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GOLDEN HORNET'S

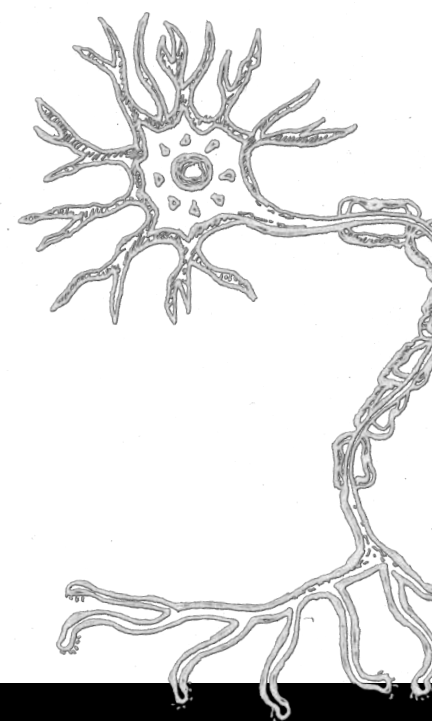
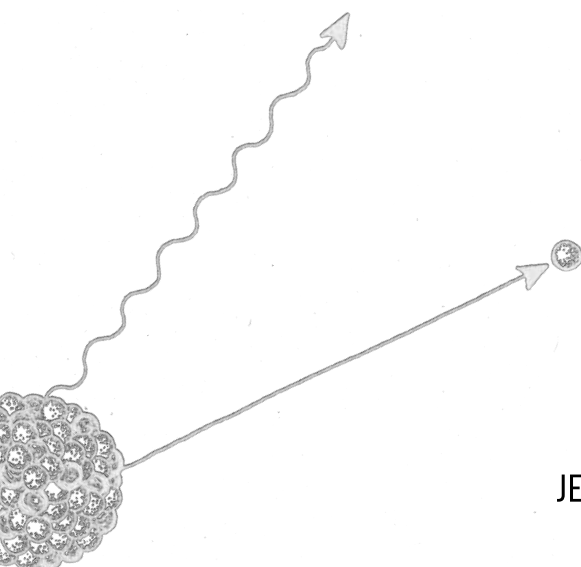
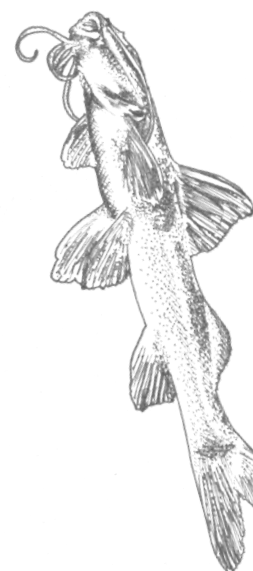
THE SOUND OF SCIENCE

FEATURING JEFFREY ZEIGLER

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APRIL 20-21, 2019
FUSEBOX FESTIVAL
AUSTIN, TX

COMMISSIONED BY
GOLDEN HORNET
CO-COMMISSIONED BY
KATHLEEN & HARVEY GUION
CO-CURATED BY
JEFFREY ZEIGLER & GRAHAM REYNOLDS



8 WORKS FOR CELLO & ELECTRONICS
BASED ON THE LIFE & THOUGHT OF 8 SCIENTISTS

ABOUT THE ENDEAVOR

Co-curated by cellist Jeffrey Zeigler and acclaimed composer-bandleader Graham Reynolds, Golden Hornet's *The Sound of Science* brings the two disciplines together in a celebration of their shared culture of inquiry, and invites audiences to explore the importance of – and connections between – different kinds of creation and discovery in the quest for a deeper understanding of the world around us and each other.

The concert presents eight brand new pieces of music by seven celebrated composers, all written for amplified cello and electronics.

From West African storytelling and collaborations with Herbie Hancock, to radioactive medical procedures and tours with St. Vincent, each composer involved is celebrated for their unfettered originality, yet unique in their creative process and experience.

