sets words sensitively, with a feeling for the natural weight, stress, and length of syllables rare today. Voices and instrumental/electronic sound are well balanced, often with telling counterpoints. The scoring is colourful. The piece is well constructed: a four-character drama opens up in scene 6 with a visit from the outside world, a three-man delegation of tenor, baritone and bass. In scene 8 Miranda is overwhelmed by 'a parade of the World's miseries, the victims of famine, torture, crime, disease'; students and Monaco residents were enlisted for the powerful crowd scene. The final duet is a moving modern addition to the great line of father-daughter exchanges: Boccanegra-Amelia, Rigoletto-Gilda, even Wotan-Brünnhilde.

There was an expert cast. Across three performances, I heard James Maddalena as Powers develop from careful exact utterance to eloquent, lyrical delivery of his lines. Patricia Risley's Evvy was rather wonderful in a long erotic aria of reunion with the husband who has passed into 'the system'. Hal Cazalet was a brilliantly precise Nicholas, the enthusiastic young technician who has the scherzo (not buffo) episodes of the varied score. As Miranda (Cordelia, Antigone), Joëlle Harvey's lines were not always verbally shaped—notes took precedence of line—but she sang with sweet, pure tones and was radiant in the finale. The characters were sharply defined. Diana Paulus's staging and Alex McDowell's scenes were model: dazzling in their inventions but never 'self-promoting'. This was a grand, rich, deeply serious new opera, presented by a team with manifold, coherent accomplishments.