

Select a country

Subscribe



search New Scientist

Go »

Login

CultureLab

Where books, arts and science collide



Sounds from another dimension

12:00 17 March 2010

Art Music Theatre

Amanda Geffer, Books & Arts editor



Images: Katherine Tomkinson

3D movies may be all the rage, but the event I attended at the [Guggenheim](#) on Thursday night definitely had them beat. It was an opera in five dimensions.

Hypermusic: Ascension is the brainchild of Harvard physicist [Lisa Randall](#), composer Hector Parra and artist [Matthew Ritchie](#). It premiered last year at the [Pompidou Centre](#) in Paris. Here at the Guggenheim, the three sat down to discuss their work before treating us to a performance.

Parra explained that he was inspired when he read Randall's book [Warped Passages](#), which explains her ideas about the possibility of a fifth dimension.

According to the so-called [Randall-Sundrum model](#), which Randall developed with physicist

Our other blogs

- [Short Sharp Science](#)
- [Big Wide World](#)
- [The S Word](#)
- [CultureLab](#)

Bookmark&share



Categories

- [Art](#)
- [Book](#)
- [Competitions](#)
- [Dance](#)
- [Event](#)
- [Exhibition](#)
- [Film](#)
- [Games](#)
- [Housekeeping](#)
- [Interview](#)
- [Music](#)
- [Television](#)
- [Theatre](#)



follow us

Twitter updates

New Scientist, digested: our stories from 19 March 2010 <http://bit.ly/dikCfd> 7 minutes ago

The Perelman Conundrum: Will the reclusive, genius mathematician accept his \$1 million prize? <http://bit.ly>

Raman Sundrum, our four-dimensional universe (that's 3 space and 1 time) lives on a brane (an object that appears in the equations of string theory), which is embedded in a fifth dimension.

The extra dimension is infinitely big but has a curved geometry. While light and matter are confined to the brane, gravity (being the geometry of spacetime itself) extends out into the fifth dimension. That might explain why gravity appears so much weaker than the other fundamental forces.

Parra began thinking about what might happen to sound in such a strange geometry. After all, he thought, sound maps the shape of the space in which it travels. Changing the shape of space changes the possible vibratory modes of sound waves; conversely, manipulating sounds can create the illusion that one is in a space of a different shape - or with an additional dimension.

Parra conceived of an opera with two characters: a baritone who is stuck in our four-dimensional world and a soprano who ventures out into the fifth dimension. When she gets there, the soprano tries to tell the baritone what she sees, but he is unable to understand her because he is in the "flatland of the voice".

Some complicated-looking charts and graphs offered us a glimpse into Parra's five dimensional process - taking sound waves and imagining what happens to them at different energy levels and in different geometries. "The physiology of the ear is totally pushed to its limits," he said.

When Parra explained his idea to Randall, she was excited to join him. She felt that the fifth dimension provided a powerful metaphor about venturing out into new territory from where it becomes difficult to be understood by those you've left behind. She agreed to write the libretto.

Ritchie was the final piece of the puzzle, needed to create dramatic visual effects for the performance. In doing so he looked to Randall's physics and to physicist Juan [Maldacena's ideas](#) about the holographic universe, he said.



His aim was to create a new visual language: one in which spherical shapes denote particles, tetrahedral forms represent unified forces and web-like structures allude to the warped spacetime geometry. He was motivated by the idea of forging ahead into new territories where the arts have yet to define a vocabulary.

"Nothing would be worse than if we assume that we have a visual language for science," Ritchie said.

After the discussion, we all sat down cross-legged on the floor of the famous rotunda, planting ourselves on laser-cut foam shapes presumably made by Ritchie, the awesome

white spiral of the Guggenheim rising up all around us.

The soprano began to sing, standing at floor level, half shrouded by a foam sculpture with curious geometries like the ones on which we were seated. Then she began her slow ascent up the rotunda. Each level she reached was then flooded by Ritchie's projections - ever-transmuting shapes and colors, some hard-edged and geometric, others amorphous or fractal like soap bubbles.

As she moved upwards - and presumably further into the fifth dimension - the sounds became increasingly distorted. In this performance, there was no baritone. Instead, we, the audience, played the role of the second character, stuck here in our brane world, trying to understand the words coming from beyond.

In an extraordinary voice, the soprano sang Randall's words:

/d5CIHU 36 minutes ago

Another week, another story about a driver led astray by their car's sat nav: Time to use nature's GPS <http://bit.ly/9rieJ6> 42 minutes ago

Recent comments

By Think Again

Sounds from another dimension:
[Where is a clip of the audio??? ...](#)

By Zephir

Sounds from another dimension:
[Well, LHC is expected to find extradimensions, too - which is really great: <http://futurismic...>](#)

By stephen

Sounds from another dimension:
[what a very interesting write up an astonishing in sight to the whole 5 dimensions equation but ...](#)

Recent entries

[Power to the people: In praise of batteries](#)

[Learning to use nature's GPS](#)

[The stunning universe of Hubble goes 3D](#)

[A defuser's guide to the population explosion](#)

[Sounds from another dimension](#)

Monthly archive

[March 2010 \(26\)](#)

[February 2010 \(31\)](#)

[January 2010 \(31\)](#)

[December 2009 \(41\)](#)

[November 2009 \(50\)](#)

Tags

alien animal Antarctica anthropology art astronomy biology brain climate change conservation Copenhagen cosmology

*I will describe this strange landscape
Flesh out its properties
Deduce the geometry
That embraced me
That I wandered through*

The sound distortions were unlike anything I'd ever heard before and remarkably they did hint at a hidden dimension. Simultaneously angelic and demonic in tone, her voice was the slither of a snake, a movie in fast-forward, the stutters and clicks and squeaks of a dolphin's sonar, an echo in a hyperspace chamber.



As she rounded the white spiral, disappearing for stretches of time, then reappearing engulfed in the shifting projections, I couldn't help but think of Picasso. In his painting, Picasso imagined what a three-dimensional object would look like when viewed from a higher dimension. Here, Parra was imagining what a voice in five dimensions would sound like in four. The result struck me as similarly modern - and game-changing.

My only complaint about the performance would have to be Randall's libretto, which - perhaps unsurprisingly - was at times far too literal, with passages like:

*We have found
we can consistently exist
with an infinite fifth dimension,
without violating known tests of gravity.
The scenario consists of a single 3-brane,
warped spacetime in the rest
and specially tuned tension here and throughout.*

That's not to mention the equations that are included, such as those for the action of the system and the Randall-Sundrum solution to Einstein's equations. According to the libretto:

*It can be identified as a slice of AdS5.
The solution holds only when the boundary and bulk cosmological terms are related by:
 $V_{brane} = V_{brane}' = 24M^3k$, $\Lambda = -24M^3k^2$,
Which we assume from now on.*

I suppose she never claimed to be a writer.

It doesn't matter, though. The profound soundscape and the hypnotic images far overpowered the words, and came together to convey a resounding message: sometimes in order to really understand your reality, you have to step outside of it.



tags cosmology Guggenheim opera physics

Post a comment

[Sign in](#) to comment, or comment anonymously.

Name

Email Address

Darwin design Einstein
environment evolution fiction
health history history of
science holiday wish list
mathematics medicine
neuroscience Origin of
Species Origin of Species
Revisited philosophy photography
physics podcast psychiatry
psychology religion science
fiction sculpture space Steve
Jones technology time