The composers self selected an array of scientific minds which intrigued them musically, and which represent a range of research that has shaped humanity as a whole.

All eight new works are inspired by and reflective of the scientist's practice, and in some cases, even incorporate sounds sourced from their research.

Conceived by Graham Reynolds, this endeavor was Commissioned by Golden Hornet and Co-Commissioned by Kathleen & Harvey Guion, without whom, we would not be here today.

We extend our thanks to Suzanne Deal Booth, steward of Bella Oaks Winery, who helped bring the project to its full potential, and we are grateful for Shalini Ramanathan & Chris Tomlinson, whose support helped make this Austin premiere a reality.

And we want to thank you, for joining us in this experience: *The Sound of Science* within the larger landscape of the wonderful Fusebox Festival. We can't wait to hear what you think.

IN ORDER OF PERFORMANCE

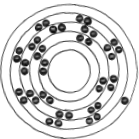


GRAHAM REYNOLDS | THE BRAIN NEUROSCIENTIST KRISTEN HARRIS

For more than two decades, Neuroscientist Dr. Kristen M. Harris and her laboratory team have been mapping the brain. Studying, photographing, and analyzing the cell biology in the hippocampus – the part of our brain which drives memory and its connection to emotion – their work informs our understanding of learning and recollection. They were among the first to develop computer-assisted approaches to analyze synapses in three dimensions, providing a new perspective on the nerve cells which make up our brain's functions. Series of images are collected from the lens of an electron microscope, and when stacked into animation, provide clues into the ways our memories adapt and change over time, with synaptic plasticity being key to the lab's research. Paired with Graham Reynolds' *The Brain*, inspired by Dr. Harris & her lab, the resulting imagery serves to visualize the structure of the brain and the meticulous detail that goes into its study.

Visuals by Dr. Kristen M. Harris, John Mendenhall, Masaaki Kuwajima, Dakota Hanka, Josef Spacek, Tom Bartol, Randy Chitwood, Art Wetzels, Dusten Hubbard, Justin Kinney, Terry Sejnowski, Clayton Smith and Lyndsey Kirk. Video Editing by Annika K. Horne.

SARAH LIPSTATE | RADIATION IN MODERATION PHYSICIST MARIE CURIE



Marie Curie was born in Warsaw, Poland in 1867, but by way of her education, reached Paris by 1891. Among many "firsts" credited to her name, Curie was the first woman to receive the Nobel Prize. She developed the theory of radioactivity (and coined the term), discovered two new elements (polonium and radium), and invented a mobile radiography unit which provided X-ray services to field hospitals during World War I. She also conceived of techniques for isolating radioactive isotopes and using them in the treatment of cancerous neoplasms. After experiencing severe stomach pains in college, composer Sarah Lipstate underwent medical tests that involved ingesting food and liquids that contained radioactive isotopes. Since this experience, a number of her creative works – both in film and music – have been inspired by radiation. She is awestruck by the glimpses below the surface that radiation provides, and aimed to capture this sense of wonder for Curie's achievements in this work.



MAJA S.K. RATKJE
A HIGHWAY IN STATE SPACE
 HER MOTHER, CHEMIST SIGNE KJELSTRUP

Born in 1973 in Trondheim, Norway, Ratkje was raised in the constant presence of science papers and journals. Her mother, Signe Kjelstrup, has been a Professor of Physical Chemistry since 1985, and currently serves as the Principal Investigator for PoreLab Center of Excellence at the Norwegian University of Science and Technology. Her works in irreversible thermodynamics concerns electrochemical cells, membrane systems, and entropy production minimization in process equipment – or, in other words – energy saving models. Maja and her mother often discuss their respective creative and scientific processes, and debate the responsibility for the outputs of art vs. science. Maja initially studied science at university, before choosing a life of contemporary music. This piece not only afforded her the opportunity to write a piece reflecting on the similarities and differences in this intimately personal relationship, but on the impact of her mother's work on the grander scale of humanity. The piece specifically focuses on her mother's hypothesis that a cell with minimum dissipations must have special supply and outlet systems, inspired by nature's own designs... like the nose of a reindeer.

Visuals and Video Editing by Bjornar Sandnes with David James, Clovis Sauzaret, Knut Jørgen Måløy, and Grunde Løvoll of Norway's PoreLab Center of Excellence in Norway.

FODAY MUSA SUSO | SALUMBA
BOTANIST GEORGE WASHINGTON CARVER

Foday Musa Suso is an internationally recognized musician and a Mandingo griot – the historians and living libraries telling the stories of West Africa through both word and music. Raised in rural Gambia – he was trained rigorously on the kora, and grew up farming peanuts, the chief crop of his home country. In the year 1890, George Washington Carver initially enrolled in college as a major in art. Though a man of many disciplines – painter, crocheter, educator, baker and more – he switched to study agriculture and is best known for his role as a botanist and chemist. He is referred to as "The Peanut Man," for his creation of over 325 new products from the plant. This connection sparks a piece of music that celebrates Carver's life as well as the pair's shared appreciation for farming as a life force. Suso is delighted to tell Carver's story (raised as a free man by the couple who had enslaved his mother and older brother), and fuse it will the extensive verbal and musical heritage that can only be passed down within a Griot family. As Suso originally composed this piece on kora, the sounds he heard were those of the peanut farm – particularly the small plink of a little hole being formed in the ground by his finger, the space for a seed to be planted.

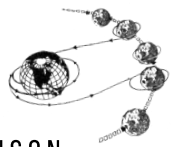


FELIPE PÉREZ SANTIAGO
QUEST
 ASTRONOMER JILL TARTER

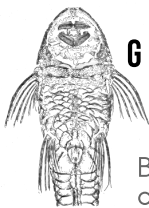
As a child growing up in Mexico City, Felipe loved Carl Sagan's *Cosmos*, which mesmerized his young mind and continues to today. Jill Tarter is an American astronomer who has spent the last forty years making strides in her field. Since the termination of funding for NASA's SETI (search for extraterrestrial intelligence) program in 1993, Tarter has served in a leadership role to secure private funding to continue the exploratory science. She is a co-founder and former director of the SETI Institute, a non-profit research organization whose mission is to explore, understand, and explain the origin and nature of life in the universe, and to apply the knowledge gained to inspire and guide present and future generations. Currently, she serves on the board for the Allen Telescope Array, which, when fully realized, will simultaneously survey the radio universe for known and unexpected sources of astrophysical emissions, and speed up the search for radio emissions from other distant technologies by orders of magnitude. Felipe is fulfilling his lifelong fascination with the universe through the creation of music which incorporates her recordings and honors her efforts in the search for extraterrestrial intelligence. Felipe will continue to build on this inspiration and its creative results, as he is currently a SETI Artist in Residence.

Video by Felipe Pérez Santiago.

YUKA C. HONDA
HER CONFIRMATION
 MATHEMATICIAN KATHERINE JOHNSON



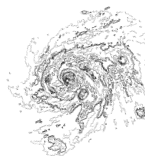
Born in Tokyo, Honda spent parts of her childhood in Germany and Denmark before eventually landing in New York City. Her various international experiences growing up have had a major influence on her music, in which her primary interest is in the integration of elements which may initially seem foreign. As such, her work naturally defies the concepts of genres, borders, and barriers. Katherine Johnson, the NASA mathematician who computed Apollo 11's route to the moon, is well known for breaking down barriers. By age 13, she was attending high school and working with numbers several grades ahead of her. In college, she found her math mentor in Dr. Claytor, the third African American to earn a PhD in Mathematics. In addition to starting a family and serving the public as a teacher, Johnson sought out a position at the Langley lab for aeronautics in 1953. An African American woman entering her field in the mid-20th century, she is remarkably credited with numerous breakthroughs in celestial navigation, was often referred to as "The Human Computer," and known to have said "I love learning, it's an art and a science." Honda shares this love and funneled this passion into the music, which honors the power of *Her Confirmation*.



GRAHAM REYNOLDS | PASTAZA BIOLOGIST BARRY CHERNOFF

Barry Chernoff is the Director of the College of the Environment at Wesleyan University. In between teaching courses in environmental studies, tropical ecology, aquatic ecosystem conservation, and quantitative analysis, Chernoff conducts research centered on the freshwater fishes of the Neotropical region, primarily those of the Amazon basin's Pastaza region. He has led international teams on over thirty-two expeditions to twelve countries for work on conserving vital watersheds. Graham was drawn to Chernoff's work for its influence and importance on this grand scale... when it comes to considering what future we are creating, there is nothing more crucial than the planet, its limited resources, and how it will fare for generations to come. Chernoff is a leader in his field, tirelessly working to prepare a new generation to continue their crucial studies. Through this piece of music, Graham incorporates sounds from the Amazon and honors Chernoff's abundant curiosity for the world around him.

Photos by Barry Chernoff and Antonio Machado-Allison. Compilation Editing by Ashley Tran.



PAOLA PRESTINI | FROM THE BONES TO THE FOSSILS CLIMATOLOGIST ANDREW KRUCZKIEWICZ

Since March 2016, Prestini and Andrew Kruczkiewicz have been working as both scientific and musical collaborators, looking at the climate's natural variability and various parameters as well as the future and significance of data currently being collected. As a part of the International Research Institute for Climate and Society at Columbia University, Kruczkiewicz's work in the field of climatology includes developing algorithms to detect and map patterns of precipitation, temperature, and other climatic variables, and analyzing their impact on agriculture and public health. In this way, he focuses on the intersection of the social and physical sciences, especially pertaining to early warning systems for extreme events such as floods, storm surge from tropical cyclones, wildfires and landslides. He is a drummer, and for the past three years has been experimenting with ideas of climate and music, including a project with the International Red Crescent Society to develop innovative approaches to communicate climate risk using music and tonality on a global scale. Prestini was drawn to connect with Kruczkiewicz for these reasons, and tapestry of her piece is inspired by his work.

Backing Track by Sxip Shirey.

Jeffrey Zeigler is one of the most versatile cellists of our time. Acclaimed for his independent streak, he has commissioned over three dozen works, and is admired as a potent collaborator and unique improviser. A longtime member of Kronos Quartet, cellist for John Zorn, Laurie Anderson, and many more, he has been described as "fiery," and a player who performs "with unforced simplicity" and beauty of tone" by *The New York Times*.

Called "the quintessential modern composer" by the *London Independent*, Austin-based composer-bandleader-improviser **Graham Reynolds** creates, performs, and records music for across a multitude of disciplines. Heard throughout the world in films, TV, stage, and radio, he recently scored Richard Linklater's *Last Flag Flying*, the Rude Mechs' *Stop Hitting Yourself*, and a multi-year commission from Ballroom Marfa, *The Marfa Triptych*.

THE SOUND OF SCIENCE WAS MADE POSSIBLE THROUGH THE SUPPORT OF



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Drawing on the collaborative spirit of rock bands and the composer-led nature of classical music, Golden Hornet is an Austin, TX based non-profit which commissions new music, fosters young and emerging composers, and presents adventurous works in non-traditional settings.

Artistic Director Graham Reynolds | **Managing Director** Kate Murray
Management Provided by Lobel Arts Associates



Fusebox is a non-profit arts organization in Austin, TX. At the center of our work is an ongoing exploration of live performance. Our programs bring unique artistic projects to thousands of people in Central Texas; provide support and resources to artists; and address civic issues at the center of contemporary life and culture.

Artistic Director Ron Berry
Producing Director Jessika Malone | **Curators** Anna Gallagher-Ross & Betelhem Makonnen